

# Home Farm, Llay

## Residential Development

### Preliminary SuDS Design Philosophy

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Revision: 00

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Client Name: Mersey Design Group Limited

Client Address: 41 Shaw Street, Liverpool, L6 1HL

Site Address: Home Farm, Gresford Road, Llay, Wrexham, LL12 0NE

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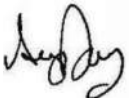
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## Preliminary SuDS Design Philosophy

| Rev | Description | Issued by | Checked | Date       |
|-----|-------------|-----------|---------|------------|
| 00  | First Issue | PRP       | AD      | 21/10/2016 |
| 01  |             |           |         |            |

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| Author                                                    | Signature                                                                           | Date       |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------|------------|
| <b>Paul Pennington</b><br>BEng MICE<br>Principal Engineer |  | 21/10/2016 |

| Reviewed                                      | Signature                                                                           | Date       |
|-----------------------------------------------|-------------------------------------------------------------------------------------|------------|
| <b>Andy Day</b><br>Qualifications<br>Director |  | 21/10/2016 |

Preliminary SuDS Design Philosophy

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## Preliminary SuDS Design Philosophy

### 1.0 Introduction

Mersey Design Group Limited have instructed Curtins Limited to produce a preliminary drainage design based on the principal of discharging all the surface water runoff generated by the proposed private residential (housing) development, on the site of the existing Home Farm in Llay near Wrexham by infiltration.

### 2.0 Existing Site Information

To assess the feasibility of infiltration discharge of the surface water runoff generated by the proposed private residential (housing) development on the site of the existing Home Farm in Llay Curtins have reviewed the following available existing information sources:

#### 2.1 Natural Resources Wales/ Environment Agency Information

A review of the information available on the Natural Resources Wales and Environment Agency websites for the site location identified the following geophysical information regarding the site:

- The site is shown as in Flood Zone 1, and not a risk of fluvial flooding from reservoirs on the Natural Resources Wales online flood map, see Figure 1 below:

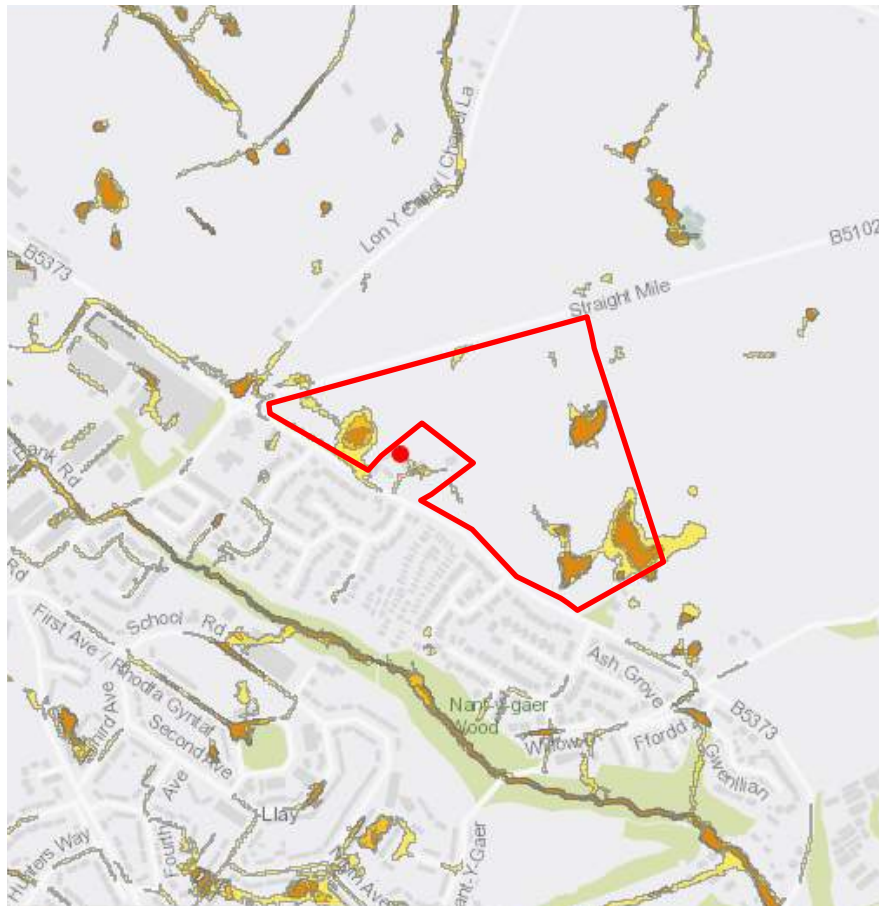
## Preliminary SuDS Design Philosophy



Figure 1 - Flooding from Rivers or Sea Map

- The site is shown as having some areas at risk of pluvial flooding on the Natural Resources Wales online surface water flooding map, see Figure 2 below:

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-  Low Risk – 1% to 0.1% A.E.P. of surface water flooding
-  Medium Risk – 3.3% to 1% A.E.P. of surface water flooding
-  High Risk – > 3.3 A.E.P. of surface water Flooding

Figure 2 - Flooding from Surface Water Map

The areas shown as at risk of surface water flooding coincide with existing ponds and depressions in the landscape.

- The Environment Agency groundwater map shows that site is not located over any source protection zone. And the BGS Aquifer maps show the site as located over a secondary A aquifer with a low to High vulnerability to degradation.

## **2.2 Topographical Survey**

The Powers and Tiltman Limited topographical survey drawings show the site generally falls from the northwest to the two ponds adjacent to the south-southeast boundary. With the topography appearing to rise beyond this boundary. See Topographical Survey drawing in Appendix A.

## **2.3 British Geological Survey Borehole Records**

Curtins have procured British Geological Survey Borehole Records for the existing borehole records that are near to the proposed development. These local borehole records show the area to be underlain by interbedded sands, gravels and clays down to approximately 7m below ground level (bgl). Below these strata the records record a thickness of sand and gravel down to approximately 22m bgl. Some of the boreholes remained dry to base, SJ35NW4 recorded a ground water level at 24.45m bgl. Copies of these British Geological Survey Borehole Records are contained in Appendix B.

## **2.4 BRE Digest 365 Soakaway Tests**

The Kane Design 'Soakaway Results and Calculations for Proposed Development at Home Farm, Llay Wrexham LL12 0NE'. States 7 No. soakaway tests where undertaken in the near surface clay soil to a depth of 2.65m bgl. None of these soakaway tests emptied to the required 25% depth in accordance with BRE 365, and test pits 1,2 and 7 showed zero movement over the course of the test. Extrapolated results were calculated for the tests that did show some drop in water level, however these returned infiltration rates ranging from 8.31E-10m/s to 2.95E-10m/s. These extrapolated rates are to be expected for the dense clays encountered, and are way below the rates required to provide viable near surface infiltration discharge systems, due to the volume of storage required and the that drainage system will not empty quickly enough before the next potential storm event arrives over the site. The Kane Design 'Soakaway Results and Calculations' report is contained in Appendix B.

## Preliminary SuDS Design Philosophy

### 3.0 Development Proposals

The proposed development is for up to a 365no. plot, private residential (housing) development with associated access roads and footpaths. It is assumed that the new access roads and footpaths will be adopted by Wrexham Council highways under a section 38 agreement upon completion of the proposed development. See the Home Farm, Llay Proposed Development Plan Figure 3.



Figure 3 – Proposed Development Plan

A full size version of this drawing is contained in Appendix A.

As can be seen from the proposed development plan, there are several public green spaces located throughout the development. Mersey Design Group Ltd. have stated that each housing plot will include a private drive. Curtins have been informed by Mersey Design Group Ltd. that there are no Welsh Water surface water sewers in the vicinity of the site and that the developer has been informed by Welsh Water that there is no possibility of discharging surface water to their drainage network.

## 4.0 Stakeholder Correspondences

As it is proposed for the new access roads on the development are to be adopted by Wrexham County Borough Council (WCBC) under a Highways Act:1980 - Section 38 highway adoption agreement between the developer and WCBC, (acting as the highway authority). Curtins have been in contact with WCBC highways department regarding the drainage proposals, whose officers have stated that a sensible and maintainable SuDS will be adopted by WCBC, as long as the following constraints/conditions are met:

- A commuted sum payment is provided by the developer to cover the future maintenance of the adopted SuDS. The commuted sum will be agreed as part of any Section 38 highway adoption agreement between the developer and WCBC.
- The private and adopted highway drainage systems will need to be kept separate.
- The adopted drainage system will have to be included within the adopted highway boundary
- Any pervious paving systems will not be adopted

Copies of the correspondences received from WCBC are included in Appendix E:

Further consultation with WCBC will be undertaken as the scheme proposals develop.

## 5.0 SuDS Design Philosophy

A review of the local borehole records shows that there should be permeable soils (Sands and Gravels) at approximately 7m bgl, below the near surface low permeability clayey soils. And that the ground water table is well below these soils at circa 24m bgl. Therefore, it will be possible to collect the surface water runoff from the various sub-catchments within the site and convey the collected stormwater through a Sustainable Drainage System (SuDS)' that will remove silt and any collected pollutants and provide attenuation storage, before discharge to ground by borehole soakaways or deep manhole soakaways that extend into the thick layer of sand a gravel permeable soils below the site. A typical detail of a borehole and a Manhole soakaways are included in Appendix C.

As it is unlikely that it will be commercially viable to provide a deep soakaway for each proposed residential plot. The runoff from several plots will be collected together and discharged to a nearest deep borehole soakaway. As the proposed residential development is spread-out over a large area, and following the best practice source control principal as closely as possible, requires that deep borehole soakaways are provided at convenient locations across the development. Where possible overflow outlets are provided. Alternatively, the proposed Deep borehole soakaways could be replaced with shallower deep manhole ring soakaways that are circa 10m deep to provide a similar discharge rate.

## Preliminary SuDS Design Philosophy

The proposed SuDS comprises the following techniques arranged in treatment trains:

- Water Butts – Rainwater Harvesting for garden irrigation.
- Back inlet gullies with integral filter screens at base of rainwater pipes (rwp's) - settlement of suspended solids and screening of detritus
- Catchpit on all access chambers and manholes – settlement of suspended solids and detritus
- Permeable Paving in driveways, patios, private roads and footpaths.
- Filter Strips and Swales – to the sides of highways for treatment and conveyance of contaminated runoff.
- Standard road gullies with proprietary mini-interceptor (Permaceptor Units) on the outlets
- Bio Retention areas – adjacent to highways for treatment and storage
- Attenuation basins/ detention ponds – placed prior to discharge location and provides storage of collected stormwater. Depending on design basins and ponds can also provide treatment of contaminated stormwater. Secondly can be multifunctional providing amenity/ and leisure facilities and can be placed in the currently proposed green space areas.

Table 4.3 of the CIRIA C753 SuDS manual describes the pollution hazard level for residential roofs as Very Low. This table also describes the pollution hazard level for the private drives and access roads Low, therefore the simple index pollution mitigation approach can be used. A simple index pollution mitigation approach calculation was undertaken using the Susdrain calculator to show that sufficient pollution mitigation is provided by the proposed SuDS treatment train prior to discharge to ground. A copy of the Susdrain simple index pollution mitigation calculation output summary for the car park SuDS treatment train is contained in Appendix D:

A simple index pollution mitigation approach calculation was undertaken using the Susdrain calculator to show that sufficient pollution mitigation is provided by the proposed SuDS treatment train prior to discharge to ground. A copy of the Susdrain simple index pollution mitigation calculation output summary for the car park SuDS treatment train is contained in Appendix C

A typical treatment train for the proposed private residential will consist of water butt on the rwp pipe discharging to a back inlet gully with internal filter screen at the base before discharging to the stormwater collection pipe-network. The stormwater collection pipe-network will include catchpit inspection chambers that will further settle out any silts or detritus as the stormwater passes through the chambers at low velocity. Where available the stormwater will be discharged to the porous subbase below the permeable paved drive, where the stormwater will be stored prior to controlled discharge to the rest of the SuDS system. The permeable paving to the drives will include a proprietary oleophilic treatment geotextile that will trap hydrocarbons in the will trap contaminated silts and pollutants in the top 130mm of the construction as the first stage of treatment train. This oxygenated environment will

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Preliminary SuDS Design Philosophy

allow naturally occurring bacteria to break down the captured hydrocarbons into their non-polluting constituents and act as a self-cleansing mechanism. Where the houses are located adjacent to the proposed pervious shared space areas the stormwater discharges from the house plots will be discharged direct into the porous sub-base storage layer below the shared space. The stormwater will be stored in the porous sub-base storage layer until it can flow through the sub-base into the nearest down slope deep soakaway structure. To control the flow of stormwater through the sloping porous sub-base layer regular check-dams constructed through the sub-base in conjunction with check-gate flow controls will be used. Where there is sufficient open green space the controlled stormwater discharge from the housing plots will be collected together and piped to a local detention pond or attenuation basin. The stormwater will be temporarily stored in the pond or basin until it can be discharge to ground by the adjacent deep borehole soakaway(s).

The adopted access roads runoff will be conveyed by surface falls to adjacent vegetated filter strips that filter out the washed off pollutants as the runoff passes through the turf. The runoff will then either flow into a swale which conveys the stormwater to a nearby bio-retention area or flows directly into a bio-retention area. The swale will treat the stormwater by filtration and absorption as it passes over the turf/ vegetation on sides and flat bottom of the swale. The bio-retention area will swale will treat the stormwater by filtration and absorption as it filters through the engineered rootzone and be taken up by the trees and planting as well as providing surface storage. The stormwater will be collected from the formation of the bio-retention areas by a filter drain that conveys the stormwater to the adjacent infiltration structure.

Where there is insufficient space to provide the above SuDS features the road runoff will be collected by standard road gullies with proprietary mini-interceptor (Permaceptor Units) on the outlets that will treat the stormwater prior to discharge to a highways drain pipework that will convey the stormwater to the nearest highway infiltration structure.

From CIRIA C753 Table 25.1 we have chosen a conservative infiltration capacity of the soil of 5E-5m/s and applied a conservative factor of safety for the infiltration system of 2. Inputting these factors into the Micro-Drainage Source Control design module we have calculated that there is sufficient storage provided within the proposed SuDS features for each proposed sub-catchment within the development to store the 33%AEP storm event plus 30% for climate change at critical duration.

For storm events producing storage volumes in excess of the 33%AEP storm event plus 30% for climate change at critical duration this additional stormwater will be temporarily stored on the green spaces of the development until it can be drained back into the SuDS system. To aid the storage of the above 33%AEP storm event we recommend that the proposed ground levels adjacent to the southeast boundary of the site be raised to c.81.00m A.O.D. to prevent stormwater flowing onto the adjacent farm

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## Preliminary SuDS Design Philosophy

and direct exceedance overflows on to Gresford Road. This stormwater containment bund will be up to c.1.6m in height and will be less than the 2.1m height of the boundary fence.

Exceedance routes through the development should be developed during the detailed design phase of the development, but in principal should be directed by land falls away from the proposed properties and towards the proposed access roads.

Our calculations also show that there is sufficient temporary surface storage capacity within the proposed green spaces of the development.

To inform the detailed design of the development we recommend that at least 6 no. Constant Head borehole soakaway tests, at least 4m into the target permeable sand and gravel soils below the near surface clay soils at a depth of circa 12m deep (dependent on the depth of the near surface clay layer encountered at each borehole location) in tandem with long-term (over winter) groundwater level monitoring, are undertaken by a competent and experienced ground investigation company.

Should the site recorded sand and gravel infiltration rate be different from the conservative assumed rate used in our calculations the depth or number of soakaways can be increased/decreased to suit the measured rates.

## 6.0 Conclusions/Recommendations

Upon review of the available site information and development proposals we have concluded that the discharge of surface water runoff by infiltration by the use of a network of several deep soakaways located across the proposed development site is SUDS scheme is deliverable taking account of the Illustrative Masterplan; as long as adequate treatment and attenuation storage is provided. The proposed SuDS system will negate the need for any surface water to be discharged into the public sewer.

Following current best practice, the required stormwater treatment and storage can be provided by conventional SuDS techniques arranged into treatment trains prior to discharge by the proposed borehole soakaways. Curtins recommend that the proposed soakaways should be networked together to provide a robust drainage system.

From consultations with Wrexham County Borough Council, for the drainage for the new roads within the proposed development to be adopted the drainage system has been designed to meet the following requirements:

- The private and adopted highway drainage systems will need to be kept separate.
- The adopted drainage system will have to be included within the adopted highway boundary
- Do not include pervious paving systems

We have calculated that there is sufficient storage provided within the proposed SuDS features for each proposed sub-catchment within the development to store the 33%AEP storm event plus 30% for climate change at critical duration.

To aid the storage of the above 33%AEP storm event we recommend that the proposed ground levels adjacent to the southeast boundary of the site be raised to c.81.00m A.O.D. to prevent stormwater flowing onto the adjacent farm and direct exceedance overflows on to Gresford Road. This stormwater containment bund will be up-to c.1.6m in height and will be less than the 2.1m height of the boundary fence.

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Preliminary SuDS Design Philosophy

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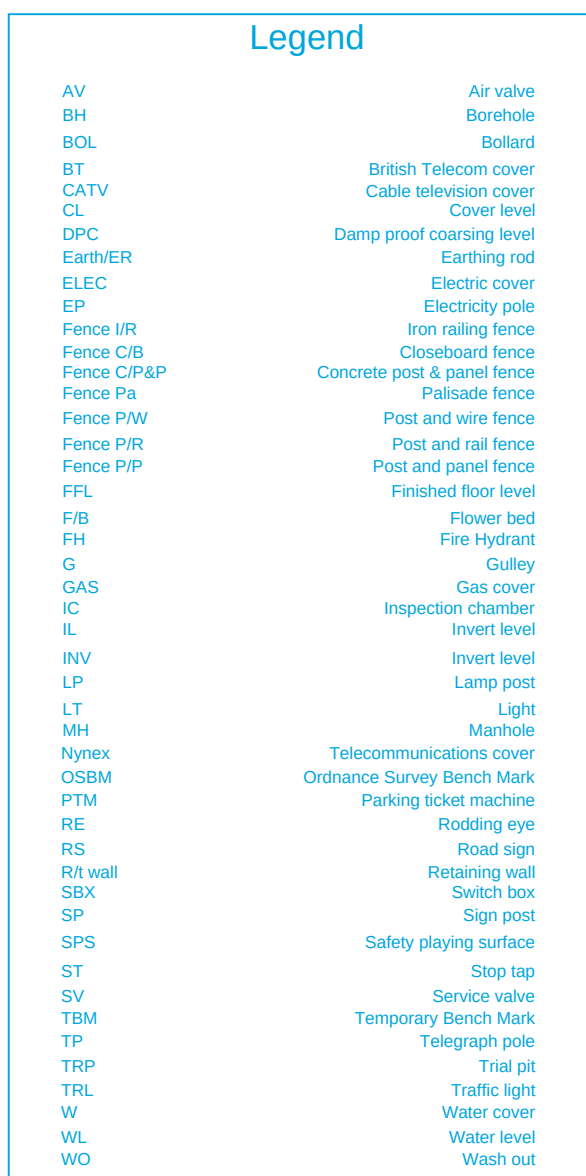
A suitable maintenance strategy should be adopted to ensure the designed SuDS is maintained and cleaned regularly and the routine maintenance and cleansing regime should be documented.

**Therefore, if the principles set out within the previous sections of this report are followed and developed at detailed design stage by the design engineer, the site can be considered to be appropriate and at low risk of flooding.**

## 7.0 Appendices

- Appendix A    Existing and Proposed drawings**
- Appendix B    Existing Available Geotechnical Information**
- Appendix C    Preliminary Drainage Design Drawings**
- Appendix D    Design Calculations**
- Appendix E    Correspondences with Wrexham County Borough Council**

**Appendix A   Existing and Proposed drawings**



| SURVEY STATIONS |            |           |  |
|-----------------|------------|-----------|--|
| Name            | Conting    | Northing  |  |
| 25              | 830303.864 | 86037.291 |  |
| 26              | 830303.832 | 86036.213 |  |
| 27              | 830305.524 | 86035.120 |  |
| 28              | 830412.766 | 86034.795 |  |
| 29              | 830408.439 | 86033.163 |  |
| 30              | 830500.899 | 86040.177 |  |
| 31              | 830503.133 | 86032.302 |  |
| 32              | 830712.614 | 85967.668 |  |
| 06G             | 830708.422 | 85968.000 |  |
| 06H             | 830824.891 | 85967.442 |  |
| 06I             | 830900.864 | 85966.108 |  |
| 06J             | 830947.449 | 85965.194 |  |
| 06K             | 830948.461 | 85964.613 |  |
| 06L             | 830931.185 | 85963.800 |  |
| 06M             | 830908.627 | 85963.148 |  |
| 06A             | 830481.832 | 85954.498 |  |
| 06B             | 830405.622 | 85953.719 |  |
| 06C             | 830367.289 | 85952.202 |  |
| 06D             | 830303.205 | 85950.508 |  |
| 06E             | 830287.719 | 85949.500 |  |

KEY DIMENSIONS SHOULD BE CHECKED ON SITE  
BEFORE COMMENCEMENT OF ANY WORKS

**NOTE**

Grid and levels related to OS using GPS data

[illegible]

Meridian House  
58/60 Hillside Road, Frodsham, Cheshire WA6 6AG  
Tel: 01928 734473 Fax: 01928 735573  
Email: mail@powestiltman.co.uk  
[www.powestiltman.co.uk](http://www.powestiltman.co.uk)

Home Farm

Llay

### Topographical Survey

Client: Michael Cunningham Architects

|                     |                      |                 |
|---------------------|----------------------|-----------------|
| Surveyed By : DG/JB | Date : 17/02/14      | Scale :<br>1:50 |
| Drawn By : DG       | Drawing No : 6880/01 |                 |
| Checked By : PD     | Amendment :          |                 |

[illegible]

Sheet 1 of 2

[illegible]

KEY DIMENSIONS SHOULD BE CHECKED ON SITE  
BEFORE COMMENCEMENT OF ANY WORKS

NOTE

Grid and levels related to QS using GPS data

[illegible]

Meridian House  
58/60 Hillside Road, Frodsham, Cheshire WA6 6AG  
Tel: 01928 734473 Fax: 01928 735573  
Email: [mail@powerstiltman.co.uk](mailto:mail@powerstiltman.co.uk)

Home Farm

|                      |
|----------------------|
| Llay                 |
| Topographical Survey |

Client: Michael Cunningham Architects

|                     |                      |                    |
|---------------------|----------------------|--------------------|
| Surveyed By : DG/JB | Date : 17/02/14      | Scale<br><br>1:500 |
| Drawn By : DG       | Drawing No : 6880/01 |                    |
| Checked By : PD     | Amendment :          |                    |

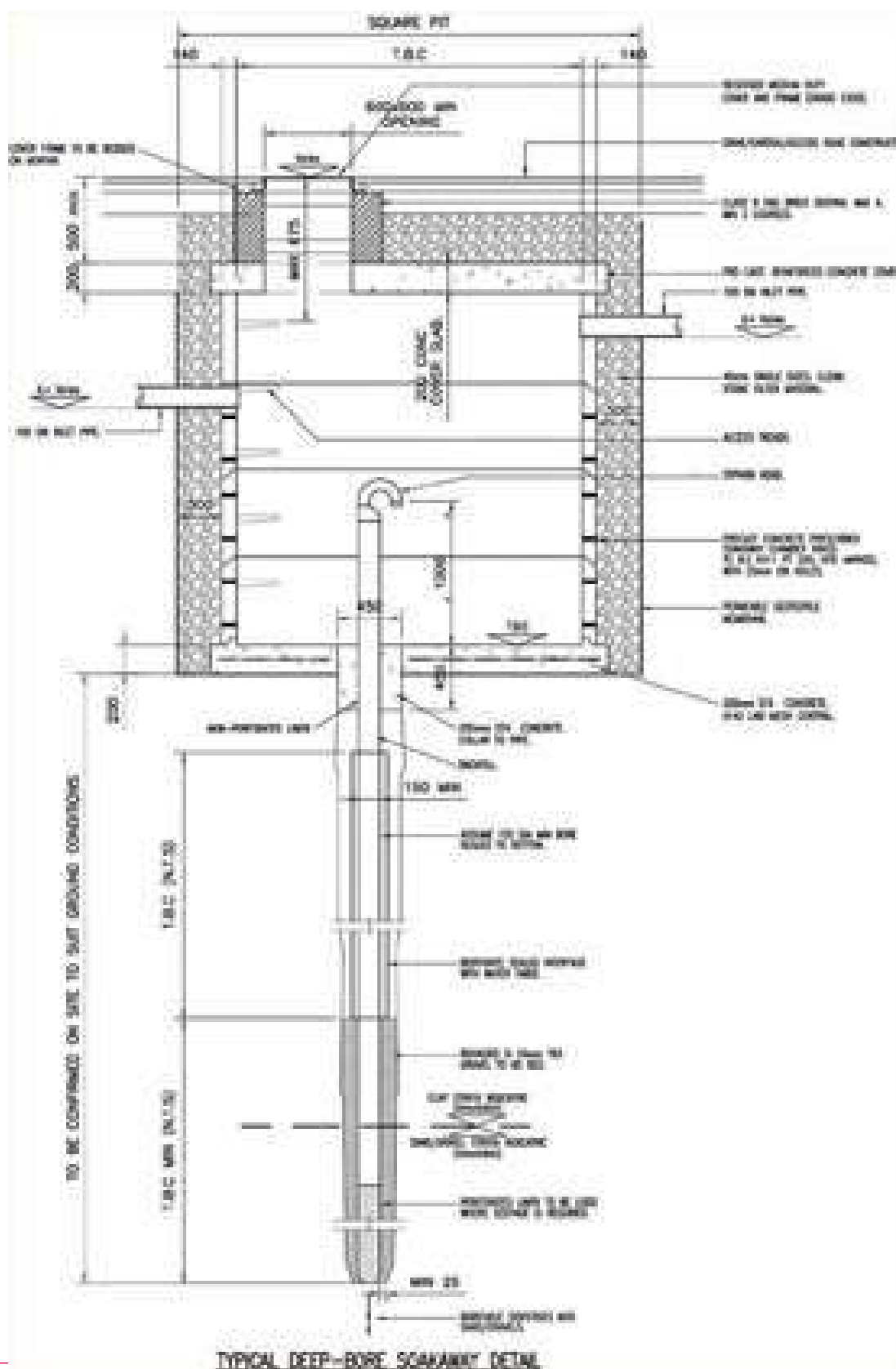


- KEY**
- EXISTING HEDGES RETAINED
  - EXISTING TREE RETAINED
  - EXISTING STONE WALL RETAINED
- PROPOSED GREEN SPACES (3.1 ha)**
- PUBLIC GREEN SPACE
- STRUCTURAL LANDSCAPE AS PART OF THE GREEN BUFFER TO THE STRAIGHT MILE AND GRESFORD ROAD
- SPECIES RICH GRASSLAND
  - UNDER STOREY SHRUBS
  - NATIVE TREES
- CIRCULATION AND ACCESS**
- INTERNAL ROAD CORRIDOR LANDSCAPE
  - ROAD NETWORK (5.5m WIDE CARRIAGEWAY)
  - SHARED SURFACE
  - PEDESTRIAN LINK
  - PATH (informal)
  - PUBLIC SQUARE
  - BUS / EMERGENCY ONLY
- FACILITIES**
- PLAY FACILITIES
  - COMMERCIAL
  - BUS STOP
- EXISTING FEATURES**
- TREES RETAINED

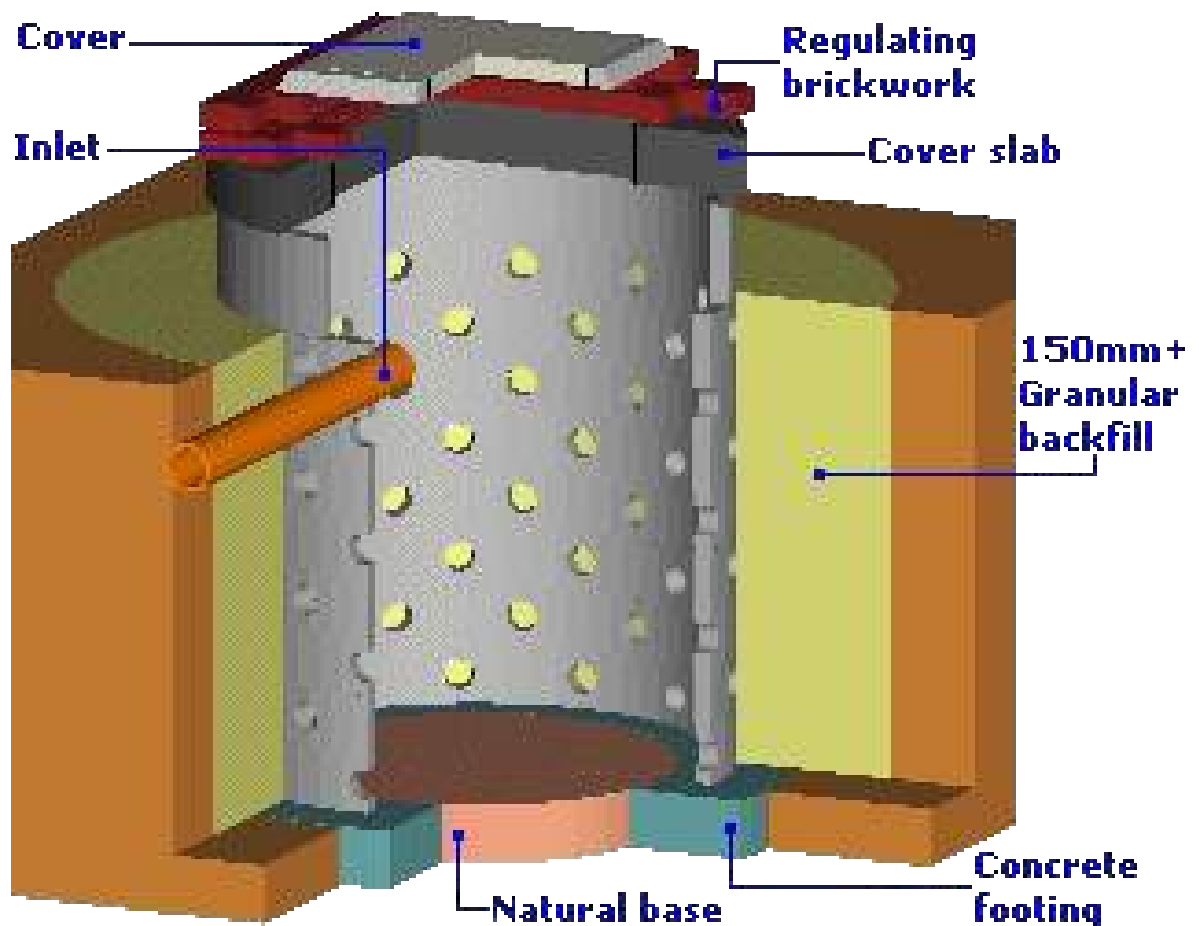
Landscape Strategy Diagram  
1:1000@A1

**653 LLAY HOUSING**  
PLAN 08: LANDSCAPE STRATEGY

## Preliminary SuDS Design Philosophy



Preliminary SuDS Design Philosophy



TYPICAL MANHOLE SOAKAWAY DETAIL

## **Appendix B   Existing Available Geotechnical Information**

Remarks:

G.W.H.'s notes on Examination  
of Cores Nov 21, 1911.  
(in writing). Vol. of  
specimens also collected

3-16-14

Bottom of Well and  
Water Level Nov/10

a core of bed: caten clay, thinning  
peds. incl. Carb. Ls. Blue faced  
joint (note, unexpected at this depth)

Base of Glacial  
Drift.

**Drift.**  
diameter of cores 14" 4.270.  
very tough; lavender, luster mottled with calcite  
diameter of cores 14"

deep red: not apparent  
deep blue at 15' deep seems at 15'  
but decreases lower

- pale mottled purplish red.  
pale band of dk red sandy shale of 1925.

dark purple with a little blue-green mottling and  
blue-purple slicker top of cap.

Clatter, perhaps about 0.6 m/sec.

1. Mr. J. Edgar Hoover  
 2. Director  
 3. Federal Bureau of Investigation  
 4. Washington, D. C.  
 5. Dear Sir:  
 6. I am writing you to inform you that I have  
 7. been assigned to the position of  
 8. Assistant Director of the  
 9. Department of Justice.  
 10. I am very pleased to accept this position  
 11. and I am sure that I will be able to  
 12. contribute to the success of the  
 13. Department.  
 14. I am, Sir, very respectfully,  
 15. Yours very truly,  
 16. J. Edgar Hoover  
 17. Assistant Director  
 18. Department of Justice  
 19. Very truly yours,  
 20. J. Edgar Hoover  
 21. Assistant Director  
 22. Department of Justice  
 23. Very truly yours,  
 24. J. Edgar Hoover  
 25. Assistant Director  
 26. Department of Justice  
 27. Very truly yours,  
 28. J. Edgar Hoover  
 29. Assistant Director  
 30. Department of Justice  
 31. Very truly yours,  
 32. J. Edgar Hoover  
 33. Assistant Director  
 34. Department of Justice  
 35. Very truly yours,  
 36. J. Edgar Hoover  
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 186. Department of Justice  
 187. Very truly yours,  
 188. J. Edgar Hoover  
 189. Assistant Director  
 190. Department of Justice  
 191. Very truly yours,  
 192. J. Edgar Hoover  
 193. Assistant Director  
 194. Department of Justice  
 195. Very truly yours,  
 196. J. Edgar Hoover  
 197. Assistant Director  
 198. Department of Justice  
 199. Very truly yours,  
 200. J. Edgar Hoover  
 201. Assistant Director  
 202. Department of Justice  
 203. Very truly yours,  
 204. J. Edgar Hoover  
 205. Assistant Director  
 206. Department of Justice  
 207. Very truly yours,  
 208. J. Edgar Hoover  
 209. Assistant Director  
 210. Department of Justice  
 211. Very truly yours,  
 212. J. Edgar Hoover  
 213. Assistant Director  
 214. Department of Justice  
 215. Very truly yours,  
 216. J. Edgar Hoover  
 217. Assistant Director  
 218. Department of Justice  
 219. Very truly yours,  
 220. J. Edgar Hoover  
 221. Assistant Director  
 222. Department of Justice  
 223. Very truly yours,  
 224. J. Edgar Hoover  
 225. Assistant Director  
 226. Department of Justice  
 227. Very truly yours,  
 228. J. Edgar Hoover  
 229. Assistant Director  
 230. Department of Justice  
 231. Very truly yours,  
 232. J. Edgar Hoover  
 233. Assistant Director  
 234. Department of Justice  
 235. Very truly yours,

Full of verbiage

joints, <sup>10-15</sup>  
 from grey to purple: <sup>10-15</sup>  
 2-4 weeks

mostly like the 10-15% of the population  
some parts of the country are more developed than others

more grey-green than brown  
lost. 11-27-90

all birds in nest  
pale green + purple mottled - all

-dull purple-gray: streaky & sandy

mostly Sst-  
some silt. at 5'-8'

|                                                                                        |                |        |         |                                                                                                                     |
|----------------------------------------------------------------------------------------|----------------|--------|---------|---------------------------------------------------------------------------------------------------------------------|
| one greenish grey non-calcareous                                                       | 24. 0.         | 114-36 | 408. 0. | greenish-grey: non-calcareous: probably rather shaly                                                                |
| Red (Strong) reddish purple                                                            | 4. 6.          | 125-73 | 412. 6. | reddish purple & green                                                                                              |
| Grey Sandstone like last                                                               | 0-61 2. 0.     | 126-34 | 414. 6. | like last                                                                                                           |
| Mottled Marl                                                                           | 0-30 1. 0.     | 126-64 | 415. 6. |                                                                                                                     |
| Grey Sandstone like sh. to bed in green                                                | 1-07 3. 6.     | 127-71 | 419. 0. | like SSts above, but finer grained & marly                                                                          |
| Mottled Marl (Soft)                                                                    | 0-61 2. 0.     | 128-32 | 421. 0. |                                                                                                                     |
| Red Marl (Soft) deep purple-red                                                        | 1-01 3. 0.     | 128-24 | 424. 0. | deep purple-red & a little mottling                                                                                 |
| Grey Marl dark greenish & yellowish with some crumbly spots                            | 1-68 5. 6.     | 130-91 | 429. 6. | dark greenish & yellowish with some crumbly spots: much shaly                                                       |
| Mottled Marl (Strong) blackish                                                         | 1-30 0. 0.     | 140-66 | 459. 6. | chiefly red-purple with some mottling and a grey-green band                                                         |
| Grey Marl chiefly red-purple with some mottling & a grey-green band                    | 1-13 7. 0.     | 142-19 | 466. 6. | dark grey-green with crumbly (concretionary) bands                                                                  |
| Mottled Marl dark red-purple with some green bands                                     | 1-53 9. 6.     | 157-58 | 517. 0. | mainly deep red-purple, with several well marked green bands                                                        |
| Light Blue Shale grey-green with faint reddish mottling in places                      | 1-22 4. 0.     | 158-80 | 521. 0. | grey-green with faint reddish mottling in places: shaly                                                             |
| Grey Sandstone pale grey-green fine grained                                            | 1-10-06 33. 0. | 168-86 | 554. 0. | dark grey-green, fine grained & shaly: at top, might be called sandy marl, but darker, missing micaceous lamination |
| Dark Warrant at top, but more some bit of massive micaceous                            | 1-37 4. 6.     | 170-23 | 558. 6. | dark grey-green, shaly, mostly shaly                                                                                |
| Light Blue Shale pale grey-blue shaly with fragments of fossil                         | 1-68 5. 6.     | 171-91 | 564. 0. | paler grey-blue shale, with pyritic & brown rods                                                                    |
| Dark Warrant dark shaly marl & shales                                                  | 1-09 3. 0.     | 172-82 | 567. 0. | dark shale, rendered platy & powdery with shales                                                                    |
| Light Blue Shale as before, rather shaly with much fossils                             | 1-45 15. 0.    | 173-39 | 582. 0. | With Carboniferous Flora.                                                                                           |
| Dark Warrant sh. shaly, but more some bit of massive micaceous                         | 2-13 7. 0.     | 174-53 | 589. 0. | dark shaly shale as before; much pitted Ironstone Nodules.                                                          |
| COAL good coal                                                                         | 0-15 6.        | 174-68 | 589. 6. | good coal: "square-root" structure                                                                                  |
| Light Blue Shale full of plant fossils, under coal                                     | 5-33 17. 6.    | 185-01 | 607. 0. | full of plant fossils, under coal: gets rather lumpy at top                                                         |
| Dark Warrant shaly, but more some bit of massive micaceous                             | 0-61 2. 0.     | 185-62 | 609. 0. | shaly, but more some bit of massive micaceous                                                                       |
| Grey Sandstone same colour & structure as "Light Blue Shale", but more massive & sandy | 2-74 9. 0.     | 188-31 | 618. 0. | same colour & structure as "Light Blue Shale", but more massive & sandy                                             |
| Grey Arenaceous Shale a variant of last                                                | 1-11 4. 0.     | 189-59 | 622. 0. | only a variant of last                                                                                              |
| Mottled Marl faint purplish & green mottling                                           | 1-04 1. 6.     | 190-04 | 623. 6. | faint purplish & green mottling                                                                                     |
| Reddish Grey Sandstone faint purplish & green mottling                                 | 1-57 15. 0.    | 194-61 | 638. 6. | faint purplish & green mottling                                                                                     |
| Mottled Marl dark purple & green mottling                                              | 1-41 14. 6.    | 199-08 | 653. 0. | including 9" sandstone parting.                                                                                     |
| Red Marl mostly dark purple & green mottling                                           | 1-63 48. 0.    | 213-66 | 701. 0. | Mottled in Patches.                                                                                                 |
| Red Micaceous Sandstone dark purple & green mottling                                   | 1-67 35. 0.    | 224-33 | 736. 0. | Blue Sandstone Bands                                                                                                |
| Coarse Micaceous Red Sandstone same color, but more sandy                              | 2-23 27. 0.    | 232-57 | 763. 0. | mostly pale purple-grey with heavily streaked micaceous & very shaly, calcareous                                    |
| Mottled Marl chiefly red-purple & green mottling                                       | 1-43 43. 0.    | 245-67 | 806. 0. | chiefly red-purple & green mottling: very hard & lumpy at base: much shaly in places                                |
| Blue Shale pale greenish grey sandy marl, laminated in places                          | 3-35 11. 0.    | 249-02 | 817. 0. | pale greenish grey sandy marl, laminated in places                                                                  |
| Red & Blue Marl like grey-blue sandstone                                               | 1-07 3. 6.     | 250-09 | 820. 6. | Base of 10" (L.T.W.)                                                                                                |
| Strong shale dark grey-blue sandstone                                                  | 2-13 7. 0.     | 250-09 | 820. 6. | Small Warrant interbedded.                                                                                          |

hard dark grey-blue shale of usual Coal Measure type: part, a red sand shale

# SJ 35 NW 43.

(3)

|              |                                                                        |            |                |                                                     |
|--------------|------------------------------------------------------------------------|------------|----------------|-----------------------------------------------------|
| Dark Shale   | dark, <sup>smooth</sup> shale, much slicken                            | 0-76 2. 6. | 252-98 830. 0. | Dark smooth shale, much slicken                     |
| Dark Warrant | do, <sup>slacken</sup> knobby & broken up                              | 1-83 6. 0. | 254-81 836. 0. | do, knobby & broken up                              |
| Blue Shale   | hard <del>blue</del> fine grained massive sandy shale with concretions | 1-124. 0.  | 256-08 840. 0. | Hard blue-grey massive sandy shale with concretions |

Boring ceased.  
Cores continue to be 9"-10" diameter to bottom

Note. No breccia-bands like those in Overton district seen in any part. Correlation with No 1 boring was established (July 28<sup>th</sup>) at first "Dark Warrant" (depth 554') which is equivalent to similar band in No 1 at 251 ft. & beds below this are reckoned to be practically the same in both borings. Specimens collected at intervals from top to bottom, & sent to office.

J.W.H.  
21/11/11

## WELSH NATIONAL WATER DEVELOPMENT AUTHORITY

## DEE AND CLWYD RIVER DIVISION

SJ35/61

## DETAILED HYDROGEOLOGICAL RECORD SHEET: INDIVIDUAL SITE RECORD

.....

NAME CAE MAWR  
LLAY, FLINTS.

N.G.R. 343 562  
SJ 35 NW

EXACT SITE KNOWN YES/NO

LOCATION SKETCH YES/NO

HEIGHT A.O.D. ..... 78' ..... METRES

ESTIMATED FROM MAP/SURVEY

REFERENCE POINT NONE/DETAILS/SKETCH

LOG YES/NO

LOCATION OF LOG HERE/I.G.S. Martine P  
108/SS

SUMMARY OF LOG Dig to 153' (46.6m)

Reached at 31.4m A.S.L.

WATER QUALITY

INFORMATION YES/NO

WATER LEVEL INFORMATION

ABSTRACTION YES/NO/OCCASIONALLY/NOT KNOWN/STAND-BY

LICENCE NO.

LICENSED ABSTRACTION

/HOUR

/DAY

/YEAR

PUMPING TEST

YES/NO

DATE

LOCATION OF DATA

WATER LEVELS RECORDED NONE/ISOLATED READINGS/MONTHLY/AUTOGRAPHIC

LOCATION OF RECORDS

BWL -74' 1914

ACCESS

L.M.S.: 26  
69-2.TIF

Sandstone rock

54. (108/21S.E./1). Llay: Llay Main Colliery, No. 1 Shaft. Mineral shaft.

Ref. Wrexham Mem., 1928, p.110. Surface 313 O.D. Shaft 2,715. 70,000 g.p.d. is pumped from a sump between the shafts at this colliery at a depth of 700 ft. Used for boilers.

|                                                    |                                                                    |                     |                     |
|----------------------------------------------------|--------------------------------------------------------------------|---------------------|---------------------|
| Drift<br>179 $\frac{1}{2}$                         | Reddish grey stony clay ...                                        | 34 $\frac{3}{4}$    | 34 $\frac{3}{4}$    |
|                                                    | Sand & gravel with clay ...                                        | 50 $\frac{3}{4}$    | 85 $\frac{1}{2}$    |
|                                                    | Sand & gravel ...                                                  | 34                  | 119 $\frac{1}{2}$   |
|                                                    | Red mottled clay ...                                               | 60                  | 179 $\frac{1}{2}$   |
| U.C.M.<br>(Erbistock Beds)<br>276 $\frac{1}{4}$    | Hard grey stone bind ...                                           | 24                  | 203 $\frac{1}{2}$   |
|                                                    | Hard grey fissured sandstone                                       | 12 $\frac{1}{2}$    | 216                 |
|                                                    | Shale with fireclay & thin coal ...                                | 41 $\frac{1}{4}$    | 257 $\frac{1}{4}$   |
|                                                    | Fine grey & shaly sandstone                                        | 24                  | 281 $\frac{1}{4}$   |
|                                                    | Red & brown marl & grey bind ...                                   | 174 $\frac{1}{2}$   | 455 $\frac{3}{4}$   |
| U.C.M.<br>(Coed-yr-Allt Beds)<br>476 $\frac{1}{4}$ | Shale, fireclay & thin coals ...                                   | 218 $\frac{1}{2}$   | 674 $\frac{1}{4}$   |
|                                                    | Grey calcareous sandstone                                          | 22 $\frac{3}{4}$    | 696 $\frac{1}{4}$   |
|                                                    | Marl & grey shale ...                                              | 85 $\frac{3}{4}$    | 782 $\frac{1}{2}$   |
|                                                    | Shale, fireclay & thin coals with many bands of fine sandstone ... | 149 $\frac{1}{2}$   | 932                 |
|                                                    | Shale, marl, fireclay & coals ...                                  | 683                 | 1,615               |
| M.C.M.<br>1,783                                    | Cefn sandstone ...                                                 | 57 $\frac{1}{4}$    | 1,672 $\frac{1}{4}$ |
|                                                    | Shales with fireclay & coals ...                                   | 1,042 $\frac{3}{4}$ | 2,715               |

55. (108/21S.E./2). Llay: Cae Mawr, 440 yds. N.N.W. of Cae Mawr Farm. Surface o.200 O.D. Shaft 74. Bore 74-153. R.W.L. 74. (Francois Cementation Co., 1914).

SJ35-61

|              |                                  |                  |                   |
|--------------|----------------------------------|------------------|-------------------|
| Drift<br>153 | Strong clay ...                  | 14               | 14                |
|              | Sand & gravel with some clay ... | 87 $\frac{1}{2}$ | 101 $\frac{1}{2}$ |
|              | Red & grey clay ...              | 51 $\frac{1}{2}$ | 153               |
|              |                                  |                  |                   |

66932-1

12

59  
Station  
Surface  
R.W.L. ...  
Dr.  
P.I.  
60  
Surface  
Suction  
Dr.  
P.I.  
61  
Shotwic  
Surface  
3,000 g  
Dr  
L.  
62  
Surface  
Dr  
L.  
63  
Surface  
Dr  
L.

6932-1

Name and Number of Shaft or Bore given by Geological Survey:

County

DENBIGH

SJ 35 NW/9

6" Quarter Sheet

21SE

Well - Bore at L. Coy

Cae Mawr - 440 yds W.N.W. of Cae Mawr Farm. 14.11.1914

1" map. 108 (Flinch)

| GEOLOGICAL CLASSIFICATION                | O.D. - c. 200' 60" fm. | DESCRIPTION | THICKNESS |    |   | DEPTH |     |   |
|------------------------------------------|------------------------|-------------|-----------|----|---|-------|-----|---|
|                                          |                        |             |           |    |   |       |     |   |
| Clay, full of pebbles                    |                        |             | 6.17      | 14 | - | 6.17  |     |   |
| Sand                                     |                        |             | 2.74      | 9  | - | 7.01  | 23  | - |
| Clay + gravel                            |                        |             | 3.96      | 13 | - | 10.97 | 36  | - |
| Sand                                     |                        |             | 11.58     | 38 | - | 22.56 | 74  | - |
| Quicksand                                |                        |             | 1.52      | 5  | - | 24.08 | 79  | - |
| Clay gravel                              |                        |             | 0.46      | 1  | 6 | 24.54 | 80  | 6 |
| Hard cong. sandstone                     |                        |             | 0.15      |    | 6 | 24.69 | 81  | - |
| Stiff clay                               |                        |             | 3.81      | 12 | 6 | 28.50 | 93  | 6 |
| Gravel                                   |                        |             | 0.61      | 2  | - | 29.11 | 95  | 6 |
| Sand                                     |                        |             | 1.68      | 5  | 6 | 30.78 | 101 | - |
| Gravel                                   |                        |             | 0.15      |    | 6 | 30.94 | 101 | 6 |
| Soft red clay                            |                        |             | 2.21      | 7  | 3 | 33.15 | 108 | 9 |
| " grey " , quite free from stones + grit |                        |             | 2.51      | 8  | 3 | 35.66 | 117 | - |
| Stiff " "                                |                        |             | 5.18      | 17 | - | 40.84 | 134 | - |
| Hard grey shale                          |                        |             | 0.61      | 2  | - | 41.45 | 136 | - |
| Soft grey clay                           |                        |             | 2.57      | 15 | - | 44.02 | 151 | - |
| Stiff " "                                |                        |             | 0.61      | 2  | - | 44.63 | 153 | - |
| 22.51m.                                  |                        |             |           |    |   |       |     |   |
| Well to 74', b.h. below                  |                        |             |           |    |   |       |     |   |
| R.W. 74'                                 |                        |             |           |    |   |       |     |   |
| Copied at Francis Commission Co. from    |                        |             |           |    |   |       |     |   |
| shown section June, 1941                 |                        |             |           |    |   |       |     |   |
| Not Sited.                               |                        |             |           |    |   |       |     |   |
| sited Denbigh 21SE                       |                        |             |           |    |   |       |     |   |

SJ 35 NW 43

3342 5652

North of Llay

1<sup>st</sup> 10. 108

Block A

Surface level (+86.4 m) + 284 ft

Water not struck

Shell and auger 8-in (203 mm) diameter

March 1977

Overburden 8.8 m

Mineral 16.2 m +

## LOG

| Geological classification | Lithology                                                                                                                                                                                                                                  | Thickness<br>m | Depth<br>m |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------|
|                           | Soil, dark brown and clayey                                                                                                                                                                                                                | 0.3            | 0.3        |
| Boulder Clay              | Clay, red-brown to grey, stiff and stony with sand lenses. Contains subangular to rounded clasts of quartzite, sandstone, igneous material, siltstone, quartz and coal. Sand horizons between 2.8 m and 3.4 m, and between 7.4 m and 7.9 m | 8.5            | 8.8        |
| Glacial Sand and Gravel   | a Pebbly sand<br>Gravel: fine with some coarse, quartzite with some volcanics, limestone, quartz, siltstone, chert and sandstone<br>Sand: medium with fine and coarse, subangular                                                          | 4.0            | 12.8       |
|                           | b Sand: fine with medium, well sorted, subangular with coal. Fines with depth                                                                                                                                                              | 12.2 +         | 25.0       |

## GRADING

|       | Mean for deposit<br>percentages |      |        | Depth below<br>surface (m) | percentages |              |             |             |           |         |         |
|-------|---------------------------------|------|--------|----------------------------|-------------|--------------|-------------|-------------|-----------|---------|---------|
|       | Fines                           | Sand | Gravel |                            | Fines       | Sand         |             |             | Gravel    |         |         |
|       |                                 |      |        |                            |             |              |             |             |           |         |         |
|       |                                 |      |        |                            | - 1/16      | + 1/16 - 1/4 | + 1/4 - 1/2 | + 1/2 - 3/4 | + 3/4 - 1 | + 1 - 2 | + 2 - 4 |
| a     | 3                               | 83   | 14     | 8.8-9.8                    | 3           | 12           | 48          | 20          | 13        | 4       | 0       |
|       |                                 |      |        | 9.8-10.8                   | 4           | 9            | 56          | 23          | 6         | 2       | 0       |
|       |                                 |      |        | 10.8-12.8                  | 3           | 18           | 48          | 15          | 14        | 2       | 0       |
|       |                                 |      |        | Mean                       | 3           | 14           | 50          | 19          | 11        | 3       | 0       |
| b     | 7                               | 93   | 0      | 12.8-13.8                  | 3           | 59           | 38          | 0           | 0         | 0       | 0       |
|       |                                 |      |        | 13.8-14.8                  | 3           | 59           | 38          | 0           | 0         | 0       | 0       |
|       |                                 |      |        | 14.8-15.8                  | 5           | 63           | 32          | 0           | 0         | 0       | 0       |
|       |                                 |      |        | 15.8-17.8                  | 9           | 81           | 10          | 0           | 0         | 0       | 0       |
|       |                                 |      |        | 17.8-21.0                  | 7           | 83           | 10          | 0           | 0         | 0       | 0       |
|       |                                 |      |        | 21.0-25.0                  | 8           | 76           | 16          | 0           | 0         | 0       | 0       |
|       |                                 |      |        | Mean                       | 7           | 75           | 18          | 0           | 0         | 0       | 0       |
| a + b | 6                               | 90   | 4      | Mean                       | 6           | 60           | 26          | 4           | 3         | 1       | 0       |

## COMPOSITION

|   | Depth below<br>surface (m) | Percentages by weight in + 8 mm fraction |           |           |           |                    |         |                 |
|---|----------------------------|------------------------------------------|-----------|-----------|-----------|--------------------|---------|-----------------|
|   |                            | Quartz                                   | Quartzite | Sandstone | Limestone | Other<br>sediments | Igneous | Chert,<br>flint |
| a | 8.8-12.8                   | 4                                        | 64        | 1         | 11        | 2                  | 14      | 4               |

SJ35NW/43

(43)

IGS 1159 1500 10/74

Institute of Geological Sciences

Sheet 1 of 2

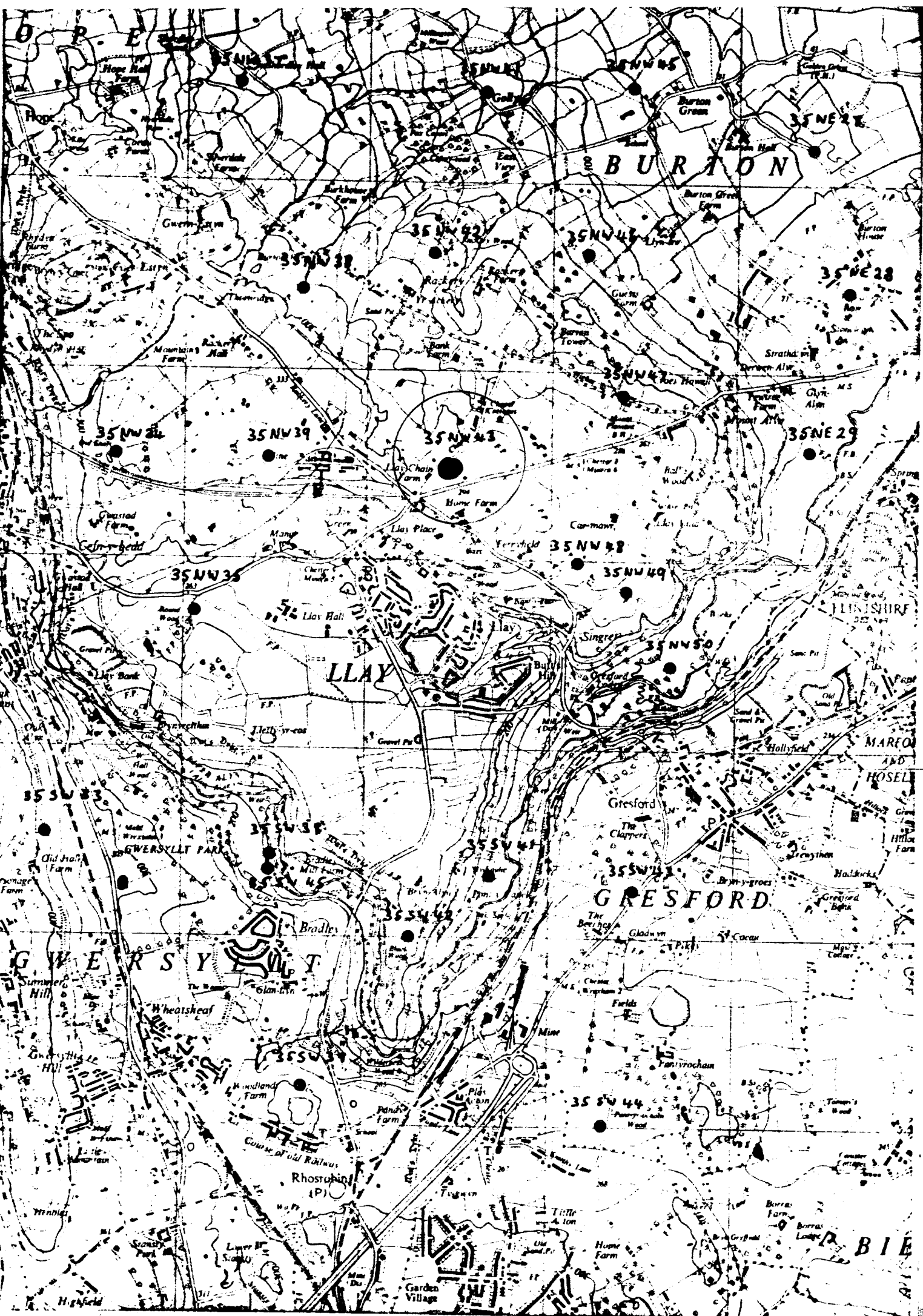
|                                     |                          |             |             |
|-------------------------------------|--------------------------|-------------|-------------|
| Borehole Reg No: SJ 35 NW <b>43</b> | Classification of ground | Thickness m | Nature      |
| Temp borehole No: 16                | OVERBORDEN               | 8.8         | SILTY CLAY. |
| Nat Grid Ref: SJ 3345 5652          | GLACIAL SAND             | 162+        | SAND        |
| Locality: Llay.                     |                          |             |             |
| Surface level: m O.D. (ft O.D.)     |                          |             |             |
| Drilled by: Strata Surveys Ltd.     |                          |             |             |
| Drill type: Shell.                  |                          |             |             |
| Hole diameter: 8"                   |                          |             |             |
| Depth(s) bailed:                    |                          |             |             |
| Date started: 1/3/77                |                          |             |             |
| Date finished: 3/3/77               |                          |             |             |
| Recorded by: DFB                    |                          |             |             |

Remarks

|                        |                                       |                  |                                                    |
|------------------------|---------------------------------------|------------------|----------------------------------------------------|
| ● Explanation          | ▽ Groundwater depth first encountered | === Casing depth | U, sample; solid ornament shows fraction recovered |
| a▽ Morning water level | W Water sample                        | — Borehole depth | ● Spot disturbed sample                            |
| p▽ Evening water level |                                       |                  | } Bulk sample                                      |
|                        |                                       |                  | S.P.T. Standard Penetration Test                   |

| Geological Classification | Description of Strata                                                                                    | Sampling | Sample Nos | Water level | Drilling and Casing progress |
|---------------------------|----------------------------------------------------------------------------------------------------------|----------|------------|-------------|------------------------------|
| TOPSOIL 0.3               | Dark brown, clayey.                                                                                      |          |            |             |                              |
| GLACIAL TILL              | Brown clay, weathered for upper 0.5m. Mottled red. Small sub-rounded pebbles. Damp. Coal frags. present. | 1 0.9    | CL SS 505  |             | Coming following Bl.         |
|                           | Grey stiff clay. Some sandy lenses with turquoise mottling becoming browner with depth.                  | 2        |            |             |                              |
| GLACIAL SAND 2.8          | Sand med/coarse. blue grey components.                                                                   | 3        |            |             |                              |
|                           | Stiff brown clay. Coal frags. present with small ang. frags. of igneous rock.                            | 4        |            |             |                              |
| GLACIAL TILL              | Dark grey soft silty clay. Small sub-rounded pebbles.                                                    | 5        |            |             |                              |
|                           | CPU. pebbles up to 30mm. incl. angular grey sltsh., probably Carboniferous                               | 6        |            |             |                              |
|                           |                                                                                                          | 7        |            |             |                              |
| GLACIAL SAND. TILL 7.4    | SAND - Dry. light brown. med-gr. well-sorted. no pebbles. sub-angular.                                   | 8 7.9    |            |             |                              |
|                           | CLAY - dark grey, as above.                                                                              |          |            |             |                              |

| Geological Classification | Description of Strata                                                                                                                  | Sampling | Sample Nos | Water level | Drilling and Casing progress |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------|----------|------------|-------------|------------------------------|
| TILL<br>8.3               | Dark gray clay CPU.                                                                                                                    | 8        |            |             |                              |
|                           | Med/coarse Sand. Dry. Sub-angular. Occasional bed of fine gravel. low clay content (<2%)<br>Pebbles mostly igneous + siltstn + gbsite. | 9        | CL 559     |             |                              |
|                           |                                                                                                                                        | 10       | CL 560     |             |                              |
|                           |                                                                                                                                        | 11       | CL 561     |             |                              |
| 12.8                      | Coaly Sand. - med. gr. 5% coal. low clay content                                                                                       | 12       |            |             |                              |
|                           | Light brown med. gr. sand. no pebbles. Small coal fraction < 1/2%. low clay content.                                                   | 13       | CL 562     |             |                              |
|                           |                                                                                                                                        | 14       | CL 563     |             |                              |
|                           | Fine/medium gr. sand. Well-sorted. light brown. No pebbles. small coal fraction. low fines content. Sub-angular.                       | 15       | CL 564     |             |                              |
|                           |                                                                                                                                        | 16       | CL 565     |             |                              |
|                           | Sand as above, but no coal.                                                                                                            | 17       |            |             |                              |
|                           | coal fraction present again                                                                                                            | 18       | CL 566     |             |                              |
|                           | no change in sand lithology to 25m.                                                                                                    | 21       | CL 567     |             |                              |
|                           | Total Depth 25m.                                                                                                                       | 25       |            |             |                              |



Surface level (+79.2 m) + 260 ft  
 Water not struck  
 Shell and auger 8-in (203 mm) diameter  
 February 1977

Overburden 2.8 m  
 Mineral 6.3 m  
 Waste 1.1 m  
 Mineral 14.8 m +

# LOG

| Geological classification | Lithology                                                                                                                                                                                                                                                                                                                  | Thickness<br>m | Depth<br>m |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------|
|                           | Soil, dark brown and clayey                                                                                                                                                                                                                                                                                                | 0.5            | 0.5        |
|                           | Clay, dark brown and sandy, very stiff at the top becoming softer and laminated in the lower half                                                                                                                                                                                                                          | 2.3            | 2.8        |
| Glacial Sand and Gravel   | a Gravel<br>Gravel: coarse and fine with some cobbles, subangular to subrounded quartzite with volcanics, limestone, and some quartz sandstone, chert and other sediments<br>Sand: medium with coarse and some fine, subangular to subrounded, contains coal                                                               | 6.3            | 9.1        |
|                           | Clay, red-brown, stony                                                                                                                                                                                                                                                                                                     | 1.1            | 10.2       |
|                           | b 'Clayey' sand, gravelly at the top fining downwards becoming clayey at the base<br>Gravel: fine and coarse, subrounded pebbles of quartzite and limestone with some volcanics, quartz, sandstone, other sediments and chert<br>Sand: fine with medium and some coarse, subrounded, light brown, becomes finer with depth | 14.8 +         | 25.0       |

# GRADING

| Mean for deposit percentages |      |        |       | Depth below surface (m) | percentages |            |         |       |         |         |      |
|------------------------------|------|--------|-------|-------------------------|-------------|------------|---------|-------|---------|---------|------|
| Fines                        | Sand | Gravel | Fines |                         | Sand        |            |         |       | Gravel  |         |      |
|                              |      |        |       |                         | - 1/16      | + 1/16-1/4 | + 1/4-1 | + 1-4 | + 4- 16 | + 16-64 | + 64 |
|                              |      |        |       |                         |             |            |         |       |         |         |      |
| a                            | 1    | 50     | 49    | 2.8-4.0                 | 2           | 5          | 20      | 11    | 17      | 35      | 10   |
|                              |      |        |       | 4.0-5.0                 | 0           | 2          | 4       | 8     | 30      | 49      | 7    |
|                              |      |        |       | 5.0-7.0                 | 1           | 5          | 31      | 15    | 19      | 29      | 0    |
|                              |      |        |       | 7.0-8.0                 | 1           | 6          | 39      | 15    | 14      | 25      | 0    |
|                              |      |        |       | 8.0-9.1                 | 2           | 7          | 61      | 17    | 8       | 5       | 0    |
|                              |      |        |       | Mean                    | 1           | 5          | 31      | 14    | 17      | 29      | 3    |
| b                            | 17   | 80     | 3     | 10.2-11.2               | 21          | 47         | 27      | 2     | 2       | 1       | 0    |
|                              |      |        |       | 11.2-12.2               | 25          | 32         | 17      | 4     | 3       | 19      | 0    |
|                              |      |        |       | 12.2-13.2               | 5           | 23         | 64      | 3     | 4       | 1       | 0    |
|                              |      |        |       | 13.2-14.2               | 5           | 19         | 71      | 3     | 2       | 0       | 0    |
|                              |      |        |       | 14.2-15.2               | 2           | 18         | 71      | 3     | 3       | 3       | 0    |
|                              |      |        |       | 15.2-16.2               | 8           | 32         | 53      | 4     | 2       | 1       | 0    |
|                              |      |        |       | 16.2-17.2               | 9           | 51         | 38      | 2     | 0       | 0       | 0    |
|                              |      |        |       | 17.2-18.2               | 8           | 76         | 15      | 1     | 0       | 0       | 0    |
|                              |      |        |       | 18.2-19.2               | 10          | 71         | 19      | 0     | 0       | 0       | 0    |
|                              |      |        |       | 19.2-21.5               | 22          | 71         | 4       | 1     | 0       | 2       | 0    |
|                              |      |        |       | 21.5-25.0               | 29          | 67         | 4       | 0     | 0       | 0       | 0    |
|                              |      |        |       | Mean                    | 17          | 51         | 27      | 2     | 1       | 2       | 0    |
| a + b                        | 12   | 71     | 17    | Mean                    | 12          | 37         | 28      | 6     | 6       | 10      | 1    |

# COMPOSITION

| Depth below surface (m) |           | Percentages by weight in +8 mm fraction |           |           |           |                 |         |              |
|-------------------------|-----------|-----------------------------------------|-----------|-----------|-----------|-----------------|---------|--------------|
|                         |           | Quartz                                  | Quartzite | Sandstone | Limestone | Other sediments | Igneous | Chert, flint |
| a                       | 2.8-4.0   | 2                                       | 48        | 3         | 14        | 12              | 21      | Trace        |
|                         | 4.0-5.0   | 3                                       | 51        | 3         | 23        | 3               | 16      | 1            |
|                         | 5.0-7.0   | 4                                       | 61        | 3         | 22        | 3               | 7       | Trace        |
|                         | 7.0-8.0   | 10                                      | 71        | 3         | 9         | 4               | 2       | 1            |
|                         | 8.0-9.0   | 1                                       | 43        | 24        | 5         | 3               | 19      | 5            |
| b                       | 11.2-12.2 | 1                                       | 19        | 15        | 58        | 3               | 4       | —            |
|                         | 12.2-16.2 | 3                                       | 56        | 9         | 20        | 2               | 9       | 1            |

SJ35NW/48

48

Institute of Geological Sciences

Sheet 1 of 3

IGS 1159 1500 10/74

| Borehole Reg No:                 | Classification of ground | Thickness m | Nature                |
|----------------------------------|--------------------------|-------------|-----------------------|
| SJ 35 NW 48                      | OVERBORDEN               | 2.8         | Topsoil,              |
| Temp borehole No: 21             |                          |             | Sandy clay.           |
| Nat Grid Ref: SJ 3413 5599       | MINERAL                  | 6.3         | GLACIAL SAND & GRAVEL |
| Locality: THE VADOG, LIAY.       |                          |             | BOULDER CLAY.         |
| Surface level: m O.D. ( ft O.D.) | WASTE                    | 1.1         | PEBBLY SAND.          |
| Drilled by: St. Su. (ARFAN)      | MINERAL                  | 14.8+       |                       |
| Drill type: 8" shell.            |                          |             |                       |
| Hole diameter: 8"                |                          |             |                       |
| Depth(s) bailed:                 |                          |             |                       |
| Date started: 17/2/77            |                          |             |                       |
| Date finished: 21/2/77           |                          |             |                       |
| Recorded by: DFBall.             |                          |             |                       |

Remarks

Explanation

▽ Groundwater depth first encountered

a▽ Morning water level

p▽ Evening water level

===== Casing depth

----- Borehole depth

W Water sample

U, sample; solid ornament shows fraction recovered

• Spot disturbed sample

█ Bulk sample

S.P.T. Standard Penetration Test

| Geological Classification | Description of Strata                                                                                                                      | Sampling | Sample Nos | Water level | Drilling and Casing progress |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|----------|------------|-------------|------------------------------|
| SOIL                      | Dark brown, clayey. Few stones.                                                                                                            |          |            |             | 8" following 4h.             |
| GLACIAL BOULDER CLAY      | Dark brown clay, very stiff. Damp. Occasional sandy pocket. V. few pebbles.                                                                |          |            |             |                              |
|                           | Sandy clay. laminations with turquoise and grey med-gr. sub-angular sand. Light brown clay matrix. becoming softer and sandier with depth. |          |            |             |                              |
| GLACIAL SAND & GRAVEL     | Gravelly sandy clay. Gravel up to 15mm. Med gr. sand.                                                                                      |          | CL 532     |             |                              |
|                           | Sandy gravel. G S F 20 70 10                                                                                                               |          |            |             |                              |
|                           | Sand - med./coarse, sub-round./sub-ang. Blue/grey in appearance. Some coal.                                                                |          | 533        |             |                              |
|                           | Gravel - mostly fine at top, coarsening with depth. Sub-rounded. with occasional angular pebble.                                           |          | 534        |             |                              |
|                           | CPA. G S F 40 50 10                                                                                                                        |          |            |             |                              |
|                           | Becoming sandier. G S F 20 75 5                                                                                                            |          | 535        |             |                              |
|                           | med./coarse sub ang. sand. Coal frags ~ 2%.                                                                                                |          |            |             |                              |

Borehole Reg No: SS 35 NW 48

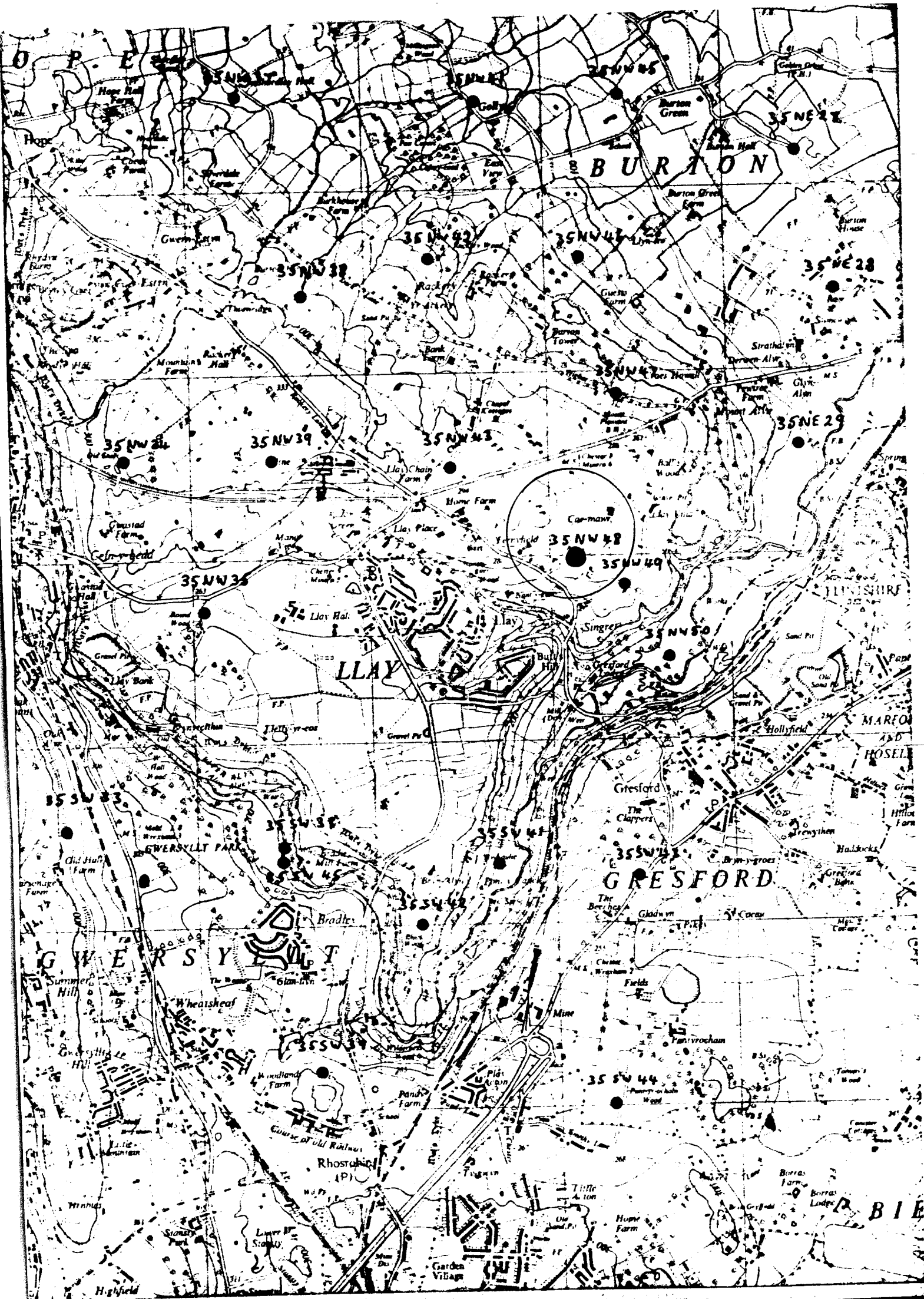
Temp. borehole No: 21

Sheet 2 of 3

| Geological Classification | Description of Strata                                                                                                                    | Sampling   | Sample Nos | Water level | Drilling and Casing progress |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|-------------|------------------------------|
| GLACIAL SAND & GRAVEL     | C.P.U.<br>Sand - med/coars. subang. G S F<br>Gravel - 75% fine 25% coarse. 20 75 5                                                       | 8<br>9     | 536        |             |                              |
| BOUNDER CLAY.             | Stoney clay - Rusty Red. Very little sand. pebbles up to 15 mm. Rounded volcanics.                                                       | 10<br>10.2 |            |             |                              |
| PEBBLY SAND               | Sand with occasional pebbles.<br>sand - med. gr. sub-rounded. light brown.<br>pebbles - mostly volcanics with gfs & gfs. G S F<br>5 90 5 | 11<br>11.2 | 537 ✓      |             |                              |
| CLAY                      | CPU. sand slightly coarse.<br>occasional clay fragments, comp. of brown clay.                                                            | 12<br>12.2 | 538 ✓      |             |                              |
| GLACIAL SAND              | SAND. clean, well-sorted, few pebbles.<br>sand - med-gr. sub-rounded. Coal frags ~ 1% G S F<br>5 75 20.                                  | 13<br>13.2 | 539 ✓      |             |                              |
|                           | CPU. Coal ~ 2%                                                                                                                           | 14<br>14.2 | 540        |             |                              |
|                           | Sand becoming finer with depth.                                                                                                          | 15<br>15.2 | 541        |             |                              |
|                           | Becoming clayey. G S F<br>5 80 15<br><del>med</del> Some pebbles up to 20 mm.                                                            | 16<br>16.2 | 542        |             |                              |
|                           | SLIGHTLY CLAYEY SAND. Coal still present.                                                                                                | 17<br>17.2 | 543        |             |                              |
|                           | CPU - sand becoming finer. NO pebbles.                                                                                                   | 18<br>18.2 | 544        |             |                              |
|                           | CPU.                                                                                                                                     | 19<br>19.2 | 545        |             |                              |
|                           | CPU. becoming clayey.                                                                                                                    | 20         | 546        |             |                              |

Borehole Reg No: **ST35NW 48**Temp. borehole No: **21**Sheet **3** of **3**

| Geological Classification    | Description of Strata         | Sampling | Sample Nos     | Water level | Drilling and Casing progress |
|------------------------------|-------------------------------|----------|----------------|-------------|------------------------------|
| GLACIAL<br>CLAYEY<br>SAND    | CPU. ~ 30% clay. few pebbles. | 20       | 546<br>(cont.) | DRY.        | 8'<br>following<br>4h.       |
|                              |                               | 21       |                |             |                              |
|                              | CPU.                          | 21.5     | 547            |             |                              |
|                              |                               | 22       |                |             |                              |
|                              | CPU.                          | 23       |                |             |                              |
|                              |                               | 24       |                |             |                              |
|                              | CPU.                          | 25       |                |             |                              |
| Total Depth 25 ft.<br>2/2/77 |                               |          |                |             |                              |



**SOAKAWAY RESULTS AND CALCULATIONS  
for  
PROPOSED DEVELOPMENT at  
HOME FARM, LLAY, WREXHAM, LL12 0NW**

**13 August 2015**

**Client:**

**SOAKAWAY RESULTS AND CALCULATIONS FOR  
PROPOSED DEVELOPMENT at HOME FARM, LLAY, WREXHAM LL12 0NW**

---

## **1.0 Introduction**

- 1.1 Soakaway tests were requested by Mike Cunningham Architects at the location of the proposed residential development and undertaken by Kane Design / Alan Kane on 13 August 2015.  
This site is Greenfield farming land, approximately 450m in length, and 535m at the northern boundary on Straight Mile Road, tapering to 230m on the southern boundary.  
Site levels range from 88m - 79.5m, falling from the north-west to south / south-east.  
The overall grade is about 1 in 84, but large tracts are relatively flat.
- 1.2 Weather on the test day was warm and dry
- 1.3 Test pits were partially filled with water and the time taken to empty recorded. In accordance with BRE 365, the time to empty from 75% to 25% was computed, and from this a soil infiltration rate was calculated.
- 1.4 This was compared with the BRE 365 criteria for the acceptance of soakaways, namely:
- The effective pit depth (depth beneath incoming pipework) must be able to contain a worst-in-30 year storm, all storm durations up to 6 hours.
  - The pit must half-empty within 24 hours.

## **2.0 Limitations:**

Seven tests were undertaken, with each test pit filled once, and readings recorded. These tests give an overview of the ability of the site to soak. All measurements are approximate.

These test results do not remove the need for a site investigation. Comments on the trial pit composition are visual from site, and there is no detailed analysis.

For detailed design, the Highway Authority are likely to ask for tests in proposed roads at intervals of about 50m. They may want to be present for these tests. The full BRE 365 testing criteria is for each test to be repeated three times.

**SOAKAWAY RESULTS AND CALCULATIONS FOR  
PROPOSED DEVELOPMENT at HOME FARM, LLAY, WREXHAM LL12 0NW**

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### **3.0 Results.**

None of the tests produced results capable of meeting BRE 365 standards. It will not half-empty within 24 hours

Tests 1,2, and 7 showed zero movement during the duration of measurement.

Tests 3, 4, and 5 showed very slight movement but nowhere near the standard.

Even this slight movement tended to peter out, and could possibly be put down to initial impact of the water from the bowser.

Test Pit 6 encountered a land drain, as indicated in the photo. Water drained to the invert level of this drain, which appeared to be fully functioning, but then no further infiltration took place. The routes, extent and effectiveness of this or any other land drains are not known.

The possibility had been considered that there might be some infiltration in areas known to contain some sand, but this did not transpire. Clay / silt / loam was present at depth and none of the seven infiltration tests even came close to being successful.

Note the presence of a manhole adjacent to test pit 5, and included in the photographs. This was dry and possibly damaged, and is assumed to be some sort of land drain collector. However, it was not taking any of the flow into test pit 6.

### **4.0 Comments from the land owner.**

There is an unlocated 150mm drain from the existing farm, crossing through the centre of the site in a west-east direction.

There is also a foul sewer from the farm draining north along Gresford Road, but not impinging on the actual site.

There has been flooding into the low south-east of the site in the past, from Gresford Road. Apparently a localised land drainage system was installed to cater for this.

The above information is unconfirmed.

### **5.0 Summary**

None of the seven test pits worked to BRE 365 standards.

On the basis of this, the soakaways tested will not work for this site.

There remains the possibility that deeper soakaways will encounter more receptive conditions, and acceptable infiltration rates.

The alternative is to take an agreed discharge to the Welsh Water public sewer network. The standard design is to match the permissible discharge to current green-field run-off, and attenuate / store the remainder on site by oversize pipes and / or a storage pond.

**SOAKAWAY RESULTS AND CALCULATIONS FOR  
PROPOSED DEVELOPMENT at HOME FARM, LLAY, WREXHAM LL12 0NW**

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**ENCLOSURES:**

Page 4/5: Drawing 1266-100: SOAKAWAY TEST LOCATIONS

Page 6-12 TEST RESULTS

**SITE PHOTO INDEX:**

Page 13: TEST PIT 1

Page 14: TEST PIT 2

Page 15: TEST PIT 3

Page 16: TEST PIT 4

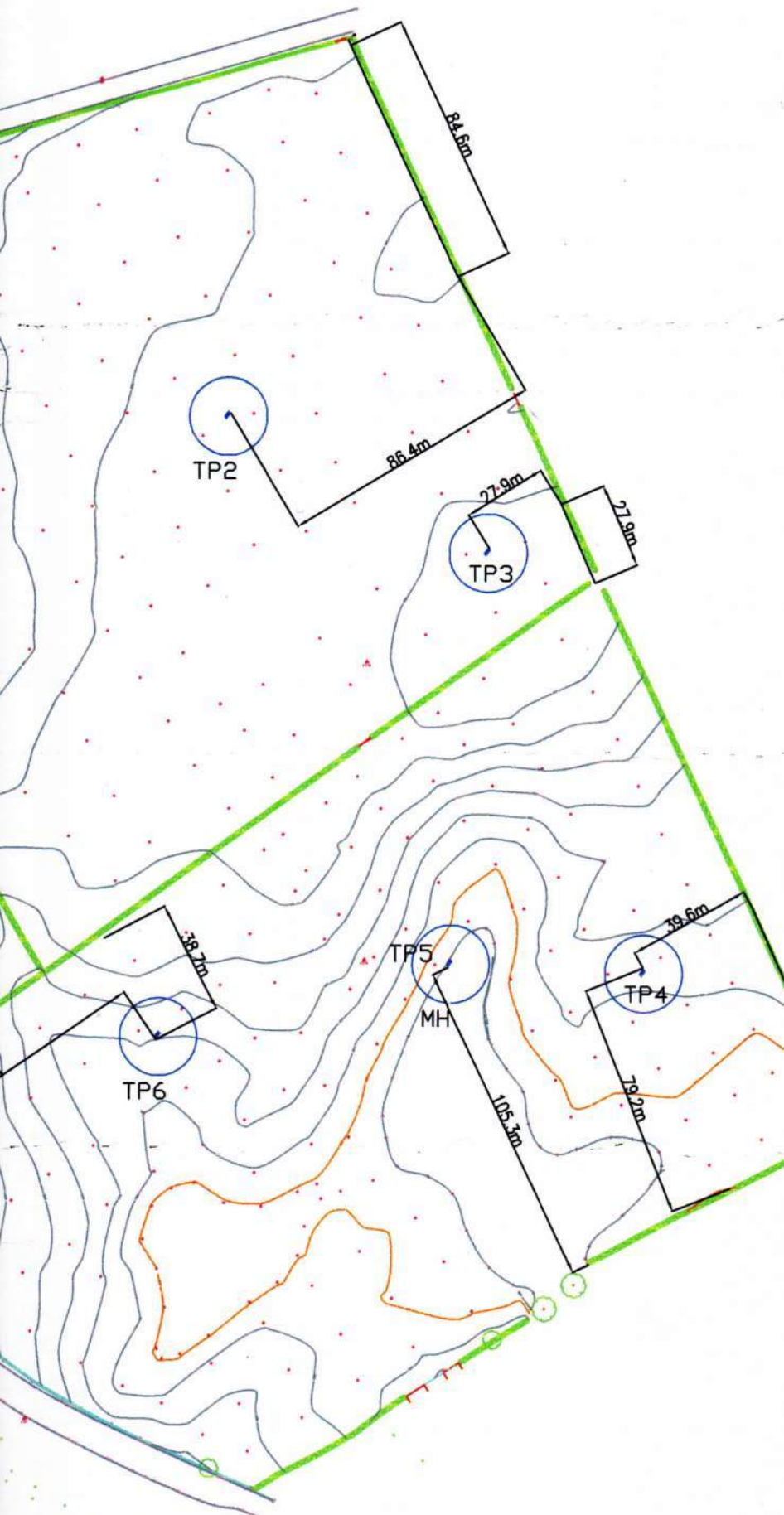
Page 17: TEST PIT 5

Page 18: TEST PIT 6

Page 19: TEST PIT 7

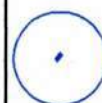
Page 20: MANHOLE ADJACENT TO TEST PIT 7





#### GENERAL NOTES

1. SURVEY DRAWING TAKEN FROM POWERS AND TILTMAN DRAWING NUMBER 6880-1 DATE 17 FEBRUARY 2014
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH REPORT "SOAKAWAYS AND CALCULATIONS FOR PROPOSED DEVELOPMENT AT HOME FARM, LLAY, WREXHAM LL12 0NW: 13 AUGUST 2015



TP2 SOAKAWAY TEST LOCATION

| Rev | Description | Date | Drawn | Chkd |
|-----|-------------|------|-------|------|
|     |             |      |       |      |

### KANE DESIGN

Civil Engineering Design

17 Winchester Way  
Gresford  
Wrexham  
LL12 8HH

Tel: 01 978 855888

Client

MERSEY DESIGN GROUP LTD

Project

PROPOSED DEVELOPMENT at  
HOME FARM, LLAY, WREXHAM, LL12 0NW

Title

SOAKAWAY TEST LOCATIONS

| DRAWING NUMBER | SCALE   | 1:1000   | @ A1     |
|----------------|---------|----------|----------|
| 1266/100       | DATE    | 13.08.15 | REVISION |
|                | DRAWN   | AK       | -        |
|                | CHECKED | AK       | -        |

**PROPOSED DEVELOPMENT: 365 HOUSES at HOME FARM, LLAY, WREXHAM, LL12 0NW**

KANE DESIGN

SOAKAWAY RESULTS

JOB NUMBER:

1266

CLIENT

Mersey Design Group

13 August 2015

AK

PAGE 1 /7

For locations see drawing 1266-100

**SOAKAWAY REFERENCE : TEST PIT 1**

**Test details**

Date Thur 13 August 2015

Weather: Hot sunny

**DEPTH  
TO  
WATER(m)**

**TIME ) DEPTH OF WATER IN PIT( mm)**

|       |         |      |      |
|-------|---------|------|------|
| START | 10.00am | 1.10 | 1550 |
|       | 10.26am | 1.10 | 1550 |
|       | 11.21am | 1.10 | 1550 |
|       | 12.03pm | 1.10 | 1550 |
|       | 12.53pm | 1.10 | 1550 |
|       | 14.32pm | 1.10 | 1550 |
| END   | 15.32pm | 1.10 | 1550 |

**PIT SIZE (m)**

Length 2.9

Width 1.2

Average Depth 2.65

PIT AREA (m 3.48

Visual Site Inspection: 0-400mm Topsoil

Approx depths. 400-bottom Clay

Slight foul smell. Cracked land drain visible

**TOTAL TIME 332 minutes**

CALCULATED:

V25 25%

V75 75%

**TIME TO FALL FROM 75% to 25% ( mins)**

|             | ACTUAL | INTERPOLATED |
|-------------|--------|--------------|
| TIME (mins) | TIME   | DEPTH (mm)   |
|             |        |              |
|             |        |              |
|             |        |              |
|             |        |              |
| 0           |        |              |

**CALCULATION:**

INFILTRATION RATE = f =

V = Effective Storage Volume between 75% and 25% full

T= Time taken to drain above X AP

where AP = 50% internal surface area, including base:

= 14.35 m2

CALCULATED

V (V75-V25)

CALCULATED

**SOAKAWAY**

FROM ABOVE

**PIT AREA**

**Depth 25%**

**Depth 75%**

**x PIT AREA**

**T**

**AP**

**f (Infiltration rate)**

m2

mm

mm

m3

minutes

m2

1

3.48

0.00

0.00

0.000

0.00

14.35

m3/second

**SOAKAWAY DID NOT DRAIN**

## SOAKAWAY DID NOT DRAIN

**PROPOSED DEVELOPMENT: 365 HOUSES at HOME FARM, LLAY, WREXHAM, LL12 0NW**KANE DESIGN  
SOAKAWAY RESULTSJOB NUMBER: 1266  
CLIENT Mersey Design Group  
AK PAGE 3 / 7

13 August 2015

For locations see drawing 1266-100

**SOAKAWAY REFERENCE : TEST PIT 3****Test details**Date Thur 13 August 2015  
Weather: Hot sunny

|       | TO<br>WATER(m<br>TIME ) | DEPTH OF WATER IN PIT( mm) |
|-------|-------------------------|----------------------------|
| START | 10.50am                 | 0.90 1750                  |
|       | 11.27am                 | 0.96 1690                  |
|       | 12.10am                 | 0.98 1670                  |
|       | 13.01pm                 | 0.98 1670                  |
|       | 14.45am                 | 0.98 1670                  |
| END   | 15.39pm                 | 0.98 1670                  |

**PIT SIZE (m)**  
 Length 2.5  
 Width 1.2  
 Average Depth 2.65

 PIT AREA (m 3.00  
 Visual Site Inspection: 0-300mm Topsoil  
 Approx depths. 300-bottom Sand becoming silt
**TOTAL TIME 289 minutes****CALCULATED:**V25 25%  
V75 75%**TIME TO FALL FROM 75% to 25% ( mins)**

|             | ACTUAL  | INTERPOLATED |
|-------------|---------|--------------|
| TIME (mins) | TIME    | DEPTH (mm)   |
| 72.25       | 12.02pm | 0.98         |
| 216.75      | 14.27pm | 0.98         |
| 144.5       |         | 0.00         |

**CALCULATION:**

INFILTRATION RATE = f =

 $V = \text{Effective Storage Volume between 75\% and 25\% full}$  $T = \text{Time taken to drain above } X \text{ AP}$ 

where AP = 50% internal surface area, including base:

= 12.81 m2

**CALCULATED****V (V75-V25)****CALCULATED**

| SOAKAWAY | PIT AREA | FROM ABOVE<br>Depth 25% | Depth 75% | x PIT AREA | T       | AP    | f (Infiltration rate) |
|----------|----------|-------------------------|-----------|------------|---------|-------|-----------------------|
|          | m2       | mm                      | mm        | m3         | minutes | m2    |                       |
| 1        | 3.00     | 0.98                    | 0.98      | 0.000      | 144.50  | 12.81 | m3/second             |

**SOAKAWAY DID NOT DRAIN**

**PROPOSED DEVELOPMENT: 365 HOUSES at HOME FARM, LLAY, WREXHAM, LL12 0NW**KANE DESIGN  
SOAKAWAY RESULTSJOB NUMBER: 1266  
CLIENT Mersey Design Group  
AK PAGE 4 / 7

13 August 2015

For locations see drawing 1266-100

**SOAKAWAY REFERENCE : TEST PIT 4****Test details**Date Thur 13 August 2015  
Weather: Hot sunny

|       | TO<br>WATER(m<br>TIME ) | DEPTH OF WATER IN PIT( mm) |
|-------|-------------------------|----------------------------|
| START | 11.05am                 | 0.90 1850                  |
|       | 11.15am                 | 1.20 1550                  |
|       | 11.32am                 | 1.20 1550                  |
|       | 12.14pm                 | 1.20 1550                  |
|       | 13.05pm                 | 1.20 1550                  |
|       | 14.53pm                 | 1.25 1500                  |
| END   | 15.43pm                 | 1.13 1620                  |

**PIT SIZE (m)**  
 Length 2.7  
 Width 1.2  
 Average Depth 2.75

 PIT AREA (m 3.18  
 Visual Site Inspection: 0-600mm Grey clay  
 Approx depths. 600-bottom Dense Clay
Collapse in?  
1.16158  
0.0394304**CALCULATED:**V25 25%  
V75 75%**TOTAL TIME 278** minutes**TIME TO FALL FROM 75% to 25% ( mins)**

|             | ACTUAL  | INTERPOLATED    |
|-------------|---------|-----------------|
| TIME (mins) | TIME    | DEPTH (mm)      |
| 69.5        | 12.25pm | 1.20            |
| 208.5       | 14.34pm | 1.23            |
|             |         | End result used |
| 139         |         | 0.03            |

**CALCULATION:**

INFILTRATION RATE = f =

 $V = \text{Effective Storage Volume between 75\% and 25\% full}$  $T = \text{Time taken to drain above } X \text{ AP}$ 

where AP = 50% internal surface area, including base:

= 13.77 m2

**CALCULATED****V (V75-V25)****CALCULATED****f (Infiltration rate)**

| SOAKAWAY | PIT AREA | FROM ABOVE<br>Depth 25% | Depth 75% | x PIT AREA | T       | AP    | f (Infiltration rate) |
|----------|----------|-------------------------|-----------|------------|---------|-------|-----------------------|
|          | m2       | mm                      | mm        | m3         | minutes | m2    |                       |
| 1        | 3.18     | 1.20                    | 1.23      | -0.00010   | 139.00  | 13.77 | -8.31E-10 m3/second   |

**SOAKAWAY DID NOT DRAIN**

**PROPOSED DEVELOPMENT: 365 HOUSES at HOME FARM, LLAY, WREXHAM, LL12 0NW**KANE DESIGN  
SOAKAWAY RESULTSJOB NUMBER: 1266  
CLIENT Mersey Design Group  
AK PAGE 5/ 7

13 August 2015

For locations see drawing 1266-100

**SOAKAWAY REFERENCE : TEST PIT 5****Test details**Date Thur 13 August 2015  
Weather: Hot sunny

|       | TIME )  | TO WATER(m) | DEPTH OF WATER IN PIT( mm) |
|-------|---------|-------------|----------------------------|
| START | 11.38am | 0.50        | 2500                       |
|       | 12.16pm | 0.60        | 2050                       |
|       | 13.07pm | 0.60        | 2050                       |
| END   | 15.47pm | 0.63        | 2020                       |

**PIT SIZE (m)**  
 Length 2.9  
 Width 1.2  
 Average Depth 3.00

 PIT AREA (m 3.48  
 Visual Site Inspection: 0-500mm Topsoil  
 Approx depths. 500-bottom Black Clay / Mud  
 Foul smell

|                   |            |         |                                             |     |
|-------------------|------------|---------|---------------------------------------------|-----|
| <b>TOTAL TIME</b> | <b>249</b> | minutes | CALCULATED:                                 |     |
|                   |            |         | V25                                         | 25% |
|                   |            |         | V75                                         | 75% |
|                   |            |         | <b>TIME TO FALL FROM 75% to 25% ( mins)</b> |     |

|             | ACTUAL  | INTERPOLATED |
|-------------|---------|--------------|
| TIME (mins) | TIME    | DEPTH (mm)   |
| 62.25       | 12.41pm | 0.60         |
| 186.75      | 14.45pm | 0.61         |
| 124.5       |         | 0.01         |

**CALCULATION:**

INFILTRATION RATE = f =

$$f = \frac{V}{T \times AP}$$

V = Effective Storage Volume between 75% and 25% full  
T = Time taken to drain above X AP

 where AP = 50% internal surface area, including base:  
 = 15.78 m2

| SOAKAWAY | PIT AREA<br>m2 | FROM ABOVE      |                 | CALCULATED<br>V (V75-V25)<br>m3 | T<br>minutes | CALCULATED<br>AP<br>m2 | CALCULATED<br>f (Infiltration rate) |           |
|----------|----------------|-----------------|-----------------|---------------------------------|--------------|------------------------|-------------------------------------|-----------|
|          |                | Depth 25%<br>mm | Depth 75%<br>mm |                                 |              |                        |                                     |           |
| 1        | 3.48           | 0.60            | 0.61            | -0.00003                        | 124.50       | 15.78                  | <b>-2.95E-10</b>                    | m3/second |

**SOAKAWAY DID NOT DRAIN**

**PROPOSED DEVELOPMENT: 365 HOUSES at HOME FARM, LLAY, WREXHAM, LL12 0NW**KANE DESIGN  
SOAKAWAY RESULTS

13 August 2015

JOB NUMBER: 1266  
CLIENT Mersey Design Group  
AK PAGE 6/ 7

For locations see drawing 1266-100

**SOAKAWAY REFERENCE : TEST PIT 6****Test details**Date Thur 13 August 2015  
Weather: Hot sunny

|       | TO<br>WATER(m<br>TIME ) | DEPTH OF WATER IN PIT( mm) |
|-------|-------------------------|----------------------------|
| START | 15.00pm                 | 0.48 2220                  |
|       | 15.15pm                 | 0.80 1900                  |
|       | 15.51pm                 | 0.80 1900                  |

**PIT SIZE (m)**  
 Length 2.9  
 Width 1.2  
 Average Depth 2.70
Water falling to land drain depth (800mm)  
Then flowing away
 PIT AREA (m 3.48  
 Visual Site Inspection: 0-300mm Topsoil  
 Approx depths. 300-bottom Clay  
 Several land drains ( see photo)

| TOTAL TIME | minutes | CALCULATED: |     | TIME TO FALL FROM 75% to 25% ( mins) |
|------------|---------|-------------|-----|--------------------------------------|
|            |         | V25         | 25% |                                      |
|            |         | V75         | 75% |                                      |

|             | ACTUAL | INTERPOLATED |
|-------------|--------|--------------|
| TIME (mins) | TIME   | DEPTH (mm)   |
|             |        |              |
|             |        |              |
|             |        |              |
|             |        |              |
| 0           |        |              |

**CALCULATION:**

INFILTRATION RATE = f =

$$f = \frac{V}{T \times AP}$$

V = Effective Storage Volume between 75% and 25% full  
T = Time taken to drain above X AP

 where AP = 50% internal surface area, including base:  
 = 14.55 m2

| SOAKAWAY | PIT AREA<br>m2 | FROM ABOVE      |                 | CALCULATED<br>V (V75-V25)<br>x PIT AREA m3 | T<br>minutes | CALCULATED<br>AP m2 | f (Infiltration rate)<br>m3/second |
|----------|----------------|-----------------|-----------------|--------------------------------------------|--------------|---------------------|------------------------------------|
|          |                | Depth 25%<br>mm | Depth 75%<br>mm |                                            |              |                     |                                    |
| 1        | 3.48           | 0.00            | 0.00            | 0.000                                      | 0.00         | 14.55               |                                    |

**SOAKAWAY DID NOT DRAIN**

**PROPOSED DEVELOPMENT: 365 HOUSES at HOME FARM, LLAY, WREXHAM, LL12 0NW**KANE DESIGN  
SOAKAWAY RESULTS

13 August 2015

JOB NUMBER: 1266  
CLIENT Mersey Design Group  
AK PAGE 7 / 7

For locations see drawing 1266-100

**SOAKAWAY REFERENCE : TEST PIT 7****Test details**Date Thur 13 August 2015  
Weather: Hot sunny

|       | TIME )  | TO WATER(m) | DEPTH OF WATER IN PIT( mm) |
|-------|---------|-------------|----------------------------|
| START | 12.44pm | 0.68        | 1820                       |
| END   | 16.03pm | 0.68        | 1820                       |

**PIT SIZE (m)**  
 Length 2.5  
 Width 1.2  
 Average Depth 2.50

 PIT AREA (m 2.94  
 Visual Site Inspection: 0-300mm Topsoil  
 Approx depths. 300-bottom Dry clay, then wet

|                                             |            |         |             |     |
|---------------------------------------------|------------|---------|-------------|-----|
| <b>TOTAL TIME</b>                           | <b>199</b> | minutes | CALCULATED: |     |
|                                             |            |         | V25         | 25% |
|                                             |            |         | V75         | 75% |
| <b>TIME TO FALL FROM 75% to 25% ( mins)</b> |            |         |             |     |

|             | ACTUAL | INTERPOLATED |
|-------------|--------|--------------|
| TIME (mins) | TIME   | DEPTH (mm)   |
|             |        |              |
|             |        |              |
|             |        |              |
|             |        |              |
| 0           |        |              |

**CALCULATION:**

INFILTRATION RATE = f =

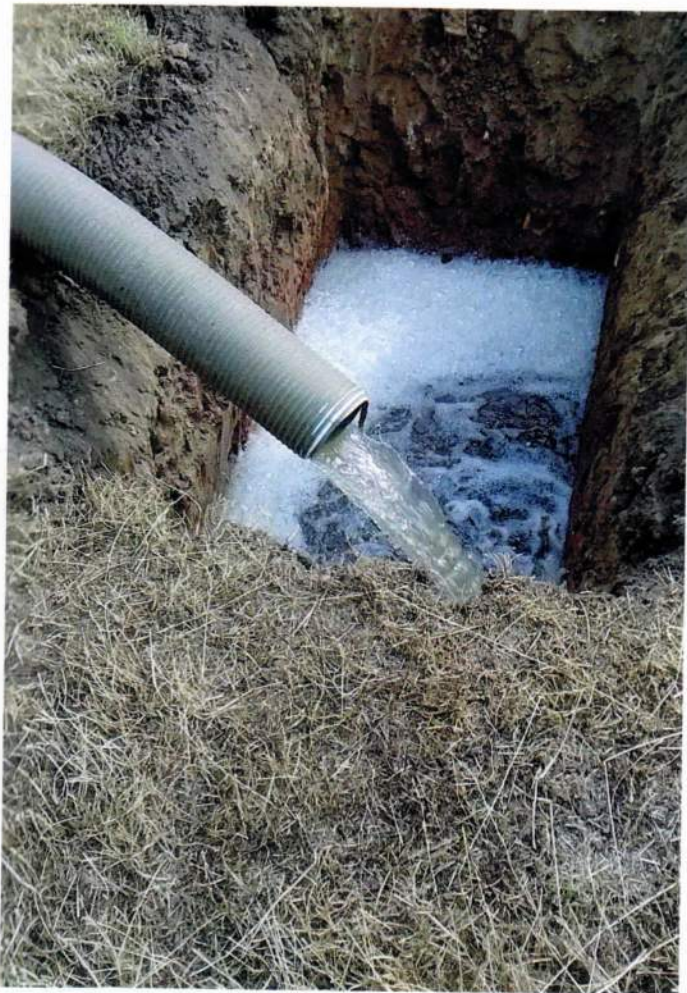
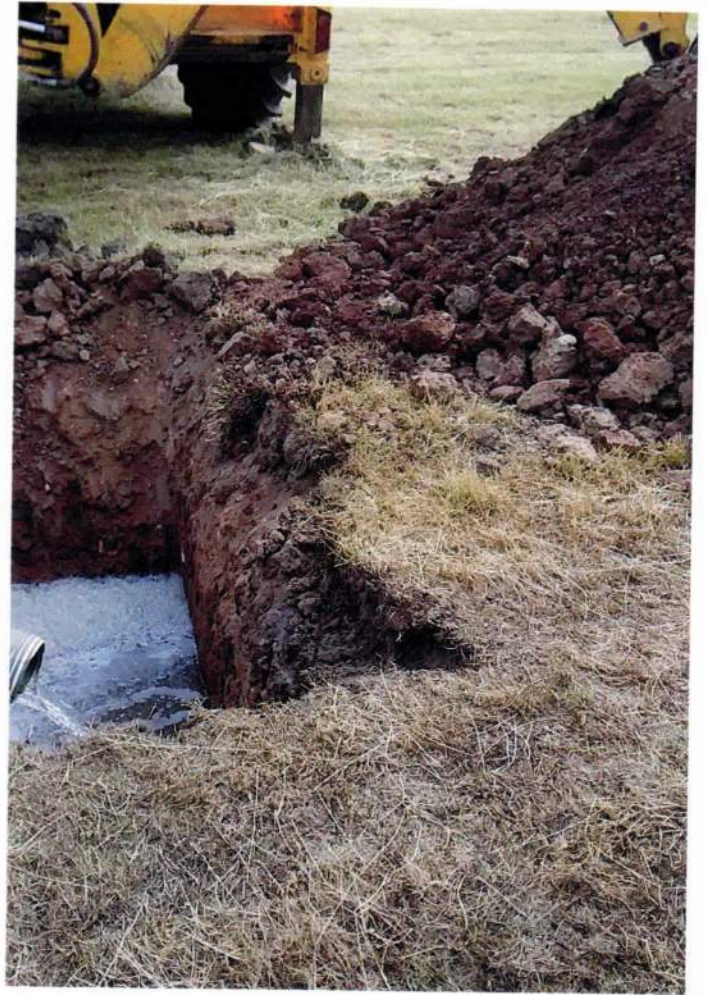
$$f = \frac{V}{T \times AP}$$

V = Effective Storage Volume between 75% and 25% full  
T = Time taken to drain above

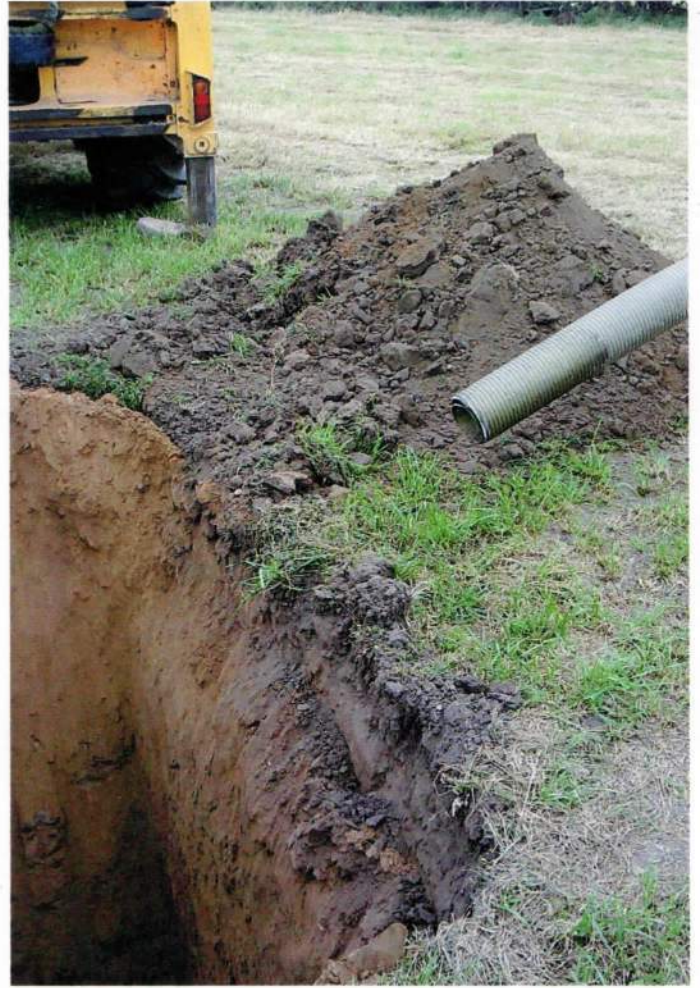
 where AP = 50% internal surface area, including base:  
 = 12.07 m2

| SOAKAWAY | PIT AREA<br>m2 | FROM ABOVE      |                 | CALCULATED<br>V (V75-V25)<br>x PIT AREA<br>m3 | T<br>minutes | CALCULATED<br>AP<br>m2 | f (Infiltration rate)<br>m3/second |
|----------|----------------|-----------------|-----------------|-----------------------------------------------|--------------|------------------------|------------------------------------|
|          |                | Depth 25%<br>mm | Depth 75%<br>mm |                                               |              |                        |                                    |
| 1        | 2.94           | 0.00            | 0.00            | 0.000                                         | 0.00         | 12.07                  |                                    |

**SOAKAWAY DID NOT DRAIN**

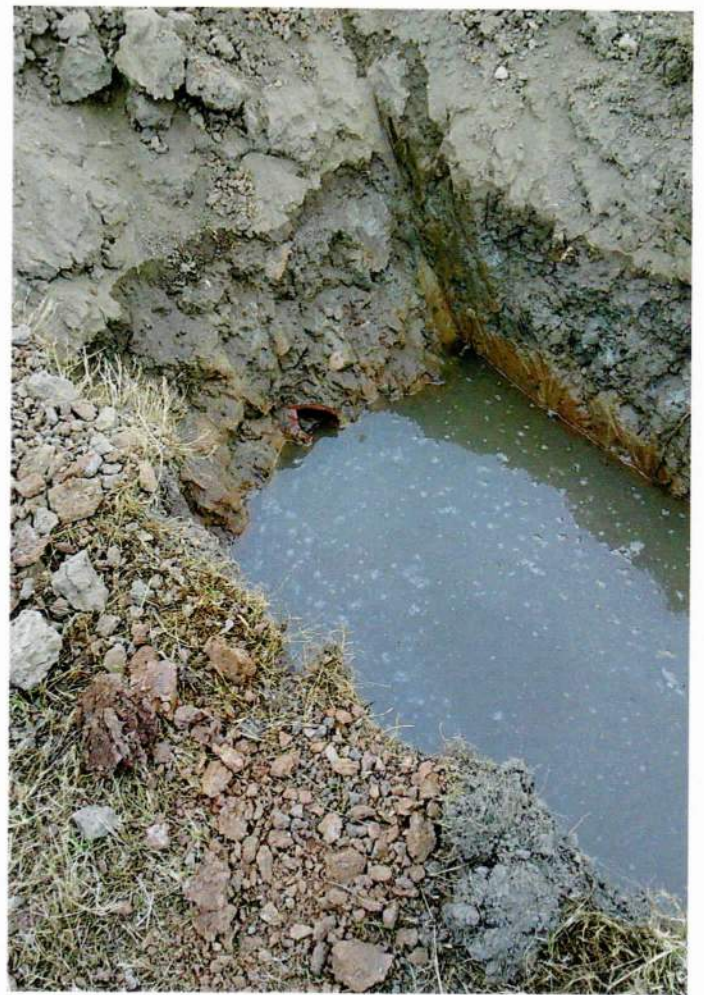








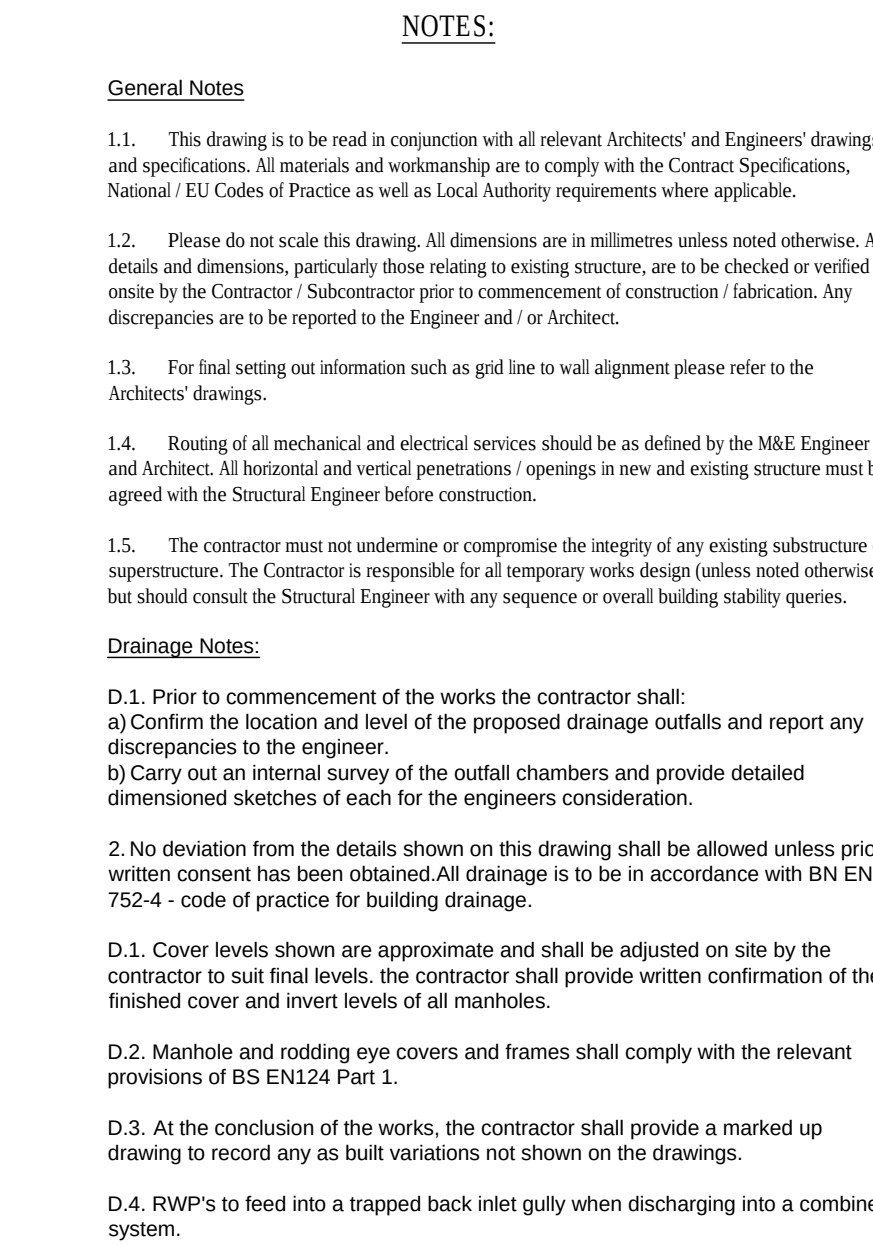








## **Appendix C   Preliminary Drainage Design Drawings**



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**Appendix D    Design Calculations**

**Project Number:** B061751.000  
**Project Name:** Home Farm Housing Development, Llay.  
**Element:** 30yr Storm

**Storage Volumes Provided**

| Sub-Catchment<br>Description   | Required Storage<br>Per Sub-Catchment<br>(cu.m) | Actual Storage<br>Per Sub-Catchment<br>(cu.m) | Tank<br>Ref. | Tank/Conduit Dimensions           |              |              | Void Ratio<br>% | Slope<br>Factor<br>or No bays |
|--------------------------------|-------------------------------------------------|-----------------------------------------------|--------------|-----------------------------------|--------------|--------------|-----------------|-------------------------------|
|                                |                                                 |                                               |              | Length<br>(m)                     | Width<br>(m) | Depth<br>(m) |                 |                               |
|                                |                                                 |                                               |              | <i>(Items in Italics = Areas)</i> |              |              |                 |                               |
| West Corner Green              | 24.30                                           | 24.84                                         | PP1          | 69.000                            | 3.000        | 0.400        | 30%             | 1.000                         |
| NW Green Buffer                | 21.20                                           | 11.88                                         | PPD          | 5.500                             | 3.000        | 0.300        | 30%             | 8.000                         |
| NW Green Space                 | 78.60                                           | 37.13                                         | PPD          | 5.500                             | 3.000        | 0.300        | 30%             | 25.000                        |
|                                |                                                 | 49.50                                         | PP2          | 100.000                           | 5.500        | 0.300        | 30%             | 1.000                         |
| NE Green Buffer                | 21.20                                           | 22.28                                         | PPD          | 5.500                             | 3.000        | 0.300        | 30%             | 15.000                        |
| NE Green Space                 | 78.60                                           | 13.37                                         | PPD          | 5.500                             | 3.000        | 0.300        | 30%             | 9.000                         |
|                                |                                                 | 62.70                                         | PP3          | 76.000                            | 5.500        | 0.500        | 30%             | 1.000                         |
| NE Cul-De-Sac                  | 64.50                                           | 28.22                                         | PPD          | 5.500                             | 3.000        | 0.300        | 30%             | 19.000                        |
|                                |                                                 | 37.13                                         | PP4          | 45.000                            | 5.500        | 0.500        | 30%             | 1.000                         |
| W Shared Space                 | 31.80                                           | 17.82                                         | PPD          | 5.500                             | 3.000        | 0.300        | 30%             | 12.000                        |
|                                |                                                 | 22.28                                         | PP5          | 45.000                            | 5.500        | 0.300        | 30%             | 1.000                         |
| Verge N of Home Farm           | 15.90                                           | 12.38                                         | PPD          | 5.500                             | 3.000        | 0.500        | 30%             | 5.000                         |
| Green Space N of Home Farm     | 15.30                                           | 14.85                                         | PPD          | 5.500                             | 3.000        | 0.500        | 30%             | 6.000                         |
| Shared Space E of Home Farm    | 78.60                                           | 22.28                                         | PPD          | 5.500                             | 3.000        | 0.300        | 30%             | 15.000                        |
|                                |                                                 | 54.72                                         | PP6          | 76.000                            | 6.000        | 0.400        | 30%             | 1.000                         |
| N Shared Space                 | 58.80                                           | 13.37                                         | PPD          | 5.500                             | 3.000        | 0.300        | 30%             | 9.000                         |
|                                |                                                 | 48.60                                         | PP7          | 108.000                           | 5.000        | 0.300        | 30%             | 1.000                         |
| E Cul-De-Sac                   | 82.20                                           | 19.80                                         | PPD          | 5.500                             | 3.000        | 0.400        | 30%             | 10.000                        |
|                                |                                                 | 61.05                                         | PP8          | 74.000                            | 5.500        | 0.500        | 30%             | 1.000                         |
| E Dead End                     | 23.20                                           | 7.43                                          | PPD          | 5.500                             | 3.000        | 0.300        | 30%             | 5.000                         |
|                                |                                                 | 18.32                                         | PP8          | 37.000                            | 5.500        | 0.300        | 30%             | 1.000                         |
| Village Green Central Catchmen | 291.90                                          | 87.62                                         | PD           | 5.500                             | 3.000        | 0.300        | 30%             | 59.000                        |
|                                |                                                 | 213.00                                        | CPond        | 426.000                           | 1.000        | 0.500        | 100%            | 1.000                         |
| West Entrance Verge            | 16.90                                           | 5.94                                          | PD           | 5.500                             | 3.000        | 0.300        | 30%             | 4.000                         |
|                                |                                                 | 10.20                                         | SS           | 25.500                            | 1.000        | 0.400        | 100%            | 1.000                         |
| SW Green Space                 | 52.50                                           | 13.37                                         | PPD          | 5.500                             | 3.000        | 0.300        | 30%             | 9.000                         |
|                                |                                                 | 49.50                                         | PP9          | 100.000                           | 5.500        | 0.300        | 30%             | 1.000                         |
| SW Shared Space                | 28.10                                           | 10.40                                         | PPD          | 5.500                             | 3.000        | 0.300        | 30%             | 7.000                         |
|                                |                                                 | 26.73                                         | PP10         | 54.000                            | 5.500        | 0.300        | 30%             | 1.000                         |
| SW Shared Space                | 121.20                                          | 25.25                                         | PPD          | 5.500                             | 3.000        | 0.300        | 30%             | 17.000                        |
|                                |                                                 | 46.17                                         | PP11         | 57.000                            | 9.000        | 0.300        | 30%             | 1.000                         |
|                                |                                                 | 52.50                                         | SWPond       | 350.000                           | 1.000        | 0.150        | 100%            | 1.000                         |
| SE Cul-De-Sac                  | 25.20                                           | 8.91                                          | PPD          | 5.500                             | 3.000        | 0.300        | 30%             | 6.000                         |
|                                |                                                 | 25.92                                         | PP12         | 32.000                            | 9.000        | 0.300        | 30%             | 1.000                         |
| SE Dead End                    | 25.60                                           | 4.46                                          | PPD          | 5.500                             | 3.000        | 0.300        | 30%             | 3.000                         |
|                                |                                                 | 31.59                                         | PP13         | 39.000                            | 9.000        | 0.300        | 30%             | 1.000                         |
| SW Pond                        | 36.20                                           | 23.76                                         | PPD          | 5.500                             | 3.000        | 0.300        | 30%             | 16.000                        |
|                                |                                                 | 17.50                                         | SWPond       | 350.000                           | 1.000        | 0.050        | 100%            | 1.000                         |
| <b>Totals</b>                  | <b>1191.80</b>                                  | <b>1252.69</b>                                |              |                                   |              |              |                 |                               |

Note Required Storage Per Sub-catchment from Micro drainage

|                                                     |               |                          |                        |                                                                                     |        |
|-----------------------------------------------------|---------------|--------------------------|------------------------|-------------------------------------------------------------------------------------|--------|
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| Date 21/10/2016 16:30                               |               | Designed by pennington_p |                        |                                                                                     |        |
| File E Cul-de-Sac-2BHS.srcx                         |               | Checked by               |                        |                                                                                     |        |
| XP Solutions                                        |               | Source Control 2016.1    |                        |                                                                                     |        |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Half Drain Time : 1465 minutes.                     |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 15 min Summer                                       | 82.610        | 24.010                   | 0.3                    | 13.2                                                                                | FLOOD  |
| 30 min Summer                                       | 82.615        | 24.015                   | 0.3                    | 17.7                                                                                | FLOOD  |
| 60 min Summer                                       | 82.620        | 24.020                   | 0.3                    | 22.5                                                                                | FLOOD  |
| 120 min Summer                                      | 82.625        | 24.025                   | 0.3                    | 27.5                                                                                | FLOOD  |
| 180 min Summer                                      | 82.627        | 24.027                   | 0.3                    | 30.3                                                                                | FLOOD  |
| 240 min Summer                                      | 82.629        | 24.029                   | 0.3                    | 32.2                                                                                | FLOOD  |
| 360 min Summer                                      | 82.632        | 24.032                   | 0.3                    | 34.6                                                                                | FLOOD  |
| 480 min Summer                                      | 82.633        | 24.033                   | 0.3                    | 36.0                                                                                | FLOOD  |
| 600 min Summer                                      | 82.634        | 24.034                   | 0.3                    | 36.8                                                                                | FLOOD  |
| 720 min Summer                                      | 82.634        | 24.034                   | 0.3                    | 37.3                                                                                | FLOOD  |
| 960 min Summer                                      | 82.634        | 24.034                   | 0.3                    | 37.5                                                                                | FLOOD  |
| 1440 min Summer                                     | 82.633        | 24.033                   | 0.3                    | 36.4                                                                                | FLOOD  |
| 2160 min Summer                                     | 82.632        | 24.032                   | 0.3                    | 34.9                                                                                | FLOOD  |
| 2880 min Summer                                     | 82.631        | 24.031                   | 0.3                    | 33.6                                                                                | FLOOD  |
| 4320 min Summer                                     | 82.628        | 24.028                   | 0.3                    | 30.9                                                                                | FLOOD  |
| 5760 min Summer                                     | 82.625        | 24.025                   | 0.3                    | 28.0                                                                                | FLOOD  |
| 7200 min Summer                                     | 82.622        | 24.022                   | 0.3                    | 25.2                                                                                | FLOOD  |
| 8640 min Summer                                     | 82.619        | 24.019                   | 0.3                    | 22.4                                                                                | FLOOD  |
| 10080 min Summer                                    | 82.617        | 24.017                   | 0.3                    | 19.8                                                                                | FLOOD  |
| 15 min Winter                                       | 82.612        | 24.012                   | 0.3                    | 14.9                                                                                | FLOOD  |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 15 min Summer                                       | 83.344        | 10.3                     | 26                     |                                                                                     |        |
| 30 min Summer                                       | 55.879        | 14.7                     | 41                     |                                                                                     |        |
| 60 min Summer                                       | 35.949        | 19.5                     | 70                     |                                                                                     |        |
| 120 min Summer                                      | 22.481        | 24.5                     | 130                    |                                                                                     |        |
| 180 min Summer                                      | 16.899        | 27.4                     | 188                    |                                                                                     |        |
| 240 min Summer                                      | 13.734        | 29.2                     | 248                    |                                                                                     |        |
| 360 min Summer                                      | 10.201        | 31.6                     | 366                    |                                                                                     |        |
| 480 min Summer                                      | 8.260         | 33.0                     | 486                    |                                                                                     |        |
| 600 min Summer                                      | 7.008         | 33.8                     | 604                    |                                                                                     |        |
| 720 min Summer                                      | 6.125         | 34.3                     | 724                    |                                                                                     |        |
| 960 min Summer                                      | 4.949         | 34.5                     | 962                    |                                                                                     |        |
| 1440 min Summer                                     | 3.659         | 33.4                     | 1266                   |                                                                                     |        |
| 2160 min Summer                                     | 2.701         | 32.0                     | 1648                   |                                                                                     |        |
| 2880 min Summer                                     | 2.176         | 30.6                     | 2044                   |                                                                                     |        |
| 4320 min Summer                                     | 1.602         | 27.9                     | 2860                   |                                                                                     |        |
| 5760 min Summer                                     | 1.288         | 25.0                     | 3688                   |                                                                                     |        |
| 7200 min Summer                                     | 1.088         | 22.2                     | 4472                   |                                                                                     |        |
| 8640 min Summer                                     | 0.947         | 19.4                     | 5272                   |                                                                                     |        |
| 10080 min Summer                                    | 0.843         | 16.8                     | 6048                   |                                                                                     |        |
| 15 min Winter                                       | 83.344        | 11.9                     | 26                     |                                                                                     |        |
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|                                                     |               |                          |                        |                                                                                     |        |
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| Date 21/10/2016 16:30                               |               | Designed by pennington_p |                        |                                                                                     |        |
| File E Cul-de-Sac-2BHS.srcx                         |               | Checked by               |                        |                                                                                     |        |
| XP Solutions                                        |               | Source Control 2016.1    |                        |                                                                                     |        |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 30 min Winter                                       | 82.617        | 24.017                   | 0.3                    | 19.9                                                                                | FLOOD  |
| 60 min Winter                                       | 82.622        | 24.022                   | 0.3                    | 25.3                                                                                | FLOOD  |
| 120 min Winter                                      | 82.628        | 24.028                   | 0.3                    | 31.1                                                                                | FLOOD  |
| 180 min Winter                                      | 82.631        | 24.031                   | 0.3                    | 34.4                                                                                | FLOOD  |
| 240 min Winter                                      | 82.634        | 24.034                   | 0.3                    | 36.6                                                                                | FLOOD  |
| 360 min Winter                                      | 82.637        | 24.037                   | 0.3                    | 39.5                                                                                | FLOOD  |
| 480 min Winter                                      | 82.638        | 24.038                   | 0.3                    | 41.4                                                                                | FLOOD  |
| 600 min Winter                                      | 82.640        | 24.040                   | 0.3                    | 42.6                                                                                | FLOOD  |
| 720 min Winter                                      | 82.640        | 24.040                   | 0.3                    | 43.4                                                                                | FLOOD  |
| 960 min Winter                                      | 82.641        | 24.041                   | 0.3                    | 44.1                                                                                | FLOOD  |
| 1440 min Winter                                     | 82.641        | 24.041                   | 0.3                    | 43.8                                                                                | FLOOD  |
| 2160 min Winter                                     | 82.638        | 24.038                   | 0.3                    | 41.3                                                                                | FLOOD  |
| 2880 min Winter                                     | 82.637        | 24.037                   | 0.3                    | 39.5                                                                                | FLOOD  |
| 4320 min Winter                                     | 82.632        | 24.032                   | 0.3                    | 35.3                                                                                | FLOOD  |
| 5760 min Winter                                     | 82.628        | 24.028                   | 0.3                    | 30.7                                                                                | FLOOD  |
| 7200 min Winter                                     | 82.623        | 24.023                   | 0.3                    | 26.2                                                                                | FLOOD  |
| 8640 min Winter                                     | 82.619        | 24.019                   | 0.3                    | 21.9                                                                                | FLOOD  |
| 10080 min Winter                                    | 82.615        | 24.015                   | 0.3                    | 17.9                                                                                | FLOOD  |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 30 min Winter                                       | 55.879        | 16.9                     | 41                     |                                                                                     |        |
| 60 min Winter                                       | 35.949        | 22.3                     | 70                     |                                                                                     |        |
| 120 min Winter                                      | 22.481        | 28.1                     | 128                    |                                                                                     |        |
| 180 min Winter                                      | 16.899        | 31.4                     | 186                    |                                                                                     |        |
| 240 min Winter                                      | 13.734        | 33.6                     | 244                    |                                                                                     |        |
| 360 min Winter                                      | 10.201        | 36.5                     | 360                    |                                                                                     |        |
| 480 min Winter                                      | 8.260         | 38.4                     | 478                    |                                                                                     |        |
| 600 min Winter                                      | 7.008         | 39.6                     | 594                    |                                                                                     |        |
| 720 min Winter                                      | 6.125         | 40.4                     | 708                    |                                                                                     |        |
| 960 min Winter                                      | 4.949         | 41.1                     | 936                    |                                                                                     |        |
| 1440 min Winter                                     | 3.659         | 40.8                     | 1374                   |                                                                                     |        |
| 2160 min Winter                                     | 2.701         | 38.3                     | 1768                   |                                                                                     |        |
| 2880 min Winter                                     | 2.176         | 36.5                     | 2200                   |                                                                                     |        |
| 4320 min Winter                                     | 1.602         | 32.3                     | 3120                   |                                                                                     |        |
| 5760 min Winter                                     | 1.288         | 27.8                     | 3992                   |                                                                                     |        |
| 7200 min Winter                                     | 1.088         | 23.2                     | 4832                   |                                                                                     |        |
| 8640 min Winter                                     | 0.947         | 18.9                     | 5624                   |                                                                                     |        |
| 10080 min Winter                                    | 0.843         | 14.9                     | 6448                   |                                                                                     |        |
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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|----------------|-------------|---------------|-----|-----------------------|----|-------------|-------|--------|-------------------|-------------|-------|------------|--------|-----------------------|----|---------|-------|----------------------|-------|---------------|-----|------------------|-----|-------------|------|-------------|------|-------------|------|-----------|------|-----------|------|-----------|------|-----|-------|-----|-------|------|-------|
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| Date 21/10/2016 16:30<br>File E Cul-de-Sac-2BHS.srcx                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Designed by pennington_p<br>Checked by |                                                                                     |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                                                                     |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Source Control 2016.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                        |                                                                                     |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| <p style="text-align: center;"><u>Rainfall Details</u></p> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Return Period (years)</td> <td>30</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>18.000</td> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Ratio R</td> <td>0.336</td> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> <td>Climate Change %</td> <td>+30</td> </tr> </table> <p style="text-align: center;"><u>Time Area Diagram</u></p> <p style="text-align: center;">Total Area (ha) 0.087</p> <table> <thead> <tr> <th>Time (mins)</th> <th>Area</th> <th>Time (mins)</th> <th>Area</th> <th>Time (mins)</th> <th>Area</th> </tr> <tr> <th>From: To:</th> <th>(ha)</th> <th>From: To:</th> <th>(ha)</th> <th>From: To:</th> <th>(ha)</th> </tr> </thead> <tbody> <tr> <td>0 4</td> <td>0.029</td> <td>4 8</td> <td>0.029</td> <td>8 12</td> <td>0.029</td> </tr> </tbody> </table> |                                        |                                                                                     | Rainfall Model | FSR         | Winter Storms | Yes | Return Period (years) | 30 | Cv (Summer) | 0.750 | Region | England and Wales | Cv (Winter) | 0.840 | M5-60 (mm) | 18.000 | Shortest Storm (mins) | 15 | Ratio R | 0.336 | Longest Storm (mins) | 10080 | Summer Storms | Yes | Climate Change % | +30 | Time (mins) | Area | Time (mins) | Area | Time (mins) | Area | From: To: | (ha) | From: To: | (ha) | From: To: | (ha) | 0 4 | 0.029 | 4 8 | 0.029 | 8 12 | 0.029 |
| Rainfall Model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | FSR                                    | Winter Storms                                                                       | Yes            |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 30                                     | Cv (Summer)                                                                         | 0.750          |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Region                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | England and Wales                      | Cv (Winter)                                                                         | 0.840          |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| M5-60 (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 18.000                                 | Shortest Storm (mins)                                                               | 15             |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Ratio R                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.336                                  | Longest Storm (mins)                                                                | 10080          |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Summer Storms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Yes                                    | Climate Change %                                                                    | +30            |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Time (mins)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Area                                   | Time (mins)                                                                         | Area           | Time (mins) | Area          |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| From: To:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | (ha)                                   | From: To:                                                                           | (ha)           | From: To:   | (ha)          |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| 0 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.029                                  | 4 8                                                                                 | 0.029          | 8 12        | 0.029         |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
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| Date 21/10/2016 16:30<br>File E Cul-de-Sac-2BHS.srcx | Designed by pennington_p<br>Checked by |                                                                                     |
| XP Solutions Source Control 2016.1                   |                                        |                                                                                     |

Model Details

Storage is Online Cover Level (m) 82.600

Deep Bore Soakaway Structure

Chamber Invert Level (m) 80.600 Infiltration Coefficient Base (m/hr) 0.18000  
 Chamber Diameter/Width (m) 1.200 Safety Factor 2.0  
 Borehole Diameter (m) 0.200  
 Borehole Depth (m) 22.000

| Side          | Side           | Side           |
|---------------|----------------|----------------|
| Depth Infil.  | Depth Infil.   | Depth Infil.   |
| (m) Coef.     | (m) Coef.      | (m) Coef.      |
| (m/hr)        | (m/hr)         | (m/hr)         |
| 0.000 0.18000 | 16.000 0.00000 | 22.000 0.00000 |

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| XP Solutions                                        |               | Source Control 2016.1    |                        |                                                                                     |        |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Half Drain Time : 488 minutes.                      |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 15 min Summer                                       | 83.203        | 24.003                   | 0.3                    | 5.6                                                                                 | FL00D  |
| 30 min Summer                                       | 83.204        | 24.004                   | 0.3                    | 7.5                                                                                 | FL00D  |
| 60 min Summer                                       | 83.206        | 24.006                   | 0.3                    | 9.3                                                                                 | FL00D  |
| 120 min Summer                                      | 83.208        | 24.008                   | 0.3                    | 11.1                                                                                | FL00D  |
| 180 min Summer                                      | 83.209        | 24.009                   | 0.3                    | 11.9                                                                                | FL00D  |
| 240 min Summer                                      | 83.209        | 24.009                   | 0.3                    | 12.2                                                                                | FL00D  |
| 360 min Summer                                      | 83.209        | 24.009                   | 0.3                    | 12.4                                                                                | FL00D  |
| 480 min Summer                                      | 83.209        | 24.009                   | 0.3                    | 12.2                                                                                | FL00D  |
| 600 min Summer                                      | 83.209        | 24.009                   | 0.3                    | 12.0                                                                                | FL00D  |
| 720 min Summer                                      | 83.209        | 24.009                   | 0.3                    | 11.8                                                                                | FL00D  |
| 960 min Summer                                      | 83.208        | 24.008                   | 0.3                    | 11.4                                                                                | FL00D  |
| 1440 min Summer                                     | 83.208        | 24.008                   | 0.3                    | 10.5                                                                                | FL00D  |
| 2160 min Summer                                     | 83.206        | 24.006                   | 0.3                    | 9.2                                                                                 | FL00D  |
| 2880 min Summer                                     | 83.205        | 24.005                   | 0.3                    | 7.8                                                                                 | FL00D  |
| 4320 min Summer                                     | 83.202        | 24.002                   | 0.3                    | 5.4                                                                                 | FL00D  |
| 5760 min Summer                                     | 83.200        | 24.000                   | 0.3                    | 3.4                                                                                 | FL00D  |
| 7200 min Summer                                     | 82.375        | 23.175                   | 0.3                    | 2.0                                                                                 | 0 K    |
| 8640 min Summer                                     | 81.553        | 22.353                   | 0.3                    | 1.1                                                                                 | 0 K    |
| 10080 min Summer                                    | 78.193        | 18.993                   | 0.3                    | 0.6                                                                                 | 0 K    |
| 15 min Winter                                       | 83.203        | 24.003                   | 0.3                    | 6.3                                                                                 | FL00D  |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 15 min Summer                                       | 83.344        | 2.7                      | 26                     |                                                                                     |        |
| 30 min Summer                                       | 55.879        | 4.5                      | 40                     |                                                                                     |        |
| 60 min Summer                                       | 35.949        | 6.4                      | 68                     |                                                                                     |        |
| 120 min Summer                                      | 22.481        | 8.1                      | 126                    |                                                                                     |        |
| 180 min Summer                                      | 16.899        | 8.9                      | 186                    |                                                                                     |        |
| 240 min Summer                                      | 13.734        | 9.3                      | 244                    |                                                                                     |        |
| 360 min Summer                                      | 10.201        | 9.4                      | 360                    |                                                                                     |        |
| 480 min Summer                                      | 8.260         | 9.2                      | 424                    |                                                                                     |        |
| 600 min Summer                                      | 7.008         | 9.0                      | 486                    |                                                                                     |        |
| 720 min Summer                                      | 6.125         | 8.8                      | 550                    |                                                                                     |        |
| 960 min Summer                                      | 4.949         | 8.4                      | 682                    |                                                                                     |        |
| 1440 min Summer                                     | 3.659         | 7.6                      | 958                    |                                                                                     |        |
| 2160 min Summer                                     | 2.701         | 6.2                      | 1364                   |                                                                                     |        |
| 2880 min Summer                                     | 2.176         | 4.9                      | 1760                   |                                                                                     |        |
| 4320 min Summer                                     | 1.602         | 2.4                      | 2512                   |                                                                                     |        |
| 5760 min Summer                                     | 1.288         | 0.5                      | 3224                   |                                                                                     |        |
| 7200 min Summer                                     | 1.088         | 0.0                      | 3888                   |                                                                                     |        |
| 8640 min Summer                                     | 0.947         | 0.0                      | 4504                   |                                                                                     |        |
| 10080 min Summer                                    | 0.843         | 0.0                      | 5144                   |                                                                                     |        |
| 15 min Winter                                       | 83.344        | 3.4                      | 26                     |                                                                                     |        |
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| XP Solutions                                        |               | Source Control 2016.1    |                        |                                                                                     |        |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 30 min Winter                                       | 83.205        | 24.005                   | 0.3                    | 8.4                                                                                 | FL00D  |
| 60 min Winter                                       | 83.208        | 24.008                   | 0.3                    | 10.6                                                                                | FL00D  |
| 120 min Winter                                      | 83.210        | 24.010                   | 0.3                    | 12.6                                                                                | FL00D  |
| 180 min Winter                                      | 83.211        | 24.011                   | 0.3                    | 13.6                                                                                | FL00D  |
| 240 min Winter                                      | 83.211        | 24.011                   | 0.3                    | 14.2                                                                                | FL00D  |
| 360 min Winter                                      | 83.212        | 24.012                   | 0.3                    | 14.6                                                                                | FL00D  |
| 480 min Winter                                      | 83.212        | 24.012                   | 0.3                    | 14.5                                                                                | FL00D  |
| 600 min Winter                                      | 83.211        | 24.011                   | 0.3                    | 14.2                                                                                | FL00D  |
| 720 min Winter                                      | 83.211        | 24.011                   | 0.3                    | 13.9                                                                                | FL00D  |
| 960 min Winter                                      | 83.210        | 24.010                   | 0.3                    | 13.3                                                                                | FL00D  |
| 1440 min Winter                                     | 83.209        | 24.009                   | 0.3                    | 12.0                                                                                | FL00D  |
| 2160 min Winter                                     | 83.207        | 24.007                   | 0.3                    | 9.8                                                                                 | FL00D  |
| 2880 min Winter                                     | 83.205        | 24.005                   | 0.3                    | 7.7                                                                                 | FL00D  |
| 4320 min Winter                                     | 83.201        | 24.001                   | 0.3                    | 4.0                                                                                 | FL00D  |
| 5760 min Winter                                     | 81.848        | 22.648                   | 0.3                    | 1.4                                                                                 | 0 K    |
| 7200 min Winter                                     | 74.672        | 15.472                   | 0.2                    | 0.5                                                                                 | 0 K    |
| 8640 min Winter                                     | 72.672        | 13.472                   | 0.2                    | 0.4                                                                                 | 0 K    |
| 10080 min Winter                                    | 71.185        | 11.985                   | 0.2                    | 0.4                                                                                 | 0 K    |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 30 min Winter                                       | 55.879        | 5.5                      | 40                     |                                                                                     |        |
| 60 min Winter                                       | 35.949        | 7.6                      | 68                     |                                                                                     |        |
| 120 min Winter                                      | 22.481        | 9.7                      | 126                    |                                                                                     |        |
| 180 min Winter                                      | 16.899        | 10.7                     | 182                    |                                                                                     |        |
| 240 min Winter                                      | 13.734        | 11.2                     | 240                    |                                                                                     |        |
| 360 min Winter                                      | 10.201        | 11.6                     | 352                    |                                                                                     |        |
| 480 min Winter                                      | 8.260         | 11.5                     | 462                    |                                                                                     |        |
| 600 min Winter                                      | 7.008         | 11.3                     | 564                    |                                                                                     |        |
| 720 min Winter                                      | 6.125         | 10.9                     | 590                    |                                                                                     |        |
| 960 min Winter                                      | 4.949         | 10.4                     | 738                    |                                                                                     |        |
| 1440 min Winter                                     | 3.659         | 9.0                      | 1044                   |                                                                                     |        |
| 2160 min Winter                                     | 2.701         | 6.9                      | 1476                   |                                                                                     |        |
| 2880 min Winter                                     | 2.176         | 4.7                      | 1884                   |                                                                                     |        |
| 4320 min Winter                                     | 1.602         | 1.0                      | 2636                   |                                                                                     |        |
| 5760 min Winter                                     | 1.288         | 0.0                      | 3232                   |                                                                                     |        |
| 7200 min Winter                                     | 1.088         | 0.0                      | 3672                   |                                                                                     |        |
| 8640 min Winter                                     | 0.947         | 0.0                      | 4400                   |                                                                                     |        |
| 10080 min Winter                                    | 0.843         | 0.0                      | 5136                   |                                                                                     |        |
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| Designed by pennington_p<br>Checked by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                   |                                                                                     |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   | Source Control 2016.1                                                               |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| <p style="text-align: center;"><u>Rainfall Details</u></p> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Return Period (years)</td> <td>30</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>18.000</td> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Ratio R</td> <td>0.336</td> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> <td>Climate Change %</td> <td>+30</td> </tr> </table> <p style="text-align: center;"><u>Time Area Diagram</u></p> <p style="text-align: center;">Total Area (ha) 0.038</p> <table> <thead> <tr> <th>Time (mins)</th> <th>Area</th> <th>Time (mins)</th> <th>Area</th> <th>Time (mins)</th> <th>Area</th> </tr> <tr> <th>From: To:</th> <th>(ha)</th> <th>From: To:</th> <th>(ha)</th> <th>From: To:</th> <th>(ha)</th> </tr> </thead> <tbody> <tr> <td>0 4</td> <td>0.013</td> <td>4 8</td> <td>0.013</td> <td>8 12</td> <td>0.013</td> </tr> </tbody> </table> |                   |                                                                                     | Rainfall Model | FSR         | Winter Storms | Yes | Return Period (years) | 30 | Cv (Summer) | 0.750 | Region | England and Wales | Cv (Winter) | 0.840 | M5-60 (mm) | 18.000 | Shortest Storm (mins) | 15 | Ratio R | 0.336 | Longest Storm (mins) | 10080 | Summer Storms | Yes | Climate Change % | +30 | Time (mins) | Area | Time (mins) | Area | Time (mins) | Area | From: To: | (ha) | From: To: | (ha) | From: To: | (ha) | 0 4 | 0.013 | 4 8 | 0.013 | 8 12 | 0.013 |
| Rainfall Model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | FSR               | Winter Storms                                                                       | Yes            |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 30                | Cv (Summer)                                                                         | 0.750          |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Region                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | England and Wales | Cv (Winter)                                                                         | 0.840          |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| M5-60 (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 18.000            | Shortest Storm (mins)                                                               | 15             |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Ratio R                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.336             | Longest Storm (mins)                                                                | 10080          |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Summer Storms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Yes               | Climate Change %                                                                    | +30            |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Time (mins)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Area              | Time (mins)                                                                         | Area           | Time (mins) | Area          |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| From: To:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | (ha)              | From: To:                                                                           | (ha)           | From: To:   | (ha)          |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| 0 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.013             | 4 8                                                                                 | 0.013          | 8 12        | 0.013         |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| <p style="text-align: center;">©1982-2016 XP Solutions</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |                                                                                     |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |

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| Designed by pennington_p |
| Checked by               |



Source Control 2016.1

Storage is Online Cover Level (m) 83.200

|                            |        |                                      |         |
|----------------------------|--------|--------------------------------------|---------|
| Chamber Invert Level (m)   | 81.200 | Infiltration Coefficient Base (m/hr) | 0.18000 |
| Chamber Diameter/Width (m) | 1.200  | Safety Factor                        | 2.0     |
| Borehole Diameter (m)      | 0.200  |                                      |         |
| Borehole Depth (m)         | 22.000 |                                      |         |

| Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) |
|--------------|-----------------------------------|--------------|-----------------------------------|--------------|-----------------------------------|
| 0.000        | 0.18000                           | 16.000       | 0.00000                           | 22.000       | 0.00000                           |

| Curtins Consulting Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |               |                     |                          |                 | Page 1                                                                              |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------|--------------------------|-----------------|-------------------------------------------------------------------------------------|--|-------------|---------------|---------------------|------------------------|-----------------|--------|---------------|--------|---------------|--------|-----|-------|---------------|--------|--------|-----|----------------|--------|---------------|--------|----------------|--------|------|-------|----------------|--------|--------|-----|----------------|--------|----------------|--------|----------------|-------|------|-------|----------------|--------|--------|-----|----------------|-------|----------------|--------|----------------|-------|------|-------|-----------------|--------|--------|------|-----------------|-------|----------------|--------|-----------------|-------|------|-------|-----------------|--------|--------|------|-----------------|-------|----------------|--------|-----------------|-------|------|-------|-----------------|--------|--------|------|------------------|-------|-----------------|--------|---------------|--------|------|-------|-----------------|--------|--------|-----|------|-------|-----------------|--------|--------|-----|------|-------|-----------------|--------|--------|-----|-----|-------|-----------------|--------|--------|-----|-----|-------|-----------------|--------|--------|-----|-----|-------|------------------|--------|--------|-----|-----|------------|---------------|--------|--------|-----|-----|-------|
| .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |                     |                          |                 |  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |                     |                          |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |                     |                          |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| Date 21/10/2016 16:20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |               |                     | Designed by pennington_p |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| File E Green Space-3BHS.srcx                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               |                     | Checked by               |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               |                     | Source Control 2016.1    |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| Summary of Results for 30 year Return Period (+30%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                     |                          |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| Half Drain Time : 702 minutes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |                     |                          |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>81.005</td><td>24.005</td><td>0.3</td><td>7.5</td><td>FLOOD</td></tr><tr><td>30 min Summer</td><td>81.007</td><td>24.007</td><td>0.3</td><td>10.0</td><td>FLOOD</td></tr><tr><td>60 min Summer</td><td>81.010</td><td>24.010</td><td>0.3</td><td>12.5</td><td>FLOOD</td></tr><tr><td>120 min Summer</td><td>81.012</td><td>24.012</td><td>0.3</td><td>15.1</td><td>FLOOD</td></tr><tr><td>180 min Summer</td><td>81.013</td><td>24.013</td><td>0.3</td><td>16.4</td><td>FLOOD</td></tr><tr><td>240 min Summer</td><td>81.014</td><td>24.014</td><td>0.3</td><td>17.1</td><td>FLOOD</td></tr><tr><td>360 min Summer</td><td>81.015</td><td>24.015</td><td>0.3</td><td>17.7</td><td>FLOOD</td></tr><tr><td>480 min Summer</td><td>81.015</td><td>24.015</td><td>0.3</td><td>17.8</td><td>FLOOD</td></tr><tr><td>600 min Summer</td><td>81.015</td><td>24.015</td><td>0.3</td><td>17.7</td><td>FLOOD</td></tr><tr><td>720 min Summer</td><td>81.014</td><td>24.014</td><td>0.3</td><td>17.5</td><td>FLOOD</td></tr><tr><td>960 min Summer</td><td>81.014</td><td>24.014</td><td>0.3</td><td>17.0</td><td>FLOOD</td></tr><tr><td>1440 min Summer</td><td>81.013</td><td>24.013</td><td>0.3</td><td>16.2</td><td>FLOOD</td></tr><tr><td>2160 min Summer</td><td>81.012</td><td>24.012</td><td>0.3</td><td>14.9</td><td>FLOOD</td></tr><tr><td>2880 min Summer</td><td>81.011</td><td>24.011</td><td>0.3</td><td>13.5</td><td>FLOOD</td></tr><tr><td>4320 min Summer</td><td>81.008</td><td>24.008</td><td>0.3</td><td>10.7</td><td>FLOOD</td></tr><tr><td>5760 min Summer</td><td>81.005</td><td>24.005</td><td>0.3</td><td>8.2</td><td>FLOOD</td></tr><tr><td>7200 min Summer</td><td>81.003</td><td>24.003</td><td>0.3</td><td>6.1</td><td>FLOOD</td></tr><tr><td>8640 min Summer</td><td>81.001</td><td>24.001</td><td>0.3</td><td>4.3</td><td>FLOOD</td></tr><tr><td>10080 min Summer</td><td>80.972</td><td>23.972</td><td>0.3</td><td>2.9</td><td>Flood Risk</td></tr><tr><td>15 min Winter</td><td>81.005</td><td>24.005</td><td>0.3</td><td>8.4</td><td>FLOOD</td></tr></table> |               |                     |                          |                 |                                                                                     |  | Storm Event | Max Level (m) | Max Depth (m)       | Max Infiltration (l/s) | Max Volume (m³) | Status | 15 min Summer | 81.005 | 24.005        | 0.3    | 7.5 | FLOOD | 30 min Summer | 81.007 | 24.007 | 0.3 | 10.0           | FLOOD  | 60 min Summer | 81.010 | 24.010         | 0.3    | 12.5 | FLOOD | 120 min Summer | 81.012 | 24.012 | 0.3 | 15.1           | FLOOD  | 180 min Summer | 81.013 | 24.013         | 0.3   | 16.4 | FLOOD | 240 min Summer | 81.014 | 24.014 | 0.3 | 17.1           | FLOOD | 360 min Summer | 81.015 | 24.015         | 0.3   | 17.7 | FLOOD | 480 min Summer  | 81.015 | 24.015 | 0.3  | 17.8            | FLOOD | 600 min Summer | 81.015 | 24.015          | 0.3   | 17.7 | FLOOD | 720 min Summer  | 81.014 | 24.014 | 0.3  | 17.5            | FLOOD | 960 min Summer | 81.014 | 24.014          | 0.3   | 17.0 | FLOOD | 1440 min Summer | 81.013 | 24.013 | 0.3  | 16.2             | FLOOD | 2160 min Summer | 81.012 | 24.012        | 0.3    | 14.9 | FLOOD | 2880 min Summer | 81.011 | 24.011 | 0.3 | 13.5 | FLOOD | 4320 min Summer | 81.008 | 24.008 | 0.3 | 10.7 | FLOOD | 5760 min Summer | 81.005 | 24.005 | 0.3 | 8.2 | FLOOD | 7200 min Summer | 81.003 | 24.003 | 0.3 | 6.1 | FLOOD | 8640 min Summer | 81.001 | 24.001 | 0.3 | 4.3 | FLOOD | 10080 min Summer | 80.972 | 23.972 | 0.3 | 2.9 | Flood Risk | 15 min Winter | 81.005 | 24.005 | 0.3 | 8.4 | FLOOD |
| Storm Event                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Max Level (m) | Max Depth (m)       | Max Infiltration (l/s)   | Max Volume (m³) | Status                                                                              |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 15 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 81.005        | 24.005              | 0.3                      | 7.5             | FLOOD                                                                               |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 30 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 81.007        | 24.007              | 0.3                      | 10.0            | FLOOD                                                                               |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 60 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 81.010        | 24.010              | 0.3                      | 12.5            | FLOOD                                                                               |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 120 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 81.012        | 24.012              | 0.3                      | 15.1            | FLOOD                                                                               |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 180 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 81.013        | 24.013              | 0.3                      | 16.4            | FLOOD                                                                               |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 240 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 81.014        | 24.014              | 0.3                      | 17.1            | FLOOD                                                                               |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 360 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 81.015        | 24.015              | 0.3                      | 17.7            | FLOOD                                                                               |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 480 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 81.015        | 24.015              | 0.3                      | 17.8            | FLOOD                                                                               |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 600 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 81.015        | 24.015              | 0.3                      | 17.7            | FLOOD                                                                               |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 720 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 81.014        | 24.014              | 0.3                      | 17.5            | FLOOD                                                                               |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 960 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 81.014        | 24.014              | 0.3                      | 17.0            | FLOOD                                                                               |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 1440 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 81.013        | 24.013              | 0.3                      | 16.2            | FLOOD                                                                               |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 2160 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 81.012        | 24.012              | 0.3                      | 14.9            | FLOOD                                                                               |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 2880 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 81.011        | 24.011              | 0.3                      | 13.5            | FLOOD                                                                               |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 4320 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 81.008        | 24.008              | 0.3                      | 10.7            | FLOOD                                                                               |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 5760 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 81.005        | 24.005              | 0.3                      | 8.2             | FLOOD                                                                               |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 7200 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 81.003        | 24.003              | 0.3                      | 6.1             | FLOOD                                                                               |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 8640 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 81.001        | 24.001              | 0.3                      | 4.3             | FLOOD                                                                               |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 10080 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 80.972        | 23.972              | 0.3                      | 2.9             | Flood Risk                                                                          |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 15 min Winter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 81.005        | 24.005              | 0.3                      | 8.4             | FLOOD                                                                               |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>83.344</td><td>4.5</td><td>26</td></tr><tr><td>30 min Summer</td><td>55.879</td><td>7.0</td><td>40</td></tr><tr><td>60 min Summer</td><td>35.949</td><td>9.6</td><td>70</td></tr><tr><td>120 min Summer</td><td>22.481</td><td>12.1</td><td>128</td></tr><tr><td>180 min Summer</td><td>16.899</td><td>13.4</td><td>186</td></tr><tr><td>240 min Summer</td><td>13.734</td><td>14.1</td><td>246</td></tr><tr><td>360 min Summer</td><td>10.201</td><td>14.8</td><td>364</td></tr><tr><td>480 min Summer</td><td>8.260</td><td>14.9</td><td>482</td></tr><tr><td>600 min Summer</td><td>7.008</td><td>14.7</td><td>576</td></tr><tr><td>720 min Summer</td><td>6.125</td><td>14.5</td><td>626</td></tr><tr><td>960 min Summer</td><td>4.949</td><td>14.0</td><td>752</td></tr><tr><td>1440 min Summer</td><td>3.659</td><td>13.2</td><td>1014</td></tr><tr><td>2160 min Summer</td><td>2.701</td><td>11.9</td><td>1428</td></tr><tr><td>2880 min Summer</td><td>2.176</td><td>10.5</td><td>1828</td></tr><tr><td>4320 min Summer</td><td>1.602</td><td>7.8</td><td>2636</td></tr><tr><td>5760 min Summer</td><td>1.288</td><td>5.3</td><td>3392</td></tr><tr><td>7200 min Summer</td><td>1.088</td><td>3.1</td><td>4104</td></tr><tr><td>8640 min Summer</td><td>0.947</td><td>1.4</td><td>4760</td></tr><tr><td>10080 min Summer</td><td>0.843</td><td>0.0</td><td>5448</td></tr><tr><td>15 min Winter</td><td>83.344</td><td>5.5</td><td>26</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |                     |                          |                 |                                                                                     |  | Storm Event | Rain (mm/hr)  | Flooded Volume (m³) | Time-Peak (mins)       | 15 min Summer   | 83.344 | 4.5           | 26     | 30 min Summer | 55.879 | 7.0 | 40    | 60 min Summer | 35.949 | 9.6    | 70  | 120 min Summer | 22.481 | 12.1          | 128    | 180 min Summer | 16.899 | 13.4 | 186   | 240 min Summer | 13.734 | 14.1   | 246 | 360 min Summer | 10.201 | 14.8           | 364    | 480 min Summer | 8.260 | 14.9 | 482   | 600 min Summer | 7.008  | 14.7   | 576 | 720 min Summer | 6.125 | 14.5           | 626    | 960 min Summer | 4.949 | 14.0 | 752   | 1440 min Summer | 3.659  | 13.2   | 1014 | 2160 min Summer | 2.701 | 11.9           | 1428   | 2880 min Summer | 2.176 | 10.5 | 1828  | 4320 min Summer | 1.602  | 7.8    | 2636 | 5760 min Summer | 1.288 | 5.3            | 3392   | 7200 min Summer | 1.088 | 3.1  | 4104  | 8640 min Summer | 0.947  | 1.4    | 4760 | 10080 min Summer | 0.843 | 0.0             | 5448   | 15 min Winter | 83.344 | 5.5  | 26    |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| Storm Event                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Rain (mm/hr)  | Flooded Volume (m³) | Time-Peak (mins)         |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 15 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 83.344        | 4.5                 | 26                       |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 30 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 55.879        | 7.0                 | 40                       |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 60 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 35.949        | 9.6                 | 70                       |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 120 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 22.481        | 12.1                | 128                      |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 180 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 16.899        | 13.4                | 186                      |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 240 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 13.734        | 14.1                | 246                      |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 360 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 10.201        | 14.8                | 364                      |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 480 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 8.260         | 14.9                | 482                      |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 600 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 7.008         | 14.7                | 576                      |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 720 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 6.125         | 14.5                | 626                      |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 960 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 4.949         | 14.0                | 752                      |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 1440 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3.659         | 13.2                | 1014                     |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 2160 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2.701         | 11.9                | 1428                     |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 2880 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2.176         | 10.5                | 1828                     |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 4320 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.602         | 7.8                 | 2636                     |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 5760 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.288         | 5.3                 | 3392                     |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 7200 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.088         | 3.1                 | 4104                     |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 8640 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.947         | 1.4                 | 4760                     |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 10080 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.843         | 0.0                 | 5448                     |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
| 15 min Winter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 83.344        | 5.5                 | 26                       |                 |                                                                                     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |
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| XP Solutions                                        |               | Source Control 2016.1    |                        |                 |                                                                                     |  |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                 |                                                                                     |  |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³) | Status                                                                              |  |
| 30 min Winter                                       | 81.008        | 24.008                   | 0.3                    | 11.2            | FLOOD                                                                               |  |
| 60 min Winter                                       | 81.011        | 24.011                   | 0.3                    | 14.2            | FLOOD                                                                               |  |
| 120 min Winter                                      | 81.014        | 24.014                   | 0.3                    | 17.1            | FLOOD                                                                               |  |
| 180 min Winter                                      | 81.016        | 24.016                   | 0.3                    | 18.7            | FLOOD                                                                               |  |
| 240 min Winter                                      | 81.017        | 24.017                   | 0.3                    | 19.7            | FLOOD                                                                               |  |
| 360 min Winter                                      | 81.018        | 24.018                   | 0.3                    | 20.6            | FLOOD                                                                               |  |
| 480 min Winter                                      | 81.018        | 24.018                   | 0.3                    | 21.0            | FLOOD                                                                               |  |
| 600 min Winter                                      | 81.018        | 24.018                   | 0.3                    | 21.0            | FLOOD                                                                               |  |
| 720 min Winter                                      | 81.018        | 24.018                   | 0.3                    | 20.9            | FLOOD                                                                               |  |
| 960 min Winter                                      | 81.017        | 24.017                   | 0.3                    | 20.1            | FLOOD                                                                               |  |
| 1440 min Winter                                     | 81.016        | 24.016                   | 0.3                    | 18.9            | FLOOD                                                                               |  |
| 2160 min Winter                                     | 81.014        | 24.014                   | 0.3                    | 16.9            | FLOOD                                                                               |  |
| 2880 min Winter                                     | 81.012        | 24.012                   | 0.3                    | 14.7            | FLOOD                                                                               |  |
| 4320 min Winter                                     | 81.007        | 24.007                   | 0.3                    | 10.3            | FLOOD                                                                               |  |
| 5760 min Winter                                     | 81.004        | 24.004                   | 0.3                    | 6.6             | FLOOD                                                                               |  |
| 7200 min Winter                                     | 81.001        | 24.001                   | 0.3                    | 3.5             | FLOOD                                                                               |  |
| 8640 min Winter                                     | 79.608        | 22.608                   | 0.3                    | 1.4             | 0 K                                                                                 |  |
| 10080 min Winter                                    | 72.786        | 15.786                   | 0.2                    | 0.5             | 0 K                                                                                 |  |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                 |                                                                                     |  |
| 30 min Winter                                       | 55.879        | 8.3                      | 40                     |                 |                                                                                     |  |
| 60 min Winter                                       | 35.949        | 11.2                     | 68                     |                 |                                                                                     |  |
| 120 min Winter                                      | 22.481        | 14.2                     | 126                    |                 |                                                                                     |  |
| 180 min Winter                                      | 16.899        | 15.7                     | 184                    |                 |                                                                                     |  |
| 240 min Winter                                      | 13.734        | 16.7                     | 242                    |                 |                                                                                     |  |
| 360 min Winter                                      | 10.201        | 17.6                     | 356                    |                 |                                                                                     |  |
| 480 min Winter                                      | 8.260         | 18.0                     | 470                    |                 |                                                                                     |  |
| 600 min Winter                                      | 7.008         | 18.1                     | 580                    |                 |                                                                                     |  |
| 720 min Winter                                      | 6.125         | 17.9                     | 688                    |                 |                                                                                     |  |
| 960 min Winter                                      | 4.949         | 17.1                     | 876                    |                 |                                                                                     |  |
| 1440 min Winter                                     | 3.659         | 16.0                     | 1098                   |                 |                                                                                     |  |
| 2160 min Winter                                     | 2.701         | 13.9                     | 1560                   |                 |                                                                                     |  |
| 2880 min Winter                                     | 2.176         | 11.7                     | 1992                   |                 |                                                                                     |  |
| 4320 min Winter                                     | 1.602         | 7.4                      | 2812                   |                 |                                                                                     |  |
| 5760 min Winter                                     | 1.288         | 3.6                      | 3568                   |                 |                                                                                     |  |
| 7200 min Winter                                     | 1.088         | 0.6                      | 4192                   |                 |                                                                                     |  |
| 8640 min Winter                                     | 0.947         | 0.0                      | 4760                   |                 |                                                                                     |  |
| 10080 min Winter                                    | 0.843         | 0.0                      | 5136                   |                 |                                                                                     |  |
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| XP Solutions Source Control 2016.1                    |                                        |                                                                                     |

Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 30                | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 18.000            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.336             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +30   |

Time Area Diagram

Total Area (ha) 0.050

| Time (mins) | Area  | Time (mins) | Area  | Time (mins) | Area  |
|-------------|-------|-------------|-------|-------------|-------|
| From: To:   | (ha)  | From: To:   | (ha)  | From: To:   | (ha)  |
| 0 4         | 0.017 | 4 8         | 0.017 | 8 12        | 0.017 |

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| XP Solutions Source Control 2016.1                    |                                        |                                                                                     |

Model Details

Storage is Online Cover Level (m) 81.000

Deep Bore Soakaway Structure

Chamber Invert Level (m) 79.000 Infiltration Coefficient Base (m/hr) 0.18000  
 Chamber Diameter/Width (m) 1.200 Safety Factor 2.0  
 Borehole Diameter (m) 0.200  
 Borehole Depth (m) 22.000

| Side          | Side           | Side           |
|---------------|----------------|----------------|
| Depth         | Depth          | Depth          |
| Infil.        | Infil.         | Infil.         |
| (m)           | (m)            | (m)            |
| Coef.         | Coef.          | Coef.          |
| (m/hr)        | (m/hr)         | (m/hr)         |
| 0.000 0.18000 | 16.000 0.00000 | 22.000 0.00000 |

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|                                                            |               |                     |                          |                                                                                     |            |  |
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| XP Solutions                                               |               |                     | Source Control 2016.1    |                                                                                     |            |  |
| <u>Summary of Results for 30 year Return Period (+30%)</u> |               |                     |                          |                                                                                     |            |  |
| Half Drain Time : 617 minutes.                             |               |                     |                          |                                                                                     |            |  |
| Storm Event                                                | Max Level (m) | Max Depth (m)       | Max Infiltration (l/s)   | Max Volume (m³)                                                                     | Status     |  |
| 15 min Summer                                              | 85.504        | 24.004              | 0.3                      | 6.7                                                                                 | FLOOD      |  |
| 30 min Summer                                              | 85.506        | 24.006              | 0.3                      | 8.9                                                                                 | FLOOD      |  |
| 60 min Summer                                              | 85.508        | 24.008              | 0.3                      | 11.2                                                                                | FLOOD      |  |
| 120 min Summer                                             | 85.510        | 24.010              | 0.3                      | 13.4                                                                                | FLOOD      |  |
| 180 min Summer                                             | 85.512        | 24.012              | 0.3                      | 14.5                                                                                | FLOOD      |  |
| 240 min Summer                                             | 85.512        | 24.012              | 0.3                      | 15.1                                                                                | FLOOD      |  |
| 360 min Summer                                             | 85.513        | 24.013              | 0.3                      | 15.5                                                                                | FLOOD      |  |
| 480 min Summer                                             | 85.512        | 24.012              | 0.3                      | 15.4                                                                                | FLOOD      |  |
| 600 min Summer                                             | 85.512        | 24.012              | 0.3                      | 15.2                                                                                | FLOOD      |  |
| 720 min Summer                                             | 85.512        | 24.012              | 0.3                      | 15.0                                                                                | FLOOD      |  |
| 960 min Summer                                             | 85.512        | 24.012              | 0.3                      | 14.6                                                                                | FLOOD      |  |
| 1440 min Summer                                            | 85.511        | 24.011              | 0.3                      | 13.8                                                                                | FLOOD      |  |
| 2160 min Summer                                            | 85.509        | 24.009              | 0.3                      | 12.4                                                                                | FLOOD      |  |
| 2880 min Summer                                            | 85.508        | 24.008              | 0.3                      | 11.1                                                                                | FLOOD      |  |
| 4320 min Summer                                            | 85.505        | 24.005              | 0.3                      | 8.4                                                                                 | FLOOD      |  |
| 5760 min Summer                                            | 85.503        | 24.003              | 0.3                      | 6.1                                                                                 | FLOOD      |  |
| 7200 min Summer                                            | 85.501        | 24.001              | 0.3                      | 4.2                                                                                 | FLOOD      |  |
| 8640 min Summer                                            | 85.290        | 23.790              | 0.3                      | 2.7                                                                                 | Flood Risk |  |
| 10080 min Summer                                           | 84.340        | 22.840              | 0.3                      | 1.6                                                                                 | 0 K        |  |
| 15 min Winter                                              | 85.505        | 24.005              | 0.3                      | 7.5                                                                                 | FLOOD      |  |
| Storm Event                                                | Rain (mm/hr)  | Flooded Volume (m³) | Time-Peak (mins)         |                                                                                     |            |  |
| 15 min Summer                                              | 83.344        | 3.7                 | 27                       |                                                                                     |            |  |
| 30 min Summer                                              | 55.879        | 5.9                 | 41                       |                                                                                     |            |  |
| 60 min Summer                                              | 35.949        | 8.2                 | 70                       |                                                                                     |            |  |
| 120 min Summer                                             | 22.481        | 10.4                | 128                      |                                                                                     |            |  |
| 180 min Summer                                             | 16.899        | 11.5                | 188                      |                                                                                     |            |  |
| 240 min Summer                                             | 13.734        | 12.1                | 246                      |                                                                                     |            |  |
| 360 min Summer                                             | 10.201        | 12.5                | 364                      |                                                                                     |            |  |
| 480 min Summer                                             | 8.260         | 12.5                | 480                      |                                                                                     |            |  |
| 600 min Summer                                             | 7.008         | 12.3                | 534                      |                                                                                     |            |  |
| 720 min Summer                                             | 6.125         | 12.1                | 600                      |                                                                                     |            |  |
| 960 min Summer                                             | 4.949         | 11.6                | 724                      |                                                                                     |            |  |
| 1440 min Summer                                            | 3.659         | 10.8                | 990                      |                                                                                     |            |  |
| 2160 min Summer                                            | 2.701         | 9.5                 | 1396                     |                                                                                     |            |  |
| 2880 min Summer                                            | 2.176         | 8.1                 | 1800                     |                                                                                     |            |  |
| 4320 min Summer                                            | 1.602         | 5.4                 | 2596                     |                                                                                     |            |  |
| 5760 min Summer                                            | 1.288         | 3.1                 | 3304                     |                                                                                     |            |  |
| 7200 min Summer                                            | 1.088         | 1.2                 | 4032                     |                                                                                     |            |  |
| 8640 min Summer                                            | 0.947         | 0.0                 | 4680                     |                                                                                     |            |  |
| 10080 min Summer                                           | 0.843         | 0.0                 | 5344                     |                                                                                     |            |  |
| 15 min Winter                                              | 83.344        | 4.6                 | 27                       |                                                                                     |            |  |
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| Curtins Consulting Ltd                              |               |                     |                                                                                     |                 | Page 2 |  |
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| Date 21/10/2016 16:06                               |               |                     | Designed by pennington_p                                                            |                 |        |  |
| File Green Space N of Home F...                     |               |                     | Checked by                                                                          |                 |        |  |
| XP Solutions                                        |               |                     | Source Control 2016.1                                                               |                 |        |  |
| Summary of Results for 30 year Return Period (+30%) |               |                     |                                                                                     |                 |        |  |
| Storm Event                                         | Max Level (m) | Max Depth (m)       | Max Infiltration (l/s)                                                              | Max Volume (m³) | Status |  |
| 30 min Winter                                       | 85.507        | 24.007              | 0.3                                                                                 | 10.0            | FLOOD  |  |
| 60 min Winter                                       | 85.510        | 24.010              | 0.3                                                                                 | 12.7            | FLOOD  |  |
| 120 min Winter                                      | 85.512        | 24.012              | 0.3                                                                                 | 15.2            | FLOOD  |  |
| 180 min Winter                                      | 85.514        | 24.014              | 0.3                                                                                 | 16.6            | FLOOD  |  |
| 240 min Winter                                      | 85.514        | 24.014              | 0.3                                                                                 | 17.4            | FLOOD  |  |
| 360 min Winter                                      | 85.515        | 24.015              | 0.3                                                                                 | 18.1            | FLOOD  |  |
| 480 min Winter                                      | 85.515        | 24.015              | 0.3                                                                                 | 18.3            | FLOOD  |  |
| 600 min Winter                                      | 85.515        | 24.015              | 0.3                                                                                 | 18.2            | FLOOD  |  |
| 720 min Winter                                      | 85.515        | 24.015              | 0.3                                                                                 | 17.9            | FLOOD  |  |
| 960 min Winter                                      | 85.514        | 24.014              | 0.3                                                                                 | 17.2            | FLOOD  |  |
| 1440 min Winter                                     | 85.513        | 24.013              | 0.3                                                                                 | 16.0            | FLOOD  |  |
| 2160 min Winter                                     | 85.511        | 24.011              | 0.3                                                                                 | 13.9            | FLOOD  |  |
| 2880 min Winter                                     | 85.509        | 24.009              | 0.3                                                                                 | 11.7            | FLOOD  |  |
| 4320 min Winter                                     | 85.505        | 24.005              | 0.3                                                                                 | 7.5             | FLOOD  |  |
| 5760 min Winter                                     | 85.501        | 24.001              | 0.3                                                                                 | 4.1             | FLOOD  |  |
| 7200 min Winter                                     | 84.347        | 22.847              | 0.3                                                                                 | 1.6             | 0 K    |  |
| 8640 min Winter                                     | 77.564        | 16.064              | 0.3                                                                                 | 0.5             | 0 K    |  |
| 10080 min Winter                                    | 75.764        | 14.264              | 0.2                                                                                 | 0.4             | 0 K    |  |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³) | Time-Peak (mins)                                                                    |                 |        |  |
| 30 min Winter                                       | 55.879        | 7.1                 | 41                                                                                  |                 |        |  |
| 60 min Winter                                       | 35.949        | 9.7                 | 70                                                                                  |                 |        |  |
| 120 min Winter                                      | 22.481        | 12.3                | 126                                                                                 |                 |        |  |
| 180 min Winter                                      | 16.899        | 13.6                | 184                                                                                 |                 |        |  |
| 240 min Winter                                      | 13.734        | 14.4                | 242                                                                                 |                 |        |  |
| 360 min Winter                                      | 10.201        | 15.1                | 356                                                                                 |                 |        |  |
| 480 min Winter                                      | 8.260         | 15.3                | 468                                                                                 |                 |        |  |
| 600 min Winter                                      | 7.008         | 15.2                | 578                                                                                 |                 |        |  |
| 720 min Winter                                      | 6.125         | 14.9                | 678                                                                                 |                 |        |  |
| 960 min Winter                                      | 4.949         | 14.2                | 774                                                                                 |                 |        |  |
| 1440 min Winter                                     | 3.659         | 13.0                | 1078                                                                                |                 |        |  |
| 2160 min Winter                                     | 2.701         | 10.9                | 1536                                                                                |                 |        |  |
| 2880 min Winter                                     | 2.176         | 8.7                 | 1964                                                                                |                 |        |  |
| 4320 min Winter                                     | 1.602         | 4.6                 | 2744                                                                                |                 |        |  |
| 5760 min Winter                                     | 1.288         | 1.2                 | 3456                                                                                |                 |        |  |
| 7200 min Winter                                     | 1.088         | 0.0                 | 4040                                                                                |                 |        |  |
| 8640 min Winter                                     | 0.947         | 0.0                 | 4328                                                                                |                 |        |  |
| 10080 min Winter                                    | 0.843         | 0.0                 | 5064                                                                                |                 |        |  |
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|--------------------------|
| Designed by pennington_p |
| Checked by               |



Source Control 2016.1

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 30                | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 18.000            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.336             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +30   |

|                                          |     |                                |       |
|------------------------------------------|-----|--------------------------------|-------|
| Volume in Pipe Network (m <sup>3</sup> ) | 1   | Dia of Outfall Pipe (m)        | 0.2   |
| Slope of Outfall Pipe (1:X)              | 175 | Roughness of Outfall Pipe (mm) | 0.600 |

Total Area (ha) 0.045

| Time (mins) | Area  | Time (mins) | Area  | Time (mins) | Area  |
|-------------|-------|-------------|-------|-------------|-------|
| From: To:   | (ha)  | From: To:   | (ha)  | From: To:   | (ha)  |
| 0 4         | 0.015 | 4 8         | 0.015 | 8 12        | 0.015 |

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| Date 21/10/2016 16:06                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Designed by pennington_p          |                                                                                     |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
| File Green Space N of Home F...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Checked by                        |                                                                                     |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                   | Source Control 2016.1                                                               |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
| <p align="center"><u>Model Details</u></p> <p align="center">Storage is Online Cover Level (m) 85.500</p> <p align="center"><u>Deep Bore Soakaway Structure</u></p> <p>           Chamber Invert Level (m) 83.500    Infiltration Coefficient Base (m/hr) 0.18000<br/>           Chamber Diameter/Width (m) 1.200    Safety Factor 2.0<br/>           Borehole Diameter (m) 0.200<br/>           Borehole Depth (m) 22.000         </p> <table border="1"> <thead> <tr> <th>Depth<br/>(m)</th> <th>Side<br/>Infil.<br/>Coef.<br/>(m/hr)</th> <th>Depth<br/>(m)</th> <th>Side<br/>Infil.<br/>Coef.<br/>(m/hr)</th> <th>Depth<br/>(m)</th> <th>Side<br/>Infil.<br/>Coef.<br/>(m/hr)</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>0.18000</td> <td>16.000</td> <td>0.00000</td> <td>22.000</td> <td>0.00000</td> </tr> </tbody> </table> |                                   |                                                                                     | Depth<br>(m)                      | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m)                      | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) | 0.000 | 0.18000 | 16.000 | 0.00000 | 22.000 | 0.00000 |
| Depth<br>(m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m)                                                                        | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m)                      | Side<br>Infil.<br>Coef.<br>(m/hr) |                                   |              |                                   |       |         |        |         |        |         |
| 0.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.18000                           | 16.000                                                                              | 0.00000                           | 22.000                            | 0.00000                           |                                   |              |                                   |       |         |        |         |        |         |
| <p align="center">©1982-2016 XP Solutions</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |                                                                                     |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |

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| XP Solutions                                               |               | Source Control 2016.1    |                        |                                                                                     |        |
| <u>Summary of Results for 30 year Return Period (+30%)</u> |               |                          |                        |                                                                                     |        |
| Half Drain Time : 758 minutes.                             |               |                          |                        |                                                                                     |        |
| Storm Event                                                | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 15 min Summer                                              | 84.005        | 24.005                   | 0.3                    | 7.7                                                                                 | FLOOD  |
| 30 min Summer                                              | 84.007        | 24.007                   | 0.3                    | 10.4                                                                                | FLOOD  |
| 60 min Summer                                              | 84.010        | 24.010                   | 0.3                    | 13.2                                                                                | FLOOD  |
| 120 min Summer                                             | 84.013        | 24.013                   | 0.3                    | 16.0                                                                                | FLOOD  |
| 180 min Summer                                             | 84.014        | 24.014                   | 0.3                    | 17.4                                                                                | FLOOD  |
| 240 min Summer                                             | 84.015        | 24.015                   | 0.3                    | 18.2                                                                                | FLOOD  |
| 360 min Summer                                             | 84.016        | 24.016                   | 0.3                    | 19.0                                                                                | FLOOD  |
| 480 min Summer                                             | 84.016        | 24.016                   | 0.3                    | 19.3                                                                                | FLOOD  |
| 600 min Summer                                             | 84.016        | 24.016                   | 0.3                    | 19.2                                                                                | FLOOD  |
| 720 min Summer                                             | 84.016        | 24.016                   | 0.3                    | 19.0                                                                                | FLOOD  |
| 960 min Summer                                             | 84.016        | 24.016                   | 0.3                    | 18.5                                                                                | FLOOD  |
| 1440 min Summer                                            | 84.015        | 24.015                   | 0.3                    | 17.7                                                                                | FLOOD  |
| 2160 min Summer                                            | 84.013        | 24.013                   | 0.3                    | 16.4                                                                                | FLOOD  |
| 2880 min Summer                                            | 84.012        | 24.012                   | 0.3                    | 15.0                                                                                | FLOOD  |
| 4320 min Summer                                            | 84.009        | 24.009                   | 0.3                    | 12.2                                                                                | FLOOD  |
| 5760 min Summer                                            | 84.007        | 24.007                   | 0.3                    | 9.6                                                                                 | FLOOD  |
| 7200 min Summer                                            | 84.004        | 24.004                   | 0.3                    | 7.3                                                                                 | FLOOD  |
| 8640 min Summer                                            | 84.002        | 24.002                   | 0.3                    | 5.4                                                                                 | FLOOD  |
| 10080 min Summer                                           | 84.001        | 24.001                   | 0.3                    | 3.8                                                                                 | FLOOD  |
| 15 min Winter                                              | 84.006        | 24.006                   | 0.3                    | 8.7                                                                                 | FLOOD  |
| Storm Event                                                | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 15 min Summer                                              | 83.344        | 4.8                      | 36                     |                                                                                     |        |
| 30 min Summer                                              | 55.879        | 7.4                      | 48                     |                                                                                     |        |
| 60 min Summer                                              | 35.949        | 10.2                     | 76                     |                                                                                     |        |
| 120 min Summer                                             | 22.481        | 13.0                     | 134                    |                                                                                     |        |
| 180 min Summer                                             | 16.899        | 14.4                     | 192                    |                                                                                     |        |
| 240 min Summer                                             | 13.734        | 15.3                     | 252                    |                                                                                     |        |
| 360 min Summer                                             | 10.201        | 16.1                     | 368                    |                                                                                     |        |
| 480 min Summer                                             | 8.260         | 16.3                     | 486                    |                                                                                     |        |
| 600 min Summer                                             | 7.008         | 16.2                     | 600                    |                                                                                     |        |
| 720 min Summer                                             | 6.125         | 16.0                     | 648                    |                                                                                     |        |
| 960 min Summer                                             | 4.949         | 15.5                     | 772                    |                                                                                     |        |
| 1440 min Summer                                            | 3.659         | 14.7                     | 1034                   |                                                                                     |        |
| 2160 min Summer                                            | 2.701         | 13.4                     | 1452                   |                                                                                     |        |
| 2880 min Summer                                            | 2.176         | 12.0                     | 1856                   |                                                                                     |        |
| 4320 min Summer                                            | 1.602         | 9.3                      | 2648                   |                                                                                     |        |
| 5760 min Summer                                            | 1.288         | 6.7                      | 3408                   |                                                                                     |        |
| 7200 min Summer                                            | 1.088         | 4.4                      | 4152                   |                                                                                     |        |
| 8640 min Summer                                            | 0.947         | 2.5                      | 4848                   |                                                                                     |        |
| 10080 min Summer                                           | 0.843         | 0.9                      | 5552                   |                                                                                     |        |
| 15 min Winter                                              | 83.344        | 5.7                      | 36                     |                                                                                     |        |
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| File N Shared Space-3BHs.srcx                       |               | Checked by               |                        |                                                                                     |        |
| XP Solutions                                        |               | Source Control 2016.1    |                        |                                                                                     |        |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 30 min Winter                                       | 84.009        | 24.009                   | 0.3                    | 11.7                                                                                | FLOOD  |
| 60 min Winter                                       | 84.012        | 24.012                   | 0.3                    | 14.9                                                                                | FLOOD  |
| 120 min Winter                                      | 84.015        | 24.015                   | 0.3                    | 18.1                                                                                | FLOOD  |
| 180 min Winter                                      | 84.017        | 24.017                   | 0.3                    | 19.9                                                                                | FLOOD  |
| 240 min Winter                                      | 84.018        | 24.018                   | 0.3                    | 20.9                                                                                | FLOOD  |
| 360 min Winter                                      | 84.019        | 24.019                   | 0.3                    | 22.1                                                                                | FLOOD  |
| 480 min Winter                                      | 84.020        | 24.020                   | 0.3                    | 22.6                                                                                | FLOOD  |
| 600 min Winter                                      | 84.020        | 24.020                   | 0.3                    | 22.7                                                                                | FLOOD  |
| 720 min Winter                                      | 84.020        | 24.020                   | 0.3                    | 22.6                                                                                | FLOOD  |
| 960 min Winter                                      | 84.019        | 24.019                   | 0.3                    | 22.0                                                                                | FLOOD  |
| 1440 min Winter                                     | 84.018        | 24.018                   | 0.3                    | 20.7                                                                                | FLOOD  |
| 2160 min Winter                                     | 84.016        | 24.016                   | 0.3                    | 18.7                                                                                | FLOOD  |
| 2880 min Winter                                     | 84.014        | 24.014                   | 0.3                    | 16.5                                                                                | FLOOD  |
| 4320 min Winter                                     | 84.009        | 24.009                   | 0.3                    | 12.1                                                                                | FLOOD  |
| 5760 min Winter                                     | 84.005        | 24.005                   | 0.3                    | 8.2                                                                                 | FLOOD  |
| 7200 min Winter                                     | 84.002        | 24.002                   | 0.3                    | 4.9                                                                                 | FLOOD  |
| 8640 min Winter                                     | 83.455        | 23.455                   | 0.3                    | 2.3                                                                                 | 0 K    |
| 10080 min Winter                                    | 82.070        | 22.070                   | 0.3                    | 0.8                                                                                 | 0 K    |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 30 min Winter                                       | 55.879        | 8.7                      | 49                     |                                                                                     |        |
| 60 min Winter                                       | 35.949        | 11.9                     | 76                     |                                                                                     |        |
| 120 min Winter                                      | 22.481        | 15.2                     | 132                    |                                                                                     |        |
| 180 min Winter                                      | 16.899        | 16.9                     | 190                    |                                                                                     |        |
| 240 min Winter                                      | 13.734        | 18.0                     | 248                    |                                                                                     |        |
| 360 min Winter                                      | 10.201        | 19.1                     | 362                    |                                                                                     |        |
| 480 min Winter                                      | 8.260         | 19.6                     | 476                    |                                                                                     |        |
| 600 min Winter                                      | 7.008         | 19.8                     | 588                    |                                                                                     |        |
| 720 min Winter                                      | 6.125         | 19.7                     | 698                    |                                                                                     |        |
| 960 min Winter                                      | 4.949         | 19.0                     | 898                    |                                                                                     |        |
| 1440 min Winter                                     | 3.659         | 17.8                     | 1116                   |                                                                                     |        |
| 2160 min Winter                                     | 2.701         | 15.8                     | 1580                   |                                                                                     |        |
| 2880 min Winter                                     | 2.176         | 13.6                     | 2024                   |                                                                                     |        |
| 4320 min Winter                                     | 1.602         | 9.2                      | 2856                   |                                                                                     |        |
| 5760 min Winter                                     | 1.288         | 5.2                      | 3592                   |                                                                                     |        |
| 7200 min Winter                                     | 1.088         | 1.9                      | 4328                   |                                                                                     |        |
| 8640 min Winter                                     | 0.947         | 0.0                      | 4936                   |                                                                                     |        |
| 10080 min Winter                                    | 0.843         | 0.0                      | 5376                   |                                                                                     |        |
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| Date 21/10/2016 16:05<br>File N Shared Space-3BHs.srcx                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Designed by pennington_p<br>Checked by |                                                                                     |                      |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                                                                     |                      |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Source Control 2016.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                                                                     |                      |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| <p align="center"><u>Rainfall Details</u></p> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Return Period (years)</td> <td>30</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>18.000</td> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Ratio R</td> <td>0.336</td> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> <td>Climate Change %</td> <td>+30</td> </tr> </table> <p align="center"><u>Pipe Network</u></p> <table> <tr> <td>Volume in Pipe Network (m³)</td> <td>5</td> <td>Dia of Outfall Pipe (m)</td> <td>0.2</td> </tr> <tr> <td>Slope of Outfall Pipe (1:X)</td> <td>175</td> <td>Roughness of Outfall Pipe (mm)</td> <td>0.600</td> </tr> </table> <p align="center"><u>Time Area Diagram</u></p> <p align="center">Total Area (ha) 0.053</p> <table> <thead> <tr> <th>Time (mins)<br/>From:</th> <th>Time (mins)<br/>To:</th> <th>Area<br/>(ha)</th> <th>Time (mins)<br/>From:</th> <th>Time (mins)<br/>To:</th> <th>Area<br/>(ha)</th> <th>Time (mins)<br/>From:</th> <th>Time (mins)<br/>To:</th> <th>Area<br/>(ha)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>4</td> <td>0.018</td> <td>4</td> <td>8</td> <td>0.018</td> <td>8</td> <td>12</td> <td>0.018</td> </tr> </tbody> </table> |                                        |                                                                                     | Rainfall Model       | FSR                | Winter Storms | Yes                  | Return Period (years) | 30           | Cv (Summer) | 0.750 | Region | England and Wales | Cv (Winter) | 0.840 | M5-60 (mm) | 18.000 | Shortest Storm (mins) | 15 | Ratio R | 0.336 | Longest Storm (mins) | 10080 | Summer Storms | Yes | Climate Change % | +30 | Volume in Pipe Network (m³) | 5 | Dia of Outfall Pipe (m) | 0.2 | Slope of Outfall Pipe (1:X) | 175 | Roughness of Outfall Pipe (mm) | 0.600 | Time (mins)<br>From: | Time (mins)<br>To: | Area<br>(ha) | Time (mins)<br>From: | Time (mins)<br>To: | Area<br>(ha) | Time (mins)<br>From: | Time (mins)<br>To: | Area<br>(ha) | 0 | 4 | 0.018 | 4 | 8 | 0.018 | 8 | 12 | 0.018 |
| Rainfall Model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | FSR                                    | Winter Storms                                                                       | Yes                  |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 30                                     | Cv (Summer)                                                                         | 0.750                |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Region                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | England and Wales                      | Cv (Winter)                                                                         | 0.840                |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| M5-60 (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 18.000                                 | Shortest Storm (mins)                                                               | 15                   |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Ratio R                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.336                                  | Longest Storm (mins)                                                                | 10080                |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Summer Storms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Yes                                    | Climate Change %                                                                    | +30                  |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Volume in Pipe Network (m³)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 5                                      | Dia of Outfall Pipe (m)                                                             | 0.2                  |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Slope of Outfall Pipe (1:X)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 175                                    | Roughness of Outfall Pipe (mm)                                                      | 0.600                |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Time (mins)<br>From:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Time (mins)<br>To:                     | Area<br>(ha)                                                                        | Time (mins)<br>From: | Time (mins)<br>To: | Area<br>(ha)  | Time (mins)<br>From: | Time (mins)<br>To:    | Area<br>(ha) |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 4                                      | 0.018                                                                               | 4                    | 8                  | 0.018         | 8                    | 12                    | 0.018        |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| <p align="center">©1982-2016 XP Solutions</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        |                                                                                     |                      |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |

| Curtins Consulting Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        | Page 4                                                                              |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|--------------|-----------------------------------|-------|---------|--------|---------|--------|---------|
| .<br>.<br>.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |  |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
| Date 21/10/2016 16:05<br>File N Shared Space-3BHs.srcx                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Designed by pennington_p<br>Checked by |                                                                                     |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                        |                                                                                     |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
| Source Control 2016.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                                                                     |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
| <p align="center"><u>Model Details</u></p> <p align="center">Storage is Online Cover Level (m) 84.000</p> <p align="center"><u>Deep Bore Soakaway Structure</u></p> <p>           Chamber Invert Level (m) 82.000    Infiltration Coefficient Base (m/hr) 0.18000<br/>           Chamber Diameter/Width (m) 1.200    Safety Factor 2.0<br/>           Borehole Diameter (m) 0.200<br/>           Borehole Depth (m) 22.000         </p> <table border="1"> <thead> <tr> <th>Depth<br/>(m)</th> <th>Side<br/>Infil.<br/>Coef.<br/>(m/hr)</th> <th>Depth<br/>(m)</th> <th>Side<br/>Infil.<br/>Coef.<br/>(m/hr)</th> <th>Depth<br/>(m)</th> <th>Side<br/>Infil.<br/>Coef.<br/>(m/hr)</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>0.18000</td> <td>16.000</td> <td>0.00000</td> <td>22.000</td> <td>0.00000</td> </tr> </tbody> </table> |                                        |                                                                                     | Depth<br>(m)                      | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m)                      | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) | 0.000 | 0.18000 | 16.000 | 0.00000 | 22.000 | 0.00000 |
| Depth<br>(m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Side<br>Infil.<br>Coef.<br>(m/hr)      | Depth<br>(m)                                                                        | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m)                      | Side<br>Infil.<br>Coef.<br>(m/hr) |                                   |              |                                   |       |         |        |         |        |         |
| 0.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.18000                                | 16.000                                                                              | 0.00000                           | 22.000                            | 0.00000                           |                                   |              |                                   |       |         |        |         |        |         |
| ©1982-2016 XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                                                                     |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |

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| Curtins Consulting Ltd                                     |                        |                              |                                    |                                       | Page 1                                                                              |               |
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| Date 21/10/2016 16:19                                      |                        |                              |                                    |                                       | Designed by pennington_p                                                            |               |
| File NE Cul-de-Sac-3BHS.srcx                               |                        |                              |                                    |                                       | Checked by                                                                          |               |
| XP Solutions                                               |                        |                              |                                    |                                       | Source Control 2016.1                                                               |               |
| <u>Summary of Results for 30 year Return Period (+30%)</u> |                        |                              |                                    |                                       |                                                                                     |               |
| Half Drain Time : 816 minutes.                             |                        |                              |                                    |                                       |                                                                                     |               |
|                                                            | <b>Storm<br/>Event</b> | <b>Max<br/>Level<br/>(m)</b> | <b>Max<br/>Depth<br/>(m)</b>       | <b>Max<br/>Infiltration<br/>(l/s)</b> | <b>Max<br/>Volume<br/>(m³)</b>                                                      | <b>Status</b> |
|                                                            | 15 min Summer          | 82.605                       | 24.005                             | 0.3                                   | 8.4                                                                                 | FL00D         |
|                                                            | 30 min Summer          | 82.608                       | 24.008                             | 0.3                                   | 11.2                                                                                | FL00D         |
|                                                            | 60 min Summer          | 82.611                       | 24.011                             | 0.3                                   | 14.1                                                                                | FL00D         |
|                                                            | 120 min Summer         | 82.614                       | 24.014                             | 0.3                                   | 17.1                                                                                | FL00D         |
|                                                            | 180 min Summer         | 82.616                       | 24.016                             | 0.3                                   | 18.6                                                                                | FL00D         |
|                                                            | 240 min Summer         | 82.617                       | 24.017                             | 0.3                                   | 19.5                                                                                | FL00D         |
|                                                            | 360 min Summer         | 82.617                       | 24.017                             | 0.3                                   | 20.4                                                                                | FL00D         |
|                                                            | 480 min Summer         | 82.618                       | 24.018                             | 0.3                                   | 20.8                                                                                | FL00D         |
|                                                            | 600 min Summer         | 82.618                       | 24.018                             | 0.3                                   | 20.7                                                                                | FL00D         |
|                                                            | 720 min Summer         | 82.618                       | 24.018                             | 0.3                                   | 20.5                                                                                | FL00D         |
|                                                            | 960 min Summer         | 82.617                       | 24.017                             | 0.3                                   | 20.0                                                                                | FL00D         |
|                                                            | 1440 min Summer        | 82.616                       | 24.016                             | 0.3                                   | 19.2                                                                                | FL00D         |
|                                                            | 2160 min Summer        | 82.615                       | 24.015                             | 0.3                                   | 17.9                                                                                | FL00D         |
|                                                            | 2880 min Summer        | 82.614                       | 24.014                             | 0.3                                   | 16.5                                                                                | FL00D         |
|                                                            | 4320 min Summer        | 82.611                       | 24.011                             | 0.3                                   | 13.7                                                                                | FL00D         |
|                                                            | 5760 min Summer        | 82.608                       | 24.008                             | 0.3                                   | 11.1                                                                                | FL00D         |
|                                                            | 7200 min Summer        | 82.606                       | 24.006                             | 0.3                                   | 8.7                                                                                 | FL00D         |
|                                                            | 8640 min Summer        | 82.604                       | 24.004                             | 0.3                                   | 6.6                                                                                 | FL00D         |
|                                                            | 10080 min Summer       | 82.602                       | 24.002                             | 0.3                                   | 4.9                                                                                 | FL00D         |
|                                                            | 15 min Winter          | 82.607                       | 24.007                             | 0.3                                   | 9.5                                                                                 | FL00D         |
|                                                            | <b>Storm<br/>Event</b> | <b>Rain<br/>(mm/hr)</b>      | <b>Flooded<br/>Volume<br/>(m³)</b> | <b>Time-Peak<br/>(mins)</b>           |                                                                                     |               |
|                                                            | 15 min Summer          | 83.344                       | 5.5                                | 26                                    |                                                                                     |               |
|                                                            | 30 min Summer          | 55.879                       | 8.2                                | 41                                    |                                                                                     |               |
|                                                            | 60 min Summer          | 35.949                       | 11.2                               | 70                                    |                                                                                     |               |
|                                                            | 120 min Summer         | 22.481                       | 14.1                               | 128                                   |                                                                                     |               |
|                                                            | 180 min Summer         | 16.899                       | 15.6                               | 188                                   |                                                                                     |               |
|                                                            | 240 min Summer         | 13.734                       | 16.6                               | 246                                   |                                                                                     |               |
|                                                            | 360 min Summer         | 10.201                       | 17.5                               | 364                                   |                                                                                     |               |
|                                                            | 480 min Summer         | 8.260                        | 17.8                               | 482                                   |                                                                                     |               |
|                                                            | 600 min Summer         | 7.008                        | 17.8                               | 600                                   |                                                                                     |               |
|                                                            | 720 min Summer         | 6.125                        | 17.5                               | 678                                   |                                                                                     |               |
|                                                            | 960 min Summer         | 4.949                        | 17.1                               | 792                                   |                                                                                     |               |
|                                                            | 1440 min Summer        | 3.659                        | 16.2                               | 1044                                  |                                                                                     |               |
|                                                            | 2160 min Summer        | 2.701                        | 14.9                               | 1456                                  |                                                                                     |               |
|                                                            | 2880 min Summer        | 2.176                        | 13.5                               | 1856                                  |                                                                                     |               |
|                                                            | 4320 min Summer        | 1.602                        | 10.8                               | 2680                                  |                                                                                     |               |
|                                                            | 5760 min Summer        | 1.288                        | 8.1                                | 3456                                  |                                                                                     |               |
|                                                            | 7200 min Summer        | 1.088                        | 5.7                                | 4184                                  |                                                                                     |               |
|                                                            | 8640 min Summer        | 0.947                        | 3.7                                | 4856                                  |                                                                                     |               |
|                                                            | 10080 min Summer       | 0.843                        | 1.9                                | 5552                                  |                                                                                     |               |
|                                                            | 15 min Winter          | 83.344                       | 6.5                                | 26                                    |                                                                                     |               |
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|-----------------------------------------------------|---------------|--------------------------|------------------------|-------------------------------------------------------------------------------------|--------|
| Curtins Consulting Ltd                              |               |                          |                        | Page 2                                                                              |        |
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| File NE Cul-de-Sac-3BHS.srcx                        |               | Checked by               |                        |                                                                                     |        |
| XP Solutions                                        |               | Source Control 2016.1    |                        |                                                                                     |        |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 30 min Winter                                       | 82.610        | 24.010                   | 0.3                    | 12.6                                                                                | FLOOD  |
| 60 min Winter                                       | 82.613        | 24.013                   | 0.3                    | 16.0                                                                                | FLOOD  |
| 120 min Winter                                      | 82.616        | 24.016                   | 0.3                    | 19.4                                                                                | FLOOD  |
| 180 min Winter                                      | 82.618        | 24.018                   | 0.3                    | 21.2                                                                                | FLOOD  |
| 240 min Winter                                      | 82.619        | 24.019                   | 0.3                    | 22.4                                                                                | FLOOD  |
| 360 min Winter                                      | 82.621        | 24.021                   | 0.3                    | 23.7                                                                                | FLOOD  |
| 480 min Winter                                      | 82.621        | 24.021                   | 0.3                    | 24.3                                                                                | FLOOD  |
| 600 min Winter                                      | 82.622        | 24.022                   | 0.3                    | 24.5                                                                                | FLOOD  |
| 720 min Winter                                      | 82.621        | 24.021                   | 0.3                    | 24.5                                                                                | FLOOD  |
| 960 min Winter                                      | 82.621        | 24.021                   | 0.3                    | 23.9                                                                                | FLOOD  |
| 1440 min Winter                                     | 82.620        | 24.020                   | 0.3                    | 22.6                                                                                | FLOOD  |
| 2160 min Winter                                     | 82.618        | 24.018                   | 0.3                    | 20.6                                                                                | FLOOD  |
| 2880 min Winter                                     | 82.615        | 24.015                   | 0.3                    | 18.4                                                                                | FLOOD  |
| 4320 min Winter                                     | 82.611        | 24.011                   | 0.3                    | 14.0                                                                                | FLOOD  |
| 5760 min Winter                                     | 82.607        | 24.007                   | 0.3                    | 9.9                                                                                 | FLOOD  |
| 7200 min Winter                                     | 82.603        | 24.003                   | 0.3                    | 6.3                                                                                 | FLOOD  |
| 8640 min Winter                                     | 82.601        | 24.001                   | 0.3                    | 3.5                                                                                 | FLOOD  |
| 10080 min Winter                                    | 81.292        | 22.692                   | 0.3                    | 1.5                                                                                 | 0 K    |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 30 min Winter                                       | 55.879        | 9.7                      | 40                     |                                                                                     |        |
| 60 min Winter                                       | 35.949        | 13.0                     | 68                     |                                                                                     |        |
| 120 min Winter                                      | 22.481        | 16.4                     | 126                    |                                                                                     |        |
| 180 min Winter                                      | 16.899        | 18.3                     | 184                    |                                                                                     |        |
| 240 min Winter                                      | 13.734        | 19.4                     | 242                    |                                                                                     |        |
| 360 min Winter                                      | 10.201        | 20.7                     | 358                    |                                                                                     |        |
| 480 min Winter                                      | 8.260         | 21.3                     | 472                    |                                                                                     |        |
| 600 min Winter                                      | 7.008         | 21.5                     | 584                    |                                                                                     |        |
| 720 min Winter                                      | 6.125         | 21.5                     | 694                    |                                                                                     |        |
| 960 min Winter                                      | 4.949         | 20.9                     | 904                    |                                                                                     |        |
| 1440 min Winter                                     | 3.659         | 19.6                     | 1126                   |                                                                                     |        |
| 2160 min Winter                                     | 2.701         | 17.6                     | 1584                   |                                                                                     |        |
| 2880 min Winter                                     | 2.176         | 15.5                     | 2028                   |                                                                                     |        |
| 4320 min Winter                                     | 1.602         | 11.0                     | 2864                   |                                                                                     |        |
| 5760 min Winter                                     | 1.288         | 6.9                      | 3640                   |                                                                                     |        |
| 7200 min Winter                                     | 1.088         | 3.4                      | 4392                   |                                                                                     |        |
| 8640 min Winter                                     | 0.947         | 0.6                      | 5016                   |                                                                                     |        |
| 10080 min Winter                                    | 0.843         | 0.0                      | 5552                   |                                                                                     |        |
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| XP Solutions Source Control 2016.1                    |                                        |                                                                                     |

Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 30                | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 18.000            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.336             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +30   |

Time Area Diagram

Total Area (ha) 0.056

| Time (mins) | Area  | Time (mins) | Area  | Time (mins) | Area  |
|-------------|-------|-------------|-------|-------------|-------|
| From: To:   | (ha)  | From: To:   | (ha)  | From: To:   | (ha)  |
| 0 4         | 0.019 | 4 8         | 0.019 | 8 12        | 0.019 |

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Model Details

Storage is Online Cover Level (m) 82.600

Deep Bore Soakaway Structure

Chamber Invert Level (m) 80.600 Infiltration Coefficient Base (m/hr) 0.18000  
 Chamber Diameter/Width (m) 1.200 Safety Factor 2.0  
 Borehole Diameter (m) 0.200  
 Borehole Depth (m) 22.000

| Side          | Side           | Side           |
|---------------|----------------|----------------|
| Depth         | Depth          | Depth          |
| Infil.        | Infil.         | Infil.         |
| (m)           | (m)            | (m)            |
| Coef.         | Coef.          | Coef.          |
| (m/hr)        | (m/hr)         | (m/hr)         |
| 0.000 0.18000 | 16.000 0.00000 | 22.000 0.00000 |

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    |     |      |               |        |     |    |
| <p>Summary of Results for 30 year Return Period (+30%)</p> <p>Half Drain Time : 453 minutes.</p> <table><thead><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr></thead><tbody><tr><td>15 min Summer</td><td>83.402</td><td>24.002</td><td>0.3</td><td>5.3</td><td>FLOOD</td></tr><tr><td>30 min Summer</td><td>83.404</td><td>24.004</td><td>0.3</td><td>7.0</td><td>FLOOD</td></tr><tr><td>60 min Summer</td><td>83.406</td><td>24.006</td><td>0.3</td><td>8.8</td><td>FLOOD</td></tr><tr><td>120 min Summer</td><td>83.407</td><td>24.007</td><td>0.3</td><td>10.4</td><td>FLOOD</td></tr><tr><td>180 min Summer</td><td>83.408</td><td>24.008</td><td>0.3</td><td>11.1</td><td>FLOOD</td></tr><tr><td>240 min Summer</td><td>83.408</td><td>24.008</td><td>0.3</td><td>11.4</td><td>FLOOD</td></tr><tr><td>360 min Summer</td><td>83.409</td><td>24.009</td><td>0.3</td><td>11.5</td><td>FLOOD</td></tr><tr><td>480 min Summer</td><td>83.408</td><td>24.008</td><td>0.3</td><td>11.3</td><td>FLOOD</td></tr><tr><td>600 min Summer</td><td>83.408</td><td>24.008</td><td>0.3</td><td>11.1</td><td>FLOOD</td></tr><tr><td>720 min Summer</td><td>83.408</td><td>24.008</td><td>0.3</td><td>10.9</td><td>FLOOD</td></tr><tr><td>960 min Summer</td><td>83.408</td><td>24.008</td><td>0.3</td><td>10.5</td><td>FLOOD</td></tr><tr><td>1440 min Summer</td><td>83.407</td><td>24.007</td><td>0.3</td><td>9.7</td><td>FLOOD</td></tr><tr><td>2160 min Summer</td><td>83.405</td><td>24.005</td><td>0.3</td><td>8.3</td><td>FLOOD</td></tr><tr><td>2880 min Summer</td><td>83.404</td><td>24.004</td><td>0.3</td><td>7.0</td><td>FLOOD</td></tr><tr><td>4320 min Summer</td><td>83.402</td><td>24.002</td><td>0.3</td><td>4.6</td><td>FLOOD</td></tr><tr><td>5760 min Summer</td><td>83.266</td><td>23.866</td><td>0.3</td><td>2.8</td><td>Flood Risk</td></tr><tr><td>7200 min Summer</td><td>82.156</td><td>22.756</td><td>0.3</td><td>1.5</td><td>0 K</td></tr><tr><td>8640 min Summer</td><td>81.485</td><td>22.085</td><td>0.3</td><td>0.8</td><td>0 K</td></tr><tr><td>10080 min Summer</td><td>75.124</td><td>15.724</td><td>0.2</td><td>0.5</td><td>0 K</td></tr><tr><td>15 min Winter</td><td>83.403</td><td>24.003</td><td>0.3</td><td>6.0</td><td>FLOOD</td></tr></tbody></table> <table><thead><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Time-Peak (mins)</th></tr></thead><tbody><tr><td>15 min Summer</td><td>83.344</td><td>2.4</td><td>26</td></tr><tr><td>30 min Summer</td><td>55.879</td><td>4.1</td><td>40</td></tr><tr><td>60 min Summer</td><td>35.949</td><td>5.8</td><td>68</td></tr><tr><td>120 min Summer</td><td>22.481</td><td>7.4</td><td>126</td></tr><tr><td>180 min Summer</td><td>16.899</td><td>8.1</td><td>184</td></tr><tr><td>240 min Summer</td><td>13.734</td><td>8.5</td><td>244</td></tr><tr><td>360 min Summer</td><td>10.201</td><td>8.5</td><td>360</td></tr><tr><td>480 min Summer</td><td>8.260</td><td>8.3</td><td>414</td></tr><tr><td>600 min Summer</td><td>7.008</td><td>8.1</td><td>476</td></tr><tr><td>720 min Summer</td><td>6.125</td><td>7.9</td><td>540</td></tr><tr><td>960 min Summer</td><td>4.949</td><td>7.6</td><td>674</td></tr><tr><td>1440 min Summer</td><td>3.659</td><td>6.7</td><td>946</td></tr><tr><td>2160 min Summer</td><td>2.701</td><td>5.3</td><td>1352</td></tr><tr><td>2880 min Summer</td><td>2.176</td><td>4.0</td><td>1740</td></tr><tr><td>4320 min Summer</td><td>1.602</td><td>1.6</td><td>2476</td></tr><tr><td>5760 min Summer</td><td>1.288</td><td>0.0</td><td>3176</td></tr><tr><td>7200 min Summer</td><td>1.088</td><td>0.0</td><td>3824</td></tr><tr><td>8640 min Summer</td><td>0.947</td><td>0.0</td><td>4488</td></tr><tr><td>10080 min Summer</td><td>0.843</td><td>0.0</td><td>5136</td></tr><tr><td>15 min Winter</td><td>83.344</td><td>3.0</td><td>26</td></tr></tbody></table> |               |                     |                                                                                     |                 |            |  | Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status | 15 min Summer | 83.402 | 24.002 | 0.3 | 5.3 | FLOOD | 30 min Summer | 83.404 | 24.004 | 0.3 | 7.0 | FLOOD | 60 min Summer | 83.406 | 24.006 | 0.3 | 8.8 | FLOOD | 120 min Summer | 83.407 | 24.007 | 0.3 | 10.4 | FLOOD | 180 min Summer | 83.408 | 24.008 | 0.3 | 11.1 | FLOOD | 240 min Summer | 83.408 | 24.008 | 0.3 | 11.4 | FLOOD | 360 min Summer | 83.409 | 24.009 | 0.3 | 11.5 | FLOOD | 480 min Summer | 83.408 | 24.008 | 0.3 | 11.3 | FLOOD | 600 min Summer | 83.408 | 24.008 | 0.3 | 11.1 | FLOOD | 720 min Summer | 83.408 | 24.008 | 0.3 | 10.9 | FLOOD | 960 min Summer | 83.408 | 24.008 | 0.3 | 10.5 | FLOOD | 1440 min Summer | 83.407 | 24.007 | 0.3 | 9.7 | FLOOD | 2160 min Summer | 83.405 | 24.005 | 0.3 | 8.3 | FLOOD | 2880 min Summer | 83.404 | 24.004 | 0.3 | 7.0 | FLOOD | 4320 min Summer | 83.402 | 24.002 | 0.3 | 4.6 | FLOOD | 5760 min Summer | 83.266 | 23.866 | 0.3 | 2.8 | Flood Risk | 7200 min Summer | 82.156 | 22.756 | 0.3 | 1.5 | 0 K | 8640 min Summer | 81.485 | 22.085 | 0.3 | 0.8 | 0 K | 10080 min Summer | 75.124 | 15.724 | 0.2 | 0.5 | 0 K | 15 min Winter | 83.403 | 24.003 | 0.3 | 6.0 | FLOOD | Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) | 15 min Summer | 83.344 | 2.4 | 26 | 30 min Summer | 55.879 | 4.1 | 40 | 60 min Summer | 35.949 | 5.8 | 68 | 120 min Summer | 22.481 | 7.4 | 126 | 180 min Summer | 16.899 | 8.1 | 184 | 240 min Summer | 13.734 | 8.5 | 244 | 360 min Summer | 10.201 | 8.5 | 360 | 480 min Summer | 8.260 | 8.3 | 414 | 600 min Summer | 7.008 | 8.1 | 476 | 720 min Summer | 6.125 | 7.9 | 540 | 960 min Summer | 4.949 | 7.6 | 674 | 1440 min Summer | 3.659 | 6.7 | 946 | 2160 min Summer | 2.701 | 5.3 | 1352 | 2880 min Summer | 2.176 | 4.0 | 1740 | 4320 min Summer | 1.602 | 1.6 | 2476 | 5760 min Summer | 1.288 | 0.0 | 3176 | 7200 min Summer | 1.088 | 0.0 | 3824 | 8640 min Summer | 0.947 | 0.0 | 4488 | 10080 min Summer | 0.843 | 0.0 | 5136 | 15 min Winter | 83.344 | 3.0 | 26 |
| Storm Event                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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(m³) | Status     |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     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      |     |      |               |        |     |    |
| 15 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 83.402        | 24.002              | 0.3                                                                                 | 5.3             | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 30 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 83.404        | 24.004              | 0.3                                                                                 | 7.0             | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 60 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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   | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 120 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 83.407        | 24.007              | 0.3                                                                                 | 10.4            | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 180 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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   | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |   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| 240 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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           |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |   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| 360 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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   | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |   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| 480 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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   | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |   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| 600 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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   | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 720 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 83.408        | 24.008              | 0.3                                                                                 | 10.9            | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 960 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 83.408        | 24.008              | 0.3                                                                                 | 10.5            | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 1440 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 83.407        | 24.007              | 0.3                                                                                 | 9.7             | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 2160 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 83.405        | 24.005              | 0.3                                                                                 | 8.3             | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 2880 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 83.404        | 24.004              | 0.3                                                                                 | 7.0             | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 4320 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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   | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 5760 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 83.266        | 23.866              | 0.3                                                                                 | 2.8             | Flood Risk |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 7200 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 82.156        | 22.756              | 0.3                                                                                 | 1.5             | 0 K        |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 8640 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 81.485        | 22.085              | 0.3                                                                                 | 0.8             | 0 K        |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 10080 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 75.124        | 15.724              | 0.2                                                                                 | 0.5             | 0 K        |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 15 min Winter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 83.403        | 24.003              | 0.3                                                                                 | 6.0             | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| Storm Event                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Rain (mm/hr)  | Flooded Volume (m³) | Time-Peak (mins)                                                                    |                 |            |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 15 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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           |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |   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| 30 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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           |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 60 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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   |            |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |   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| 120 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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           |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |   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| 180 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| 240 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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           |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |   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| 360 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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           |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |   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| 480 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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           |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |   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| 600 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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           |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |   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| 720 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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           |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |   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| 960 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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           |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |   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| 1440 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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           |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |   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| 2160 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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           |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |   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| 2880 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2.176         | 4.0                 | 1740                                                                                |                 |            |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 4320 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.602         | 1.6                 | 2476                                                                                |                 |            |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 5760 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.288         | 0.0                 | 3176                                                                                |                 |            |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 7200 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.088         | 0.0                 | 3824                                                                                |                 |            |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 8640 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.947         | 0.0                 | 4488                                                                                |                 |            |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 10080 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.843         | 0.0                 | 5136                                                                                |                 |            |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 15 min Winter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 83.344        | 3.0                 | 26                                                                                  |                 |            |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |     |       |               |        |        |     |     |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |   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           |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |     |     |                |        |     |     |                |        |     |     |                |        |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                |       |     |     |                 |       |     |     |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |

|                                                     |               |                          |                        |                 |                                                                                     |  |
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| Date 21/10/2016 16:18                               |               | Designed by pennington_p |                        |                 |                                                                                     |  |
| File NE Green Buffer-2BHS.srcx                      |               | Checked by               |                        |                 |                                                                                     |  |
| XP Solutions                                        |               | Source Control 2016.1    |                        |                 |                                                                                     |  |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                 |                                                                                     |  |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³) | Status                                                                              |  |
| 30 min Winter                                       | 83.405        | 24.005                   | 0.3                    | 7.9             | FLOOD                                                                               |  |
| 60 min Winter                                       | 83.407        | 24.007                   | 0.3                    | 10.0            | FLOOD                                                                               |  |
| 120 min Winter                                      | 83.409        | 24.009                   | 0.3                    | 11.9            | FLOOD                                                                               |  |
| 180 min Winter                                      | 83.410        | 24.010                   | 0.3                    | 12.8            | FLOOD                                                                               |  |
| 240 min Winter                                      | 83.410        | 24.010                   | 0.3                    | 13.3            | FLOOD                                                                               |  |
| 360 min Winter                                      | 83.411        | 24.011                   | 0.3                    | 13.5            | FLOOD                                                                               |  |
| 480 min Winter                                      | 83.410        | 24.010                   | 0.3                    | 13.4            | FLOOD                                                                               |  |
| 600 min Winter                                      | 83.410        | 24.010                   | 0.3                    | 13.1            | FLOOD                                                                               |  |
| 720 min Winter                                      | 83.410        | 24.010                   | 0.3                    | 12.8            | FLOOD                                                                               |  |
| 960 min Winter                                      | 83.409        | 24.009                   | 0.3                    | 12.3            | FLOOD                                                                               |  |
| 1440 min Winter                                     | 83.408        | 24.008                   | 0.3                    | 10.9            | FLOOD                                                                               |  |
| 2160 min Winter                                     | 83.406        | 24.006                   | 0.3                    | 8.7             | FLOOD                                                                               |  |
| 2880 min Winter                                     | 83.404        | 24.004                   | 0.3                    | 6.6             | FLOOD                                                                               |  |
| 4320 min Winter                                     | 83.400        | 24.000                   | 0.3                    | 3.1             | FLOOD                                                                               |  |
| 5760 min Winter                                     | 81.586        | 22.186                   | 0.3                    | 0.9             | 0 K                                                                                 |  |
| 7200 min Winter                                     | 74.055        | 14.655                   | 0.2                    | 0.5             | 0 K                                                                                 |  |
| 8640 min Winter                                     | 72.160        | 12.760                   | 0.2                    | 0.4             | 0 K                                                                                 |  |
| 10080 min Winter                                    | 70.752        | 11.352                   | 0.2                    | 0.4             | 0 K                                                                                 |  |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                 |                                                                                     |  |
| 30 min Winter                                       | 55.879        | 5.0                      | 40                     |                 |                                                                                     |  |
| 60 min Winter                                       | 35.949        | 7.0                      | 68                     |                 |                                                                                     |  |
| 120 min Winter                                      | 22.481        | 8.9                      | 124                    |                 |                                                                                     |  |
| 180 min Winter                                      | 16.899        | 9.8                      | 182                    |                 |                                                                                     |  |
| 240 min Winter                                      | 13.734        | 10.3                     | 240                    |                 |                                                                                     |  |
| 360 min Winter                                      | 10.201        | 10.6                     | 352                    |                 |                                                                                     |  |
| 480 min Winter                                      | 8.260         | 10.5                     | 460                    |                 |                                                                                     |  |
| 600 min Winter                                      | 7.008         | 10.2                     | 554                    |                 |                                                                                     |  |
| 720 min Winter                                      | 6.125         | 9.9                      | 578                    |                 |                                                                                     |  |
| 960 min Winter                                      | 4.949         | 9.3                      | 730                    |                 |                                                                                     |  |
| 1440 min Winter                                     | 3.659         | 7.9                      | 1034                   |                 |                                                                                     |  |
| 2160 min Winter                                     | 2.701         | 5.8                      | 1468                   |                 |                                                                                     |  |
| 2880 min Winter                                     | 2.176         | 3.7                      | 1872                   |                 |                                                                                     |  |
| 4320 min Winter                                     | 1.602         | 0.2                      | 2592                   |                 |                                                                                     |  |
| 5760 min Winter                                     | 1.288         | 0.0                      | 3120                   |                 |                                                                                     |  |
| 7200 min Winter                                     | 1.088         | 0.0                      | 3672                   |                 |                                                                                     |  |
| 8640 min Winter                                     | 0.947         | 0.0                      | 4400                   |                 |                                                                                     |  |
| 10080 min Winter                                    | 0.843         | 0.0                      | 5136                   |                 |                                                                                     |  |
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| XP Solutions                   |                          | Source Control 2016.1                                                               |

Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 30                | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 18.000            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.336             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +30   |

Time Area Diagram

Total Area (ha) 0.036

| Time (mins) | Area  | Time (mins) | Area  | Time (mins) | Area  |
|-------------|-------|-------------|-------|-------------|-------|
| From: To:   | (ha)  | From: To:   | (ha)  | From: To:   | (ha)  |
| 0      4    | 0.012 | 4      8    | 0.012 | 8      12   | 0.012 |

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|                                                         |                                        |                                                                                     |
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| XP Solutions Source Control 2016.1                      |                                        |                                                                                     |

Model Details

Storage is Online Cover Level (m) 83.400

Deep Bore Soakaway Structure

Chamber Invert Level (m) 81.400 Infiltration Coefficient Base (m/hr) 0.18000  
 Chamber Diameter/Width (m) 1.200 Safety Factor 2.0  
 Borehole Diameter (m) 0.200  
 Borehole Depth (m) 22.000

| Side          | Side           | Side           |
|---------------|----------------|----------------|
| Depth Infil.  | Depth Infil.   | Depth Infil.   |
| (m) Coef.     | (m) Coef.      | (m) Coef.      |
| (m/hr)        | (m/hr)         | (m/hr)         |
| 0.000 0.18000 | 16.000 0.00000 | 22.000 0.00000 |

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|                                                            |  |                          |                     |                        |                                                                                     |
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| Date 21/10/2016 16:17                                      |  | Designed by pennington_p |                     |                        |                                                                                     |
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| XP Solutions                                               |  | Source Control 2016.1    |                     |                        |                                                                                     |
| <u>Summary of Results for 30 year Return Period (+30%)</u> |  |                          |                     |                        |                                                                                     |
| Half Drain Time : 374 minutes.                             |  |                          |                     |                        |                                                                                     |
| Storm Event                                                |  | Max Level (m)            | Max Depth (m)       | Max Infiltration (l/s) | Max Volume (m³) Status                                                              |
| 15 min Summer                                              |  | 86.152                   | 24.002              | 0.3                    | 4.5 FLOOD                                                                           |
| 30 min Summer                                              |  | 86.153                   | 24.003              | 0.3                    | 6.0 FLOOD                                                                           |
| 60 min Summer                                              |  | 86.155                   | 24.005              | 0.3                    | 7.5 FLOOD                                                                           |
| 120 min Summer                                             |  | 86.156                   | 24.006              | 0.3                    | 8.7 FLOOD                                                                           |
| 180 min Summer                                             |  | 86.156                   | 24.006              | 0.3                    | 9.3 FLOOD                                                                           |
| 240 min Summer                                             |  | 86.156                   | 24.006              | 0.3                    | 9.4 FLOOD                                                                           |
| 360 min Summer                                             |  | 86.156                   | 24.006              | 0.3                    | 9.3 FLOOD                                                                           |
| 480 min Summer                                             |  | 86.156                   | 24.006              | 0.3                    | 9.2 FLOOD                                                                           |
| 600 min Summer                                             |  | 86.156                   | 24.006              | 0.3                    | 9.0 FLOOD                                                                           |
| 720 min Summer                                             |  | 86.156                   | 24.006              | 0.3                    | 8.8 FLOOD                                                                           |
| 960 min Summer                                             |  | 86.155                   | 24.005              | 0.3                    | 8.4 FLOOD                                                                           |
| 1440 min Summer                                            |  | 86.155                   | 24.005              | 0.3                    | 7.5 FLOOD                                                                           |
| 2160 min Summer                                            |  | 86.153                   | 24.003              | 0.3                    | 6.1 FLOOD                                                                           |
| 2880 min Summer                                            |  | 86.152                   | 24.002              | 0.3                    | 4.9 FLOOD                                                                           |
| 4320 min Summer                                            |  | 86.051                   | 23.901              | 0.3                    | 2.8 Flood Risk                                                                      |
| 5760 min Summer                                            |  | 84.831                   | 22.681              | 0.3                    | 1.5 0 K                                                                             |
| 7200 min Summer                                            |  | 84.155                   | 22.005              | 0.3                    | 0.7 0 K                                                                             |
| 8640 min Summer                                            |  | 77.356                   | 15.206              | 0.2                    | 0.5 0 K                                                                             |
| 10080 min Summer                                           |  | 75.684                   | 13.534              | 0.2                    | 0.4 0 K                                                                             |
| 15 min Winter                                              |  | 86.152                   | 24.002              | 0.3                    | 5.1 FLOOD                                                                           |
| Storm Event                                                |  | Rain (mm/hr)             | Flooded Volume (m³) | Time-Peak (mins)       |                                                                                     |
| 15 min Summer                                              |  | 83.344                   | 1.6                 | 25                     |                                                                                     |
| 30 min Summer                                              |  | 55.879                   | 3.0                 | 40                     |                                                                                     |
| 60 min Summer                                              |  | 35.949                   | 4.5                 | 68                     |                                                                                     |
| 120 min Summer                                             |  | 22.481                   | 5.8                 | 126                    |                                                                                     |
| 180 min Summer                                             |  | 16.899                   | 6.3                 | 184                    |                                                                                     |
| 240 min Summer                                             |  | 13.734                   | 6.5                 | 242                    |                                                                                     |
| 360 min Summer                                             |  | 10.201                   | 6.4                 | 322                    |                                                                                     |
| 480 min Summer                                             |  | 8.260                    | 6.2                 | 384                    |                                                                                     |
| 600 min Summer                                             |  | 7.008                    | 6.0                 | 448                    |                                                                                     |
| 720 min Summer                                             |  | 6.125                    | 5.8                 | 514                    |                                                                                     |
| 960 min Summer                                             |  | 4.949                    | 5.4                 | 652                    |                                                                                     |
| 1440 min Summer                                            |  | 3.659                    | 4.5                 | 926                    |                                                                                     |
| 2160 min Summer                                            |  | 2.701                    | 3.2                 | 1324                   |                                                                                     |
| 2880 min Summer                                            |  | 2.176                    | 1.9                 | 1704                   |                                                                                     |
| 4320 min Summer                                            |  | 1.602                    | 0.0                 | 2424                   |                                                                                     |
| 5760 min Summer                                            |  | 1.288                    | 0.0                 | 3064                   |                                                                                     |
| 7200 min Summer                                            |  | 1.088                    | 0.0                 | 3688                   |                                                                                     |
| 8640 min Summer                                            |  | 0.947                    | 0.0                 | 4400                   |                                                                                     |
| 10080 min Summer                                           |  | 0.843                    | 0.0                 | 5136                   |                                                                                     |
| 15 min Winter                                              |  | 83.344                   | 2.2                 | 25                     |                                                                                     |
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| XP Solutions                                        |               | Source Control 2016.1    |                        |                                                                                     |        |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 30 min Winter                                       | 86.154        | 24.004                   | 0.3                    | 6.8                                                                                 | FLOOD  |
| 60 min Winter                                       | 86.156        | 24.006                   | 0.3                    | 8.5                                                                                 | FLOOD  |
| 120 min Winter                                      | 86.157        | 24.007                   | 0.3                    | 10.0                                                                                | FLOOD  |
| 180 min Winter                                      | 86.158        | 24.008                   | 0.3                    | 10.7                                                                                | FLOOD  |
| 240 min Winter                                      | 86.158        | 24.008                   | 0.3                    | 11.0                                                                                | FLOOD  |
| 360 min Winter                                      | 86.158        | 24.008                   | 0.3                    | 11.1                                                                                | FLOOD  |
| 480 min Winter                                      | 86.158        | 24.008                   | 0.3                    | 10.8                                                                                | FLOOD  |
| 600 min Winter                                      | 86.158        | 24.008                   | 0.3                    | 10.5                                                                                | FLOOD  |
| 720 min Winter                                      | 86.157        | 24.007                   | 0.3                    | 10.3                                                                                | FLOOD  |
| 960 min Winter                                      | 86.157        | 24.007                   | 0.3                    | 9.6                                                                                 | FLOOD  |
| 1440 min Winter                                     | 86.155        | 24.005                   | 0.3                    | 8.2                                                                                 | FLOOD  |
| 2160 min Winter                                     | 86.153        | 24.003                   | 0.3                    | 6.1                                                                                 | FLOOD  |
| 2880 min Winter                                     | 86.151        | 24.001                   | 0.3                    | 4.1                                                                                 | FLOOD  |
| 4320 min Winter                                     | 84.702        | 22.552                   | 0.3                    | 1.3                                                                                 | 0 K    |
| 5760 min Winter                                     | 77.095        | 14.945                   | 0.2                    | 0.5                                                                                 | 0 K    |
| 7200 min Winter                                     | 74.762        | 12.612                   | 0.2                    | 0.4                                                                                 | 0 K    |
| 8640 min Winter                                     | 73.131        | 10.981                   | 0.2                    | 0.3                                                                                 | 0 K    |
| 10080 min Winter                                    | 71.918        | 9.768                    | 0.2                    | 0.3                                                                                 | 0 K    |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 30 min Winter                                       | 55.879        | 3.8                      | 39                     |                                                                                     |        |
| 60 min Winter                                       | 35.949        | 5.5                      | 68                     |                                                                                     |        |
| 120 min Winter                                      | 22.481        | 7.1                      | 124                    |                                                                                     |        |
| 180 min Winter                                      | 16.899        | 7.8                      | 182                    |                                                                                     |        |
| 240 min Winter                                      | 13.734        | 8.1                      | 238                    |                                                                                     |        |
| 360 min Winter                                      | 10.201        | 8.1                      | 348                    |                                                                                     |        |
| 480 min Winter                                      | 8.260         | 7.8                      | 448                    |                                                                                     |        |
| 600 min Winter                                      | 7.008         | 7.6                      | 480                    |                                                                                     |        |
| 720 min Winter                                      | 6.125         | 7.3                      | 556                    |                                                                                     |        |
| 960 min Winter                                      | 4.949         | 6.7                      | 710                    |                                                                                     |        |
| 1440 min Winter                                     | 3.659         | 5.3                      | 1008                   |                                                                                     |        |
| 2160 min Winter                                     | 2.701         | 3.1                      | 1424                   |                                                                                     |        |
| 2880 min Winter                                     | 2.176         | 1.2                      | 1796                   |                                                                                     |        |
| 4320 min Winter                                     | 1.602         | 0.0                      | 2428                   |                                                                                     |        |
| 5760 min Winter                                     | 1.288         | 0.0                      | 2936                   |                                                                                     |        |
| 7200 min Winter                                     | 1.088         | 0.0                      | 3672                   |                                                                                     |        |
| 8640 min Winter                                     | 0.947         | 0.0                      | 4400                   |                                                                                     |        |
| 10080 min Winter                                    | 0.843         | 0.0                      | 5136                   |                                                                                     |        |
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| XP Solutions                   |                          | Source Control 2016.1                                                               |

Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 30                | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 18.000            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.336             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +30   |

Time Area Diagram

Total Area (ha) 0.031

| Time (mins) | Area  | Time (mins) | Area  | Time (mins) | Area  |
|-------------|-------|-------------|-------|-------------|-------|
| From: To:   | (ha)  | From: To:   | (ha)  | From: To:   | (ha)  |
| 0      4    | 0.010 | 4      8    | 0.010 | 8      12   | 0.010 |

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| Designed by pennington_p<br>Checked by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                   |                                                                                     |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                   | Source Control 2016.1                                                               |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
| <p align="center"><u>Model Details</u></p> <p align="center">Storage is Online Cover Level (m) 86.150</p> <p align="center"><u>Deep Bore Soakaway Structure</u></p> <p>           Chamber Invert Level (m) 84.150    Infiltration Coefficient Base (m/hr) 0.18000<br/>           Chamber Diameter/Width (m) 1.200    Safety Factor 2.0<br/>           Borehole Diameter (m) 0.200<br/>           Borehole Depth (m) 22.000         </p> <table border="1"> <thead> <tr> <th>Depth<br/>(m)</th> <th>Side<br/>Infil.<br/>Coef.<br/>(m/hr)</th> <th>Depth<br/>(m)</th> <th>Side<br/>Infil.<br/>Coef.<br/>(m/hr)</th> <th>Depth<br/>(m)</th> <th>Side<br/>Infil.<br/>Coef.<br/>(m/hr)</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>0.18000</td> <td>16.000</td> <td>0.00000</td> <td>22.000</td> <td>0.00000</td> </tr> </tbody> </table> |                                   |                                                                                     | Depth<br>(m)                      | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m)                      | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) | 0.000 | 0.18000 | 16.000 | 0.00000 | 22.000 | 0.00000 |
| Depth<br>(m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m)                                                                        | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m)                      | Side<br>Infil.<br>Coef.<br>(m/hr) |                                   |              |                                   |       |         |        |         |        |         |
| 0.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.18000                           | 16.000                                                                              | 0.00000                           | 22.000                            | 0.00000                           |                                   |              |                                   |       |         |        |         |        |         |
| <p align="center">©1982-2016 XP Solutions</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |                                                                                     |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |

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| XP Solutions                                               |               | Source Control 2016.1    |                        |                                                                                     |        |
| <u>Summary of Results for 30 year Return Period (+30%)</u> |               |                          |                        |                                                                                     |        |
| Half Drain Time : 973 minutes.                             |               |                          |                        |                                                                                     |        |
| Storm Event                                                | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 15 min Summer                                              | 85.507        | 24.007                   | 0.3                    | 9.7                                                                                 | FLOOD  |
| 30 min Summer                                              | 85.510        | 24.010                   | 0.3                    | 12.9                                                                                | FLOOD  |
| 60 min Summer                                              | 85.513        | 24.013                   | 0.3                    | 16.3                                                                                | FLOOD  |
| 120 min Summer                                             | 85.517        | 24.017                   | 0.3                    | 19.8                                                                                | FLOOD  |
| 180 min Summer                                             | 85.519        | 24.019                   | 0.3                    | 21.6                                                                                | FLOOD  |
| 240 min Summer                                             | 85.520        | 24.020                   | 0.3                    | 22.8                                                                                | FLOOD  |
| 360 min Summer                                             | 85.521        | 24.021                   | 0.3                    | 24.1                                                                                | FLOOD  |
| 480 min Summer                                             | 85.522        | 24.022                   | 0.3                    | 24.7                                                                                | FLOOD  |
| 600 min Summer                                             | 85.522        | 24.022                   | 0.3                    | 24.9                                                                                | FLOOD  |
| 720 min Summer                                             | 85.522        | 24.022                   | 0.3                    | 24.8                                                                                | FLOOD  |
| 960 min Summer                                             | 85.521        | 24.021                   | 0.3                    | 24.3                                                                                | FLOOD  |
| 1440 min Summer                                            | 85.520        | 24.020                   | 0.3                    | 23.3                                                                                | FLOOD  |
| 2160 min Summer                                            | 85.519        | 24.019                   | 0.3                    | 22.1                                                                                | FLOOD  |
| 2880 min Summer                                            | 85.518        | 24.018                   | 0.3                    | 20.7                                                                                | FLOOD  |
| 4320 min Summer                                            | 85.515        | 24.015                   | 0.3                    | 17.9                                                                                | FLOOD  |
| 5760 min Summer                                            | 85.512        | 24.012                   | 0.3                    | 15.1                                                                                | FLOOD  |
| 7200 min Summer                                            | 85.510        | 24.010                   | 0.3                    | 12.5                                                                                | FLOOD  |
| 8640 min Summer                                            | 85.507        | 24.007                   | 0.3                    | 10.2                                                                                | FLOOD  |
| 10080 min Summer                                           | 85.505        | 24.005                   | 0.3                    | 8.1                                                                                 | FLOOD  |
| 15 min Winter                                              | 85.508        | 24.008                   | 0.3                    | 10.9                                                                                | FLOOD  |
| Storm Event                                                | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 15 min Summer                                              | 83.344        | 6.7                      | 26                     |                                                                                     |        |
| 30 min Summer                                              | 55.879        | 9.9                      | 41                     |                                                                                     |        |
| 60 min Summer                                              | 35.949        | 13.3                     | 70                     |                                                                                     |        |
| 120 min Summer                                             | 22.481        | 16.8                     | 128                    |                                                                                     |        |
| 180 min Summer                                             | 16.899        | 18.7                     | 188                    |                                                                                     |        |
| 240 min Summer                                             | 13.734        | 19.8                     | 246                    |                                                                                     |        |
| 360 min Summer                                             | 10.201        | 21.1                     | 366                    |                                                                                     |        |
| 480 min Summer                                             | 8.260         | 21.7                     | 484                    |                                                                                     |        |
| 600 min Summer                                             | 7.008         | 21.9                     | 602                    |                                                                                     |        |
| 720 min Summer                                             | 6.125         | 21.8                     | 720                    |                                                                                     |        |
| 960 min Summer                                             | 4.949         | 21.3                     | 844                    |                                                                                     |        |
| 1440 min Summer                                            | 3.659         | 20.4                     | 1098                   |                                                                                     |        |
| 2160 min Summer                                            | 2.701         | 19.1                     | 1496                   |                                                                                     |        |
| 2880 min Summer                                            | 2.176         | 17.7                     | 1908                   |                                                                                     |        |
| 4320 min Summer                                            | 1.602         | 14.9                     | 2728                   |                                                                                     |        |
| 5760 min Summer                                            | 1.288         | 12.2                     | 3520                   |                                                                                     |        |
| 7200 min Summer                                            | 1.088         | 9.6                      | 4256                   |                                                                                     |        |
| 8640 min Summer                                            | 0.947         | 7.2                      | 5016                   |                                                                                     |        |
| 10080 min Summer                                           | 0.843         | 5.1                      | 5744                   |                                                                                     |        |
| 15 min Winter                                              | 83.344        | 7.9                      | 26                     |                                                                                     |        |
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| XP Solutions                                        |               | Source Control 2016.1    |                        |                                                                                     |        |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 30 min Winter                                       | 85.512        | 24.012                   | 0.3                    | 14.5                                                                                | FLOOD  |
| 60 min Winter                                       | 85.515        | 24.015                   | 0.3                    | 18.4                                                                                | FLOOD  |
| 120 min Winter                                      | 85.519        | 24.019                   | 0.3                    | 22.4                                                                                | FLOOD  |
| 180 min Winter                                      | 85.522        | 24.022                   | 0.3                    | 24.6                                                                                | FLOOD  |
| 240 min Winter                                      | 85.523        | 24.023                   | 0.3                    | 26.1                                                                                | FLOOD  |
| 360 min Winter                                      | 85.525        | 24.025                   | 0.3                    | 27.8                                                                                | FLOOD  |
| 480 min Winter                                      | 85.526        | 24.026                   | 0.3                    | 28.7                                                                                | FLOOD  |
| 600 min Winter                                      | 85.526        | 24.026                   | 0.3                    | 29.1                                                                                | FLOOD  |
| 720 min Winter                                      | 85.526        | 24.026                   | 0.3                    | 29.3                                                                                | FLOOD  |
| 960 min Winter                                      | 85.526        | 24.026                   | 0.3                    | 29.1                                                                                | FLOOD  |
| 1440 min Winter                                     | 85.525        | 24.025                   | 0.3                    | 27.6                                                                                | FLOOD  |
| 2160 min Winter                                     | 85.523        | 24.023                   | 0.3                    | 25.7                                                                                | FLOOD  |
| 2880 min Winter                                     | 85.521        | 24.021                   | 0.3                    | 23.6                                                                                | FLOOD  |
| 4320 min Winter                                     | 85.516        | 24.016                   | 0.3                    | 19.1                                                                                | FLOOD  |
| 5760 min Winter                                     | 85.512        | 24.012                   | 0.3                    | 14.8                                                                                | FLOOD  |
| 7200 min Winter                                     | 85.508        | 24.008                   | 0.3                    | 10.8                                                                                | FLOOD  |
| 8640 min Winter                                     | 85.504        | 24.004                   | 0.3                    | 7.4                                                                                 | FLOOD  |
| 10080 min Winter                                    | 85.502        | 24.002                   | 0.3                    | 4.5                                                                                 | FLOOD  |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 30 min Winter                                       | 55.879        | 11.5                     | 40                     |                                                                                     |        |
| 60 min Winter                                       | 35.949        | 15.4                     | 70                     |                                                                                     |        |
| 120 min Winter                                      | 22.481        | 19.4                     | 126                    |                                                                                     |        |
| 180 min Winter                                      | 16.899        | 21.7                     | 184                    |                                                                                     |        |
| 240 min Winter                                      | 13.734        | 23.1                     | 242                    |                                                                                     |        |
| 360 min Winter                                      | 10.201        | 24.8                     | 358                    |                                                                                     |        |
| 480 min Winter                                      | 8.260         | 25.7                     | 474                    |                                                                                     |        |
| 600 min Winter                                      | 7.008         | 26.2                     | 588                    |                                                                                     |        |
| 720 min Winter                                      | 6.125         | 26.3                     | 700                    |                                                                                     |        |
| 960 min Winter                                      | 4.949         | 26.1                     | 918                    |                                                                                     |        |
| 1440 min Winter                                     | 3.659         | 24.6                     | 1176                   |                                                                                     |        |
| 2160 min Winter                                     | 2.701         | 22.8                     | 1628                   |                                                                                     |        |
| 2880 min Winter                                     | 2.176         | 20.7                     | 2080                   |                                                                                     |        |
| 4320 min Winter                                     | 1.602         | 16.2                     | 2948                   |                                                                                     |        |
| 5760 min Winter                                     | 1.288         | 11.8                     | 3752                   |                                                                                     |        |
| 7200 min Winter                                     | 1.088         | 7.9                      | 4536                   |                                                                                     |        |
| 8640 min Winter                                     | 0.947         | 4.4                      | 5200                   |                                                                                     |        |
| 10080 min Winter                                    | 0.843         | 1.5                      | 5856                   |                                                                                     |        |
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| Date 21/10/2016 16:16<br>File NW Green Space-3BHS.srcx                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Designed by pennington_p<br>Checked by |                                                                                     |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |                                                                                     |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Source Control 2016.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                                                                     |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| <p style="text-align: center;"><u>Rainfall Details</u></p> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Return Period (years)</td> <td>30</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>18.000</td> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Ratio R</td> <td>0.336</td> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> <td>Climate Change %</td> <td>+30</td> </tr> </table> <p style="text-align: center;"><u>Time Area Diagram</u></p> <p style="text-align: center;">Total Area (ha) 0.064</p> <table> <thead> <tr> <th>Time (mins)</th> <th>Area (ha)</th> <th>Time (mins)</th> <th>Area (ha)</th> <th>Time (mins)</th> <th>Area (ha)</th> </tr> <tr> <th>From:</th> <th>To:</th> <th>From:</th> <th>To:</th> <th>From:</th> <th>To:</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>4</td> <td>0.021</td> <td>4</td> <td>8</td> <td>0.021</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>8</td> <td>12</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td>0.021</td> </tr> </tbody> </table> |                                        |                                                                                     | Rainfall Model | FSR         | Winter Storms | Yes | Return Period (years) | 30 | Cv (Summer) | 0.750 | Region | England and Wales | Cv (Winter) | 0.840 | M5-60 (mm) | 18.000 | Shortest Storm (mins) | 15 | Ratio R | 0.336 | Longest Storm (mins) | 10080 | Summer Storms | Yes | Climate Change % | +30 | Time (mins) | Area (ha) | Time (mins) | Area (ha) | Time (mins) | Area (ha) | From: | To: | From: | To: | From: | To: | 0 | 4 | 0.021 | 4 | 8 | 0.021 |  |  |  |  | 8 | 12 |  |  |  |  |  | 0.021 |
| Rainfall Model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | FSR                                    | Winter Storms                                                                       | Yes            |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 30                                     | Cv (Summer)                                                                         | 0.750          |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Region                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | England and Wales                      | Cv (Winter)                                                                         | 0.840          |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| M5-60 (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 18.000                                 | Shortest Storm (mins)                                                               | 15             |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Ratio R                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0.336                                  | Longest Storm (mins)                                                                | 10080          |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Summer Storms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Yes                                    | Climate Change %                                                                    | +30            |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Time (mins)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Area (ha)                              | Time (mins)                                                                         | Area (ha)      | Time (mins) | Area (ha)     |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| From:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | To:                                    | From:                                                                               | To:            | From:       | To:           |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4                                      | 0.021                                                                               | 4              | 8           | 0.021         |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |                                                                                     |                | 8           | 12            |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |                                                                                     |                |             | 0.021         |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
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| Source Control 2016.1    |



Storage is Online Cover Level (m) 85.500

|                            |        |                                      |         |
|----------------------------|--------|--------------------------------------|---------|
| Chamber Invert Level (m)   | 83.500 | Infiltration Coefficient Base (m/hr) | 0.18000 |
| Chamber Diameter/Width (m) | 1.200  | Safety Factor                        | 2.0     |
| Borehole Diameter (m)      | 0.200  |                                      |         |
| Borehole Depth (m)         | 22.000 |                                      |         |

| Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) |
|--------------|-----------------------------------|--------------|-----------------------------------|--------------|-----------------------------------|
| 0.000        | 0.18000                           | 16.000       | 0.00000                           | 22.000       | 0.00000                           |

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| XP Solutions                                               |               | Source Control 2016.1    |                        |                                                                                     |        |
| <u>Summary of Results for 30 year Return Period (+30%)</u> |               |                          |                        |                                                                                     |        |
| Half Drain Time : 776 minutes.                             |               |                          |                        |                                                                                     |        |
| Storm Event                                                | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 15 min Summer                                              | 80.005        | 24.005                   | 0.3                    | 7.9                                                                                 | FLOOD  |
| 30 min Summer                                              | 80.008        | 24.008                   | 0.3                    | 10.6                                                                                | FLOOD  |
| 60 min Summer                                              | 80.010        | 24.010                   | 0.3                    | 13.5                                                                                | FLOOD  |
| 120 min Summer                                             | 80.013        | 24.013                   | 0.3                    | 16.3                                                                                | FLOOD  |
| 180 min Summer                                             | 80.015        | 24.015                   | 0.3                    | 17.8                                                                                | FLOOD  |
| 240 min Summer                                             | 80.016        | 24.016                   | 0.3                    | 18.6                                                                                | FLOOD  |
| 360 min Summer                                             | 80.017        | 24.017                   | 0.3                    | 19.5                                                                                | FLOOD  |
| 480 min Summer                                             | 80.017        | 24.017                   | 0.3                    | 19.8                                                                                | FLOOD  |
| 600 min Summer                                             | 80.017        | 24.017                   | 0.3                    | 19.7                                                                                | FLOOD  |
| 720 min Summer                                             | 80.016        | 24.016                   | 0.3                    | 19.5                                                                                | FLOOD  |
| 960 min Summer                                             | 80.016        | 24.016                   | 0.3                    | 19.0                                                                                | FLOOD  |
| 1440 min Summer                                            | 80.015        | 24.015                   | 0.3                    | 18.2                                                                                | FLOOD  |
| 2160 min Summer                                            | 80.014        | 24.014                   | 0.3                    | 16.9                                                                                | FLOOD  |
| 2880 min Summer                                            | 80.013        | 24.013                   | 0.3                    | 15.5                                                                                | FLOOD  |
| 4320 min Summer                                            | 80.010        | 24.010                   | 0.3                    | 12.7                                                                                | FLOOD  |
| 5760 min Summer                                            | 80.007        | 24.007                   | 0.3                    | 10.1                                                                                | FLOOD  |
| 7200 min Summer                                            | 80.005        | 24.005                   | 0.3                    | 7.8                                                                                 | FLOOD  |
| 8640 min Summer                                            | 80.003        | 24.003                   | 0.3                    | 5.8                                                                                 | FLOOD  |
| 10080 min Summer                                           | 80.001        | 24.001                   | 0.3                    | 4.2                                                                                 | FLOOD  |
| 15 min Winter                                              | 80.006        | 24.006                   | 0.3                    | 8.9                                                                                 | FLOOD  |
| Storm Event                                                | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 15 min Summer                                              | 83.344        | 4.9                      | 36                     |                                                                                     |        |
| 30 min Summer                                              | 55.879        | 7.6                      | 49                     |                                                                                     |        |
| 60 min Summer                                              | 35.949        | 10.5                     | 76                     |                                                                                     |        |
| 120 min Summer                                             | 22.481        | 13.3                     | 134                    |                                                                                     |        |
| 180 min Summer                                             | 16.899        | 14.8                     | 192                    |                                                                                     |        |
| 240 min Summer                                             | 13.734        | 15.7                     | 252                    |                                                                                     |        |
| 360 min Summer                                             | 10.201        | 16.5                     | 368                    |                                                                                     |        |
| 480 min Summer                                             | 8.260         | 16.8                     | 486                    |                                                                                     |        |
| 600 min Summer                                             | 7.008         | 16.7                     | 604                    |                                                                                     |        |
| 720 min Summer                                             | 6.125         | 16.5                     | 660                    |                                                                                     |        |
| 960 min Summer                                             | 4.949         | 16.0                     | 778                    |                                                                                     |        |
| 1440 min Summer                                            | 3.659         | 15.2                     | 1036                   |                                                                                     |        |
| 2160 min Summer                                            | 2.701         | 13.9                     | 1448                   |                                                                                     |        |
| 2880 min Summer                                            | 2.176         | 12.5                     | 1860                   |                                                                                     |        |
| 4320 min Summer                                            | 1.602         | 9.7                      | 2648                   |                                                                                     |        |
| 5760 min Summer                                            | 1.288         | 7.1                      | 3416                   |                                                                                     |        |
| 7200 min Summer                                            | 1.088         | 4.8                      | 4168                   |                                                                                     |        |
| 8640 min Summer                                            | 0.947         | 2.9                      | 4848                   |                                                                                     |        |
| 10080 min Summer                                           | 0.843         | 1.2                      | 5552                   |                                                                                     |        |
| 15 min Winter                                              | 83.344        | 5.9                      | 36                     |                                                                                     |        |
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| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |            |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status     |
| 30 min Winter                                       | 80.009        | 24.009                   | 0.3                    | 11.9                                                                                | FLOOD      |
| 60 min Winter                                       | 80.012        | 24.012                   | 0.3                    | 15.2                                                                                | FLOOD      |
| 120 min Winter                                      | 80.016        | 24.016                   | 0.3                    | 18.5                                                                                | FLOOD      |
| 180 min Winter                                      | 80.017        | 24.017                   | 0.3                    | 20.3                                                                                | FLOOD      |
| 240 min Winter                                      | 80.018        | 24.018                   | 0.3                    | 21.4                                                                                | FLOOD      |
| 360 min Winter                                      | 80.020        | 24.020                   | 0.3                    | 22.6                                                                                | FLOOD      |
| 480 min Winter                                      | 80.020        | 24.020                   | 0.3                    | 23.2                                                                                | FLOOD      |
| 600 min Winter                                      | 80.020        | 24.020                   | 0.3                    | 23.3                                                                                | FLOOD      |
| 720 min Winter                                      | 80.020        | 24.020                   | 0.3                    | 23.2                                                                                | FLOOD      |
| 960 min Winter                                      | 80.020        | 24.020                   | 0.3                    | 22.6                                                                                | FLOOD      |
| 1440 min Winter                                     | 80.018        | 24.018                   | 0.3                    | 21.3                                                                                | FLOOD      |
| 2160 min Winter                                     | 80.016        | 24.016                   | 0.3                    | 19.4                                                                                | FLOOD      |
| 2880 min Winter                                     | 80.014        | 24.014                   | 0.3                    | 17.2                                                                                | FLOOD      |
| 4320 min Winter                                     | 80.010        | 24.010                   | 0.3                    | 12.7                                                                                | FLOOD      |
| 5760 min Winter                                     | 80.006        | 24.006                   | 0.3                    | 8.7                                                                                 | FLOOD      |
| 7200 min Winter                                     | 80.002        | 24.002                   | 0.3                    | 5.3                                                                                 | FLOOD      |
| 8640 min Winter                                     | 79.785        | 23.785                   | 0.3                    | 2.7                                                                                 | Flood Risk |
| 10080 min Winter                                    | 78.244        | 22.244                   | 0.3                    | 1.0                                                                                 | 0 K        |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |            |
| 30 min Winter                                       | 55.879        | 9.0                      | 49                     |                                                                                     |            |
| 60 min Winter                                       | 35.949        | 12.2                     | 76                     |                                                                                     |            |
| 120 min Winter                                      | 22.481        | 15.5                     | 132                    |                                                                                     |            |
| 180 min Winter                                      | 16.899        | 17.3                     | 190                    |                                                                                     |            |
| 240 min Winter                                      | 13.734        | 18.4                     | 248                    |                                                                                     |            |
| 360 min Winter                                      | 10.201        | 19.6                     | 362                    |                                                                                     |            |
| 480 min Winter                                      | 8.260         | 20.2                     | 476                    |                                                                                     |            |
| 600 min Winter                                      | 7.008         | 20.3                     | 590                    |                                                                                     |            |
| 720 min Winter                                      | 6.125         | 20.3                     | 698                    |                                                                                     |            |
| 960 min Winter                                      | 4.949         | 19.7                     | 902                    |                                                                                     |            |
| 1440 min Winter                                     | 3.659         | 18.4                     | 1122                   |                                                                                     |            |
| 2160 min Winter                                     | 2.701         | 16.4                     | 1584                   |                                                                                     |            |
| 2880 min Winter                                     | 2.176         | 14.2                     | 2024                   |                                                                                     |            |
| 4320 min Winter                                     | 1.602         | 9.8                      | 2856                   |                                                                                     |            |
| 5760 min Winter                                     | 1.288         | 5.8                      | 3640                   |                                                                                     |            |
| 7200 min Winter                                     | 1.088         | 2.4                      | 4328                   |                                                                                     |            |
| 8640 min Winter                                     | 0.947         | 0.0                      | 4928                   |                                                                                     |            |
| 10080 min Winter                                    | 0.843         | 0.0                      | 5440                   |                                                                                     |            |
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| Date 21/10/2016 16:02<br>File S Shared Space-6BHs.srcx                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Designed by pennington_p<br>Checked by |                                                                                     |                      |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                                                                     |                      |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Source Control 2016.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                                                                     |                      |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| <p align="center"><u>Rainfall Details</u></p> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Return Period (years)</td> <td>30</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>18.000</td> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Ratio R</td> <td>0.336</td> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> <td>Climate Change %</td> <td>+30</td> </tr> </table> <p align="center"><u>Pipe Network</u></p> <table> <tr> <td>Volume in Pipe Network (m³)</td> <td>5</td> <td>Dia of Outfall Pipe (m)</td> <td>0.2</td> </tr> <tr> <td>Slope of Outfall Pipe (1:X)</td> <td>175</td> <td>Roughness of Outfall Pipe (mm)</td> <td>0.600</td> </tr> </table> <p align="center"><u>Time Area Diagram</u></p> <p align="center">Total Area (ha) 0.054</p> <table> <thead> <tr> <th>Time (mins)<br/>From:</th> <th>Time (mins)<br/>To:</th> <th>Area<br/>(ha)</th> <th>Time (mins)<br/>From:</th> <th>Time (mins)<br/>To:</th> <th>Area<br/>(ha)</th> <th>Time (mins)<br/>From:</th> <th>Time (mins)<br/>To:</th> <th>Area<br/>(ha)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>4</td> <td>0.018</td> <td>4</td> <td>8</td> <td>0.018</td> <td>8</td> <td>12</td> <td>0.018</td> </tr> </tbody> </table> |                                        |                                                                                     | Rainfall Model       | FSR                | Winter Storms | Yes                  | Return Period (years) | 30           | Cv (Summer) | 0.750 | Region | England and Wales | Cv (Winter) | 0.840 | M5-60 (mm) | 18.000 | Shortest Storm (mins) | 15 | Ratio R | 0.336 | Longest Storm (mins) | 10080 | Summer Storms | Yes | Climate Change % | +30 | Volume in Pipe Network (m³) | 5 | Dia of Outfall Pipe (m) | 0.2 | Slope of Outfall Pipe (1:X) | 175 | Roughness of Outfall Pipe (mm) | 0.600 | Time (mins)<br>From: | Time (mins)<br>To: | Area<br>(ha) | Time (mins)<br>From: | Time (mins)<br>To: | Area<br>(ha) | Time (mins)<br>From: | Time (mins)<br>To: | Area<br>(ha) | 0 | 4 | 0.018 | 4 | 8 | 0.018 | 8 | 12 | 0.018 |
| Rainfall Model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | FSR                                    | Winter Storms                                                                       | Yes                  |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 30                                     | Cv (Summer)                                                                         | 0.750                |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Region                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | England and Wales                      | Cv (Winter)                                                                         | 0.840                |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| M5-60 (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 18.000                                 | Shortest Storm (mins)                                                               | 15                   |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Ratio R                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.336                                  | Longest Storm (mins)                                                                | 10080                |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Summer Storms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Yes                                    | Climate Change %                                                                    | +30                  |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Volume in Pipe Network (m³)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 5                                      | Dia of Outfall Pipe (m)                                                             | 0.2                  |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Slope of Outfall Pipe (1:X)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 175                                    | Roughness of Outfall Pipe (mm)                                                      | 0.600                |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Time (mins)<br>From:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Time (mins)<br>To:                     | Area<br>(ha)                                                                        | Time (mins)<br>From: | Time (mins)<br>To: | Area<br>(ha)  | Time (mins)<br>From: | Time (mins)<br>To:    | Area<br>(ha) |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 4                                      | 0.018                                                                               | 4                    | 8                  | 0.018         | 8                    | 12                    | 0.018        |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
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| XP Solutions Source Control 2016.1                     |                                        |                                                                                     |

Model Details

Storage is Online Cover Level (m) 80.000

Deep Bore Soakaway Structure

Chamber Invert Level (m) 78.000 Infiltration Coefficient Base (m/hr) 0.18000  
 Chamber Diameter/Width (m) 1.200 Safety Factor 2.0  
 Borehole Diameter (m) 0.200  
 Borehole Depth (m) 22.000

| Side<br>Depth<br>(m)<br>Infil.<br>Coef.<br>(m/hr) | Side<br>Depth<br>(m)<br>Infil.<br>Coef.<br>(m/hr) | Side<br>Depth<br>(m)<br>Infil.<br>Coef.<br>(m/hr) |
|---------------------------------------------------|---------------------------------------------------|---------------------------------------------------|
| 0.000 0.18000                                     | 16.000 0.00000                                    | 22.000 0.00000                                    |

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| XP Solutions                                               |                        |                              | Source Control 2016.1                                                               |                                       |                                |               |
| <u>Summary of Results for 30 year Return Period (+30%)</u> |                        |                              |                                                                                     |                                       |                                |               |
| Half Drain Time : 522 minutes.                             |                        |                              |                                                                                     |                                       |                                |               |
|                                                            | <b>Storm<br/>Event</b> | <b>Max<br/>Level<br/>(m)</b> | <b>Max<br/>Depth<br/>(m)</b>                                                        | <b>Max<br/>Infiltration<br/>(l/s)</b> | <b>Max<br/>Volume<br/>(m³)</b> | <b>Status</b> |
|                                                            | 15 min Summer          | 79.503                       | 24.003                                                                              | 0.3                                   | 5.9                            | FL00D         |
|                                                            | 30 min Summer          | 79.505                       | 24.005                                                                              | 0.3                                   | 7.9                            | FL00D         |
|                                                            | 60 min Summer          | 79.507                       | 24.007                                                                              | 0.3                                   | 9.9                            | FL00D         |
|                                                            | 120 min Summer         | 79.509                       | 24.009                                                                              | 0.3                                   | 11.7                           | FL00D         |
|                                                            | 180 min Summer         | 79.510                       | 24.010                                                                              | 0.3                                   | 12.6                           | FL00D         |
|                                                            | 240 min Summer         | 79.510                       | 24.010                                                                              | 0.3                                   | 13.0                           | FL00D         |
|                                                            | 360 min Summer         | 79.510                       | 24.010                                                                              | 0.3                                   | 13.2                           | FL00D         |
|                                                            | 480 min Summer         | 79.510                       | 24.010                                                                              | 0.3                                   | 13.1                           | FL00D         |
|                                                            | 600 min Summer         | 79.510                       | 24.010                                                                              | 0.3                                   | 12.9                           | FL00D         |
|                                                            | 720 min Summer         | 79.510                       | 24.010                                                                              | 0.3                                   | 12.7                           | FL00D         |
|                                                            | 960 min Summer         | 79.509                       | 24.009                                                                              | 0.3                                   | 12.3                           | FL00D         |
|                                                            | 1440 min Summer        | 79.508                       | 24.008                                                                              | 0.3                                   | 11.5                           | FL00D         |
|                                                            | 2160 min Summer        | 79.507                       | 24.007                                                                              | 0.3                                   | 10.1                           | FL00D         |
|                                                            | 2880 min Summer        | 79.506                       | 24.006                                                                              | 0.3                                   | 8.7                            | FL00D         |
|                                                            | 4320 min Summer        | 79.503                       | 24.003                                                                              | 0.3                                   | 6.2                            | FL00D         |
|                                                            | 5760 min Summer        | 79.501                       | 24.001                                                                              | 0.3                                   | 4.1                            | FL00D         |
|                                                            | 7200 min Summer        | 79.157                       | 23.657                                                                              | 0.3                                   | 2.6                            | 0 K           |
|                                                            | 8640 min Summer        | 78.183                       | 22.683                                                                              | 0.3                                   | 1.5                            | 0 K           |
|                                                            | 10080 min Summer       | 77.579                       | 22.079                                                                              | 0.3                                   | 0.8                            | 0 K           |
|                                                            | 15 min Winter          | 79.504                       | 24.004                                                                              | 0.3                                   | 6.7                            | FL00D         |
|                                                            | <b>Storm<br/>Event</b> | <b>Rain<br/>(mm/hr)</b>      | <b>Flooded<br/>Volume<br/>(m³)</b>                                                  | <b>Time-Peak<br/>(mins)</b>           |                                |               |
|                                                            | 15 min Summer          | 83.344                       | 3.0                                                                                 | 26                                    |                                |               |
|                                                            | 30 min Summer          | 55.879                       | 4.9                                                                                 | 40                                    |                                |               |
|                                                            | 60 min Summer          | 35.949                       | 6.9                                                                                 | 68                                    |                                |               |
|                                                            | 120 min Summer         | 22.481                       | 8.8                                                                                 | 128                                   |                                |               |
|                                                            | 180 min Summer         | 16.899                       | 9.6                                                                                 | 186                                   |                                |               |
|                                                            | 240 min Summer         | 13.734                       | 10.1                                                                                | 244                                   |                                |               |
|                                                            | 360 min Summer         | 10.201                       | 10.3                                                                                | 362                                   |                                |               |
|                                                            | 480 min Summer         | 8.260                        | 10.1                                                                                | 442                                   |                                |               |
|                                                            | 600 min Summer         | 7.008                        | 9.9                                                                                 | 500                                   |                                |               |
|                                                            | 720 min Summer         | 6.125                        | 9.7                                                                                 | 564                                   |                                |               |
|                                                            | 960 min Summer         | 4.949                        | 9.3                                                                                 | 692                                   |                                |               |
|                                                            | 1440 min Summer        | 3.659                        | 8.5                                                                                 | 968                                   |                                |               |
|                                                            | 2160 min Summer        | 2.701                        | 7.1                                                                                 | 1372                                  |                                |               |
|                                                            | 2880 min Summer        | 2.176                        | 5.8                                                                                 | 1768                                  |                                |               |
|                                                            | 4320 min Summer        | 1.602                        | 3.3                                                                                 | 2520                                  |                                |               |
|                                                            | 5760 min Summer        | 1.288                        | 1.2                                                                                 | 3232                                  |                                |               |
|                                                            | 7200 min Summer        | 1.088                        | 0.0                                                                                 | 3904                                  |                                |               |
|                                                            | 8640 min Summer        | 0.947                        | 0.0                                                                                 | 4584                                  |                                |               |
|                                                            | 10080 min Summer       | 0.843                        | 0.0                                                                                 | 5160                                  |                                |               |
|                                                            | 15 min Winter          | 83.344                       | 3.7                                                                                 | 26                                    |                                |               |
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| XP Solutions                                        |               | Source Control 2016.1    |                        |                                                                                     |        |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 30 min Winter                                       | 79.506        | 24.006                   | 0.3                    | 8.9                                                                                 | FLOOD  |
| 60 min Winter                                       | 79.508        | 24.008                   | 0.3                    | 11.2                                                                                | FLOOD  |
| 120 min Winter                                      | 79.510        | 24.010                   | 0.3                    | 13.4                                                                                | FLOOD  |
| 180 min Winter                                      | 79.512        | 24.012                   | 0.3                    | 14.5                                                                                | FLOOD  |
| 240 min Winter                                      | 79.512        | 24.012                   | 0.3                    | 15.1                                                                                | FLOOD  |
| 360 min Winter                                      | 79.513        | 24.013                   | 0.3                    | 15.6                                                                                | FLOOD  |
| 480 min Winter                                      | 79.513        | 24.013                   | 0.3                    | 15.6                                                                                | FLOOD  |
| 600 min Winter                                      | 79.512        | 24.012                   | 0.3                    | 15.3                                                                                | FLOOD  |
| 720 min Winter                                      | 79.512        | 24.012                   | 0.3                    | 15.0                                                                                | FLOOD  |
| 960 min Winter                                      | 79.511        | 24.011                   | 0.3                    | 14.4                                                                                | FLOOD  |
| 1440 min Winter                                     | 79.510        | 24.010                   | 0.3                    | 13.1                                                                                | FLOOD  |
| 2160 min Winter                                     | 79.508        | 24.008                   | 0.3                    | 11.0                                                                                | FLOOD  |
| 2880 min Winter                                     | 79.506        | 24.006                   | 0.3                    | 8.8                                                                                 | FLOOD  |
| 4320 min Winter                                     | 79.502        | 24.002                   | 0.3                    | 4.9                                                                                 | FLOOD  |
| 5760 min Winter                                     | 78.723        | 23.223                   | 0.3                    | 2.1                                                                                 | 0 K    |
| 7200 min Winter                                     | 72.937        | 17.437                   | 0.3                    | 0.5                                                                                 | 0 K    |
| 8640 min Winter                                     | 69.684        | 14.184                   | 0.2                    | 0.4                                                                                 | 0 K    |
| 10080 min Winter                                    | 68.118        | 12.618                   | 0.2                    | 0.4                                                                                 | 0 K    |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 30 min Winter                                       | 55.879        | 5.9                      | 40                     |                                                                                     |        |
| 60 min Winter                                       | 35.949        | 8.2                      | 68                     |                                                                                     |        |
| 120 min Winter                                      | 22.481        | 10.4                     | 126                    |                                                                                     |        |
| 180 min Winter                                      | 16.899        | 11.5                     | 182                    |                                                                                     |        |
| 240 min Winter                                      | 13.734        | 12.1                     | 240                    |                                                                                     |        |
| 360 min Winter                                      | 10.201        | 12.6                     | 354                    |                                                                                     |        |
| 480 min Winter                                      | 8.260         | 12.6                     | 464                    |                                                                                     |        |
| 600 min Winter                                      | 7.008         | 12.4                     | 568                    |                                                                                     |        |
| 720 min Winter                                      | 6.125         | 12.0                     | 654                    |                                                                                     |        |
| 960 min Winter                                      | 4.949         | 11.5                     | 748                    |                                                                                     |        |
| 1440 min Winter                                     | 3.659         | 10.2                     | 1054                   |                                                                                     |        |
| 2160 min Winter                                     | 2.701         | 8.0                      | 1496                   |                                                                                     |        |
| 2880 min Winter                                     | 2.176         | 5.8                      | 1908                   |                                                                                     |        |
| 4320 min Winter                                     | 1.602         | 2.0                      | 2648                   |                                                                                     |        |
| 5760 min Winter                                     | 1.288         | 0.0                      | 3296                   |                                                                                     |        |
| 7200 min Winter                                     | 1.088         | 0.0                      | 3744                   |                                                                                     |        |
| 8640 min Winter                                     | 0.947         | 0.0                      | 4400                   |                                                                                     |        |
| 10080 min Winter                                    | 0.843         | 0.0                      | 5136                   |                                                                                     |        |
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| Curtins Consulting Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        | Page 3                                                                              |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
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| .<br>.<br>.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |  |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Date 21/10/2016 16:15<br>File SE Cul-de-Sac-2BHS.srcx                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Designed by pennington_p<br>Checked by |                                                                                     |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |                                                                                     |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Source Control 2016.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                                                                     |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| <p style="text-align: center;"><u>Rainfall Details</u></p> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Return Period (years)</td> <td>30</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>18.000</td> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Ratio R</td> <td>0.336</td> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> <td>Climate Change %</td> <td>+30</td> </tr> </table> <p style="text-align: center;"><u>Time Area Diagram</u></p> <p style="text-align: center;">Total Area (ha) 0.040</p> <table> <thead> <tr> <th>Time (mins)</th> <th>Area (ha)</th> <th>Time (mins)</th> <th>Area (ha)</th> <th>Time (mins)</th> <th>Area (ha)</th> </tr> <tr> <th>From:</th> <th>To:</th> <th>From:</th> <th>To:</th> <th>From:</th> <th>To:</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>4</td> <td>0.013</td> <td>4</td> <td>8</td> <td>0.013</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>8</td> <td>12</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td>0.013</td> </tr> </tbody> </table> |                                        |                                                                                     | Rainfall Model | FSR         | Winter Storms | Yes | Return Period (years) | 30 | Cv (Summer) | 0.750 | Region | England and Wales | Cv (Winter) | 0.840 | M5-60 (mm) | 18.000 | Shortest Storm (mins) | 15 | Ratio R | 0.336 | Longest Storm (mins) | 10080 | Summer Storms | Yes | Climate Change % | +30 | Time (mins) | Area (ha) | Time (mins) | Area (ha) | Time (mins) | Area (ha) | From: | To: | From: | To: | From: | To: | 0 | 4 | 0.013 | 4 | 8 | 0.013 |  |  |  |  | 8 | 12 |  |  |  |  |  | 0.013 |
| Rainfall Model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | FSR                                    | Winter Storms                                                                       | Yes            |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 30                                     | Cv (Summer)                                                                         | 0.750          |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Region                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | England and Wales                      | Cv (Winter)                                                                         | 0.840          |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| M5-60 (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 18.000                                 | Shortest Storm (mins)                                                               | 15             |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Ratio R                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0.336                                  | Longest Storm (mins)                                                                | 10080          |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Summer Storms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Yes                                    | Climate Change %                                                                    | +30            |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Time (mins)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Area (ha)                              | Time (mins)                                                                         | Area (ha)      | Time (mins) | Area (ha)     |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| From:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | To:                                    | From:                                                                               | To:            | From:       | To:           |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4                                      | 0.013                                                                               | 4              | 8           | 0.013         |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
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| Curtins Consulting Ltd                                |                                        | Page 4                                                                              |
| .<br>.<br>.                                           |                                        |  |
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| XP Solutions Source Control 2016.1                    |                                        |                                                                                     |

Model Details

Storage is Online Cover Level (m) 79.500

Deep Bore Soakaway Structure

Chamber Invert Level (m) 77.500 Infiltration Coefficient Base (m/hr) 0.18000  
 Chamber Diameter/Width (m) 1.200 Safety Factor 2.0  
 Borehole Diameter (m) 0.200  
 Borehole Depth (m) 22.000

| Side          | Side           | Side           |
|---------------|----------------|----------------|
| Depth Infil.  | Depth Infil.   | Depth Infil.   |
| (m) Coef.     | (m) Coef.      | (m) Coef.      |
| (m/hr)        | (m/hr)         | (m/hr)         |
| 0.000 0.18000 | 16.000 0.00000 | 22.000 0.00000 |

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| Curtins Consulting Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                     |                                                                                     |                 | Page 1 |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
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| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |                     | Source Control 2016.1                                                               |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| <u>Summary of Results for 30 year Return Period (+30%)</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               |                     |                                                                                     |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| Half Drain Time : 953 minutes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                     |                                                                                     |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>79.707</td><td>24.007</td><td>0.3</td><td>9.5</td><td>FL00D</td></tr><tr><td>30 min Summer</td><td>79.710</td><td>24.010</td><td>0.3</td><td>12.7</td><td>FL00D</td></tr><tr><td>60 min Summer</td><td>79.713</td><td>24.013</td><td>0.3</td><td>16.0</td><td>FL00D</td></tr><tr><td>120 min Summer</td><td>79.716</td><td>24.016</td><td>0.3</td><td>19.4</td><td>FL00D</td></tr><tr><td>180 min Summer</td><td>79.718</td><td>24.018</td><td>0.3</td><td>21.3</td><td>FL00D</td></tr><tr><td>240 min Summer</td><td>79.719</td><td>24.019</td><td>0.3</td><td>22.4</td><td>FL00D</td></tr><tr><td>360 min Summer</td><td>79.721</td><td>24.021</td><td>0.3</td><td>23.6</td><td>FL00D</td></tr><tr><td>480 min Summer</td><td>79.721</td><td>24.021</td><td>0.3</td><td>24.2</td><td>FL00D</td></tr><tr><td>600 min Summer</td><td>79.721</td><td>24.021</td><td>0.3</td><td>24.3</td><td>FL00D</td></tr><tr><td>720 min Summer</td><td>79.721</td><td>24.021</td><td>0.3</td><td>24.2</td><td>FL00D</td></tr><tr><td>960 min Summer</td><td>79.721</td><td>24.021</td><td>0.3</td><td>23.7</td><td>FL00D</td></tr><tr><td>1440 min Summer</td><td>79.720</td><td>24.020</td><td>0.3</td><td>22.8</td><td>FL00D</td></tr><tr><td>2160 min Summer</td><td>79.719</td><td>24.019</td><td>0.3</td><td>21.5</td><td>FL00D</td></tr><tr><td>2880 min Summer</td><td>79.717</td><td>24.017</td><td>0.3</td><td>20.2</td><td>FL00D</td></tr><tr><td>4320 min Summer</td><td>79.714</td><td>24.014</td><td>0.3</td><td>17.4</td><td>FL00D</td></tr><tr><td>5760 min Summer</td><td>79.712</td><td>24.012</td><td>0.3</td><td>14.6</td><td>FL00D</td></tr><tr><td>7200 min Summer</td><td>79.709</td><td>24.009</td><td>0.3</td><td>12.0</td><td>FL00D</td></tr><tr><td>8640 min Summer</td><td>79.707</td><td>24.007</td><td>0.3</td><td>9.7</td><td>FL00D</td></tr><tr><td>10080 min Summer</td><td>79.705</td><td>24.005</td><td>0.3</td><td>7.7</td><td>FL00D</td></tr><tr><td>15 min Winter</td><td>79.708</td><td>24.008</td><td>0.3</td><td>10.7</td><td>FL00D</td></tr></table> |               |                     |                                                                                     |                 |        |  | Storm Event | Max Level (m) | Max Depth (m)       | Max Infiltration (l/s) | Max Volume (m³) | Status | 15 min Summer | 79.707 | 24.007        | 0.3    | 9.5 | FL00D | 30 min Summer | 79.710 | 24.010 | 0.3 | 12.7           | FL00D  | 60 min Summer | 79.713 | 24.013         | 0.3    | 16.0 | FL00D | 120 min Summer | 79.716 | 24.016 | 0.3 | 19.4           | FL00D  | 180 min Summer | 79.718 | 24.018         | 0.3   | 21.3 | FL00D | 240 min Summer | 79.719 | 24.019 | 0.3 | 22.4           | FL00D | 360 min Summer | 79.721 | 24.021         | 0.3   | 23.6 | FL00D | 480 min Summer  | 79.721 | 24.021 | 0.3  | 24.2            | FL00D | 600 min Summer | 79.721 | 24.021          | 0.3   | 24.3 | FL00D | 720 min Summer  | 79.721 | 24.021 | 0.3  | 24.2            | FL00D | 960 min Summer | 79.721 | 24.021          | 0.3   | 23.7 | FL00D | 1440 min Summer | 79.720 | 24.020 | 0.3  | 22.8             | FL00D | 2160 min Summer | 79.719 | 24.019        | 0.3    | 21.5 | FL00D | 2880 min Summer | 79.717 | 24.017 | 0.3 | 20.2 | FL00D | 4320 min Summer | 79.714 | 24.014 | 0.3 | 17.4 | FL00D | 5760 min Summer | 79.712 | 24.012 | 0.3 | 14.6 | FL00D | 7200 min Summer | 79.709 | 24.009 | 0.3 | 12.0 | FL00D | 8640 min Summer | 79.707 | 24.007 | 0.3 | 9.7 | FL00D | 10080 min Summer | 79.705 | 24.005 | 0.3 | 7.7 | FL00D | 15 min Winter | 79.708 | 24.008 | 0.3 | 10.7 | FL00D |
| Storm Event                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Max Level (m) | Max Depth (m)       | Max Infiltration (l/s)                                                              | Max Volume (m³) | Status |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 15 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 79.707        | 24.007              | 0.3                                                                                 | 9.5             | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 30 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 79.710        | 24.010              | 0.3                                                                                 | 12.7            | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 60 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 79.713        | 24.013              | 0.3                                                                                 | 16.0            | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 120 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 79.716        | 24.016              | 0.3                                                                                 | 19.4            | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 180 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 79.718        | 24.018              | 0.3                                                                                 | 21.3            | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 240 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 79.719        | 24.019              | 0.3                                                                                 | 22.4            | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 360 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 79.721        | 24.021              | 0.3                                                                                 | 23.6            | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 480 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 79.721        | 24.021              | 0.3                                                                                 | 24.2            | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 600 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 79.721        | 24.021              | 0.3                                                                                 | 24.3            | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 720 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 79.721        | 24.021              | 0.3                                                                                 | 24.2            | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 960 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 79.721        | 24.021              | 0.3                                                                                 | 23.7            | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 1440 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 79.720        | 24.020              | 0.3                                                                                 | 22.8            | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 2160 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 79.719        | 24.019              | 0.3                                                                                 | 21.5            | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 2880 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 79.717        | 24.017              | 0.3                                                                                 | 20.2            | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 4320 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 79.714        | 24.014              | 0.3                                                                                 | 17.4            | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 5760 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 79.712        | 24.012              | 0.3                                                                                 | 14.6            | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 7200 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 79.709        | 24.009              | 0.3                                                                                 | 12.0            | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 8640 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 79.707        | 24.007              | 0.3                                                                                 | 9.7             | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 10080 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 79.705        | 24.005              | 0.3                                                                                 | 7.7             | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 15 min Winter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 79.708        | 24.008              | 0.3                                                                                 | 10.7            | FL00D  |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>83.344</td><td>6.6</td><td>26</td></tr><tr><td>30 min Summer</td><td>55.879</td><td>9.7</td><td>41</td></tr><tr><td>60 min Summer</td><td>35.949</td><td>13.1</td><td>70</td></tr><tr><td>120 min Summer</td><td>22.481</td><td>16.5</td><td>128</td></tr><tr><td>180 min Summer</td><td>16.899</td><td>18.3</td><td>188</td></tr><tr><td>240 min Summer</td><td>13.734</td><td>19.4</td><td>246</td></tr><tr><td>360 min Summer</td><td>10.201</td><td>20.6</td><td>366</td></tr><tr><td>480 min Summer</td><td>8.260</td><td>21.2</td><td>484</td></tr><tr><td>600 min Summer</td><td>7.008</td><td>21.4</td><td>602</td></tr><tr><td>720 min Summer</td><td>6.125</td><td>21.2</td><td>720</td></tr><tr><td>960 min Summer</td><td>4.949</td><td>20.7</td><td>838</td></tr><tr><td>1440 min Summer</td><td>3.659</td><td>19.8</td><td>1090</td></tr><tr><td>2160 min Summer</td><td>2.701</td><td>18.5</td><td>1492</td></tr><tr><td>2880 min Summer</td><td>2.176</td><td>17.2</td><td>1904</td></tr><tr><td>4320 min Summer</td><td>1.602</td><td>14.4</td><td>2724</td></tr><tr><td>5760 min Summer</td><td>1.288</td><td>11.6</td><td>3512</td></tr><tr><td>7200 min Summer</td><td>1.088</td><td>9.1</td><td>4256</td></tr><tr><td>8640 min Summer</td><td>0.947</td><td>6.7</td><td>5016</td></tr><tr><td>10080 min Summer</td><td>0.843</td><td>4.7</td><td>5744</td></tr><tr><td>15 min Winter</td><td>83.344</td><td>7.7</td><td>26</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |                     |                                                                                     |                 |        |  | Storm Event | Rain (mm/hr)  | Flooded Volume (m³) | Time-Peak (mins)       | 15 min Summer   | 83.344 | 6.6           | 26     | 30 min Summer | 55.879 | 9.7 | 41    | 60 min Summer | 35.949 | 13.1   | 70  | 120 min Summer | 22.481 | 16.5          | 128    | 180 min Summer | 16.899 | 18.3 | 188   | 240 min Summer | 13.734 | 19.4   | 246 | 360 min Summer | 10.201 | 20.6           | 366    | 480 min Summer | 8.260 | 21.2 | 484   | 600 min Summer | 7.008  | 21.4   | 602 | 720 min Summer | 6.125 | 21.2           | 720    | 960 min Summer | 4.949 | 20.7 | 838   | 1440 min Summer | 3.659  | 19.8   | 1090 | 2160 min Summer | 2.701 | 18.5           | 1492   | 2880 min Summer | 2.176 | 17.2 | 1904  | 4320 min Summer | 1.602  | 14.4   | 2724 | 5760 min Summer | 1.288 | 11.6           | 3512   | 7200 min Summer | 1.088 | 9.1  | 4256  | 8640 min Summer | 0.947  | 6.7    | 5016 | 10080 min Summer | 0.843 | 4.7             | 5744   | 15 min Winter | 83.344 | 7.7  | 26    |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| Storm Event                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Rain (mm/hr)  | Flooded Volume (m³) | Time-Peak (mins)                                                                    |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 15 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 83.344        | 6.6                 | 26                                                                                  |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 30 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 55.879        | 9.7                 | 41                                                                                  |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 60 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 35.949        | 13.1                | 70                                                                                  |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 120 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 22.481        | 16.5                | 128                                                                                 |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 180 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 16.899        | 18.3                | 188                                                                                 |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 240 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 13.734        | 19.4                | 246                                                                                 |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 360 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 10.201        | 20.6                | 366                                                                                 |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 480 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 8.260         | 21.2                | 484                                                                                 |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 600 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 7.008         | 21.4                | 602                                                                                 |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 720 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6.125         | 21.2                | 720                                                                                 |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 960 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 4.949         | 20.7                | 838                                                                                 |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 1440 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3.659         | 19.8                | 1090                                                                                |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 2160 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2.701         | 18.5                | 1492                                                                                |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 2880 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2.176         | 17.2                | 1904                                                                                |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 4320 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1.602         | 14.4                | 2724                                                                                |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 5760 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1.288         | 11.6                | 3512                                                                                |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 7200 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1.088         | 9.1                 | 4256                                                                                |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 8640 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.947         | 6.7                 | 5016                                                                                |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 10080 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0.843         | 4.7                 | 5744                                                                                |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
| 15 min Winter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 83.344        | 7.7                 | 26                                                                                  |                 |        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |      |       |                |        |        |     |                |        |                |        |                |       |      |       |                |        |        |     |                |       |                |        |                |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                 |       |                |        |                 |       |      |       |                 |        |        |      |                  |       |                 |        |               |        |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                  |        |        |     |     |       |               |        |        |     |      |       |
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|                                                     |               |                          |                        |                                                                                     |        |
|-----------------------------------------------------|---------------|--------------------------|------------------------|-------------------------------------------------------------------------------------|--------|
| Curtins Consulting Ltd                              |               |                          |                        | Page 2                                                                              |        |
| .                                                   |               |                          |                        |  |        |
| .                                                   |               |                          |                        |                                                                                     |        |
| .                                                   |               |                          |                        |                                                                                     |        |
| Date 21/10/2016 16:14                               |               | Designed by pennington_p |                        |                                                                                     |        |
| File SE Dead End-1BH.srcx                           |               | Checked by               |                        |                                                                                     |        |
| XP Solutions                                        |               | Source Control 2016.1    |                        |                                                                                     |        |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 30 min Winter                                       | 79.711        | 24.011                   | 0.3                    | 14.3                                                                                | FLOOD  |
| 60 min Winter                                       | 79.715        | 24.015                   | 0.3                    | 18.1                                                                                | FLOOD  |
| 120 min Winter                                      | 79.719        | 24.019                   | 0.3                    | 22.0                                                                                | FLOOD  |
| 180 min Winter                                      | 79.721        | 24.021                   | 0.3                    | 24.2                                                                                | FLOOD  |
| 240 min Winter                                      | 79.723        | 24.023                   | 0.3                    | 25.6                                                                                | FLOOD  |
| 360 min Winter                                      | 79.724        | 24.024                   | 0.3                    | 27.2                                                                                | FLOOD  |
| 480 min Winter                                      | 79.725        | 24.025                   | 0.3                    | 28.1                                                                                | FLOOD  |
| 600 min Winter                                      | 79.726        | 24.026                   | 0.3                    | 28.6                                                                                | FLOOD  |
| 720 min Winter                                      | 79.726        | 24.026                   | 0.3                    | 28.7                                                                                | FLOOD  |
| 960 min Winter                                      | 79.725        | 24.025                   | 0.3                    | 28.4                                                                                | FLOOD  |
| 1440 min Winter                                     | 79.724        | 24.024                   | 0.3                    | 26.9                                                                                | FLOOD  |
| 2160 min Winter                                     | 79.722        | 24.022                   | 0.3                    | 25.1                                                                                | FLOOD  |
| 2880 min Winter                                     | 79.720        | 24.020                   | 0.3                    | 23.0                                                                                | FLOOD  |
| 4320 min Winter                                     | 79.716        | 24.016                   | 0.3                    | 18.5                                                                                | FLOOD  |
| 5760 min Winter                                     | 79.711        | 24.011                   | 0.3                    | 14.2                                                                                | FLOOD  |
| 7200 min Winter                                     | 79.707        | 24.007                   | 0.3                    | 10.2                                                                                | FLOOD  |
| 8640 min Winter                                     | 79.704        | 24.004                   | 0.3                    | 6.8                                                                                 | FLOOD  |
| 10080 min Winter                                    | 79.701        | 24.001                   | 0.3                    | 4.0                                                                                 | FLOOD  |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 30 min Winter                                       | 55.879        | 11.3                     | 40                     |                                                                                     |        |
| 60 min Winter                                       | 35.949        | 15.1                     | 70                     |                                                                                     |        |
| 120 min Winter                                      | 22.481        | 19.0                     | 126                    |                                                                                     |        |
| 180 min Winter                                      | 16.899        | 21.2                     | 184                    |                                                                                     |        |
| 240 min Winter                                      | 13.734        | 22.6                     | 242                    |                                                                                     |        |
| 360 min Winter                                      | 10.201        | 24.3                     | 358                    |                                                                                     |        |
| 480 min Winter                                      | 8.260         | 25.1                     | 474                    |                                                                                     |        |
| 600 min Winter                                      | 7.008         | 25.6                     | 588                    |                                                                                     |        |
| 720 min Winter                                      | 6.125         | 25.7                     | 700                    |                                                                                     |        |
| 960 min Winter                                      | 4.949         | 25.4                     | 916                    |                                                                                     |        |
| 1440 min Winter                                     | 3.659         | 23.9                     | 1170                   |                                                                                     |        |
| 2160 min Winter                                     | 2.701         | 22.1                     | 1624                   |                                                                                     |        |
| 2880 min Winter                                     | 2.176         | 20.0                     | 2080                   |                                                                                     |        |
| 4320 min Winter                                     | 1.602         | 15.5                     | 2944                   |                                                                                     |        |
| 5760 min Winter                                     | 1.288         | 11.2                     | 3752                   |                                                                                     |        |
| 7200 min Winter                                     | 1.088         | 7.3                      | 4536                   |                                                                                     |        |
| 8640 min Winter                                     | 0.947         | 3.9                      | 5192                   |                                                                                     |        |
| 10080 min Winter                                    | 0.843         | 1.1                      | 5848                   |                                                                                     |        |
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| Designed by pennington_p |
| Checked by               |



Source Control 2016.1

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 30                | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 18.000            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.336             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +30   |

Total Area (ha) 0.063

| Time (mins) | Area  | Time (mins) | Area  | Time (mins) | Area  |
|-------------|-------|-------------|-------|-------------|-------|
| From: To:   | (ha)  | From: To:   | (ha)  | From: To:   | (ha)  |
| 0 4         | 0.021 | 4 8         | 0.021 | 8 12        | 0.021 |

| Curtins Consulting Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        | Page 4                                                                              |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|--------------|-----------------------------------|-------|---------|--------|---------|--------|---------|
| .<br>.<br>.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |  |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
| Date 21/10/2016 16:14<br>File SE Dead End-1BH.srcx                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Designed by pennington_p<br>Checked by |                                                                                     |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |                                                                                     |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
| Source Control 2016.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                                                                     |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
| <p style="text-align: center;"><u>Model Details</u></p> <p style="text-align: center;">Storage is Online Cover Level (m) 79.700</p> <p style="text-align: center;"><u>Deep Bore Soakaway Structure</u></p> <p>           Chamber Invert Level (m) 77.700   Infiltration Coefficient Base (m/hr) 0.18000<br/>           Chamber Diameter/Width (m) 1.200   Safety Factor 2.0<br/>           Borehole Diameter (m) 0.200<br/>           Borehole Depth (m) 22.000         </p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Depth<br/>(m)</th> <th>Side<br/>Infil.<br/>Coef.<br/>(m/hr)</th> <th>Depth<br/>(m)</th> <th>Side<br/>Infil.<br/>Coef.<br/>(m/hr)</th> <th>Depth<br/>(m)</th> <th>Side<br/>Infil.<br/>Coef.<br/>(m/hr)</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>0.18000</td> <td>16.000</td> <td>0.00000</td> <td>22.000</td> <td>0.00000</td> </tr> </tbody> </table> |                                        |                                                                                     | Depth<br>(m)                      | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m)                      | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) | 0.000 | 0.18000 | 16.000 | 0.00000 | 22.000 | 0.00000 |
| Depth<br>(m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Side<br>Infil.<br>Coef.<br>(m/hr)      | Depth<br>(m)                                                                        | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m)                      | Side<br>Infil.<br>Coef.<br>(m/hr) |                                   |              |                                   |       |         |        |         |        |         |
| 0.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.18000                                | 16.000                                                                              | 0.00000                           | 22.000                            | 0.00000                           |                                   |              |                                   |       |         |        |         |        |         |
| ©1982-2016 XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                                                                     |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |

| Curtins Consulting Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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    |       |     |      |                  |       |     |      |               |        |     |    |
| <p>Summary of Results for 30 year Return Period (+30%)</p> <p>Half Drain Time : 702 minutes.</p> <table><thead><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr></thead><tbody><tr><td>15 min Summer</td><td>79.505</td><td>24.005</td><td>0.3</td><td>7.5</td><td>FLOOD</td></tr><tr><td>30 min Summer</td><td>79.507</td><td>24.007</td><td>0.3</td><td>10.0</td><td>FLOOD</td></tr><tr><td>60 min Summer</td><td>79.510</td><td>24.010</td><td>0.3</td><td>12.5</td><td>FLOOD</td></tr><tr><td>120 min Summer</td><td>79.512</td><td>24.012</td><td>0.3</td><td>15.1</td><td>FLOOD</td></tr><tr><td>180 min Summer</td><td>79.513</td><td>24.013</td><td>0.3</td><td>16.4</td><td>FLOOD</td></tr><tr><td>240 min Summer</td><td>79.514</td><td>24.014</td><td>0.3</td><td>17.1</td><td>FLOOD</td></tr><tr><td>360 min Summer</td><td>79.515</td><td>24.015</td><td>0.3</td><td>17.7</td><td>FLOOD</td></tr><tr><td>480 min Summer</td><td>79.515</td><td>24.015</td><td>0.3</td><td>17.8</td><td>FLOOD</td></tr><tr><td>600 min Summer</td><td>79.515</td><td>24.015</td><td>0.3</td><td>17.7</td><td>FLOOD</td></tr><tr><td>720 min Summer</td><td>79.514</td><td>24.014</td><td>0.3</td><td>17.5</td><td>FLOOD</td></tr><tr><td>960 min Summer</td><td>79.514</td><td>24.014</td><td>0.3</td><td>17.0</td><td>FLOOD</td></tr><tr><td>1440 min Summer</td><td>79.513</td><td>24.013</td><td>0.3</td><td>16.2</td><td>FLOOD</td></tr><tr><td>2160 min Summer</td><td>79.512</td><td>24.012</td><td>0.3</td><td>14.9</td><td>FLOOD</td></tr><tr><td>2880 min Summer</td><td>79.511</td><td>24.011</td><td>0.3</td><td>13.5</td><td>FLOOD</td></tr><tr><td>4320 min Summer</td><td>79.508</td><td>24.008</td><td>0.3</td><td>10.7</td><td>FLOOD</td></tr><tr><td>5760 min Summer</td><td>79.505</td><td>24.005</td><td>0.3</td><td>8.2</td><td>FLOOD</td></tr><tr><td>7200 min Summer</td><td>79.503</td><td>24.003</td><td>0.3</td><td>6.1</td><td>FLOOD</td></tr><tr><td>8640 min Summer</td><td>79.501</td><td>24.001</td><td>0.3</td><td>4.3</td><td>FLOOD</td></tr><tr><td>10080 min Summer</td><td>79.472</td><td>23.972</td><td>0.3</td><td>2.9</td><td>Flood Risk</td></tr><tr><td>15 min Winter</td><td>79.505</td><td>24.005</td><td>0.3</td><td>8.4</td><td>FLOOD</td></tr></tbody></table> <table><thead><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Time-Peak (mins)</th></tr></thead><tbody><tr><td>15 min Summer</td><td>83.344</td><td>4.5</td><td>26</td></tr><tr><td>30 min Summer</td><td>55.879</td><td>7.0</td><td>40</td></tr><tr><td>60 min Summer</td><td>35.949</td><td>9.6</td><td>70</td></tr><tr><td>120 min Summer</td><td>22.481</td><td>12.1</td><td>128</td></tr><tr><td>180 min Summer</td><td>16.899</td><td>13.4</td><td>186</td></tr><tr><td>240 min Summer</td><td>13.734</td><td>14.1</td><td>246</td></tr><tr><td>360 min Summer</td><td>10.201</td><td>14.8</td><td>364</td></tr><tr><td>480 min Summer</td><td>8.260</td><td>14.9</td><td>482</td></tr><tr><td>600 min Summer</td><td>7.008</td><td>14.7</td><td>576</td></tr><tr><td>720 min Summer</td><td>6.125</td><td>14.5</td><td>626</td></tr><tr><td>960 min Summer</td><td>4.949</td><td>14.0</td><td>752</td></tr><tr><td>1440 min Summer</td><td>3.659</td><td>13.2</td><td>1014</td></tr><tr><td>2160 min Summer</td><td>2.701</td><td>11.9</td><td>1428</td></tr><tr><td>2880 min Summer</td><td>2.176</td><td>10.5</td><td>1828</td></tr><tr><td>4320 min Summer</td><td>1.602</td><td>7.8</td><td>2636</td></tr><tr><td>5760 min Summer</td><td>1.288</td><td>5.3</td><td>3392</td></tr><tr><td>7200 min Summer</td><td>1.088</td><td>3.1</td><td>4104</td></tr><tr><td>8640 min Summer</td><td>0.947</td><td>1.4</td><td>4760</td></tr><tr><td>10080 min Summer</td><td>0.843</td><td>0.0</td><td>5448</td></tr><tr><td>15 min Winter</td><td>83.344</td><td>5.5</td><td>26</td></tr></tbody></table> |               |                     |                                                                                     |                 |            |  | Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status | 15 min Summer | 79.505 | 24.005 | 0.3 | 7.5 | FLOOD | 30 min Summer | 79.507 | 24.007 | 0.3 | 10.0 | FLOOD | 60 min Summer | 79.510 | 24.010 | 0.3 | 12.5 | FLOOD | 120 min Summer | 79.512 | 24.012 | 0.3 | 15.1 | FLOOD | 180 min Summer | 79.513 | 24.013 | 0.3 | 16.4 | FLOOD | 240 min Summer | 79.514 | 24.014 | 0.3 | 17.1 | FLOOD | 360 min Summer | 79.515 | 24.015 | 0.3 | 17.7 | FLOOD | 480 min Summer | 79.515 | 24.015 | 0.3 | 17.8 | FLOOD | 600 min Summer | 79.515 | 24.015 | 0.3 | 17.7 | FLOOD | 720 min Summer | 79.514 | 24.014 | 0.3 | 17.5 | FLOOD | 960 min Summer | 79.514 | 24.014 | 0.3 | 17.0 | FLOOD | 1440 min Summer | 79.513 | 24.013 | 0.3 | 16.2 | FLOOD | 2160 min Summer | 79.512 | 24.012 | 0.3 | 14.9 | FLOOD | 2880 min Summer | 79.511 | 24.011 | 0.3 | 13.5 | FLOOD | 4320 min Summer | 79.508 | 24.008 | 0.3 | 10.7 | FLOOD | 5760 min Summer | 79.505 | 24.005 | 0.3 | 8.2 | FLOOD | 7200 min Summer | 79.503 | 24.003 | 0.3 | 6.1 | FLOOD | 8640 min Summer | 79.501 | 24.001 | 0.3 | 4.3 | FLOOD | 10080 min Summer | 79.472 | 23.972 | 0.3 | 2.9 | Flood Risk | 15 min Winter | 79.505 | 24.005 | 0.3 | 8.4 | FLOOD | Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) | 15 min Summer | 83.344 | 4.5 | 26 | 30 min Summer | 55.879 | 7.0 | 40 | 60 min Summer | 35.949 | 9.6 | 70 | 120 min Summer | 22.481 | 12.1 | 128 | 180 min Summer | 16.899 | 13.4 | 186 | 240 min Summer | 13.734 | 14.1 | 246 | 360 min Summer | 10.201 | 14.8 | 364 | 480 min Summer | 8.260 | 14.9 | 482 | 600 min Summer | 7.008 | 14.7 | 576 | 720 min Summer | 6.125 | 14.5 | 626 | 960 min Summer | 4.949 | 14.0 | 752 | 1440 min Summer | 3.659 | 13.2 | 1014 | 2160 min Summer | 2.701 | 11.9 | 1428 | 2880 min Summer | 2.176 | 10.5 | 1828 | 4320 min Summer | 1.602 | 7.8 | 2636 | 5760 min Summer | 1.288 | 5.3 | 3392 | 7200 min Summer | 1.088 | 3.1 | 4104 | 8640 min Summer | 0.947 | 1.4 | 4760 | 10080 min Summer | 0.843 | 0.0 | 5448 | 15 min Winter | 83.344 | 5.5 | 26 |
| Storm Event                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Max Level (m) | Max Depth (m)       | Max Infiltration (l/s)                                                              | Max Volume (m³) | Status     |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 15 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 79.505        | 24.005              | 0.3                                                                                 | 7.5             | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 30 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 79.507        | 24.007              | 0.3                                                                                 | 10.0            | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 60 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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         | 12.5            | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 120 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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         | 15.1            | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |             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| 180 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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         | 16.4            | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 240 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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         | 17.1            | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 360 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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         | 17.7            | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 480 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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         | 17.8            | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 600 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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         | 17.7            | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 720 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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         | 17.5            | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 960 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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         | 17.0            | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 1440 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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         | 16.2            | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 2160 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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         | 14.9            | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 2880 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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         | 13.5            | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 4320 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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         | 10.7            | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 5760 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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         | 8.2             | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 7200 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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         | 6.1             | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |             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| 8640 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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         | 4.3             | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 10080 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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         | 2.9             | Flood Risk |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 15 min Winter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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         | 8.4             | FLOOD      |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| Storm Event                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Rain (mm/hr)  | Flooded Volume (m³) | Time-Peak (mins)                                                                    |                 |            |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 15 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 83.344        | 4.5                 | 26                                                                                  |                 |            |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 30 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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         |                 |            |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 60 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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       |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 120 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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       |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 180 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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       |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 240 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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       |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |             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| 360 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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       |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |             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| 480 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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       |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 600 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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       |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |             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| 720 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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       |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 960 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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       |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 1440 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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       |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 2160 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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       |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 2880 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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       |        |     |     |       |                 |        |        |     |     |       |                 |        |        |     |     |       |                  |        |        |     |     |            |               |        |        |     |     |       |             |              |                     |                  |               |        |     |    |               |        |     |    |               |        |     |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                 |       |     |      |                  |       |     |      |               |        |     |    |
| 4320 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| 5760 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| 7200 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| 8640 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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         |                 |            |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 | 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| 10080 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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         |                 |            |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 | 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    |       |     |      |                  |       |     |      |               |        |     |    |
| 15 min Winter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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         |                 |            |  |             |               |               |                        |                 |        |               |        |        |     |     |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 | 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| Curtins Consulting Ltd                              |               |                     |                                                                                     |                 | Page 2 |  |
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| XP Solutions                                        |               |                     | Source Control 2016.1                                                               |                 |        |  |
| Summary of Results for 30 year Return Period (+30%) |               |                     |                                                                                     |                 |        |  |
| Storm Event                                         | Max Level (m) | Max Depth (m)       | Max Infiltration (l/s)                                                              | Max Volume (m³) | Status |  |
| 30 min Winter                                       | 79.508        | 24.008              | 0.3                                                                                 | 11.2            | FLOOD  |  |
| 60 min Winter                                       | 79.511        | 24.011              | 0.3                                                                                 | 14.2            | FLOOD  |  |
| 120 min Winter                                      | 79.514        | 24.014              | 0.3                                                                                 | 17.1            | FLOOD  |  |
| 180 min Winter                                      | 79.516        | 24.016              | 0.3                                                                                 | 18.7            | FLOOD  |  |
| 240 min Winter                                      | 79.517        | 24.017              | 0.3                                                                                 | 19.7            | FLOOD  |  |
| 360 min Winter                                      | 79.518        | 24.018              | 0.3                                                                                 | 20.6            | FLOOD  |  |
| 480 min Winter                                      | 79.518        | 24.018              | 0.3                                                                                 | 21.0            | FLOOD  |  |
| 600 min Winter                                      | 79.518        | 24.018              | 0.3                                                                                 | 21.0            | FLOOD  |  |
| 720 min Winter                                      | 79.518        | 24.018              | 0.3                                                                                 | 20.9            | FLOOD  |  |
| 960 min Winter                                      | 79.517        | 24.017              | 0.3                                                                                 | 20.1            | FLOOD  |  |
| 1440 min Winter                                     | 79.516        | 24.016              | 0.3                                                                                 | 18.9            | FLOOD  |  |
| 2160 min Winter                                     | 79.514        | 24.014              | 0.3                                                                                 | 16.9            | FLOOD  |  |
| 2880 min Winter                                     | 79.512        | 24.012              | 0.3                                                                                 | 14.7            | FLOOD  |  |
| 4320 min Winter                                     | 79.507        | 24.007              | 0.3                                                                                 | 10.3            | FLOOD  |  |
| 5760 min Winter                                     | 79.504        | 24.004              | 0.3                                                                                 | 6.6             | FLOOD  |  |
| 7200 min Winter                                     | 79.501        | 24.001              | 0.3                                                                                 | 3.5             | FLOOD  |  |
| 8640 min Winter                                     | 78.108        | 22.608              | 0.3                                                                                 | 1.4             | 0 K    |  |
| 10080 min Winter                                    | 71.286        | 15.786              | 0.2                                                                                 | 0.5             | 0 K    |  |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³) | Time-Peak (mins)                                                                    |                 |        |  |
| 30 min Winter                                       | 55.879        | 8.3                 | 40                                                                                  |                 |        |  |
| 60 min Winter                                       | 35.949        | 11.2                | 68                                                                                  |                 |        |  |
| 120 min Winter                                      | 22.481        | 14.2                | 126                                                                                 |                 |        |  |
| 180 min Winter                                      | 16.899        | 15.7                | 184                                                                                 |                 |        |  |
| 240 min Winter                                      | 13.734        | 16.7                | 242                                                                                 |                 |        |  |
| 360 min Winter                                      | 10.201        | 17.6                | 356                                                                                 |                 |        |  |
| 480 min Winter                                      | 8.260         | 18.0                | 470                                                                                 |                 |        |  |
| 600 min Winter                                      | 7.008         | 18.1                | 580                                                                                 |                 |        |  |
| 720 min Winter                                      | 6.125         | 17.9                | 688                                                                                 |                 |        |  |
| 960 min Winter                                      | 4.949         | 17.1                | 876                                                                                 |                 |        |  |
| 1440 min Winter                                     | 3.659         | 16.0                | 1098                                                                                |                 |        |  |
| 2160 min Winter                                     | 2.701         | 13.9                | 1560                                                                                |                 |        |  |
| 2880 min Winter                                     | 2.176         | 11.7                | 1992                                                                                |                 |        |  |
| 4320 min Winter                                     | 1.602         | 7.4                 | 2812                                                                                |                 |        |  |
| 5760 min Winter                                     | 1.288         | 3.6                 | 3568                                                                                |                 |        |  |
| 7200 min Winter                                     | 1.088         | 0.6                 | 4192                                                                                |                 |        |  |
| 8640 min Winter                                     | 0.947         | 0.0                 | 4760                                                                                |                 |        |  |
| 10080 min Winter                                    | 0.843         | 0.0                 | 5136                                                                                |                 |        |  |
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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|----------------|-------------|---------------|-----|-----------------------|----|-------------|-------|--------|-------------------|-------------|-------|------------|--------|-----------------------|----|---------|-------|----------------------|-------|---------------|-----|------------------|-----|-------------|------|-------------|------|-------------|------|-----------|------|-----------|------|-----------|------|-----|-------|-----|-------|------|-------|
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| Date 21/10/2016 16:31<br>File SE Pond-2BHs.srcx                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Designed by pennington_p<br>Checked by |                                                                                     |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                                                                     |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Source Control 2016.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                        |                                                                                     |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| <p style="text-align: center;"><u>Rainfall Details</u></p> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Return Period (years)</td> <td>30</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>18.000</td> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Ratio R</td> <td>0.336</td> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> <td>Climate Change %</td> <td>+30</td> </tr> </table> <p style="text-align: center;"><u>Time Area Diagram</u></p> <p style="text-align: center;">Total Area (ha) 0.050</p> <table> <thead> <tr> <th>Time (mins)</th> <th>Area</th> <th>Time (mins)</th> <th>Area</th> <th>Time (mins)</th> <th>Area</th> </tr> <tr> <th>From: To:</th> <th>(ha)</th> <th>From: To:</th> <th>(ha)</th> <th>From: To:</th> <th>(ha)</th> </tr> </thead> <tbody> <tr> <td>0 4</td> <td>0.017</td> <td>4 8</td> <td>0.017</td> <td>8 12</td> <td>0.017</td> </tr> </tbody> </table> |                                        |                                                                                     | Rainfall Model | FSR         | Winter Storms | Yes | Return Period (years) | 30 | Cv (Summer) | 0.750 | Region | England and Wales | Cv (Winter) | 0.840 | M5-60 (mm) | 18.000 | Shortest Storm (mins) | 15 | Ratio R | 0.336 | Longest Storm (mins) | 10080 | Summer Storms | Yes | Climate Change % | +30 | Time (mins) | Area | Time (mins) | Area | Time (mins) | Area | From: To: | (ha) | From: To: | (ha) | From: To: | (ha) | 0 4 | 0.017 | 4 8 | 0.017 | 8 12 | 0.017 |
| Rainfall Model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | FSR                                    | Winter Storms                                                                       | Yes            |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 30                                     | Cv (Summer)                                                                         | 0.750          |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Region                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | England and Wales                      | Cv (Winter)                                                                         | 0.840          |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| M5-60 (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 18.000                                 | Shortest Storm (mins)                                                               | 15             |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Ratio R                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.336                                  | Longest Storm (mins)                                                                | 10080          |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Summer Storms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Yes                                    | Climate Change %                                                                    | +30            |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Time (mins)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Area                                   | Time (mins)                                                                         | Area           | Time (mins) | Area          |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| From: To:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | (ha)                                   | From: To:                                                                           | (ha)           | From: To:   | (ha)          |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| 0 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.017                                  | 4 8                                                                                 | 0.017          | 8 12        | 0.017         |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
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| Curtins Consulting Ltd                          |                                        | Page 4                                                                              |
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| Date 21/10/2016 16:31<br>File SE Pond-2BHS.srcx | Designed by pennington_p<br>Checked by |                                                                                     |
| XP Solutions Source Control 2016.1              |                                        |                                                                                     |

Model Details

Storage is Online Cover Level (m) 79.500

Deep Bore Soakaway Structure

Chamber Invert Level (m) 77.500 Infiltration Coefficient Base (m/hr) 0.18000  
 Chamber Diameter/Width (m) 1.200 Safety Factor 2.0  
 Borehole Diameter (m) 0.200  
 Borehole Depth (m) 22.000

| Side          | Side           | Side           |
|---------------|----------------|----------------|
| Depth Infil.  | Depth Infil.   | Depth Infil.   |
| (m) Coef.     | (m) Coef.      | (m) Coef.      |
| (m/hr)        | (m/hr)         | (m/hr)         |
| 0.000 0.18000 | 16.000 0.00000 | 22.000 0.00000 |

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|                                                            |               |                          |                        |                                                                                     |        |
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| Curtins Consulting Ltd                                     |               |                          |                        | Page 1                                                                              |        |
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| Date 21/10/2016 16:07                                      |               | Designed by pennington_p |                        |                                                                                     |        |
| File Shared Space E of Home ...                            |               | Checked by               |                        |                                                                                     |        |
| XP Solutions                                               |               | Source Control 2016.1    |                        |                                                                                     |        |
| <u>Summary of Results for 30 year Return Period (+30%)</u> |               |                          |                        |                                                                                     |        |
| Half Drain Time : 981 minutes.                             |               |                          |                        |                                                                                     |        |
| Storm Event                                                | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 15 min Summer                                              | 84.807        | 24.007                   | 0.3                    | 9.6                                                                                 | FLOOD  |
| 30 min Summer                                              | 84.810        | 24.010                   | 0.3                    | 12.9                                                                                | FLOOD  |
| 60 min Summer                                              | 84.813        | 24.013                   | 0.3                    | 16.3                                                                                | FLOOD  |
| 120 min Summer                                             | 84.817        | 24.017                   | 0.3                    | 19.7                                                                                | FLOOD  |
| 180 min Summer                                             | 84.819        | 24.019                   | 0.3                    | 21.6                                                                                | FLOOD  |
| 240 min Summer                                             | 84.820        | 24.020                   | 0.3                    | 22.8                                                                                | FLOOD  |
| 360 min Summer                                             | 84.821        | 24.021                   | 0.3                    | 24.1                                                                                | FLOOD  |
| 480 min Summer                                             | 84.822        | 24.022                   | 0.3                    | 24.7                                                                                | FLOOD  |
| 600 min Summer                                             | 84.822        | 24.022                   | 0.3                    | 24.8                                                                                | FLOOD  |
| 720 min Summer                                             | 84.822        | 24.022                   | 0.3                    | 24.8                                                                                | FLOOD  |
| 960 min Summer                                             | 84.821        | 24.021                   | 0.3                    | 24.3                                                                                | FLOOD  |
| 1440 min Summer                                            | 84.820        | 24.020                   | 0.3                    | 23.3                                                                                | FLOOD  |
| 2160 min Summer                                            | 84.819        | 24.019                   | 0.3                    | 22.1                                                                                | FLOOD  |
| 2880 min Summer                                            | 84.818        | 24.018                   | 0.3                    | 20.7                                                                                | FLOOD  |
| 4320 min Summer                                            | 84.815        | 24.015                   | 0.3                    | 17.9                                                                                | FLOOD  |
| 5760 min Summer                                            | 84.812        | 24.012                   | 0.3                    | 15.1                                                                                | FLOOD  |
| 7200 min Summer                                            | 84.810        | 24.010                   | 0.3                    | 12.5                                                                                | FLOOD  |
| 8640 min Summer                                            | 84.807        | 24.007                   | 0.3                    | 10.2                                                                                | FLOOD  |
| 10080 min Summer                                           | 84.805        | 24.005                   | 0.3                    | 8.1                                                                                 | FLOOD  |
| 15 min Winter                                              | 84.808        | 24.008                   | 0.3                    | 10.8                                                                                | FLOOD  |
| Storm Event                                                | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 15 min Summer                                              | 83.344        | 6.7                      | 27                     |                                                                                     |        |
| 30 min Summer                                              | 55.879        | 9.9                      | 42                     |                                                                                     |        |
| 60 min Summer                                              | 35.949        | 13.3                     | 72                     |                                                                                     |        |
| 120 min Summer                                             | 22.481        | 16.8                     | 130                    |                                                                                     |        |
| 180 min Summer                                             | 16.899        | 18.7                     | 190                    |                                                                                     |        |
| 240 min Summer                                             | 13.734        | 19.8                     | 248                    |                                                                                     |        |
| 360 min Summer                                             | 10.201        | 21.1                     | 366                    |                                                                                     |        |
| 480 min Summer                                             | 8.260         | 21.7                     | 484                    |                                                                                     |        |
| 600 min Summer                                             | 7.008         | 21.9                     | 604                    |                                                                                     |        |
| 720 min Summer                                             | 6.125         | 21.8                     | 722                    |                                                                                     |        |
| 960 min Summer                                             | 4.949         | 21.3                     | 850                    |                                                                                     |        |
| 1440 min Summer                                            | 3.659         | 20.4                     | 1102                   |                                                                                     |        |
| 2160 min Summer                                            | 2.701         | 19.1                     | 1500                   |                                                                                     |        |
| 2880 min Summer                                            | 2.176         | 17.7                     | 1912                   |                                                                                     |        |
| 4320 min Summer                                            | 1.602         | 14.9                     | 2728                   |                                                                                     |        |
| 5760 min Summer                                            | 1.288         | 12.2                     | 3520                   |                                                                                     |        |
| 7200 min Summer                                            | 1.088         | 9.6                      | 4264                   |                                                                                     |        |
| 8640 min Summer                                            | 0.947         | 7.2                      | 5024                   |                                                                                     |        |
| 10080 min Summer                                           | 0.843         | 5.1                      | 5752                   |                                                                                     |        |
| 15 min Winter                                              | 83.344        | 7.9                      | 27                     |                                                                                     |        |
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|-----------------------------------------------------|---------------|--------------------------|------------------------|-------------------------------------------------------------------------------------|--------|
| Curtins Consulting Ltd                              |               |                          |                        | Page 2                                                                              |        |
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| Date 21/10/2016 16:07                               |               | Designed by pennington_p |                        |                                                                                     |        |
| File Shared Space E of Home ...                     |               | Checked by               |                        |                                                                                     |        |
| XP Solutions                                        |               | Source Control 2016.1    |                        |                                                                                     |        |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 30 min Winter                                       | 84.812        | 24.012                   | 0.3                    | 14.5                                                                                | FLOOD  |
| 60 min Winter                                       | 84.815        | 24.015                   | 0.3                    | 18.4                                                                                | FLOOD  |
| 120 min Winter                                      | 84.819        | 24.019                   | 0.3                    | 22.4                                                                                | FLOOD  |
| 180 min Winter                                      | 84.822        | 24.022                   | 0.3                    | 24.6                                                                                | FLOOD  |
| 240 min Winter                                      | 84.823        | 24.023                   | 0.3                    | 26.1                                                                                | FLOOD  |
| 360 min Winter                                      | 84.825        | 24.025                   | 0.3                    | 27.7                                                                                | FLOOD  |
| 480 min Winter                                      | 84.826        | 24.026                   | 0.3                    | 28.7                                                                                | FLOOD  |
| 600 min Winter                                      | 84.826        | 24.026                   | 0.3                    | 29.1                                                                                | FLOOD  |
| 720 min Winter                                      | 84.826        | 24.026                   | 0.3                    | 29.3                                                                                | FLOOD  |
| 960 min Winter                                      | 84.826        | 24.026                   | 0.3                    | 29.1                                                                                | FLOOD  |
| 1440 min Winter                                     | 84.825        | 24.025                   | 0.3                    | 27.6                                                                                | FLOOD  |
| 2160 min Winter                                     | 84.823        | 24.023                   | 0.3                    | 25.7                                                                                | FLOOD  |
| 2880 min Winter                                     | 84.821        | 24.021                   | 0.3                    | 23.6                                                                                | FLOOD  |
| 4320 min Winter                                     | 84.816        | 24.016                   | 0.3                    | 19.2                                                                                | FLOOD  |
| 5760 min Winter                                     | 84.812        | 24.012                   | 0.3                    | 14.8                                                                                | FLOOD  |
| 7200 min Winter                                     | 84.808        | 24.008                   | 0.3                    | 10.8                                                                                | FLOOD  |
| 8640 min Winter                                     | 84.804        | 24.004                   | 0.3                    | 7.4                                                                                 | FLOOD  |
| 10080 min Winter                                    | 84.802        | 24.002                   | 0.3                    | 4.5                                                                                 | FLOOD  |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 30 min Winter                                       | 55.879        | 11.5                     | 42                     |                                                                                     |        |
| 60 min Winter                                       | 35.949        | 15.4                     | 70                     |                                                                                     |        |
| 120 min Winter                                      | 22.481        | 19.4                     | 128                    |                                                                                     |        |
| 180 min Winter                                      | 16.899        | 21.6                     | 186                    |                                                                                     |        |
| 240 min Winter                                      | 13.734        | 23.1                     | 244                    |                                                                                     |        |
| 360 min Winter                                      | 10.201        | 24.8                     | 360                    |                                                                                     |        |
| 480 min Winter                                      | 8.260         | 25.7                     | 476                    |                                                                                     |        |
| 600 min Winter                                      | 7.008         | 26.2                     | 588                    |                                                                                     |        |
| 720 min Winter                                      | 6.125         | 26.3                     | 702                    |                                                                                     |        |
| 960 min Winter                                      | 4.949         | 26.1                     | 920                    |                                                                                     |        |
| 1440 min Winter                                     | 3.659         | 24.6                     | 1182                   |                                                                                     |        |
| 2160 min Winter                                     | 2.701         | 22.8                     | 1632                   |                                                                                     |        |
| 2880 min Winter                                     | 2.176         | 20.7                     | 2084                   |                                                                                     |        |
| 4320 min Winter                                     | 1.602         | 16.2                     | 2948                   |                                                                                     |        |
| 5760 min Winter                                     | 1.288         | 11.8                     | 3760                   |                                                                                     |        |
| 7200 min Winter                                     | 1.088         | 7.9                      | 4544                   |                                                                                     |        |
| 8640 min Winter                                     | 0.947         | 4.4                      | 5208                   |                                                                                     |        |
| 10080 min Winter                                    | 0.843         | 1.5                      | 5864                   |                                                                                     |        |
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Designed by pennington\_p

Checked by

Source Control 2016.1



|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 30                | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 18.000            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.336             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +30   |

|                                          |     |                                |       |
|------------------------------------------|-----|--------------------------------|-------|
| Volume in Pipe Network (m <sup>3</sup> ) | 1   | Dia of Outfall Pipe (m)        | 0.2   |
| Slope of Outfall Pipe (1:X)              | 175 | Roughness of Outfall Pipe (mm) | 0.600 |

Total Area (ha) 0.064

| Time (mins)<br>From: | Area<br>To: (ha) | Time (mins)<br>From: | Area<br>To: (ha) | Time (mins)<br>From: | Area<br>To: (ha) |
|----------------------|------------------|----------------------|------------------|----------------------|------------------|
| 0                    | 4 0.021          | 4                    | 8 0.021          | 8                    | 12 0.021         |

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| Date 21/10/2016 16:07                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Designed by pennington_p          |                                                                                     |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
| File Shared Space E of Home ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Checked by                        |                                                                                     |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                   | Source Control 2016.1                                                               |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
| <p style="text-align: center;"><u>Model Details</u></p> <p style="text-align: center;">Storage is Online Cover Level (m) 84.800</p> <p style="text-align: center;"><u>Deep Bore Soakaway Structure</u></p> <p>           Chamber Invert Level (m) 82.800    Infiltration Coefficient Base (m/hr) 0.18000<br/>           Chamber Diameter/Width (m) 1.200    Safety Factor 2.0<br/>           Borehole Diameter (m) 0.200<br/>           Borehole Depth (m) 22.000         </p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Depth<br/>(m)</th> <th>Side<br/>Infil.<br/>Coef.<br/>(m/hr)</th> <th>Depth<br/>(m)</th> <th>Side<br/>Infil.<br/>Coef.<br/>(m/hr)</th> <th>Depth<br/>(m)</th> <th>Side<br/>Infil.<br/>Coef.<br/>(m/hr)</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>0.18000</td> <td>16.000</td> <td>0.00000</td> <td>22.000</td> <td>0.00000</td> </tr> </tbody> </table> |                                   |                                                                                     | Depth<br>(m)                      | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m)                      | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) | 0.000 | 0.18000 | 16.000 | 0.00000 | 22.000 | 0.00000 |
| Depth<br>(m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m)                                                                        | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m)                      | Side<br>Infil.<br>Coef.<br>(m/hr) |                                   |              |                                   |       |         |        |         |        |         |
| 0.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.18000                           | 16.000                                                                              | 0.00000                           | 22.000                            | 0.00000                           |                                   |              |                                   |       |         |        |         |        |         |
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| Curtins Consulting Ltd                                     |               |                     |                                                                                     |                 | Page 1     |  |
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| Date 21/10/2016 16:13                                      |               |                     | Designed by pennington_p                                                            |                 |            |  |
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| XP Solutions                                               |               |                     | Source Control 2016.1                                                               |                 |            |  |
| <u>Summary of Results for 30 year Return Period (+30%)</u> |               |                     |                                                                                     |                 |            |  |
| Half Drain Time : 677 minutes.                             |               |                     |                                                                                     |                 |            |  |
| Storm Event                                                | Max Level (m) | Max Depth (m)       | Max Infiltration (l/s)                                                              | Max Volume (m³) | Status     |  |
| 15 min Summer                                              | 83.004        | 24.004              | 0.3                                                                                 | 7.1             | FLOOD      |  |
| 30 min Summer                                              | 83.007        | 24.007              | 0.3                                                                                 | 9.6             | FLOOD      |  |
| 60 min Summer                                              | 83.009        | 24.009              | 0.3                                                                                 | 12.1            | FLOOD      |  |
| 120 min Summer                                             | 83.012        | 24.012              | 0.3                                                                                 | 14.6            | FLOOD      |  |
| 180 min Summer                                             | 83.013        | 24.013              | 0.3                                                                                 | 15.9            | FLOOD      |  |
| 240 min Summer                                             | 83.014        | 24.014              | 0.3                                                                                 | 16.6            | FLOOD      |  |
| 360 min Summer                                             | 83.014        | 24.014              | 0.3                                                                                 | 17.2            | FLOOD      |  |
| 480 min Summer                                             | 83.014        | 24.014              | 0.3                                                                                 | 17.3            | FLOOD      |  |
| 600 min Summer                                             | 83.014        | 24.014              | 0.3                                                                                 | 17.2            | FLOOD      |  |
| 720 min Summer                                             | 83.014        | 24.014              | 0.3                                                                                 | 17.0            | FLOOD      |  |
| 960 min Summer                                             | 83.014        | 24.014              | 0.3                                                                                 | 16.5            | FLOOD      |  |
| 1440 min Summer                                            | 83.013        | 24.013              | 0.3                                                                                 | 15.7            | FLOOD      |  |
| 2160 min Summer                                            | 83.011        | 24.011              | 0.3                                                                                 | 14.4            | FLOOD      |  |
| 2880 min Summer                                            | 83.010        | 24.010              | 0.3                                                                                 | 13.0            | FLOOD      |  |
| 4320 min Summer                                            | 83.007        | 24.007              | 0.3                                                                                 | 10.3            | FLOOD      |  |
| 5760 min Summer                                            | 83.005        | 24.005              | 0.3                                                                                 | 7.8             | FLOOD      |  |
| 7200 min Summer                                            | 83.003        | 24.003              | 0.3                                                                                 | 5.7             | FLOOD      |  |
| 8640 min Summer                                            | 83.001        | 24.001              | 0.3                                                                                 | 4.0             | FLOOD      |  |
| 10080 min Summer                                           | 82.711        | 23.711              | 0.3                                                                                 | 2.6             | Flood Risk |  |
| 15 min Winter                                              | 83.005        | 24.005              | 0.3                                                                                 | 8.0             | FLOOD      |  |
| Storm Event                                                | Rain (mm/hr)  | Flooded Volume (m³) | Time-Peak (mins)                                                                    |                 |            |  |
| 15 min Summer                                              | 83.344        | 4.1                 | 36                                                                                  |                 |            |  |
| 30 min Summer                                              | 55.879        | 6.6                 | 48                                                                                  |                 |            |  |
| 60 min Summer                                              | 35.949        | 9.2                 | 76                                                                                  |                 |            |  |
| 120 min Summer                                             | 22.481        | 11.7                | 134                                                                                 |                 |            |  |
| 180 min Summer                                             | 16.899        | 12.9                | 192                                                                                 |                 |            |  |
| 240 min Summer                                             | 13.734        | 13.6                | 250                                                                                 |                 |            |  |
| 360 min Summer                                             | 10.201        | 14.3                | 368                                                                                 |                 |            |  |
| 480 min Summer                                             | 8.260         | 14.4                | 484                                                                                 |                 |            |  |
| 600 min Summer                                             | 7.008         | 14.2                | 566                                                                                 |                 |            |  |
| 720 min Summer                                             | 6.125         | 14.0                | 622                                                                                 |                 |            |  |
| 960 min Summer                                             | 4.949         | 13.6                | 752                                                                                 |                 |            |  |
| 1440 min Summer                                            | 3.659         | 12.7                | 1016                                                                                |                 |            |  |
| 2160 min Summer                                            | 2.701         | 11.4                | 1424                                                                                |                 |            |  |
| 2880 min Summer                                            | 2.176         | 10.0                | 1828                                                                                |                 |            |  |
| 4320 min Summer                                            | 1.602         | 7.3                 | 2608                                                                                |                 |            |  |
| 5760 min Summer                                            | 1.288         | 4.8                 | 3360                                                                                |                 |            |  |
| 7200 min Summer                                            | 1.088         | 2.7                 | 4112                                                                                |                 |            |  |
| 8640 min Summer                                            | 0.947         | 1.0                 | 4768                                                                                |                 |            |  |
| 10080 min Summer                                           | 0.843         | 0.0                 | 5448                                                                                |                 |            |  |
| 15 min Winter                                              | 83.344        | 5.0                 | 36                                                                                  |                 |            |  |
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| XP Solutions                                        |               | Source Control 2016.1    |                        |                                                                                     |        |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 30 min Winter                                       | 83.008        | 24.008                   | 0.3                    | 10.8                                                                                | FLOOD  |
| 60 min Winter                                       | 83.011        | 24.011                   | 0.3                    | 13.7                                                                                | FLOOD  |
| 120 min Winter                                      | 83.014        | 24.014                   | 0.3                    | 16.6                                                                                | FLOOD  |
| 180 min Winter                                      | 83.015        | 24.015                   | 0.3                    | 18.2                                                                                | FLOOD  |
| 240 min Winter                                      | 83.016        | 24.016                   | 0.3                    | 19.1                                                                                | FLOOD  |
| 360 min Winter                                      | 83.017        | 24.017                   | 0.3                    | 20.1                                                                                | FLOOD  |
| 480 min Winter                                      | 83.017        | 24.017                   | 0.3                    | 20.4                                                                                | FLOOD  |
| 600 min Winter                                      | 83.017        | 24.017                   | 0.3                    | 20.4                                                                                | FLOOD  |
| 720 min Winter                                      | 83.017        | 24.017                   | 0.3                    | 20.2                                                                                | FLOOD  |
| 960 min Winter                                      | 83.017        | 24.017                   | 0.3                    | 19.5                                                                                | FLOOD  |
| 1440 min Winter                                     | 83.015        | 24.015                   | 0.3                    | 18.3                                                                                | FLOOD  |
| 2160 min Winter                                     | 83.013        | 24.013                   | 0.3                    | 16.3                                                                                | FLOOD  |
| 2880 min Winter                                     | 83.011        | 24.011                   | 0.3                    | 14.1                                                                                | FLOOD  |
| 4320 min Winter                                     | 83.007        | 24.007                   | 0.3                    | 9.8                                                                                 | FLOOD  |
| 5760 min Winter                                     | 83.003        | 24.003                   | 0.3                    | 6.0                                                                                 | FLOOD  |
| 7200 min Winter                                     | 83.000        | 24.000                   | 0.3                    | 3.1                                                                                 | FLOOD  |
| 8640 min Winter                                     | 81.375        | 22.375                   | 0.3                    | 1.1                                                                                 | 0 K    |
| 10080 min Winter                                    | 74.553        | 15.553                   | 0.2                    | 0.5                                                                                 | 0 K    |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 30 min Winter                                       | 55.879        | 7.8                      | 48                     |                                                                                     |        |
| 60 min Winter                                       | 35.949        | 10.7                     | 76                     |                                                                                     |        |
| 120 min Winter                                      | 22.481        | 13.7                     | 132                    |                                                                                     |        |
| 180 min Winter                                      | 16.899        | 15.2                     | 190                    |                                                                                     |        |
| 240 min Winter                                      | 13.734        | 16.1                     | 246                    |                                                                                     |        |
| 360 min Winter                                      | 10.201        | 17.1                     | 362                    |                                                                                     |        |
| 480 min Winter                                      | 8.260         | 17.5                     | 474                    |                                                                                     |        |
| 600 min Winter                                      | 7.008         | 17.5                     | 586                    |                                                                                     |        |
| 720 min Winter                                      | 6.125         | 17.3                     | 692                    |                                                                                     |        |
| 960 min Winter                                      | 4.949         | 16.5                     | 812                    |                                                                                     |        |
| 1440 min Winter                                     | 3.659         | 15.4                     | 1100                   |                                                                                     |        |
| 2160 min Winter                                     | 2.701         | 13.3                     | 1556                   |                                                                                     |        |
| 2880 min Winter                                     | 2.176         | 11.1                     | 1992                   |                                                                                     |        |
| 4320 min Winter                                     | 1.602         | 6.8                      | 2808                   |                                                                                     |        |
| 5760 min Winter                                     | 1.288         | 3.1                      | 3536                   |                                                                                     |        |
| 7200 min Winter                                     | 1.088         | 0.1                      | 4184                   |                                                                                     |        |
| 8640 min Winter                                     | 0.947         | 0.0                      | 4704                   |                                                                                     |        |
| 10080 min Winter                                    | 0.843         | 0.0                      | 5072                   |                                                                                     |        |
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| XP Solutions Source Control 2016.1                     |                                        |                                                                                     |

Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 30                | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 18.000            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.336             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +30   |

Pipe Network

|                             |     |                                |       |
|-----------------------------|-----|--------------------------------|-------|
| Volume in Pipe Network (m³) | 5   | Dia of Outfall Pipe (m)        | 0.2   |
| Slope of Outfall Pipe (1:X) | 175 | Roughness of Outfall Pipe (mm) | 0.600 |

Time Area Diagram

Total Area (ha) 0.049

| Time (mins) | Area    | Time (mins) | Area    | Time (mins) | Area     |
|-------------|---------|-------------|---------|-------------|----------|
| From:       | To:     | From:       | To:     | From:       | To:      |
| 0           | 4 0.016 | 4           | 8 0.016 | 8           | 12 0.016 |

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| XP Solutions Source Control 2016.1                     |                                        |                                                                                     |

Model Details

Storage is Online Cover Level (m) 83.000

Deep Bore Soakaway Structure

Chamber Invert Level (m) 81.000 Infiltration Coefficient Base (m/hr) 0.18000  
 Chamber Diameter/Width (m) 1.200 Safety Factor 2.0  
 Borehole Diameter (m) 0.200  
 Borehole Depth (m) 22.000

| Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) |
|--------------|-----------------------------------|--------------|-----------------------------------|--------------|-----------------------------------|
| 0.000        | 0.18000                           | 16.000       | 0.00000                           | 22.000       | 0.00000                           |

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| Date 21/10/2016 16:12                                      |               | Designed by pennington_p |                        |                                                                                     |        |
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| XP Solutions                                               |               | Source Control 2016.1    |                        |                                                                                     |        |
| <u>Summary of Results for 30 year Return Period (+30%)</u> |               |                          |                        |                                                                                     |        |
| Half Drain Time : 1033 minutes.                            |               |                          |                        |                                                                                     |        |
| Storm Event                                                | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 15 min Summer                                              | 81.007        | 24.007                   | 0.3                    | 10.1                                                                                | FLOOD  |
| 30 min Summer                                              | 81.010        | 24.010                   | 0.3                    | 13.4                                                                                | FLOOD  |
| 60 min Summer                                              | 81.014        | 24.014                   | 0.3                    | 17.1                                                                                | FLOOD  |
| 120 min Summer                                             | 81.018        | 24.018                   | 0.3                    | 20.7                                                                                | FLOOD  |
| 180 min Summer                                             | 81.020        | 24.020                   | 0.3                    | 22.7                                                                                | FLOOD  |
| 240 min Summer                                             | 81.021        | 24.021                   | 0.3                    | 24.0                                                                                | FLOOD  |
| 360 min Summer                                             | 81.022        | 24.022                   | 0.3                    | 25.4                                                                                | FLOOD  |
| 480 min Summer                                             | 81.023        | 24.023                   | 0.3                    | 26.1                                                                                | FLOOD  |
| 600 min Summer                                             | 81.023        | 24.023                   | 0.3                    | 26.4                                                                                | FLOOD  |
| 720 min Summer                                             | 81.023        | 24.023                   | 0.3                    | 26.4                                                                                | FLOOD  |
| 960 min Summer                                             | 81.023        | 24.023                   | 0.3                    | 25.9                                                                                | FLOOD  |
| 1440 min Summer                                            | 81.022        | 24.022                   | 0.3                    | 24.9                                                                                | FLOOD  |
| 2160 min Summer                                            | 81.021        | 24.021                   | 0.3                    | 23.7                                                                                | FLOOD  |
| 2880 min Summer                                            | 81.019        | 24.019                   | 0.3                    | 22.3                                                                                | FLOOD  |
| 4320 min Summer                                            | 81.017        | 24.017                   | 0.3                    | 19.5                                                                                | FLOOD  |
| 5760 min Summer                                            | 81.014        | 24.014                   | 0.3                    | 16.7                                                                                | FLOOD  |
| 7200 min Summer                                            | 81.011        | 24.011                   | 0.3                    | 14.1                                                                                | FLOOD  |
| 8640 min Summer                                            | 81.009        | 24.009                   | 0.3                    | 11.6                                                                                | FLOOD  |
| 10080 min Summer                                           | 81.006        | 24.006                   | 0.3                    | 9.5                                                                                 | FLOOD  |
| 15 min Winter                                              | 81.008        | 24.008                   | 0.3                    | 11.3                                                                                | FLOOD  |
| Storm Event                                                | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 15 min Summer                                              | 83.344        | 7.1                      | 29                     |                                                                                     |        |
| 30 min Summer                                              | 55.879        | 10.5                     | 43                     |                                                                                     |        |
| 60 min Summer                                              | 35.949        | 14.1                     | 72                     |                                                                                     |        |
| 120 min Summer                                             | 22.481        | 17.8                     | 132                    |                                                                                     |        |
| 180 min Summer                                             | 16.899        | 19.8                     | 190                    |                                                                                     |        |
| 240 min Summer                                             | 13.734        | 21.0                     | 250                    |                                                                                     |        |
| 360 min Summer                                             | 10.201        | 22.4                     | 368                    |                                                                                     |        |
| 480 min Summer                                             | 8.260         | 23.1                     | 486                    |                                                                                     |        |
| 600 min Summer                                             | 7.008         | 23.4                     | 604                    |                                                                                     |        |
| 720 min Summer                                             | 6.125         | 23.4                     | 722                    |                                                                                     |        |
| 960 min Summer                                             | 4.949         | 22.9                     | 880                    |                                                                                     |        |
| 1440 min Summer                                            | 3.659         | 22.0                     | 1126                   |                                                                                     |        |
| 2160 min Summer                                            | 2.701         | 20.7                     | 1520                   |                                                                                     |        |
| 2880 min Summer                                            | 2.176         | 19.3                     | 1936                   |                                                                                     |        |
| 4320 min Summer                                            | 1.602         | 16.5                     | 2732                   |                                                                                     |        |
| 5760 min Summer                                            | 1.288         | 13.7                     | 3528                   |                                                                                     |        |
| 7200 min Summer                                            | 1.088         | 11.1                     | 4320                   |                                                                                     |        |
| 8640 min Summer                                            | 0.947         | 8.7                      | 5040                   |                                                                                     |        |
| 10080 min Summer                                           | 0.843         | 6.5                      | 5760                   |                                                                                     |        |
| 15 min Winter                                              | 83.344        | 8.4                      | 29                     |                                                                                     |        |
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| XP Solutions                                        |               | Source Control 2016.1    |                        |                                                                                     |        |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 30 min Winter                                       | 81.012        | 24.012                   | 0.3                    | 15.1                                                                                | FL00D  |
| 60 min Winter                                       | 81.016        | 24.016                   | 0.3                    | 19.2                                                                                | FL00D  |
| 120 min Winter                                      | 81.021        | 24.021                   | 0.3                    | 23.5                                                                                | FL00D  |
| 180 min Winter                                      | 81.023        | 24.023                   | 0.3                    | 25.9                                                                                | FL00D  |
| 240 min Winter                                      | 81.024        | 24.024                   | 0.3                    | 27.4                                                                                | FL00D  |
| 360 min Winter                                      | 81.026        | 24.026                   | 0.3                    | 29.3                                                                                | FL00D  |
| 480 min Winter                                      | 81.027        | 24.027                   | 0.3                    | 30.3                                                                                | FL00D  |
| 600 min Winter                                      | 81.028        | 24.028                   | 0.3                    | 30.9                                                                                | FL00D  |
| 720 min Winter                                      | 81.028        | 24.028                   | 0.3                    | 31.1                                                                                | FL00D  |
| 960 min Winter                                      | 81.028        | 24.028                   | 0.3                    | 31.0                                                                                | FL00D  |
| 1440 min Winter                                     | 81.027        | 24.027                   | 0.3                    | 29.5                                                                                | FL00D  |
| 2160 min Winter                                     | 81.025        | 24.025                   | 0.3                    | 27.7                                                                                | FL00D  |
| 2880 min Winter                                     | 81.023        | 24.023                   | 0.3                    | 25.6                                                                                | FL00D  |
| 4320 min Winter                                     | 81.018        | 24.018                   | 0.3                    | 21.2                                                                                | FL00D  |
| 5760 min Winter                                     | 81.014        | 24.014                   | 0.3                    | 16.7                                                                                | FL00D  |
| 7200 min Winter                                     | 81.010        | 24.010                   | 0.3                    | 12.6                                                                                | FL00D  |
| 8640 min Winter                                     | 81.006        | 24.006                   | 0.3                    | 9.0                                                                                 | FL00D  |
| 10080 min Winter                                    | 81.003        | 24.003                   | 0.3                    | 5.9                                                                                 | FL00D  |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 30 min Winter                                       | 55.879        | 12.2                     | 43                     |                                                                                     |        |
| 60 min Winter                                       | 35.949        | 16.3                     | 72                     |                                                                                     |        |
| 120 min Winter                                      | 22.481        | 20.5                     | 130                    |                                                                                     |        |
| 180 min Winter                                      | 16.899        | 22.9                     | 188                    |                                                                                     |        |
| 240 min Winter                                      | 13.734        | 24.4                     | 246                    |                                                                                     |        |
| 360 min Winter                                      | 10.201        | 26.3                     | 362                    |                                                                                     |        |
| 480 min Winter                                      | 8.260         | 27.3                     | 476                    |                                                                                     |        |
| 600 min Winter                                      | 7.008         | 27.9                     | 592                    |                                                                                     |        |
| 720 min Winter                                      | 6.125         | 28.1                     | 704                    |                                                                                     |        |
| 960 min Winter                                      | 4.949         | 28.0                     | 924                    |                                                                                     |        |
| 1440 min Winter                                     | 3.659         | 26.5                     | 1308                   |                                                                                     |        |
| 2160 min Winter                                     | 2.701         | 24.7                     | 1648                   |                                                                                     |        |
| 2880 min Winter                                     | 2.176         | 22.7                     | 2108                   |                                                                                     |        |
| 4320 min Winter                                     | 1.602         | 18.2                     | 2988                   |                                                                                     |        |
| 5760 min Winter                                     | 1.288         | 13.8                     | 3816                   |                                                                                     |        |
| 7200 min Winter                                     | 1.088         | 9.7                      | 4608                   |                                                                                     |        |
| 8640 min Winter                                     | 0.947         | 6.1                      | 5288                   |                                                                                     |        |
| 10080 min Winter                                    | 0.843         | 3.0                      | 5960                   |                                                                                     |        |
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| Source Control 2016.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                                                                     |                      |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| <p align="center"><u>Rainfall Details</u></p> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Return Period (years)</td> <td>30</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>18.000</td> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Ratio R</td> <td>0.336</td> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> <td>Climate Change %</td> <td>+30</td> </tr> </table> <p align="center"><u>Pipe Network</u></p> <table> <tr> <td>Volume in Pipe Network (m³)</td> <td>2</td> <td>Dia of Outfall Pipe (m)</td> <td>0.2</td> </tr> <tr> <td>Slope of Outfall Pipe (1:X)</td> <td>175</td> <td>Roughness of Outfall Pipe (mm)</td> <td>0.600</td> </tr> </table> <p align="center"><u>Time Area Diagram</u></p> <p align="center">Total Area (ha) 0.067</p> <table> <thead> <tr> <th>Time (mins)<br/>From:</th> <th>Time (mins)<br/>To:</th> <th>Area<br/>(ha)</th> <th>Time (mins)<br/>From:</th> <th>Time (mins)<br/>To:</th> <th>Area<br/>(ha)</th> <th>Time (mins)<br/>From:</th> <th>Time (mins)<br/>To:</th> <th>Area<br/>(ha)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>4</td> <td>0.022</td> <td>4</td> <td>8</td> <td>0.022</td> <td>8</td> <td>12</td> <td>0.022</td> </tr> </tbody> </table> |                                        |                                                                                     | Rainfall Model       | FSR                | Winter Storms | Yes                  | Return Period (years) | 30           | Cv (Summer) | 0.750 | Region | England and Wales | Cv (Winter) | 0.840 | M5-60 (mm) | 18.000 | Shortest Storm (mins) | 15 | Ratio R | 0.336 | Longest Storm (mins) | 10080 | Summer Storms | Yes | Climate Change % | +30 | Volume in Pipe Network (m³) | 2 | Dia of Outfall Pipe (m) | 0.2 | Slope of Outfall Pipe (1:X) | 175 | Roughness of Outfall Pipe (mm) | 0.600 | Time (mins)<br>From: | Time (mins)<br>To: | Area<br>(ha) | Time (mins)<br>From: | Time (mins)<br>To: | Area<br>(ha) | Time (mins)<br>From: | Time (mins)<br>To: | Area<br>(ha) | 0 | 4 | 0.022 | 4 | 8 | 0.022 | 8 | 12 | 0.022 |
| Rainfall Model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | FSR                                    | Winter Storms                                                                       | Yes                  |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 30                                     | Cv (Summer)                                                                         | 0.750                |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Region                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | England and Wales                      | Cv (Winter)                                                                         | 0.840                |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| M5-60 (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 18.000                                 | Shortest Storm (mins)                                                               | 15                   |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Ratio R                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.336                                  | Longest Storm (mins)                                                                | 10080                |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Summer Storms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Yes                                    | Climate Change %                                                                    | +30                  |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Volume in Pipe Network (m³)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2                                      | Dia of Outfall Pipe (m)                                                             | 0.2                  |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Slope of Outfall Pipe (1:X)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 175                                    | Roughness of Outfall Pipe (mm)                                                      | 0.600                |                    |               |                      |                       |              |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| Time (mins)<br>From:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Time (mins)<br>To:                     | Area<br>(ha)                                                                        | Time (mins)<br>From: | Time (mins)<br>To: | Area<br>(ha)  | Time (mins)<br>From: | Time (mins)<br>To:    | Area<br>(ha) |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
| 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 4                                      | 0.022                                                                               | 4                    | 8                  | 0.022         | 8                    | 12                    | 0.022        |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |                      |                    |              |                      |                    |              |                      |                    |              |   |   |       |   |   |       |   |    |       |
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| Source Control 2016.1    |



Storage is Online Cover Level (m) 81.000

|                            |        |                                      |         |
|----------------------------|--------|--------------------------------------|---------|
| Chamber Invert Level (m)   | 79.000 | Infiltration Coefficient Base (m/hr) | 0.18000 |
| Chamber Diameter/Width (m) | 1.200  | Safety Factor                        | 2.0     |
| Borehole Diameter (m)      | 0.200  |                                      |         |
| Borehole Depth (m)         | 22.000 |                                      |         |

| Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) |
|--------------|-----------------------------------|--------------|-----------------------------------|--------------|-----------------------------------|
| 0.000        | 0.18000                           | 16.000       | 0.00000                           | 22.000       | 0.00000                           |

|                                                            |               |                          |                        |                                                                                     |        |
|------------------------------------------------------------|---------------|--------------------------|------------------------|-------------------------------------------------------------------------------------|--------|
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| Date 21/10/2016 16:34                                      |               | Designed by pennington_p |                        |                                                                                     |        |
| File Typical highway-1BH.srcx                              |               | Checked by               |                        |                                                                                     |        |
| XP Solutions                                               |               | Source Control 2016.1    |                        |                                                                                     |        |
| <u>Summary of Results for 30 year Return Period (+30%)</u> |               |                          |                        |                                                                                     |        |
| Half Drain Time : 358 minutes.                             |               |                          |                        |                                                                                     |        |
| Storm Event                                                | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 15 min Summer                                              | 80.001        | 24.001                   | 0.3                    | 4.4                                                                                 | FLOOD  |
| 30 min Summer                                              | 80.003        | 24.003                   | 0.3                    | 5.8                                                                                 | FLOOD  |
| 60 min Summer                                              | 80.004        | 24.004                   | 0.3                    | 7.2                                                                                 | FLOOD  |
| 120 min Summer                                             | 80.005        | 24.005                   | 0.3                    | 8.4                                                                                 | FLOOD  |
| 180 min Summer                                             | 80.006        | 24.006                   | 0.3                    | 8.9                                                                                 | FLOOD  |
| 240 min Summer                                             | 80.006        | 24.006                   | 0.3                    | 9.0                                                                                 | FLOOD  |
| 360 min Summer                                             | 80.006        | 24.006                   | 0.3                    | 8.9                                                                                 | FLOOD  |
| 480 min Summer                                             | 80.006        | 24.006                   | 0.3                    | 8.7                                                                                 | FLOOD  |
| 600 min Summer                                             | 80.006        | 24.006                   | 0.3                    | 8.6                                                                                 | FLOOD  |
| 720 min Summer                                             | 80.005        | 24.005                   | 0.3                    | 8.4                                                                                 | FLOOD  |
| 960 min Summer                                             | 80.005        | 24.005                   | 0.3                    | 8.0                                                                                 | FLOOD  |
| 1440 min Summer                                            | 80.004        | 24.004                   | 0.3                    | 7.1                                                                                 | FLOOD  |
| 2160 min Summer                                            | 80.003        | 24.003                   | 0.3                    | 5.7                                                                                 | FLOOD  |
| 2880 min Summer                                            | 80.002        | 24.002                   | 0.3                    | 4.5                                                                                 | FLOOD  |
| 4320 min Summer                                            | 79.623        | 23.623                   | 0.3                    | 2.5                                                                                 | 0 K    |
| 5760 min Summer                                            | 78.496        | 22.496                   | 0.3                    | 1.3                                                                                 | 0 K    |
| 7200 min Summer                                            | 75.322        | 19.322                   | 0.3                    | 0.6                                                                                 | 0 K    |
| 8640 min Summer                                            | 70.714        | 14.714                   | 0.2                    | 0.5                                                                                 | 0 K    |
| 10080 min Summer                                           | 69.095        | 13.095                   | 0.2                    | 0.4                                                                                 | 0 K    |
| 15 min Winter                                              | 80.002        | 24.002                   | 0.3                    | 4.9                                                                                 | FLOOD  |
| Storm Event                                                | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 15 min Summer                                              | 83.344        | 1.4                      | 25                     |                                                                                     |        |
| 30 min Summer                                              | 55.879        | 2.8                      | 39                     |                                                                                     |        |
| 60 min Summer                                              | 35.949        | 4.2                      | 68                     |                                                                                     |        |
| 120 min Summer                                             | 22.481        | 5.5                      | 126                    |                                                                                     |        |
| 180 min Summer                                             | 16.899        | 5.9                      | 184                    |                                                                                     |        |
| 240 min Summer                                             | 13.734        | 6.1                      | 242                    |                                                                                     |        |
| 360 min Summer                                             | 10.201        | 6.0                      | 316                    |                                                                                     |        |
| 480 min Summer                                             | 8.260         | 5.8                      | 380                    |                                                                                     |        |
| 600 min Summer                                             | 7.008         | 5.6                      | 442                    |                                                                                     |        |
| 720 min Summer                                             | 6.125         | 5.4                      | 510                    |                                                                                     |        |
| 960 min Summer                                             | 4.949         | 5.0                      | 648                    |                                                                                     |        |
| 1440 min Summer                                            | 3.659         | 4.1                      | 920                    |                                                                                     |        |
| 2160 min Summer                                            | 2.701         | 2.8                      | 1320                   |                                                                                     |        |
| 2880 min Summer                                            | 2.176         | 1.5                      | 1700                   |                                                                                     |        |
| 4320 min Summer                                            | 1.602         | 0.0                      | 2388                   |                                                                                     |        |
| 5760 min Summer                                            | 1.288         | 0.0                      | 3056                   |                                                                                     |        |
| 7200 min Summer                                            | 1.088         | 0.0                      | 3680                   |                                                                                     |        |
| 8640 min Summer                                            | 0.947         | 0.0                      | 4400                   |                                                                                     |        |
| 10080 min Summer                                           | 0.843         | 0.0                      | 5136                   |                                                                                     |        |
| 15 min Winter                                              | 83.344        | 2.0                      | 25                     |                                                                                     |        |
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| XP Solutions                                        |               | Source Control 2016.1    |                        |                                                                                     |        |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 30 min Winter                                       | 80.004        | 24.004                   | 0.3                    | 6.6                                                                                 | FL00D  |
| 60 min Winter                                       | 80.005        | 24.005                   | 0.3                    | 8.2                                                                                 | FL00D  |
| 120 min Winter                                      | 80.007        | 24.007                   | 0.3                    | 9.7                                                                                 | FL00D  |
| 180 min Winter                                      | 80.007        | 24.007                   | 0.3                    | 10.3                                                                                | FL00D  |
| 240 min Winter                                      | 80.008        | 24.008                   | 0.3                    | 10.6                                                                                | FL00D  |
| 360 min Winter                                      | 80.008        | 24.008                   | 0.3                    | 10.6                                                                                | FL00D  |
| 480 min Winter                                      | 80.007        | 24.007                   | 0.3                    | 10.3                                                                                | FL00D  |
| 600 min Winter                                      | 80.007        | 24.007                   | 0.3                    | 10.0                                                                                | FL00D  |
| 720 min Winter                                      | 80.007        | 24.007                   | 0.3                    | 9.8                                                                                 | FL00D  |
| 960 min Winter                                      | 80.006        | 24.006                   | 0.3                    | 9.1                                                                                 | FL00D  |
| 1440 min Winter                                     | 80.005        | 24.005                   | 0.3                    | 7.7                                                                                 | FL00D  |
| 2160 min Winter                                     | 80.003        | 24.003                   | 0.3                    | 5.6                                                                                 | FL00D  |
| 2880 min Winter                                     | 80.001        | 24.001                   | 0.3                    | 3.7                                                                                 | FL00D  |
| 4320 min Winter                                     | 78.310        | 22.310                   | 0.3                    | 1.0                                                                                 | 0 K    |
| 5760 min Winter                                     | 70.461        | 14.461                   | 0.2                    | 0.5                                                                                 | 0 K    |
| 7200 min Winter                                     | 68.204        | 12.204                   | 0.2                    | 0.4                                                                                 | 0 K    |
| 8640 min Winter                                     | 66.625        | 10.625                   | 0.2                    | 0.3                                                                                 | 0 K    |
| 10080 min Winter                                    | 65.451        | 9.451                    | 0.1                    | 0.3                                                                                 | 0 K    |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 30 min Winter                                       | 55.879        | 3.6                      | 39                     |                                                                                     |        |
| 60 min Winter                                       | 35.949        | 5.2                      | 68                     |                                                                                     |        |
| 120 min Winter                                      | 22.481        | 6.7                      | 124                    |                                                                                     |        |
| 180 min Winter                                      | 16.899        | 7.3                      | 180                    |                                                                                     |        |
| 240 min Winter                                      | 13.734        | 7.6                      | 238                    |                                                                                     |        |
| 360 min Winter                                      | 10.201        | 7.6                      | 346                    |                                                                                     |        |
| 480 min Winter                                      | 8.260         | 7.3                      | 442                    |                                                                                     |        |
| 600 min Winter                                      | 7.008         | 7.1                      | 476                    |                                                                                     |        |
| 720 min Winter                                      | 6.125         | 6.8                      | 552                    |                                                                                     |        |
| 960 min Winter                                      | 4.949         | 6.2                      | 706                    |                                                                                     |        |
| 1440 min Winter                                     | 3.659         | 4.7                      | 1000                   |                                                                                     |        |
| 2160 min Winter                                     | 2.701         | 2.6                      | 1412                   |                                                                                     |        |
| 2880 min Winter                                     | 2.176         | 0.7                      | 1788                   |                                                                                     |        |
| 4320 min Winter                                     | 1.602         | 0.0                      | 2388                   |                                                                                     |        |
| 5760 min Winter                                     | 1.288         | 0.0                      | 2936                   |                                                                                     |        |
| 7200 min Winter                                     | 1.088         | 0.0                      | 3672                   |                                                                                     |        |
| 8640 min Winter                                     | 0.947         | 0.0                      | 4400                   |                                                                                     |        |
| 10080 min Winter                                    | 0.843         | 0.0                      | 5136                   |                                                                                     |        |
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| XP Solutions Source Control 2016.1                     |                                        |                                                                                     |

Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 30                | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 18.000            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.336             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +30   |

Time Area Diagram

Total Area (ha) 0.030

| Time (mins) Area |     |       | Time (mins) Area |     |       | Time (mins) Area |     |       |
|------------------|-----|-------|------------------|-----|-------|------------------|-----|-------|
| From:            | To: | (ha)  | From:            | To: | (ha)  | From:            | To: | (ha)  |
| 0                | 4   | 0.010 | 4                | 8   | 0.010 | 8                | 12  | 0.010 |

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Storage is Online Cover Level (m) 80.000

|                            |        |                                      |         |
|----------------------------|--------|--------------------------------------|---------|
| Chamber Invert Level (m)   | 78.000 | Infiltration Coefficient Base (m/hr) | 0.18000 |
| Chamber Diameter/Width (m) | 1.200  | Safety Factor                        | 2.0     |
| Borehole Diameter (m)      | 0.200  |                                      |         |
| Borehole Depth (m)         | 22.000 |                                      |         |

| Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) |
|--------------|-----------------------------------|--------------|-----------------------------------|--------------|-----------------------------------|
| 0.000        | 0.18000                           | 16.000       | 0.00000                           | 22.000       | 0.00000                           |

|                                                     |               |                     |                                                                                     |                 |            |  |
|-----------------------------------------------------|---------------|---------------------|-------------------------------------------------------------------------------------|-----------------|------------|--|
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| XP Solutions                                        |               |                     | Source Control 2016.1                                                               |                 |            |  |
| Summary of Results for 30 year Return Period (+30%) |               |                     |                                                                                     |                 |            |  |
| Half Drain Time : 288 minutes.                      |               |                     |                                                                                     |                 |            |  |
| Storm Event                                         | Max Level (m) | Max Depth (m)       | Max Infiltration (l/s)                                                              | Max Volume (m³) | Status     |  |
| 15 min Summer                                       | 86.001        | 24.001              | 0.3                                                                                 | 3.6             | FLOOD      |  |
| 30 min Summer                                       | 86.002        | 24.002              | 0.3                                                                                 | 4.7             | FLOOD      |  |
| 60 min Summer                                       | 86.003        | 24.003              | 0.3                                                                                 | 5.9             | FLOOD      |  |
| 120 min Summer                                      | 86.004        | 24.004              | 0.3                                                                                 | 6.8             | FLOOD      |  |
| 180 min Summer                                      | 86.004        | 24.004              | 0.3                                                                                 | 7.0             | FLOOD      |  |
| 240 min Summer                                      | 86.004        | 24.004              | 0.3                                                                                 | 7.1             | FLOOD      |  |
| 360 min Summer                                      | 86.004        | 24.004              | 0.3                                                                                 | 6.9             | FLOOD      |  |
| 480 min Summer                                      | 86.004        | 24.004              | 0.3                                                                                 | 6.8             | FLOOD      |  |
| 600 min Summer                                      | 86.004        | 24.004              | 0.3                                                                                 | 6.6             | FLOOD      |  |
| 720 min Summer                                      | 86.003        | 24.003              | 0.3                                                                                 | 6.4             | FLOOD      |  |
| 960 min Summer                                      | 86.003        | 24.003              | 0.3                                                                                 | 5.9             | FLOOD      |  |
| 1440 min Summer                                     | 86.002        | 24.002              | 0.3                                                                                 | 5.0             | FLOOD      |  |
| 2160 min Summer                                     | 86.001        | 24.001              | 0.3                                                                                 | 3.8             | FLOOD      |  |
| 2880 min Summer                                     | 85.791        | 23.791              | 0.3                                                                                 | 2.7             | Flood Risk |  |
| 4320 min Summer                                     | 84.476        | 22.476              | 0.3                                                                                 | 1.2             | 0 K        |  |
| 5760 min Summer                                     | 79.612        | 17.612              | 0.3                                                                                 | 0.6             | 0 K        |  |
| 7200 min Summer                                     | 76.128        | 14.128              | 0.2                                                                                 | 0.4             | 0 K        |  |
| 8640 min Summer                                     | 74.287        | 12.287              | 0.2                                                                                 | 0.4             | 0 K        |  |
| 10080 min Summer                                    | 72.911        | 10.911              | 0.2                                                                                 | 0.3             | 0 K        |  |
| 15 min Winter                                       | 86.001        | 24.001              | 0.3                                                                                 | 4.1             | FLOOD      |  |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³) | Time-Peak (mins)                                                                    |                 |            |  |
| 15 min Summer                                       | 83.344        | 0.6                 | 26                                                                                  |                 |            |  |
| 30 min Summer                                       | 55.879        | 1.8                 | 40                                                                                  |                 |            |  |
| 60 min Summer                                       | 35.949        | 2.9                 | 68                                                                                  |                 |            |  |
| 120 min Summer                                      | 22.481        | 3.8                 | 126                                                                                 |                 |            |  |
| 180 min Summer                                      | 16.899        | 4.1                 | 182                                                                                 |                 |            |  |
| 240 min Summer                                      | 13.734        | 4.1                 | 230                                                                                 |                 |            |  |
| 360 min Summer                                      | 10.201        | 4.0                 | 290                                                                                 |                 |            |  |
| 480 min Summer                                      | 8.260         | 3.8                 | 358                                                                                 |                 |            |  |
| 600 min Summer                                      | 7.008         | 3.6                 | 424                                                                                 |                 |            |  |
| 720 min Summer                                      | 6.125         | 3.4                 | 492                                                                                 |                 |            |  |
| 960 min Summer                                      | 4.949         | 3.0                 | 628                                                                                 |                 |            |  |
| 1440 min Summer                                     | 3.659         | 2.1                 | 900                                                                                 |                 |            |  |
| 2160 min Summer                                     | 2.701         | 0.8                 | 1280                                                                                |                 |            |  |
| 2880 min Summer                                     | 2.176         | 0.0                 | 1648                                                                                |                 |            |  |
| 4320 min Summer                                     | 1.602         | 0.0                 | 2308                                                                                |                 |            |  |
| 5760 min Summer                                     | 1.288         | 0.0                 | 2944                                                                                |                 |            |  |
| 7200 min Summer                                     | 1.088         | 0.0                 | 3648                                                                                |                 |            |  |
| 8640 min Summer                                     | 0.947         | 0.0                 | 4400                                                                                |                 |            |  |
| 10080 min Summer                                    | 0.843         | 0.0                 | 5144                                                                                |                 |            |  |
| 15 min Winter                                       | 83.344        | 1.1                 | 26                                                                                  |                 |            |  |
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| Curtins Consulting Ltd                              |               |                          |                        |                 | Page 2                                                                              |  |
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| Date 21/10/2016 16:08                               |               | Designed by pennington_p |                        |                 |                                                                                     |  |
| File Verge N of Home Frarm-3...                     |               | Checked by               |                        |                 |                                                                                     |  |
| XP Solutions                                        |               | Source Control 2016.1    |                        |                 |                                                                                     |  |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                 |                                                                                     |  |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³) | Status                                                                              |  |
| 30 min Winter                                       | 86.002        | 24.002                   | 0.3                    | 5.4             | FLOOD                                                                               |  |
| 60 min Winter                                       | 86.004        | 24.004                   | 0.3                    | 6.7             | FLOOD                                                                               |  |
| 120 min Winter                                      | 86.005        | 24.005                   | 0.3                    | 7.8             | FLOOD                                                                               |  |
| 180 min Winter                                      | 86.005        | 24.005                   | 0.3                    | 8.2             | FLOOD                                                                               |  |
| 240 min Winter                                      | 86.005        | 24.005                   | 0.3                    | 8.3             | FLOOD                                                                               |  |
| 360 min Winter                                      | 86.005        | 24.005                   | 0.3                    | 8.1             | FLOOD                                                                               |  |
| 480 min Winter                                      | 86.005        | 24.005                   | 0.3                    | 7.9             | FLOOD                                                                               |  |
| 600 min Winter                                      | 86.005        | 24.005                   | 0.3                    | 7.6             | FLOOD                                                                               |  |
| 720 min Winter                                      | 86.004        | 24.004                   | 0.3                    | 7.3             | FLOOD                                                                               |  |
| 960 min Winter                                      | 86.004        | 24.004                   | 0.3                    | 6.6             | FLOOD                                                                               |  |
| 1440 min Winter                                     | 86.002        | 24.002                   | 0.3                    | 5.2             | FLOOD                                                                               |  |
| 2160 min Winter                                     | 86.000        | 24.000                   | 0.3                    | 3.2             | FLOOD                                                                               |  |
| 2880 min Winter                                     | 84.890        | 22.890                   | 0.3                    | 1.7             | 0 K                                                                                 |  |
| 4320 min Winter                                     | 77.020        | 15.020                   | 0.2                    | 0.5             | 0 K                                                                                 |  |
| 5760 min Winter                                     | 74.111        | 12.111                   | 0.2                    | 0.4             | 0 K                                                                                 |  |
| 7200 min Winter                                     | 72.241        | 10.241                   | 0.2                    | 0.3             | 0 K                                                                                 |  |
| 8640 min Winter                                     | 70.874        | 8.874                    | 0.1                    | 0.3             | 0 K                                                                                 |  |
| 10080 min Winter                                    | 69.913        | 7.913                    | 0.1                    | 0.2             | 0 K                                                                                 |  |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                 |                                                                                     |  |
| 30 min Winter                                       | 55.879        | 2.4                      | 40                     |                 |                                                                                     |  |
| 60 min Winter                                       | 35.949        | 3.7                      | 68                     |                 |                                                                                     |  |
| 120 min Winter                                      | 22.481        | 4.8                      | 124                    |                 |                                                                                     |  |
| 180 min Winter                                      | 16.899        | 5.3                      | 180                    |                 |                                                                                     |  |
| 240 min Winter                                      | 13.734        | 5.4                      | 236                    |                 |                                                                                     |  |
| 360 min Winter                                      | 10.201        | 5.2                      | 338                    |                 |                                                                                     |  |
| 480 min Winter                                      | 8.260         | 4.9                      | 382                    |                 |                                                                                     |  |
| 600 min Winter                                      | 7.008         | 4.7                      | 460                    |                 |                                                                                     |  |
| 720 min Winter                                      | 6.125         | 4.3                      | 536                    |                 |                                                                                     |  |
| 960 min Winter                                      | 4.949         | 3.7                      | 686                    |                 |                                                                                     |  |
| 1440 min Winter                                     | 3.659         | 2.2                      | 972                    |                 |                                                                                     |  |
| 2160 min Winter                                     | 2.701         | 0.3                      | 1348                   |                 |                                                                                     |  |
| 2880 min Winter                                     | 2.176         | 0.0                      | 1688                   |                 |                                                                                     |  |
| 4320 min Winter                                     | 1.602         | 0.0                      | 2200                   |                 |                                                                                     |  |
| 5760 min Winter                                     | 1.288         | 0.0                      | 2888                   |                 |                                                                                     |  |
| 7200 min Winter                                     | 1.088         | 0.0                      | 3664                   |                 |                                                                                     |  |
| 8640 min Winter                                     | 0.947         | 0.0                      | 4424                   |                 |                                                                                     |  |
| 10080 min Winter                                    | 0.843         | 0.0                      | 5056                   |                 |                                                                                     |  |
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| Checked by               |
| Source Control 2016.1    |



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|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 30                | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 18.000            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.336             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +30   |

|                                          |     |                                |       |
|------------------------------------------|-----|--------------------------------|-------|
| Volume in Pipe Network (m <sup>3</sup> ) | 1   | Dia of Outfall Pipe (m)        | 0.2   |
| Slope of Outfall Pipe (1:X)              | 175 | Roughness of Outfall Pipe (mm) | 0.600 |

Total Area (ha) 0.025

| Time (mins) | Area  | Time (mins) | Area  | Time (mins) | Area  |
|-------------|-------|-------------|-------|-------------|-------|
| From: To:   | (ha)  | From: To:   | (ha)  | From: To:   | (ha)  |
| 0 4         | 0.008 | 4 8         | 0.008 | 8 12        | 0.008 |

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| Date 21/10/2016 16:08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Designed by pennington_p          |                                                                                     |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
| File Verge N of Home Frarm-3...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Checked by                        |                                                                                     |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                   | Source Control 2016.1                                                               |                                   |                                   |                                   |                                   |              |                                   |       |         |        |         |        |         |
| <p align="center"><u>Model Details</u></p> <p align="center">Storage is Online Cover Level (m) 86.000</p> <p align="center"><u>Deep Bore Soakaway Structure</u></p> <p>           Chamber Invert Level (m) 84.000    Infiltration Coefficient Base (m/hr) 0.18000<br/>           Chamber Diameter/Width (m) 1.200    Safety Factor 2.0<br/>           Borehole Diameter (m) 0.200<br/>           Borehole Depth (m) 22.000         </p> <table border="1"> <thead> <tr> <th>Depth<br/>(m)</th> <th>Side<br/>Infil.<br/>Coef.<br/>(m/hr)</th> <th>Depth<br/>(m)</th> <th>Side<br/>Infil.<br/>Coef.<br/>(m/hr)</th> <th>Depth<br/>(m)</th> <th>Side<br/>Infil.<br/>Coef.<br/>(m/hr)</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>0.18000</td> <td>16.000</td> <td>0.00000</td> <td>22.000</td> <td>0.00000</td> </tr> </tbody> </table> |                                   |                                                                                     | Depth<br>(m)                      | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m)                      | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) | 0.000 | 0.18000 | 16.000 | 0.00000 | 22.000 | 0.00000 |
| Depth<br>(m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m)                                                                        | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m)                      | Side<br>Infil.<br>Coef.<br>(m/hr) |                                   |              |                                   |       |         |        |         |        |         |
| 0.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.18000                           | 16.000                                                                              | 0.00000                           | 22.000                            | 0.00000                           |                                   |              |                                   |       |         |        |         |        |         |
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| XP Solutions                                        |               | Source Control 2016.1    |                        |                                                                                     |        |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Half Drain Time : 1488 minutes.                     |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 15 min Summer                                       | 82.710        | 24.010                   | 0.3                    | 13.1                                                                                | FL00D  |
| 30 min Summer                                       | 82.715        | 24.015                   | 0.3                    | 17.7                                                                                | FL00D  |
| 60 min Summer                                       | 82.720        | 24.020                   | 0.3                    | 22.6                                                                                | FL00D  |
| 120 min Summer                                      | 82.725        | 24.025                   | 0.3                    | 27.7                                                                                | FL00D  |
| 180 min Summer                                      | 82.728        | 24.028                   | 0.3                    | 30.6                                                                                | FL00D  |
| 240 min Summer                                      | 82.730        | 24.030                   | 0.3                    | 32.5                                                                                | FL00D  |
| 360 min Summer                                      | 82.732        | 24.032                   | 0.3                    | 34.9                                                                                | FL00D  |
| 480 min Summer                                      | 82.733        | 24.033                   | 0.3                    | 36.4                                                                                | FL00D  |
| 600 min Summer                                      | 82.734        | 24.034                   | 0.3                    | 37.3                                                                                | FL00D  |
| 720 min Summer                                      | 82.735        | 24.035                   | 0.3                    | 37.8                                                                                | FL00D  |
| 960 min Summer                                      | 82.735        | 24.035                   | 0.3                    | 38.0                                                                                | FL00D  |
| 1440 min Summer                                     | 82.734        | 24.034                   | 0.3                    | 37.0                                                                                | FL00D  |
| 2160 min Summer                                     | 82.733        | 24.033                   | 0.3                    | 35.5                                                                                | FL00D  |
| 2880 min Summer                                     | 82.731        | 24.031                   | 0.3                    | 34.2                                                                                | FL00D  |
| 4320 min Summer                                     | 82.728        | 24.028                   | 0.3                    | 31.5                                                                                | FL00D  |
| 5760 min Summer                                     | 82.726        | 24.026                   | 0.3                    | 28.6                                                                                | FL00D  |
| 7200 min Summer                                     | 82.723        | 24.023                   | 0.3                    | 25.7                                                                                | FL00D  |
| 8640 min Summer                                     | 82.720        | 24.020                   | 0.3                    | 23.0                                                                                | FL00D  |
| 10080 min Summer                                    | 82.717        | 24.017                   | 0.3                    | 20.4                                                                                | FL00D  |
| 15 min Winter                                       | 82.712        | 24.012                   | 0.3                    | 14.8                                                                                | FL00D  |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 15 min Summer                                       | 83.344        | 10.2                     | 37                     |                                                                                     |        |
| 30 min Summer                                       | 55.879        | 14.7                     | 50                     |                                                                                     |        |
| 60 min Summer                                       | 35.949        | 19.6                     | 78                     |                                                                                     |        |
| 120 min Summer                                      | 22.481        | 24.7                     | 136                    |                                                                                     |        |
| 180 min Summer                                      | 16.899        | 27.6                     | 194                    |                                                                                     |        |
| 240 min Summer                                      | 13.734        | 29.5                     | 254                    |                                                                                     |        |
| 360 min Summer                                      | 10.201        | 31.9                     | 372                    |                                                                                     |        |
| 480 min Summer                                      | 8.260         | 33.4                     | 490                    |                                                                                     |        |
| 600 min Summer                                      | 7.008         | 34.3                     | 610                    |                                                                                     |        |
| 720 min Summer                                      | 6.125         | 34.8                     | 728                    |                                                                                     |        |
| 960 min Summer                                      | 4.949         | 35.0                     | 966                    |                                                                                     |        |
| 1440 min Summer                                     | 3.659         | 34.0                     | 1290                   |                                                                                     |        |
| 2160 min Summer                                     | 2.701         | 32.5                     | 1664                   |                                                                                     |        |
| 2880 min Summer                                     | 2.176         | 31.2                     | 2048                   |                                                                                     |        |
| 4320 min Summer                                     | 1.602         | 28.5                     | 2868                   |                                                                                     |        |
| 5760 min Summer                                     | 1.288         | 25.6                     | 3696                   |                                                                                     |        |
| 7200 min Summer                                     | 1.088         | 22.8                     | 4480                   |                                                                                     |        |
| 8640 min Summer                                     | 0.947         | 20.0                     | 5288                   |                                                                                     |        |
| 10080 min Summer                                    | 0.843         | 17.4                     | 6064                   |                                                                                     |        |
| 15 min Winter                                       | 83.344        | 11.8                     | 38                     |                                                                                     |        |
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| XP Solutions                                        |               | Source Control 2016.1    |                        |                                                                                     |        |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 30 min Winter                                       | 82.717        | 24.017                   | 0.3                    | 19.9                                                                                | FLOOD  |
| 60 min Winter                                       | 82.722        | 24.022                   | 0.3                    | 25.4                                                                                | FLOOD  |
| 120 min Winter                                      | 82.728        | 24.028                   | 0.3                    | 31.3                                                                                | FLOOD  |
| 180 min Winter                                      | 82.732        | 24.032                   | 0.3                    | 34.7                                                                                | FLOOD  |
| 240 min Winter                                      | 82.734        | 24.034                   | 0.3                    | 37.0                                                                                | FLOOD  |
| 360 min Winter                                      | 82.737        | 24.037                   | 0.3                    | 39.9                                                                                | FLOOD  |
| 480 min Winter                                      | 82.739        | 24.039                   | 0.3                    | 41.8                                                                                | FLOOD  |
| 600 min Winter                                      | 82.740        | 24.040                   | 0.3                    | 43.1                                                                                | FLOOD  |
| 720 min Winter                                      | 82.741        | 24.041                   | 0.3                    | 43.9                                                                                | FLOOD  |
| 960 min Winter                                      | 82.742        | 24.042                   | 0.3                    | 44.7                                                                                | FLOOD  |
| 1440 min Winter                                     | 82.741        | 24.041                   | 0.3                    | 44.5                                                                                | FLOOD  |
| 2160 min Winter                                     | 82.739        | 24.039                   | 0.3                    | 42.0                                                                                | FLOOD  |
| 2880 min Winter                                     | 82.737        | 24.037                   | 0.3                    | 40.2                                                                                | FLOOD  |
| 4320 min Winter                                     | 82.733        | 24.033                   | 0.3                    | 36.0                                                                                | FLOOD  |
| 5760 min Winter                                     | 82.728        | 24.028                   | 0.3                    | 31.5                                                                                | FLOOD  |
| 7200 min Winter                                     | 82.724        | 24.024                   | 0.3                    | 26.9                                                                                | FLOOD  |
| 8640 min Winter                                     | 82.720        | 24.020                   | 0.3                    | 22.6                                                                                | FLOOD  |
| 10080 min Winter                                    | 82.716        | 24.016                   | 0.3                    | 18.6                                                                                | FLOOD  |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 30 min Winter                                       | 55.879        | 16.9                     | 50                     |                                                                                     |        |
| 60 min Winter                                       | 35.949        | 22.4                     | 78                     |                                                                                     |        |
| 120 min Winter                                      | 22.481        | 28.3                     | 134                    |                                                                                     |        |
| 180 min Winter                                      | 16.899        | 31.7                     | 192                    |                                                                                     |        |
| 240 min Winter                                      | 13.734        | 34.0                     | 250                    |                                                                                     |        |
| 360 min Winter                                      | 10.201        | 36.9                     | 366                    |                                                                                     |        |
| 480 min Winter                                      | 8.260         | 38.8                     | 482                    |                                                                                     |        |
| 600 min Winter                                      | 7.008         | 40.1                     | 598                    |                                                                                     |        |
| 720 min Winter                                      | 6.125         | 40.9                     | 714                    |                                                                                     |        |
| 960 min Winter                                      | 4.949         | 41.7                     | 942                    |                                                                                     |        |
| 1440 min Winter                                     | 3.659         | 41.5                     | 1382                   |                                                                                     |        |
| 2160 min Winter                                     | 2.701         | 39.0                     | 1788                   |                                                                                     |        |
| 2880 min Winter                                     | 2.176         | 37.2                     | 2216                   |                                                                                     |        |
| 4320 min Winter                                     | 1.602         | 33.0                     | 3128                   |                                                                                     |        |
| 5760 min Winter                                     | 1.288         | 28.5                     | 4040                   |                                                                                     |        |
| 7200 min Winter                                     | 1.088         | 24.0                     | 4848                   |                                                                                     |        |
| 8640 min Winter                                     | 0.947         | 19.6                     | 5664                   |                                                                                     |        |
| 10080 min Winter                                    | 0.843         | 15.6                     | 6456                   |                                                                                     |        |
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| Date 21/10/2016 16:04<br>File Village Green-7BHs.srcx |  |                                                                                     |
| Designed by pennington_p<br>Checked by                |  |                                                                                     |
| XP Solutions                                          |  | Source Control 2016.1                                                               |

Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 30                | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 18.000            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.336             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +30   |

Pipe Network

|                             |     |                                |       |
|-----------------------------|-----|--------------------------------|-------|
| Volume in Pipe Network (m³) | 5   | Dia of Outfall Pipe (m)        | 0.2   |
| Slope of Outfall Pipe (1:X) | 175 | Roughness of Outfall Pipe (mm) | 0.600 |

Time Area Diagram

Total Area (ha) 0.088

| Time (mins)<br>From: | To: | Area<br>(ha) | Time (mins)<br>From: | To: | Area<br>(ha) | Time (mins)<br>From: | To: | Area<br>(ha) |
|----------------------|-----|--------------|----------------------|-----|--------------|----------------------|-----|--------------|
| 0                    | 4   | 0.029        | 4                    | 8   | 0.029        | 8                    | 12  | 0.029        |

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|--------------------------|
| Designed by pennington_p |
| Checked by               |



Source Control 2016.1

Storage is Online Cover Level (m) 82.700

|                            |        |                                      |         |
|----------------------------|--------|--------------------------------------|---------|
| Chamber Invert Level (m)   | 80.700 | Infiltration Coefficient Base (m/hr) | 0.18000 |
| Chamber Diameter/Width (m) | 1.200  | Safety Factor                        | 2.0     |
| Borehole Diameter (m)      | 0.200  |                                      |         |
| Borehole Depth (m)         | 22.000 |                                      |         |

| Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) | Depth<br>(m) | Side<br>Infil.<br>Coef.<br>(m/hr) |
|--------------|-----------------------------------|--------------|-----------------------------------|--------------|-----------------------------------|
| 0.000        | 0.18000                           | 16.000       | 0.00000                           | 22.000       | 0.00000                           |

| Curtins Consulting Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               |                     |                                                                                     |                 | Page 1     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
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| Date 21/10/2016 16:14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                     | Designed by pennington_p                                                            |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| File West Corner Green.srcx                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |                     | Checked by                                                                          |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |                     | Source Control 2016.1                                                               |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| <div>Summary of Results for 30 year Return Period (+30%)</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |                     |                                                                                     |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| <div>Half Drain Time : 374 minutes.</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |                     |                                                                                     |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>87.002</td><td>24.002</td><td>0.3</td><td>4.5</td><td>FLOOD</td></tr><tr><td>30 min Summer</td><td>87.003</td><td>24.003</td><td>0.3</td><td>6.0</td><td>FLOOD</td></tr><tr><td>60 min Summer</td><td>87.005</td><td>24.005</td><td>0.3</td><td>7.5</td><td>FLOOD</td></tr><tr><td>120 min Summer</td><td>87.006</td><td>24.006</td><td>0.3</td><td>8.7</td><td>FLOOD</td></tr><tr><td>180 min Summer</td><td>87.006</td><td>24.006</td><td>0.3</td><td>9.3</td><td>FLOOD</td></tr><tr><td>240 min Summer</td><td>87.006</td><td>24.006</td><td>0.3</td><td>9.4</td><td>FLOOD</td></tr><tr><td>360 min Summer</td><td>87.006</td><td>24.006</td><td>0.3</td><td>9.3</td><td>FLOOD</td></tr><tr><td>480 min Summer</td><td>87.006</td><td>24.006</td><td>0.3</td><td>9.2</td><td>FLOOD</td></tr><tr><td>600 min Summer</td><td>87.006</td><td>24.006</td><td>0.3</td><td>9.0</td><td>FLOOD</td></tr><tr><td>720 min Summer</td><td>87.006</td><td>24.006</td><td>0.3</td><td>8.8</td><td>FLOOD</td></tr><tr><td>960 min Summer</td><td>87.005</td><td>24.005</td><td>0.3</td><td>8.4</td><td>FLOOD</td></tr><tr><td>1440 min Summer</td><td>87.005</td><td>24.005</td><td>0.3</td><td>7.5</td><td>FLOOD</td></tr><tr><td>2160 min Summer</td><td>87.003</td><td>24.003</td><td>0.3</td><td>6.1</td><td>FLOOD</td></tr><tr><td>2880 min Summer</td><td>87.002</td><td>24.002</td><td>0.3</td><td>4.9</td><td>FLOOD</td></tr><tr><td>4320 min Summer</td><td>86.901</td><td>23.901</td><td>0.3</td><td>2.8</td><td>Flood Risk</td></tr><tr><td>5760 min Summer</td><td>85.681</td><td>22.681</td><td>0.3</td><td>1.5</td><td>0 K</td></tr><tr><td>7200 min Summer</td><td>85.005</td><td>22.005</td><td>0.3</td><td>0.7</td><td>0 K</td></tr><tr><td>8640 min Summer</td><td>78.206</td><td>15.206</td><td>0.2</td><td>0.5</td><td>0 K</td></tr><tr><td>10080 min Summer</td><td>76.534</td><td>13.534</td><td>0.2</td><td>0.4</td><td>0 K</td></tr><tr><td>15 min Winter</td><td>87.002</td><td>24.002</td><td>0.3</td><td>5.1</td><td>FLOOD</td></tr></table> |               |                     |                                                                                     |                 |            |  | Storm Event | Max Level (m) | Max Depth (m)       | Max Infiltration (l/s) | Max Volume (m³) | Status | 15 min Summer | 87.002 | 24.002        | 0.3    | 4.5 | FLOOD | 30 min Summer | 87.003 | 24.003 | 0.3 | 6.0            | FLOOD  | 60 min Summer | 87.005 | 24.005         | 0.3    | 7.5 | FLOOD | 120 min Summer | 87.006 | 24.006 | 0.3 | 8.7            | FLOOD  | 180 min Summer | 87.006 | 24.006         | 0.3   | 9.3 | FLOOD | 240 min Summer | 87.006 | 24.006 | 0.3 | 9.4            | FLOOD | 360 min Summer | 87.006 | 24.006         | 0.3   | 9.3 | FLOOD | 480 min Summer  | 87.006 | 24.006 | 0.3 | 9.2             | FLOOD | 600 min Summer | 87.006 | 24.006          | 0.3   | 9.0 | FLOOD | 720 min Summer  | 87.006 | 24.006 | 0.3  | 8.8             | FLOOD | 960 min Summer | 87.005 | 24.005          | 0.3   | 8.4 | FLOOD | 1440 min Summer | 87.005 | 24.005 | 0.3  | 7.5              | FLOOD | 2160 min Summer | 87.003 | 24.003        | 0.3    | 6.1 | FLOOD | 2880 min Summer | 87.002 | 24.002 | 0.3 | 4.9 | FLOOD | 4320 min Summer | 86.901 | 23.901 | 0.3 | 2.8 | Flood Risk | 5760 min Summer | 85.681 | 22.681 | 0.3 | 1.5 | 0 K | 7200 min Summer | 85.005 | 22.005 | 0.3 | 0.7 | 0 K | 8640 min Summer | 78.206 | 15.206 | 0.2 | 0.5 | 0 K | 10080 min Summer | 76.534 | 13.534 | 0.2 | 0.4 | 0 K | 15 min Winter | 87.002 | 24.002 | 0.3 | 5.1 | FLOOD |
| Storm Event                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Max Level (m) | Max Depth (m)       | Max Infiltration (l/s)                                                              | Max Volume (m³) | Status     |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 15 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 87.002        | 24.002              | 0.3                                                                                 | 4.5             | FLOOD      |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 30 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 87.003        | 24.003              | 0.3                                                                                 | 6.0             | FLOOD      |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 60 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 87.005        | 24.005              | 0.3                                                                                 | 7.5             | FLOOD      |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 120 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 87.006        | 24.006              | 0.3                                                                                 | 8.7             | FLOOD      |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 180 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 87.006        | 24.006              | 0.3                                                                                 | 9.3             | FLOOD      |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 240 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 87.006        | 24.006              | 0.3                                                                                 | 9.4             | FLOOD      |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 360 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 87.006        | 24.006              | 0.3                                                                                 | 9.3             | FLOOD      |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 480 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 87.006        | 24.006              | 0.3                                                                                 | 9.2             | FLOOD      |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 600 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 87.006        | 24.006              | 0.3                                                                                 | 9.0             | FLOOD      |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 720 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 87.006        | 24.006              | 0.3                                                                                 | 8.8             | FLOOD      |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 960 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 87.005        | 24.005              | 0.3                                                                                 | 8.4             | FLOOD      |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 1440 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 87.005        | 24.005              | 0.3                                                                                 | 7.5             | FLOOD      |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 2160 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 87.003        | 24.003              | 0.3                                                                                 | 6.1             | FLOOD      |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 2880 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 87.002        | 24.002              | 0.3                                                                                 | 4.9             | FLOOD      |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 4320 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 86.901        | 23.901              | 0.3                                                                                 | 2.8             | Flood Risk |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 5760 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 85.681        | 22.681              | 0.3                                                                                 | 1.5             | 0 K        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 7200 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 85.005        | 22.005              | 0.3                                                                                 | 0.7             | 0 K        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 8640 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 78.206        | 15.206              | 0.2                                                                                 | 0.5             | 0 K        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 10080 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 76.534        | 13.534              | 0.2                                                                                 | 0.4             | 0 K        |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 15 min Winter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 87.002        | 24.002              | 0.3                                                                                 | 5.1             | FLOOD      |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>83.344</td><td>1.6</td><td>25</td></tr><tr><td>30 min Summer</td><td>55.879</td><td>3.0</td><td>40</td></tr><tr><td>60 min Summer</td><td>35.949</td><td>4.5</td><td>68</td></tr><tr><td>120 min Summer</td><td>22.481</td><td>5.8</td><td>126</td></tr><tr><td>180 min Summer</td><td>16.899</td><td>6.3</td><td>184</td></tr><tr><td>240 min Summer</td><td>13.734</td><td>6.5</td><td>242</td></tr><tr><td>360 min Summer</td><td>10.201</td><td>6.4</td><td>322</td></tr><tr><td>480 min Summer</td><td>8.260</td><td>6.2</td><td>384</td></tr><tr><td>600 min Summer</td><td>7.008</td><td>6.0</td><td>448</td></tr><tr><td>720 min Summer</td><td>6.125</td><td>5.8</td><td>514</td></tr><tr><td>960 min Summer</td><td>4.949</td><td>5.4</td><td>652</td></tr><tr><td>1440 min Summer</td><td>3.659</td><td>4.5</td><td>926</td></tr><tr><td>2160 min Summer</td><td>2.701</td><td>3.2</td><td>1324</td></tr><tr><td>2880 min Summer</td><td>2.176</td><td>1.9</td><td>1704</td></tr><tr><td>4320 min Summer</td><td>1.602</td><td>0.0</td><td>2424</td></tr><tr><td>5760 min Summer</td><td>1.288</td><td>0.0</td><td>3064</td></tr><tr><td>7200 min Summer</td><td>1.088</td><td>0.0</td><td>3688</td></tr><tr><td>8640 min Summer</td><td>0.947</td><td>0.0</td><td>4400</td></tr><tr><td>10080 min Summer</td><td>0.843</td><td>0.0</td><td>5136</td></tr><tr><td>15 min Winter</td><td>83.344</td><td>2.2</td><td>25</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |                     |                                                                                     |                 |            |  | Storm Event | Rain (mm/hr)  | Flooded Volume (m³) | Time-Peak (mins)       | 15 min Summer   | 83.344 | 1.6           | 25     | 30 min Summer | 55.879 | 3.0 | 40    | 60 min Summer | 35.949 | 4.5    | 68  | 120 min Summer | 22.481 | 5.8           | 126    | 180 min Summer | 16.899 | 6.3 | 184   | 240 min Summer | 13.734 | 6.5    | 242 | 360 min Summer | 10.201 | 6.4            | 322    | 480 min Summer | 8.260 | 6.2 | 384   | 600 min Summer | 7.008  | 6.0    | 448 | 720 min Summer | 6.125 | 5.8            | 514    | 960 min Summer | 4.949 | 5.4 | 652   | 1440 min Summer | 3.659  | 4.5    | 926 | 2160 min Summer | 2.701 | 3.2            | 1324   | 2880 min Summer | 2.176 | 1.9 | 1704  | 4320 min Summer | 1.602  | 0.0    | 2424 | 5760 min Summer | 1.288 | 0.0            | 3064   | 7200 min Summer | 1.088 | 0.0 | 3688  | 8640 min Summer | 0.947  | 0.0    | 4400 | 10080 min Summer | 0.843 | 0.0             | 5136   | 15 min Winter | 83.344 | 2.2 | 25    |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| Storm Event                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Rain (mm/hr)  | Flooded Volume (m³) | Time-Peak (mins)                                                                    |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 15 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 83.344        | 1.6                 | 25                                                                                  |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 30 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 55.879        | 3.0                 | 40                                                                                  |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 60 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 35.949        | 4.5                 | 68                                                                                  |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 120 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 22.481        | 5.8                 | 126                                                                                 |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 180 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 16.899        | 6.3                 | 184                                                                                 |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 240 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 13.734        | 6.5                 | 242                                                                                 |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 360 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 10.201        | 6.4                 | 322                                                                                 |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 480 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 8.260         | 6.2                 | 384                                                                                 |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 600 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 7.008         | 6.0                 | 448                                                                                 |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 720 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 6.125         | 5.8                 | 514                                                                                 |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 960 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 4.949         | 5.4                 | 652                                                                                 |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 1440 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3.659         | 4.5                 | 926                                                                                 |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 2160 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2.701         | 3.2                 | 1324                                                                                |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 2880 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2.176         | 1.9                 | 1704                                                                                |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 4320 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1.602         | 0.0                 | 2424                                                                                |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 5760 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1.288         | 0.0                 | 3064                                                                                |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 7200 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1.088         | 0.0                 | 3688                                                                                |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 8640 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0.947         | 0.0                 | 4400                                                                                |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 10080 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.843         | 0.0                 | 5136                                                                                |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
| 15 min Winter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 83.344        | 2.2                 | 25                                                                                  |                 |            |  |             |               |                     |                        |                 |        |               |        |               |        |     |       |               |        |        |     |                |        |               |        |                |        |     |       |                |        |        |     |                |        |                |        |                |       |     |       |                |        |        |     |                |       |                |        |                |       |     |       |                 |        |        |     |                 |       |                |        |                 |       |     |       |                 |        |        |      |                 |       |                |        |                 |       |     |       |                 |        |        |      |                  |       |                 |        |               |        |     |       |                 |        |        |     |     |       |                 |        |        |     |     |            |                 |        |        |     |     |     |                 |        |        |     |     |     |                 |        |        |     |     |     |                  |        |        |     |     |     |               |        |        |     |     |       |
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| XP Solutions                                        |               | Source Control 2016.1    |                        |                                                                                     |        |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 30 min Winter                                       | 87.004        | 24.004                   | 0.3                    | 6.8                                                                                 | FLOOD  |
| 60 min Winter                                       | 87.006        | 24.006                   | 0.3                    | 8.5                                                                                 | FLOOD  |
| 120 min Winter                                      | 87.007        | 24.007                   | 0.3                    | 10.0                                                                                | FLOOD  |
| 180 min Winter                                      | 87.008        | 24.008                   | 0.3                    | 10.7                                                                                | FLOOD  |
| 240 min Winter                                      | 87.008        | 24.008                   | 0.3                    | 11.0                                                                                | FLOOD  |
| 360 min Winter                                      | 87.008        | 24.008                   | 0.3                    | 11.1                                                                                | FLOOD  |
| 480 min Winter                                      | 87.008        | 24.008                   | 0.3                    | 10.8                                                                                | FLOOD  |
| 600 min Winter                                      | 87.008        | 24.008                   | 0.3                    | 10.5                                                                                | FLOOD  |
| 720 min Winter                                      | 87.007        | 24.007                   | 0.3                    | 10.3                                                                                | FLOOD  |
| 960 min Winter                                      | 87.007        | 24.007                   | 0.3                    | 9.6                                                                                 | FLOOD  |
| 1440 min Winter                                     | 87.005        | 24.005                   | 0.3                    | 8.2                                                                                 | FLOOD  |
| 2160 min Winter                                     | 87.003        | 24.003                   | 0.3                    | 6.1                                                                                 | FLOOD  |
| 2880 min Winter                                     | 87.001        | 24.001                   | 0.3                    | 4.1                                                                                 | FLOOD  |
| 4320 min Winter                                     | 85.552        | 22.552                   | 0.3                    | 1.3                                                                                 | 0 K    |
| 5760 min Winter                                     | 77.945        | 14.945                   | 0.2                    | 0.5                                                                                 | 0 K    |
| 7200 min Winter                                     | 75.612        | 12.612                   | 0.2                    | 0.4                                                                                 | 0 K    |
| 8640 min Winter                                     | 73.981        | 10.981                   | 0.2                    | 0.3                                                                                 | 0 K    |
| 10080 min Winter                                    | 72.768        | 9.768                    | 0.2                    | 0.3                                                                                 | 0 K    |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 30 min Winter                                       | 55.879        | 3.8                      | 39                     |                                                                                     |        |
| 60 min Winter                                       | 35.949        | 5.5                      | 68                     |                                                                                     |        |
| 120 min Winter                                      | 22.481        | 7.1                      | 124                    |                                                                                     |        |
| 180 min Winter                                      | 16.899        | 7.8                      | 182                    |                                                                                     |        |
| 240 min Winter                                      | 13.734        | 8.1                      | 238                    |                                                                                     |        |
| 360 min Winter                                      | 10.201        | 8.1                      | 348                    |                                                                                     |        |
| 480 min Winter                                      | 8.260         | 7.8                      | 448                    |                                                                                     |        |
| 600 min Winter                                      | 7.008         | 7.6                      | 480                    |                                                                                     |        |
| 720 min Winter                                      | 6.125         | 7.3                      | 556                    |                                                                                     |        |
| 960 min Winter                                      | 4.949         | 6.7                      | 710                    |                                                                                     |        |
| 1440 min Winter                                     | 3.659         | 5.3                      | 1008                   |                                                                                     |        |
| 2160 min Winter                                     | 2.701         | 3.1                      | 1424                   |                                                                                     |        |
| 2880 min Winter                                     | 2.176         | 1.2                      | 1796                   |                                                                                     |        |
| 4320 min Winter                                     | 1.602         | 0.0                      | 2428                   |                                                                                     |        |
| 5760 min Winter                                     | 1.288         | 0.0                      | 2936                   |                                                                                     |        |
| 7200 min Winter                                     | 1.088         | 0.0                      | 3672                   |                                                                                     |        |
| 8640 min Winter                                     | 0.947         | 0.0                      | 4400                   |                                                                                     |        |
| 10080 min Winter                                    | 0.843         | 0.0                      | 5136                   |                                                                                     |        |
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| Checked by               |



Source Control 2016.1

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 30                | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 18.000            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.336             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +30   |

Total Area (ha) 0.031

| Time (mins) | Area  | Time (mins) | Area  | Time (mins) | Area  |
|-------------|-------|-------------|-------|-------------|-------|
| From: To:   | (ha)  | From: To:   | (ha)  | From: To:   | (ha)  |
| 0 4         | 0.010 | 4 8         | 0.010 | 8 12        | 0.010 |

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| XP Solutions Source Control 2016.1                   |                                        |                                                                                     |

Model Details

Storage is Online Cover Level (m) 87.000

Deep Bore Soakaway Structure

Chamber Invert Level (m) 85.000 Infiltration Coefficient Base (m/hr) 0.18000  
 Chamber Diameter/Width (m) 1.200 Safety Factor 2.0  
 Borehole Diameter (m) 0.200  
 Borehole Depth (m) 22.000

| Side          | Side           | Side           |
|---------------|----------------|----------------|
| Depth Infil.  | Depth Infil.   | Depth Infil.   |
| (m) Coef.     | (m) Coef.      | (m) Coef.      |
| (m/hr)        | (m/hr)         | (m/hr)         |
| 0.000 0.18000 | 16.000 0.00000 | 22.000 0.00000 |

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|                                                     |               |                          |                        |                                                                                     |        |
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| XP Solutions                                        |               | Source Control 2016.1    |                        |                                                                                     |        |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Half Drain Time : 664 minutes.                      |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 15 min Summer                                       | 84.304        | 24.004                   | 0.3                    | 7.1                                                                                 | FL00D  |
| 30 min Summer                                       | 84.306        | 24.006                   | 0.3                    | 9.4                                                                                 | FL00D  |
| 60 min Summer                                       | 84.309        | 24.009                   | 0.3                    | 11.9                                                                                | FL00D  |
| 120 min Summer                                      | 84.311        | 24.011                   | 0.3                    | 14.3                                                                                | FL00D  |
| 180 min Summer                                      | 84.313        | 24.013                   | 0.3                    | 15.6                                                                                | FL00D  |
| 240 min Summer                                      | 84.313        | 24.013                   | 0.3                    | 16.2                                                                                | FL00D  |
| 360 min Summer                                      | 84.314        | 24.014                   | 0.3                    | 16.8                                                                                | FL00D  |
| 480 min Summer                                      | 84.314        | 24.014                   | 0.3                    | 16.9                                                                                | FL00D  |
| 600 min Summer                                      | 84.314        | 24.014                   | 0.3                    | 16.7                                                                                | FL00D  |
| 720 min Summer                                      | 84.313        | 24.013                   | 0.3                    | 16.5                                                                                | FL00D  |
| 960 min Summer                                      | 84.313        | 24.013                   | 0.3                    | 16.0                                                                                | FL00D  |
| 1440 min Summer                                     | 84.312        | 24.012                   | 0.3                    | 15.2                                                                                | FL00D  |
| 2160 min Summer                                     | 84.311        | 24.011                   | 0.3                    | 13.9                                                                                | FL00D  |
| 2880 min Summer                                     | 84.310        | 24.010                   | 0.3                    | 12.5                                                                                | FL00D  |
| 4320 min Summer                                     | 84.307        | 24.007                   | 0.3                    | 9.8                                                                                 | FL00D  |
| 5760 min Summer                                     | 84.304        | 24.004                   | 0.3                    | 7.4                                                                                 | FL00D  |
| 7200 min Summer                                     | 84.302        | 24.002                   | 0.3                    | 5.3                                                                                 | FL00D  |
| 8640 min Summer                                     | 84.301        | 24.001                   | 0.3                    | 3.6                                                                                 | FL00D  |
| 10080 min Summer                                    | 83.767        | 23.467                   | 0.3                    | 2.4                                                                                 | 0 K    |
| 15 min Winter                                       | 84.305        | 24.005                   | 0.3                    | 8.0                                                                                 | FL00D  |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 15 min Summer                                       | 83.344        | 4.1                      | 31                     |                                                                                     |        |
| 30 min Summer                                       | 55.879        | 6.5                      | 44                     |                                                                                     |        |
| 60 min Summer                                       | 35.949        | 9.0                      | 74                     |                                                                                     |        |
| 120 min Summer                                      | 22.481        | 11.4                     | 132                    |                                                                                     |        |
| 180 min Summer                                      | 16.899        | 12.6                     | 190                    |                                                                                     |        |
| 240 min Summer                                      | 13.734        | 13.3                     | 248                    |                                                                                     |        |
| 360 min Summer                                      | 10.201        | 13.8                     | 366                    |                                                                                     |        |
| 480 min Summer                                      | 8.260         | 13.9                     | 482                    |                                                                                     |        |
| 600 min Summer                                      | 7.008         | 13.7                     | 564                    |                                                                                     |        |
| 720 min Summer                                      | 6.125         | 13.5                     | 616                    |                                                                                     |        |
| 960 min Summer                                      | 4.949         | 13.1                     | 742                    |                                                                                     |        |
| 1440 min Summer                                     | 3.659         | 12.2                     | 1004                   |                                                                                     |        |
| 2160 min Summer                                     | 2.701         | 10.9                     | 1420                   |                                                                                     |        |
| 2880 min Summer                                     | 2.176         | 9.5                      | 1824                   |                                                                                     |        |
| 4320 min Summer                                     | 1.602         | 6.8                      | 2608                   |                                                                                     |        |
| 5760 min Summer                                     | 1.288         | 4.4                      | 3360                   |                                                                                     |        |
| 7200 min Summer                                     | 1.088         | 2.3                      | 4064                   |                                                                                     |        |
| 8640 min Summer                                     | 0.947         | 0.7                      | 4760                   |                                                                                     |        |
| 10080 min Summer                                    | 0.843         | 0.0                      | 5432                   |                                                                                     |        |
| 15 min Winter                                       | 83.344        | 5.0                      | 31                     |                                                                                     |        |
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| XP Solutions                                        |               |                     | Source Control 2016.1                                                               |                 |            |  |
| Summary of Results for 30 year Return Period (+30%) |               |                     |                                                                                     |                 |            |  |
| Storm Event                                         | Max Level (m) | Max Depth (m)       | Max Infiltration (l/s)                                                              | Max Volume (m³) | Status     |  |
| 30 min Winter                                       | 84.308        | 24.008              | 0.3                                                                                 | 10.7            | FLOOD      |  |
| 60 min Winter                                       | 84.311        | 24.011              | 0.3                                                                                 | 13.5            | FLOOD      |  |
| 120 min Winter                                      | 84.313        | 24.013              | 0.3                                                                                 | 16.3            | FLOOD      |  |
| 180 min Winter                                      | 84.315        | 24.015              | 0.3                                                                                 | 17.8            | FLOOD      |  |
| 240 min Winter                                      | 84.316        | 24.016              | 0.3                                                                                 | 18.7            | FLOOD      |  |
| 360 min Winter                                      | 84.317        | 24.017              | 0.3                                                                                 | 19.6            | FLOOD      |  |
| 480 min Winter                                      | 84.317        | 24.017              | 0.3                                                                                 | 19.9            | FLOOD      |  |
| 600 min Winter                                      | 84.317        | 24.017              | 0.3                                                                                 | 19.9            | FLOOD      |  |
| 720 min Winter                                      | 84.317        | 24.017              | 0.3                                                                                 | 19.7            | FLOOD      |  |
| 960 min Winter                                      | 84.316        | 24.016              | 0.3                                                                                 | 18.9            | FLOOD      |  |
| 1440 min Winter                                     | 84.315        | 24.015              | 0.3                                                                                 | 17.8            | FLOOD      |  |
| 2160 min Winter                                     | 84.313        | 24.013              | 0.3                                                                                 | 15.7            | FLOOD      |  |
| 2880 min Winter                                     | 84.310        | 24.010              | 0.3                                                                                 | 13.4            | FLOOD      |  |
| 4320 min Winter                                     | 84.306        | 24.006              | 0.3                                                                                 | 9.2             | FLOOD      |  |
| 5760 min Winter                                     | 84.303        | 24.003              | 0.3                                                                                 | 5.5             | FLOOD      |  |
| 7200 min Winter                                     | 84.076        | 23.776              | 0.3                                                                                 | 2.7             | Flood Risk |  |
| 8640 min Winter                                     | 82.475        | 22.175              | 0.3                                                                                 | 0.9             | 0 K        |  |
| 10080 min Winter                                    | 75.526        | 15.226              | 0.2                                                                                 | 0.5             | 0 K        |  |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³) | Time-Peak (mins)                                                                    |                 |            |  |
| 30 min Winter                                       | 55.879        | 7.7                 | 44                                                                                  |                 |            |  |
| 60 min Winter                                       | 35.949        | 10.5                | 72                                                                                  |                 |            |  |
| 120 min Winter                                      | 22.481        | 13.4                | 130                                                                                 |                 |            |  |
| 180 min Winter                                      | 16.899        | 14.8                | 188                                                                                 |                 |            |  |
| 240 min Winter                                      | 13.734        | 15.7                | 244                                                                                 |                 |            |  |
| 360 min Winter                                      | 10.201        | 16.6                | 360                                                                                 |                 |            |  |
| 480 min Winter                                      | 8.260         | 16.9                | 472                                                                                 |                 |            |  |
| 600 min Winter                                      | 7.008         | 16.9                | 582                                                                                 |                 |            |  |
| 720 min Winter                                      | 6.125         | 16.7                | 688                                                                                 |                 |            |  |
| 960 min Winter                                      | 4.949         | 16.0                | 796                                                                                 |                 |            |  |
| 1440 min Winter                                     | 3.659         | 14.8                | 1094                                                                                |                 |            |  |
| 2160 min Winter                                     | 2.701         | 12.7                | 1552                                                                                |                 |            |  |
| 2880 min Winter                                     | 2.176         | 10.5                | 1976                                                                                |                 |            |  |
| 4320 min Winter                                     | 1.602         | 6.2                 | 2784                                                                                |                 |            |  |
| 5760 min Winter                                     | 1.288         | 2.6                 | 3528                                                                                |                 |            |  |
| 7200 min Winter                                     | 1.088         | 0.0                 | 4168                                                                                |                 |            |  |
| 8640 min Winter                                     | 0.947         | 0.0                 | 4664                                                                                |                 |            |  |
| 10080 min Winter                                    | 0.843         | 0.0                 | 5080                                                                                |                 |            |  |
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| XP Solutions Source Control 2016.1                      |                                        |                                                                                     |

Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 30                | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 18.000            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.336             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +30   |

Pipe Network

|                             |     |                                |       |
|-----------------------------|-----|--------------------------------|-------|
| Volume in Pipe Network (m³) | 3   | Dia of Outfall Pipe (m)        | 0.2   |
| Slope of Outfall Pipe (1:X) | 175 | Roughness of Outfall Pipe (mm) | 0.600 |

Time Area Diagram

Total Area (ha) 0.048

| Time (mins) | Area | Time (mins) | Area | Time (mins) | Area  |
|-------------|------|-------------|------|-------------|-------|
| From:       | To:  | From:       | To:  | From:       | To:   |
| 0           | 4    | 0.016       | 4    | 8           | 0.016 |
|             |      |             |      | 8           | 12    |
|             |      |             |      |             | 0.016 |

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Model Details

Storage is Online Cover Level (m) 84.300

Deep Bore Soakaway Structure

Chamber Invert Level (m) 82.300 Infiltration Coefficient Base (m/hr) 0.18000  
 Chamber Diameter/Width (m) 1.200 Safety Factor 2.0  
 Borehole Diameter (m) 0.200  
 Borehole Depth (m) 22.000

| Side          | Side           | Side           |
|---------------|----------------|----------------|
| Depth Infil.  | Depth Infil.   | Depth Infil.   |
| (m) Coef.     | (m) Coef.      | (m) Coef.      |
| (m/hr)        | (m/hr)         | (m/hr)         |
| 0.000 0.18000 | 16.000 0.00000 | 22.000 0.00000 |

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|                                                            |               |                          |                        |                                                                                     |        |
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| XP Solutions                                               |               | Source Control 2016.1    |                        |                                                                                     |        |
| <u>Summary of Results for 30 year Return Period (+30%)</u> |               |                          |                        |                                                                                     |        |
| Half Drain Time : 840 minutes.                             |               |                          |                        |                                                                                     |        |
| Storm Event                                                | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 15 min Summer                                              | 85.705        | 24.005                   | 0.3                    | 8.5                                                                                 | FLOOD  |
| 30 min Summer                                              | 85.708        | 24.008                   | 0.3                    | 11.3                                                                                | FLOOD  |
| 60 min Summer                                              | 85.711        | 24.011                   | 0.3                    | 14.3                                                                                | FLOOD  |
| 120 min Summer                                             | 85.714        | 24.014                   | 0.3                    | 17.4                                                                                | FLOOD  |
| 180 min Summer                                             | 85.716        | 24.016                   | 0.3                    | 19.0                                                                                | FLOOD  |
| 240 min Summer                                             | 85.717        | 24.017                   | 0.3                    | 19.9                                                                                | FLOOD  |
| 360 min Summer                                             | 85.718        | 24.018                   | 0.3                    | 20.9                                                                                | FLOOD  |
| 480 min Summer                                             | 85.718        | 24.018                   | 0.3                    | 21.2                                                                                | FLOOD  |
| 600 min Summer                                             | 85.718        | 24.018                   | 0.3                    | 21.2                                                                                | FLOOD  |
| 720 min Summer                                             | 85.718        | 24.018                   | 0.3                    | 21.0                                                                                | FLOOD  |
| 960 min Summer                                             | 85.718        | 24.018                   | 0.3                    | 20.5                                                                                | FLOOD  |
| 1440 min Summer                                            | 85.717        | 24.017                   | 0.3                    | 19.7                                                                                | FLOOD  |
| 2160 min Summer                                            | 85.715        | 24.015                   | 0.3                    | 18.4                                                                                | FLOOD  |
| 2880 min Summer                                            | 85.714        | 24.014                   | 0.3                    | 17.0                                                                                | FLOOD  |
| 4320 min Summer                                            | 85.711        | 24.011                   | 0.3                    | 14.2                                                                                | FLOOD  |
| 5760 min Summer                                            | 85.709        | 24.009                   | 0.3                    | 11.6                                                                                | FLOOD  |
| 7200 min Summer                                            | 85.706        | 24.006                   | 0.3                    | 9.1                                                                                 | FLOOD  |
| 8640 min Summer                                            | 85.704        | 24.004                   | 0.3                    | 7.0                                                                                 | FLOOD  |
| 10080 min Summer                                           | 85.702        | 24.002                   | 0.3                    | 5.3                                                                                 | FLOOD  |
| 15 min Winter                                              | 85.707        | 24.007                   | 0.3                    | 9.5                                                                                 | FLOOD  |
| Storm Event                                                | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 15 min Summer                                              | 83.344        | 5.5                      | 31                     |                                                                                     |        |
| 30 min Summer                                              | 55.879        | 8.4                      | 45                     |                                                                                     |        |
| 60 min Summer                                              | 35.949        | 11.4                     | 74                     |                                                                                     |        |
| 120 min Summer                                             | 22.481        | 14.4                     | 132                    |                                                                                     |        |
| 180 min Summer                                             | 16.899        | 16.0                     | 190                    |                                                                                     |        |
| 240 min Summer                                             | 13.734        | 16.9                     | 250                    |                                                                                     |        |
| 360 min Summer                                             | 10.201        | 17.9                     | 368                    |                                                                                     |        |
| 480 min Summer                                             | 8.260         | 18.3                     | 486                    |                                                                                     |        |
| 600 min Summer                                             | 7.008         | 18.3                     | 604                    |                                                                                     |        |
| 720 min Summer                                             | 6.125         | 18.1                     | 688                    |                                                                                     |        |
| 960 min Summer                                             | 4.949         | 17.6                     | 800                    |                                                                                     |        |
| 1440 min Summer                                            | 3.659         | 16.7                     | 1054                   |                                                                                     |        |
| 2160 min Summer                                            | 2.701         | 15.4                     | 1460                   |                                                                                     |        |
| 2880 min Summer                                            | 2.176         | 14.0                     | 1872                   |                                                                                     |        |
| 4320 min Summer                                            | 1.602         | 11.3                     | 2684                   |                                                                                     |        |
| 5760 min Summer                                            | 1.288         | 8.6                      | 3464                   |                                                                                     |        |
| 7200 min Summer                                            | 1.088         | 6.2                      | 4192                   |                                                                                     |        |
| 8640 min Summer                                            | 0.947         | 4.1                      | 4920                   |                                                                                     |        |
| 10080 min Summer                                           | 0.843         | 2.3                      | 5568                   |                                                                                     |        |
| 15 min Winter                                              | 83.344        | 6.6                      | 31                     |                                                                                     |        |
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| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 30 min Winter                                       | 85.710        | 24.010                   | 0.3                    | 12.7                                                                                | FL00D  |
| 60 min Winter                                       | 85.713        | 24.013                   | 0.3                    | 16.2                                                                                | FL00D  |
| 120 min Winter                                      | 85.717        | 24.017                   | 0.3                    | 19.7                                                                                | FL00D  |
| 180 min Winter                                      | 85.719        | 24.019                   | 0.3                    | 21.6                                                                                | FL00D  |
| 240 min Winter                                      | 85.720        | 24.020                   | 0.3                    | 22.8                                                                                | FL00D  |
| 360 min Winter                                      | 85.721        | 24.021                   | 0.3                    | 24.2                                                                                | FL00D  |
| 480 min Winter                                      | 85.722        | 24.022                   | 0.3                    | 24.8                                                                                | FL00D  |
| 600 min Winter                                      | 85.722        | 24.022                   | 0.3                    | 25.1                                                                                | FL00D  |
| 720 min Winter                                      | 85.722        | 24.022                   | 0.3                    | 25.1                                                                                | FL00D  |
| 960 min Winter                                      | 85.722        | 24.022                   | 0.3                    | 24.5                                                                                | FL00D  |
| 1440 min Winter                                     | 85.720        | 24.020                   | 0.3                    | 23.2                                                                                | FL00D  |
| 2160 min Winter                                     | 85.718        | 24.018                   | 0.3                    | 21.2                                                                                | FL00D  |
| 2880 min Winter                                     | 85.716        | 24.016                   | 0.3                    | 19.1                                                                                | FL00D  |
| 4320 min Winter                                     | 85.712        | 24.012                   | 0.3                    | 14.6                                                                                | FL00D  |
| 5760 min Winter                                     | 85.708        | 24.008                   | 0.3                    | 10.5                                                                                | FL00D  |
| 7200 min Winter                                     | 85.704        | 24.004                   | 0.3                    | 6.9                                                                                 | FL00D  |
| 8640 min Winter                                     | 85.701        | 24.001                   | 0.3                    | 3.9                                                                                 | FL00D  |
| 10080 min Winter                                    | 84.654        | 22.954                   | 0.3                    | 1.8                                                                                 | 0 K    |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 30 min Winter                                       | 55.879        | 9.8                      | 45                     |                                                                                     |        |
| 60 min Winter                                       | 35.949        | 13.2                     | 72                     |                                                                                     |        |
| 120 min Winter                                      | 22.481        | 16.7                     | 130                    |                                                                                     |        |
| 180 min Winter                                      | 16.899        | 18.6                     | 188                    |                                                                                     |        |
| 240 min Winter                                      | 13.734        | 19.8                     | 246                    |                                                                                     |        |
| 360 min Winter                                      | 10.201        | 21.2                     | 360                    |                                                                                     |        |
| 480 min Winter                                      | 8.260         | 21.8                     | 476                    |                                                                                     |        |
| 600 min Winter                                      | 7.008         | 22.1                     | 588                    |                                                                                     |        |
| 720 min Winter                                      | 6.125         | 22.1                     | 700                    |                                                                                     |        |
| 960 min Winter                                      | 4.949         | 21.6                     | 910                    |                                                                                     |        |
| 1440 min Winter                                     | 3.659         | 20.2                     | 1130                   |                                                                                     |        |
| 2160 min Winter                                     | 2.701         | 18.3                     | 1600                   |                                                                                     |        |
| 2880 min Winter                                     | 2.176         | 16.1                     | 2048                   |                                                                                     |        |
| 4320 min Winter                                     | 1.602         | 11.6                     | 2900                   |                                                                                     |        |
| 5760 min Winter                                     | 1.288         | 7.5                      | 3688                   |                                                                                     |        |
| 7200 min Winter                                     | 1.088         | 3.9                      | 4408                   |                                                                                     |        |
| 8640 min Winter                                     | 0.947         | 1.0                      | 5024                   |                                                                                     |        |
| 10080 min Winter                                    | 0.843         | 0.0                      | 5576                   |                                                                                     |        |
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Source Control 2016.1

## Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 30                | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 18.000            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.336             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +30   |

## Pipe Network

|                                          |     |                                |       |
|------------------------------------------|-----|--------------------------------|-------|
| Volume in Pipe Network (m <sup>3</sup> ) | 3   | Dia of Outfall Pipe (m)        | 0.2   |
| Slope of Outfall Pipe (1:X)              | 175 | Roughness of Outfall Pipe (mm) | 0.600 |

### Time Area Diagram

Total Area (ha) 0.057

| Time (mins)<br>From: To: | Area (ha) | Time (mins)<br>From: To: | Area (ha) | Time (mins)<br>From: To: | Area (ha) |
|--------------------------|-----------|--------------------------|-----------|--------------------------|-----------|
| 0 4                      | 0.019     | 4 8                      | 0.019     | 8 12                     | 0.019     |

|                                                       |                                        |                                                                                     |
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| XP Solutions Source Control 2016.1                    |                                        |                                                                                     |

Model Details

Storage is Online Cover Level (m) 85.700

Deep Bore Soakaway Structure

Chamber Invert Level (m) 83.700 Infiltration Coefficient Base (m/hr) 0.18000  
 Chamber Diameter/Width (m) 1.200 Safety Factor 2.0  
 Borehole Diameter (m) 0.200  
 Borehole Depth (m) 22.000

| Side<br>Depth<br>(m)<br>Infil.<br>Coef.<br>(m/hr) | Side<br>Depth<br>(m)<br>Infil.<br>Coef.<br>(m/hr) | Side<br>Depth<br>(m)<br>Infil.<br>Coef.<br>(m/hr) |
|---------------------------------------------------|---------------------------------------------------|---------------------------------------------------|
| 0.000 0.18000                                     | 16.000 0.00000                                    | 22.000 0.00000                                    |

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--|-----------------|--------|--------|-----|------|-------|-----------------|--------|--------|-----|------|-------|-----------------|--------|--------|-----|------|-------|------------------|--------|--------|-----|------|-------|---------------|--------|--------|-----|------|-------|-------------|--------------|---------------------|------------------|---------------|--------|-----|----|---------------|--------|------|----|---------------|--------|------|----|----------------|--------|------|-----|----------------|--------|------|-----|----------------|--------|------|-----|----------------|--------|------|-----|----------------|-------|------|-----|----------------|-------|------|-----|----------------|-------|------|-----|----------------|-------|------|-----|-----------------|-------|------|------|-----------------|-------|------|------|-----------------|-------|------|------|-----------------|-------|------|------|-----------------|-------|------|------|-----------------|-------|------|------|-----------------|-------|------|------|------------------|-------|-----|------|---------------|--------|-----|----|
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       |     |      |       |                 |        |        |     |      |       |                  |        |        |     |      |       |               |        |        |     |      |       |             |              |                     |                  |               |        |     |    |               |        |      |    |               |        |      |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                  |       |     | 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 |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
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 |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| <p>Summary of Results for 30 year Return Period (+30%)</p> <p>Half Drain Time : 1163 minutes.</p> <table><thead><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr></thead><tbody><tr><td>15 min Summer</td><td>84.908</td><td>24.008</td><td>0.3</td><td>10.9</td><td>FL00D</td></tr><tr><td>30 min Summer</td><td>84.912</td><td>24.012</td><td>0.3</td><td>14.6</td><td>FL00D</td></tr><tr><td>60 min Summer</td><td>84.916</td><td>24.016</td><td>0.3</td><td>18.6</td><td>FL00D</td></tr><tr><td>120 min Summer</td><td>84.920</td><td>24.020</td><td>0.3</td><td>22.7</td><td>FL00D</td></tr><tr><td>180 min Summer</td><td>84.922</td><td>24.022</td><td>0.3</td><td>25.0</td><td>FL00D</td></tr><tr><td>240 min Summer</td><td>84.923</td><td>24.023</td><td>0.3</td><td>26.4</td><td>FL00D</td></tr><tr><td>360 min Summer</td><td>84.925</td><td>24.025</td><td>0.3</td><td>28.1</td><td>FL00D</td></tr><tr><td>480 min Summer</td><td>84.926</td><td>24.026</td><td>0.3</td><td>29.1</td><td>FL00D</td></tr><tr><td>600 min Summer</td><td>84.927</td><td>24.027</td><td>0.3</td><td>29.5</td><td>FL00D</td></tr><tr><td>720 min Summer</td><td>84.927</td><td>24.027</td><td>0.3</td><td>29.6</td><td>FL00D</td></tr><tr><td>960 min Summer</td><td>84.926</td><td>24.026</td><td>0.3</td><td>29.3</td><td>FL00D</td></tr><tr><td>1440 min Summer</td><td>84.925</td><td>24.025</td><td>0.3</td><td>28.3</td><td>FL00D</td></tr><tr><td>2160 min Summer</td><td>84.924</td><td>24.024</td><td>0.3</td><td>26.9</td><td>FL00D</td></tr><tr><td>2880 min Summer</td><td>84.923</td><td>24.023</td><td>0.3</td><td>25.6</td><td>FL00D</td></tr><tr><td>4320 min Summer</td><td>84.920</td><td>24.020</td><td>0.3</td><td>22.8</td><td>FL00D</td></tr><tr><td>5760 min Summer</td><td>84.917</td><td>24.017</td><td>0.3</td><td>20.0</td><td>FL00D</td></tr><tr><td>7200 min Summer</td><td>84.914</td><td>24.014</td><td>0.3</td><td>17.2</td><td>FL00D</td></tr><tr><td>8640 min Summer</td><td>84.912</td><td>24.012</td><td>0.3</td><td>14.7</td><td>FL00D</td></tr><tr><td>10080 min Summer</td><td>84.909</td><td>24.009</td><td>0.3</td><td>12.3</td><td>FL00D</td></tr><tr><td>15 min Winter</td><td>84.909</td><td>24.009</td><td>0.3</td><td>12.3</td><td>FL00D</td></tr></tbody></table><br><table><thead><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Time-Peak (mins)</th></tr></thead><tbody><tr><td>15 min Summer</td><td>83.344</td><td>8.0</td><td>32</td></tr><tr><td>30 min Summer</td><td>55.879</td><td>11.7</td><td>45</td></tr><tr><td>60 min Summer</td><td>35.949</td><td>15.7</td><td>74</td></tr><tr><td>120 min Summer</td><td>22.481</td><td>19.7</td><td>132</td></tr><tr><td>180 min Summer</td><td>16.899</td><td>22.0</td><td>192</td></tr><tr><td>240 min Summer</td><td>13.734</td><td>23.5</td><td>250</td></tr><tr><td>360 min Summer</td><td>10.201</td><td>25.2</td><td>370</td></tr><tr><td>480 min Summer</td><td>8.260</td><td>26.1</td><td>488</td></tr><tr><td>600 min Summer</td><td>7.008</td><td>26.5</td><td>606</td></tr><tr><td>720 min Summer</td><td>6.125</td><td>26.6</td><td>724</td></tr><tr><td>960 min Summer</td><td>4.949</td><td>26.3</td><td>942</td></tr><tr><td>1440 min Summer</td><td>3.659</td><td>25.3</td><td>1166</td></tr><tr><td>2160 min Summer</td><td>2.701</td><td>24.0</td><td>1548</td></tr><tr><td>2880 min Summer</td><td>2.176</td><td>22.6</td><td>1964</td></tr><tr><td>4320 min Summer</td><td>1.602</td><td>19.8</td><td>2776</td></tr><tr><td>5760 min Summer</td><td>1.288</td><td>17.0</td><td>3584</td></tr><tr><td>7200 min Summer</td><td>1.088</td><td>14.3</td><td>4376</td></tr><tr><td>8640 min Summer</td><td>0.947</td><td>11.7</td><td>5112</td></tr><tr><td>10080 min Summer</td><td>0.843</td><td>9.4</td><td>5856</td></tr><tr><td>15 min Winter</td><td>83.344</td><td>9.3</td><td>32</td></tr></tbody></table> |               |                          |                        |                                                                                     |        | Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status | 15 min Summer | 84.908 | 24.008 | 0.3 | 10.9 | FL00D | 30 min Summer | 84.912 | 24.012 | 0.3 | 14.6 | FL00D | 60 min Summer | 84.916 | 24.016 | 0.3 | 18.6 | FL00D | 120 min Summer | 84.920 | 24.020 | 0.3 | 22.7 | FL00D | 180 min Summer | 84.922 | 24.022 | 0.3 | 25.0 | FL00D | 240 min Summer | 84.923 | 24.023 | 0.3 | 26.4 | FL00D | 360 min Summer | 84.925 | 24.025 | 0.3 | 28.1 | FL00D | 480 min Summer | 84.926 | 24.026 | 0.3 | 29.1 | FL00D | 600 min Summer | 84.927 | 24.027 | 0.3 | 29.5 | FL00D | 720 min Summer | 84.927 | 24.027 | 0.3 | 29.6 | FL00D | 960 min Summer | 84.926 | 24.026 | 0.3 | 29.3 | FL00D | 1440 min Summer | 84.925 | 24.025 | 0.3 | 28.3 | FL00D | 2160 min Summer | 84.924 | 24.024 | 0.3 | 26.9 | FL00D | 2880 min Summer | 84.923 | 24.023 | 0.3 | 25.6 | FL00D | 4320 min Summer | 84.920 | 24.020 | 0.3 | 22.8 | FL00D | 5760 min Summer | 84.917 | 24.017 | 0.3 | 20.0 | FL00D | 7200 min Summer | 84.914 | 24.014 | 0.3 | 17.2 | FL00D | 8640 min Summer | 84.912 | 24.012 | 0.3 | 14.7 | FL00D | 10080 min Summer | 84.909 | 24.009 | 0.3 | 12.3 | FL00D | 15 min Winter | 84.909 | 24.009 | 0.3 | 12.3 | FL00D | Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) | 15 min Summer | 83.344 | 8.0 | 32 | 30 min Summer | 55.879 | 11.7 | 45 | 60 min Summer | 35.949 | 15.7 | 74 | 120 min Summer | 22.481 | 19.7 | 132 | 180 min Summer | 16.899 | 22.0 | 192 | 240 min Summer | 13.734 | 23.5 | 250 | 360 min Summer | 10.201 | 25.2 | 370 | 480 min Summer | 8.260 | 26.1 | 488 | 600 min Summer | 7.008 | 26.5 | 606 | 720 min Summer | 6.125 | 26.6 | 724 | 960 min Summer | 4.949 | 26.3 | 942 | 1440 min Summer | 3.659 | 25.3 | 1166 | 2160 min Summer | 2.701 | 24.0 | 1548 | 2880 min Summer | 2.176 | 22.6 | 1964 | 4320 min Summer | 1.602 | 19.8 | 2776 | 5760 min Summer | 1.288 | 17.0 | 3584 | 7200 min Summer | 1.088 | 14.3 | 4376 | 8640 min Summer | 0.947 | 11.7 | 5112 | 10080 min Summer | 0.843 | 9.4 | 5856 | 15 min Winter | 83.344 | 9.3 | 32 |
| Storm Event                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |  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| 15 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| 30 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| 60 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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                                                  | FL00D  |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |  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| 120 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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                                                  | FL00D  |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |  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| 180 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 84.922        | 24.022                   | 0.3                    | 25.0                                                                                | FL00D  |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                  |        |        |     |      |       |               |        |        |     |      |       |             |              |                     |                  |               |        |     |    |               |        |      |    |               |        |      |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 240 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 84.923        | 24.023                   | 0.3                    | 26.4                                                                                | FL00D  |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                  |        |        |     |      |       |               |        |        |     |      |       |             |              |                     |                  |               |        |     |    |               |        |      |    |               |        |      |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 360 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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                                                  | FL00D  |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                  |        |        |     |      |       |               |        |        |     |      |       |             |              |                     |                  |               |        |     |    |               |        |      |    |               |        |      |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 480 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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                                                  | FL00D  |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                  |        |        |     |      |       |               |        |        |     |      |       |             |              |                     |                  |               |        |     |    |               |        |      |    |               |        |      |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 600 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 84.927        | 24.027                   | 0.3                    | 29.5                                                                                | FL00D  |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                  |        |        |     |      |       |               |        |        |     |      |       |             |              |                     |                  |               |        |     |    |               |        |      |    |               |        |      |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 720 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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                                                  | FL00D  |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                  |        |        |     |      |       |               |        |        |     |      |       |             |              |                     |                  |               |        |     |    |               |        |      |    |               |        |      |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 960 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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                                                  | FL00D  |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                  |        |        |     |      |       |               |        |        |     |      |       |             |              |                     |                  |               |        |     |    |               |        |      |    |               |        |      |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 1440 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 84.925        | 24.025                   | 0.3                    | 28.3                                                                                | FL00D  |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                  |        |        |     |      |       |               |        |        |     |      |       |             |              |                     |                  |               |        |     |    |               |        |      |    |               |        |      |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 2160 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 84.924        | 24.024                   | 0.3                    | 26.9                                                                                | FL00D  |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                  |        |        |     |      |       |               |        |        |     |      |       |             |              |                     |                  |               |        |     |    |               |        |      |    |               |        |      |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 2880 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 84.923        | 24.023                   | 0.3                    | 25.6                                                                                | FL00D  |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                  |        |        |     |      |       |               |        |        |     |      |       |             |              |                     |                  |               |        |     |    |               |        |      |    |               |        |      |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 4320 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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                                                  | FL00D  |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                  |        |        |     |      |       |               |        |        |     |      |       |             |              |                     |                  |               |        |     |    |               |        |      |    |               |        |      |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 5760 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 84.917        | 24.017                   | 0.3                    | 20.0                                                                                | FL00D  |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                  |        |        |     |      |       |               |        |        |     |      |       |             |              |                     |                  |               |        |     |    |               |        |      |    |               |        |      |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 7200 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 84.914        | 24.014                   | 0.3                    | 17.2                                                                                | FL00D  |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                  |        |        |     |      |       |               |        |        |     |      |       |             |              |                     |                  |               |        |     |    |               |        |      |    |               |        |      |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 8640 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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                                                  | FL00D  |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                  |        |        |     |      |       |               |        |        |     |      |       |             |              |                     |                  |               |        |     |    |               |        |      |    |               |        |      |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 10080 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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                                                  | FL00D  |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |  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 |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 15 min Winter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| Storm Event                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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| 15 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| 30 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| 60 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| 120 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| 180 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| 240 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| 360 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| 480 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| 600 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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 |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 720 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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               |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                  |        |        |     |      |       |               |        |        |     |      |       |             |              |                     |                  |               |        |     |    |               |        |      |    |               |        |      |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 960 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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               |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                  |        |        |     |      |       |               |        |        |     |      |       |             |              |                     |                  |               |        |     |    |               |        |      |    |               |        |      |    |                |        |      |     |                |        |      |     |                |        |      |     |                |        |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                |       |      |     |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |      |      |                 |       |     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| 1440 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| 2160 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| 2880 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| 4320 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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 |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 5760 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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 |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 7200 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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 |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 8640 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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                                                  |        |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |  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 |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 10080 min Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0.843         | 9.4                      | 5856                   |                                                                                     |        |             |               |               |                        |                 |        |               |        |        |     |      |       |               |        |        |     |      |       |               |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |                 |        |        |     |      |       |  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 |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
| 15 min Winter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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 |      |                 |       |      |      |                  |       |     |      |               |        |     |    |
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 |      |                 |       |      |      |                  |       |     |      |               |        |     |    |

|                                                     |               |                          |                        |                                                                                     |        |
|-----------------------------------------------------|---------------|--------------------------|------------------------|-------------------------------------------------------------------------------------|--------|
| Curtins Consulting Ltd                              |               |                          |                        | Page 2                                                                              |        |
| .                                                   |               |                          |                        |  |        |
| .                                                   |               |                          |                        |                                                                                     |        |
| .                                                   |               |                          |                        |                                                                                     |        |
| Date 21/10/2016 16:10                               |               | Designed by pennington_p |                        |                                                                                     |        |
| File W Shared Space-1BH.srcx                        |               | Checked by               |                        |                                                                                     |        |
| XP Solutions                                        |               | Source Control 2016.1    |                        |                                                                                     |        |
| Summary of Results for 30 year Return Period (+30%) |               |                          |                        |                                                                                     |        |
| Storm Event                                         | Max Level (m) | Max Depth (m)            | Max Infiltration (l/s) | Max Volume (m³)                                                                     | Status |
| 30 min Winter                                       | 84.914        | 24.014                   | 0.3                    | 16.5                                                                                | FLOOD  |
| 60 min Winter                                       | 84.918        | 24.018                   | 0.3                    | 21.0                                                                                | FLOOD  |
| 120 min Winter                                      | 84.923        | 24.023                   | 0.3                    | 25.7                                                                                | FLOOD  |
| 180 min Winter                                      | 84.925        | 24.025                   | 0.3                    | 28.4                                                                                | FLOOD  |
| 240 min Winter                                      | 84.927        | 24.027                   | 0.3                    | 30.2                                                                                | FLOOD  |
| 360 min Winter                                      | 84.929        | 24.029                   | 0.3                    | 32.3                                                                                | FLOOD  |
| 480 min Winter                                      | 84.931        | 24.031                   | 0.3                    | 33.6                                                                                | FLOOD  |
| 600 min Winter                                      | 84.931        | 24.031                   | 0.3                    | 34.4                                                                                | FLOOD  |
| 720 min Winter                                      | 84.932        | 24.032                   | 0.3                    | 34.8                                                                                | FLOOD  |
| 960 min Winter                                      | 84.932        | 24.032                   | 0.3                    | 34.9                                                                                | FLOOD  |
| 1440 min Winter                                     | 84.931        | 24.031                   | 0.3                    | 33.7                                                                                | FLOOD  |
| 2160 min Winter                                     | 84.929        | 24.029                   | 0.3                    | 31.7                                                                                | FLOOD  |
| 2880 min Winter                                     | 84.927        | 24.027                   | 0.3                    | 29.7                                                                                | FLOOD  |
| 4320 min Winter                                     | 84.922        | 24.022                   | 0.3                    | 25.3                                                                                | FLOOD  |
| 5760 min Winter                                     | 84.918        | 24.018                   | 0.3                    | 20.8                                                                                | FLOOD  |
| 7200 min Winter                                     | 84.914        | 24.014                   | 0.3                    | 16.5                                                                                | FLOOD  |
| 8640 min Winter                                     | 84.910        | 24.010                   | 0.3                    | 12.6                                                                                | FLOOD  |
| 10080 min Winter                                    | 84.906        | 24.006                   | 0.3                    | 9.1                                                                                 | FLOOD  |
| Storm Event                                         | Rain (mm/hr)  | Flooded Volume (m³)      | Time-Peak (mins)       |                                                                                     |        |
| 30 min Winter                                       | 55.879        | 13.5                     | 45                     |                                                                                     |        |
| 60 min Winter                                       | 35.949        | 18.0                     | 74                     |                                                                                     |        |
| 120 min Winter                                      | 22.481        | 22.7                     | 130                    |                                                                                     |        |
| 180 min Winter                                      | 16.899        | 25.4                     | 188                    |                                                                                     |        |
| 240 min Winter                                      | 13.734        | 27.2                     | 248                    |                                                                                     |        |
| 360 min Winter                                      | 10.201        | 29.3                     | 364                    |                                                                                     |        |
| 480 min Winter                                      | 8.260         | 30.6                     | 478                    |                                                                                     |        |
| 600 min Winter                                      | 7.008         | 31.4                     | 594                    |                                                                                     |        |
| 720 min Winter                                      | 6.125         | 31.8                     | 708                    |                                                                                     |        |
| 960 min Winter                                      | 4.949         | 31.9                     | 932                    |                                                                                     |        |
| 1440 min Winter                                     | 3.659         | 30.7                     | 1348                   |                                                                                     |        |
| 2160 min Winter                                     | 2.701         | 28.7                     | 1676                   |                                                                                     |        |
| 2880 min Winter                                     | 2.176         | 26.7                     | 2140                   |                                                                                     |        |
| 4320 min Winter                                     | 1.602         | 22.3                     | 3036                   |                                                                                     |        |
| 5760 min Winter                                     | 1.288         | 17.8                     | 3872                   |                                                                                     |        |
| 7200 min Winter                                     | 1.088         | 13.5                     | 4688                   |                                                                                     |        |
| 8640 min Winter                                     | 0.947         | 9.6                      | 5448                   |                                                                                     |        |
| 10080 min Winter                                    | 0.843         | 6.2                      | 6152                   |                                                                                     |        |
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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------|----------------|-------------|---------------|-----|-----------------------|----|-------------|-------|--------|-------------------|-------------|-------|------------|--------|-----------------------|----|---------|-------|----------------------|-------|---------------|-----|------------------|-----|-----------------------------|---|-------------------------|-----|-----------------------------|-----|--------------------------------|-------|-------------|-----------|-------------|-----------|-------------|-----------|-------|-----|-------|-----|-------|-----|---|---|-------|---|---|-------|--|--|--|--|---|----|--|--|--|--|--|-------|
| .<br>.<br>.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |  |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Date 21/10/2016 16:10<br>File W Shared Space-1BH.srcx                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |                                                                                     |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Designed by pennington_p<br>Checked by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |                                                                                     |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                   | Source Control 2016.1                                                               |                |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| <p align="center"><u>Rainfall Details</u></p> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Return Period (years)</td> <td>30</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>18.000</td> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Ratio R</td> <td>0.336</td> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> <td>Climate Change %</td> <td>+30</td> </tr> </table> <p align="center"><u>Pipe Network</u></p> <table> <tr> <td>Volume in Pipe Network (m³)</td> <td>3</td> <td>Dia of Outfall Pipe (m)</td> <td>0.2</td> </tr> <tr> <td>Slope of Outfall Pipe (1:X)</td> <td>175</td> <td>Roughness of Outfall Pipe (mm)</td> <td>0.600</td> </tr> </table> <p align="center"><u>Time Area Diagram</u></p> <p align="center">Total Area (ha) 0.073</p> <table> <thead> <tr> <th>Time (mins)</th> <th>Area (ha)</th> <th>Time (mins)</th> <th>Area (ha)</th> <th>Time (mins)</th> <th>Area (ha)</th> </tr> <tr> <th>From:</th> <th>To:</th> <th>From:</th> <th>To:</th> <th>From:</th> <th>To:</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>4</td> <td>0.024</td> <td>4</td> <td>8</td> <td>0.024</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>8</td> <td>12</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td>0.024</td> </tr> </tbody> </table> |                   |                                                                                     | Rainfall Model | FSR         | Winter Storms | Yes | Return Period (years) | 30 | Cv (Summer) | 0.750 | Region | England and Wales | Cv (Winter) | 0.840 | M5-60 (mm) | 18.000 | Shortest Storm (mins) | 15 | Ratio R | 0.336 | Longest Storm (mins) | 10080 | Summer Storms | Yes | Climate Change % | +30 | Volume in Pipe Network (m³) | 3 | Dia of Outfall Pipe (m) | 0.2 | Slope of Outfall Pipe (1:X) | 175 | Roughness of Outfall Pipe (mm) | 0.600 | Time (mins) | Area (ha) | Time (mins) | Area (ha) | Time (mins) | Area (ha) | From: | To: | From: | To: | From: | To: | 0 | 4 | 0.024 | 4 | 8 | 0.024 |  |  |  |  | 8 | 12 |  |  |  |  |  | 0.024 |
| Rainfall Model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | FSR               | Winter Storms                                                                       | Yes            |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 30                | Cv (Summer)                                                                         | 0.750          |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Region                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | England and Wales | Cv (Winter)                                                                         | 0.840          |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| M5-60 (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 18.000            | Shortest Storm (mins)                                                               | 15             |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Ratio R                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0.336             | Longest Storm (mins)                                                                | 10080          |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Summer Storms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Yes               | Climate Change %                                                                    | +30            |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Volume in Pipe Network (m³)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 3                 | Dia of Outfall Pipe (m)                                                             | 0.2            |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Slope of Outfall Pipe (1:X)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 175               | Roughness of Outfall Pipe (mm)                                                      | 0.600          |             |               |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| Time (mins)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Area (ha)         | Time (mins)                                                                         | Area (ha)      | Time (mins) | Area (ha)     |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| From:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | To:               | From:                                                                               | To:            | From:       | To:           |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
| 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4                 | 0.024                                                                               | 4              | 8           | 0.024         |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |                                                                                     |                | 8           | 12            |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |                                                                                     |                |             | 0.024         |     |                       |    |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |                             |   |                         |     |                             |     |                                |       |             |           |             |           |             |           |       |     |       |     |       |     |   |   |       |   |   |       |  |  |  |  |   |    |  |  |  |  |  |       |
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|                                                       |                                        |                                                                                     |
|-------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|
| Curtins Consulting Ltd                                |                                        | Page 4                                                                              |
| .<br>.<br>.                                           |                                        |  |
| Date 21/10/2016 16:10<br>File W Shared Space-1BH.srcx | Designed by pennington_p<br>Checked by |                                                                                     |
| XP Solutions Source Control 2016.1                    |                                        |                                                                                     |

Model Details

Storage is Online Cover Level (m) 84.900

Deep Bore Soakaway Structure

Chamber Invert Level (m) 82.900 Infiltration Coefficient Base (m/hr) 0.18000  
 Chamber Diameter/Width (m) 1.200 Safety Factor 2.0  
 Borehole Diameter (m) 0.200  
 Borehole Depth (m) 22.000

| Side          | Side           | Side           |
|---------------|----------------|----------------|
| Depth Infil.  | Depth Infil.   | Depth Infil.   |
| (m) Coef.     | (m) Coef.      | (m) Coef.      |
| (m/hr)        | (m/hr)         | (m/hr)         |
| 0.000 0.18000 | 16.000 0.00000 | 22.000 0.00000 |

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| SUMMARY TABLE                         |                                                                                     | DESIGN CONDITIONS                                                                                                                                                                                                                                                                                                                                                                                                                                             |   |   |   |
|---------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|
|                                       |                                                                                     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2 | 3 | 4 |
| Land Use Type                         | Plus private Drives                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| Pollution Hazard Level                | Low                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| Pollution Hazard Indices              |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| TSS                                   | 0.5                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| Metals                                | 0.4                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| Hydrocarbons                          | 0.4                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| SuDS components proposed              |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| Component 1                           | Swale                                                                               | SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B                                                                                                                                                                                                               |   |   |   |
| Component 2                           | Bioretention system (where the system is not designed as an infiltration component) |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| Component 3                           | None                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| SuDS Pollution Mitigation Indices     |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| TSS                                   | 0.9                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| Metals                                | >0.95                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| Hydrocarbons                          | >0.95                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| Groundwater protection type           | None                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| Groundwater protection                |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| Pollution Mitigation Indices          |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| TSS                                   | 0                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| Metals                                | 0                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| Hydrocarbons                          | 0                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| Combined Pollution Mitigation Indices |                                                                                     | 0.9 Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England |   |   |   |
| TSS                                   | >0.95                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| Metals                                | >0.95                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| Hydrocarbons                          | >0.95                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| Acceptability of Pollution Mitigation |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| TSS                                   | Sufficient                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| Metals                                | Sufficient                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |
| Hydrocarbons                          | Sufficient                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |

| SUMMARY TABLE                         |                                                                                     | DESIGN CONDITIONS                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |   |   |
|---------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|
|                                       |                                                                                     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2 | 3 | 4 |
| Land Use Type                         | Plus private Drives                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Pollution Hazard Level                | Low                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Pollution Hazard Indices              |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| TSS                                   | 0.5                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Metals                                | 0.4                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Hydrocarbons                          | 0.4                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| SuDS components proposed              |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Component 1                           | Pervious pavement (where the pavement is not designed as an infiltration component) | SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B                                                                                                                                                                                                           |   |   |   |
| Component 2                           | Detention basin                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Component 3                           | None                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| SuDS Pollution Mitigation Indices     |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| TSS                                   | 0.95                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Metals                                | 0.85                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Hydrocarbons                          | >0.95                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Groundwater protection type           | None                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Groundwater protection                |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Pollution Mitigation Indices          |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| TSS                                   | 0                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Metals                                | 0                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Hydrocarbons                          | 0                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Combined Pollution Mitigation Indices |                                                                                     | Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England |   |   |   |
| TSS                                   | 0.95                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Metals                                | 0.85                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Hydrocarbons                          | >0.95                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Acceptability of Pollution Mitigation |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| TSS                                   | Sufficient                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Metals                                | Sufficient                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Hydrocarbons                          | Sufficient                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |

| SUMMARY TABLE                         |                                                                                     | DESIGN CONDITIONS                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |   |   |
|---------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|
|                                       |                                                                                     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2 | 3 | 4 |
| Land Use Type                         | Plus private Drives                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Pollution Hazard Level                | Low                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Pollution Hazard Indices              |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| TSS                                   | 0.5                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Metals                                | 0.4                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Hydrocarbons                          | 0.4                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| SuDS components proposed              |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Component 1                           | Pervious pavement (where the pavement is not designed as an infiltration component) | SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B                                                                                                                                                                                                           |   |   |   |
| Component 2                           | None                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Component 3                           | None                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| SuDS Pollution Mitigation Indices     |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| TSS                                   | 0.7                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Metals                                | 0.6                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Hydrocarbons                          | 0.7                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Groundwater protection type           | None                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Groundwater protection                |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Pollution Mitigation Indices          |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| TSS                                   | 0                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Metals                                | 0                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Hydrocarbons                          | 0                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Combined Pollution Mitigation Indices |                                                                                     | Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England |   |   |   |
| TSS                                   | 0.7                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Metals                                | 0.6                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Hydrocarbons                          | 0.7                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Acceptability of Pollution Mitigation |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| TSS                                   | Sufficient                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Metals                                | Sufficient                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |
| Hydrocarbons                          | Sufficient                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |

**Appendix E    Correspondences with Wrexham County Borough Council**

**From:** Peter Douthwaite <Peter.Douthwaite@wrexham.gov.uk>  
**Sent:** 19 July 2016 14:51  
**To:** Paul Pennington  
**Cc:** Neil Taunt  
**Subject:** RE: Home Farm, Llay Development Planning App Ref: P/2014/0905

Paul

Our area Engineer responsible for the adoption of highways has made the following response:

*I have several concerns about the use of pervious materials for draining surface water run off from carriageways.*

*They are :-*

- 1) The open textured nature of the surface material will silt up with time and impair the effectiveness of the material. Conventional sweeping will not rectify the situation and therefore the road will fail over time resulting in flooding of the carriageway.*
- 2) The water within the porous layers will freeze during harsh winters and will have an effect on both the life of the surface course and render the surface icy during such conditions as it is unlikely that the roads which are constructed of this material will not make the gritting routes.*
- 3) The open porous texture of the material does not lend itself to providing a long lifecycle.*
- 4) The use of sub-base layers for storage of the run off does question the structural integrity of the road and whether the road would be subject to settlement or heave over time.*

*Based on the above I would refuse their request to use this process and encourage them to utilise an alternative highway drainage system which can be maintained.*

Regards

Pete Douthwaite  
Senior Development Control Engineer Uwch Beiriannydd Rheoli Datblygu

01978 729689

\* Wrexham County Borough Council, Environment Department, Abbey Road South, Wrexham Industrial Estate LL13 9PW

\* Cyngor Bwrdeistref Sirol Wrecsam, Adran yr Amgylchedd, Ffordd Abaty De, Ystâd Ddiwydiannol Wrecsam, LL13 9PW

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**From:** Paul Pennington [<mailto:Paul.Pennington@curtins.com>]  
**Sent:** 18 July 2016 11:04  
**To:** Peter Douthwaite  
**Subject:** RE: Home Farm, Llay Development Planning App Ref: P/2014/0905

Thanks Pete, I thought I'd best check.

Also I have 2 specific adoption queries that Neil stated you would be better place to answer:

1. Will WCBC adopt pervious asphalt paving in the highway (full or partial i.e. not at junctions)
2. If not will WCBC adopt a reservoir pavement system (i.e. impervious asphalt over a type 3 porous subbase storage layer, with some other system to get run-off into the storage layer)

I look forward to receiving your responses.

Regards

**Paul Pennington** Principal Engineer

**Curtins**

T. 0151 726 2000 | [paul.pennington@curtins.com](mailto:paul.pennington@curtins.com)

---

**From:** Peter Douthwaite [<mailto:Peter.Douthwaite@wrexham.gov.uk>]

**Sent:** 15 July 2016 16:30

**To:** Paul Pennington <[Paul.Pennington@curtins.com](mailto:Paul.Pennington@curtins.com)>

**Subject:** RE: Home Farm, Llay Development Planning App Ref: P/2014/0905

Paul

The highway drainage system must discharge into a system which is maintained by either the Council or by Welsh Water – we will not adopt any highway drainage system that discharges into a privately owned system.

Regards

Pete

---

**From:** Paul Pennington [<mailto:Paul.Pennington@curtins.com>]

**Sent:** 15 July 2016 09:48

**To:** Peter Douthwaite

**Subject:** RE: Home Farm, Llay Development Planning App Ref: P/2014/0905

Peter

Thanks for the quick response, just to clarify your response to the first query below. If the highway drainage were to be collected and then discharged to a private owned and maintained attenuation pond/ basin with borehole discharge so that the limit of the WCBC's responsibility ended at the highway boundary, would this be acceptable to WCBC? Or would the highway drainage system require a totally separate up to the point of discharge to ground?

Regards

**Paul Pennington** Principal Engineer

**Curtins**

T. 0151 726 2000 | [paul.pennington@curtins.com](mailto:paul.pennington@curtins.com)

---

**From:** Peter Douthwaite [<mailto:Peter.Douthwaite@wrexham.gov.uk>]

**Sent:** 15 July 2016 09:04

**To:** Paul Pennington <[Paul.Pennington@curtins.com](mailto:Paul.Pennington@curtins.com)>  
**Cc:** Neil Taunt <[Neil.Taunt@wrexham.gov.uk](mailto:Neil.Taunt@wrexham.gov.uk)>  
**Subject:** RE: Home Farm, Llay Development Planning App Ref: P/2014/0905

Paul

In response to your email;

- Will the Borough Council require the adopted highway drainage system to be kept entirely separate from the private SuDS, or will the council be prepared to adopt a drainage system that also serves the private housing?

Wrexham CBC will only adopt highway drainage – all private drainage will need to enter a separate system

- What types of SuDS devices are the council prepared to adopt and maintain e.g. Pervious Pavements/ Reservoir Pavements, Standard Road gullies with propriety treatment devices or treatment channels, filter strips, swales, attenuation basins, detention ponds, interceptors, below ground storage structures (pipe, arch or geocellular), borehole soakaways (see typical detail below) etc.

WCBC have no policy on the adoption of SuDS devices but we are willing to consider any sensible proposals; we will take commuted sum payments for future maintenance of any SuDS device we agree to adopt. All SuDS features associated with the drainage of the highway would need to be included in the adopted highway area.

You should discuss any SuDS proposals with WCBC Senior Flood Management Officer Neil Taunt [neil.taunt@wrexham.gov.uk](mailto:neil.taunt@wrexham.gov.uk)

Regards

Pete Douthwaite  
Senior Development Control Engineer Uwch Beiriannydd Rheoli Datblygu

01978 729689

\* Wrexham County Borough Council, Environment Department, Abbey Road South, Wrexham Industrial Estate LL13 9PW

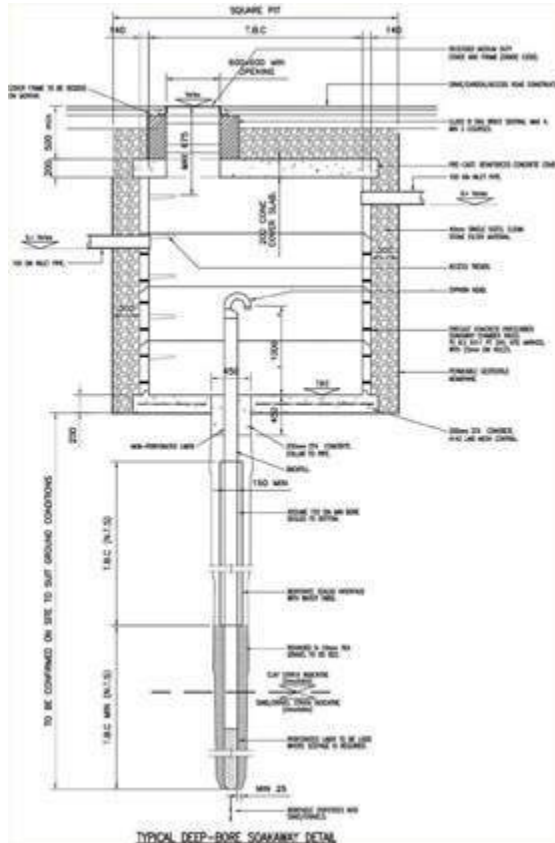
\* Cyngor Bwrdeistref Sirol Wrecsam, Adran yr Amgylchedd, Ffordd Abaty De, Ystâd Ddiwydiannol Wrecsam, LL13 9PW

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**From:** Paul Pennington [<mailto:Paul.Pennington@curtins.com>]  
**Sent:** 13 July 2016 12:19  
**To:** Peter Douthwaite  
**Cc:** Tim Bingham  
**Subject:** Home Farm, Llay Development Planning App Ref: P/2014/0905

Peter



Please can you pass these queries on to the relevant council officer (if it is not yourself). If you or have any queries regarding the above please contact me at the contact details below to discuss the proposals.

Regards

Click here

**Paul Pennington**  
**Principal Engineer**  
T. 0151 726 2000  
[paul.pennington@curtins.com](mailto:paul.pennington@curtins.com)

Liverpool L3 4DB

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