

Our ref: 7956_FCA

Flood Consequences Assessment
and Drainage Strategy

for

Land off Mold Road

Gwersyllt, Wrexham

For : Castle Green Homes Ltd
Unit 20, St Asaph Business Park
St Asaph
Denbighshire
LL17 0LJ

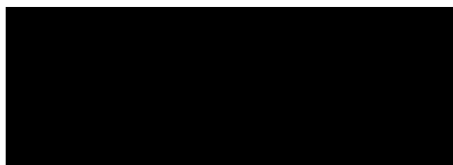
18th September 2026

Flood Consequences Assessment and Drainage Strategy
for Land Off Mold Road, Gwersyllt, Wrexham

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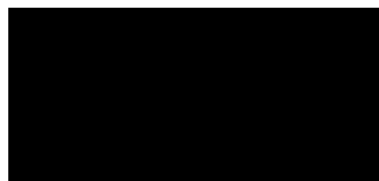
Prepared by



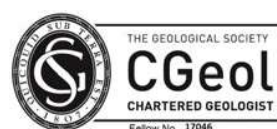
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Checked and Approved



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Document Revision

Report Reference	Date	Description	Prepared	Checked and Approved
7956_FCA_Issue 9	18/09/2025	Flood Consequences Assessment	A Jones	P R Sykes

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1.0 Introduction

Coopers (Chester) Ltd, (Coopers) have been appointed by Castle Green Homes Ltd to assess the risk of flooding and to provide a Drainage Strategy for a site off Mold Road in Gwersyllt, Wrexham. Castle Green Homes Ltd are proposing a new housing development, comprising of approximately 83 No. dwellings.

Castle Green Homes Ltd are planning the construction of a mixture of semi-detached and detached residential properties with associated access road, parking, vehicular access and landscaping subject to conditions. It is understood the site does not currently benefit from any planning decision.

This flood consequences assessment (FCA) evaluates the proposals with regards to flood risk, identifying and appraising potential flood risk both to and from the whole site. Coopers have carried out the following:

- i. Assessment of the development potential of the site in line with the Welsh Government's Technical Advice Note 15: Development and Flood Risk (TAN15) and;
- ii. An assessment of surface water runoff and drainage strategy

Since January 7th, 2019, all new developments will require sustainable drainage for surface water if there are at least 2 No. properties or the construction area is more than 100sq.m. The surface water drainage systems must be designed and built to meet Welsh Government standards for sustainable drainage.

These systems must be approved by the local authority acting in its SuDS Approving Body (SAB) role before construction work begins. The SAB will have a duty to adopt compliant systems.

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2.0 Site Characteristics

2.1 Site Location

The site is a parcel of agricultural land in Gwersyllt, Wrexham. The site is situated off Mold Road at approximate grid reference SJ322525.

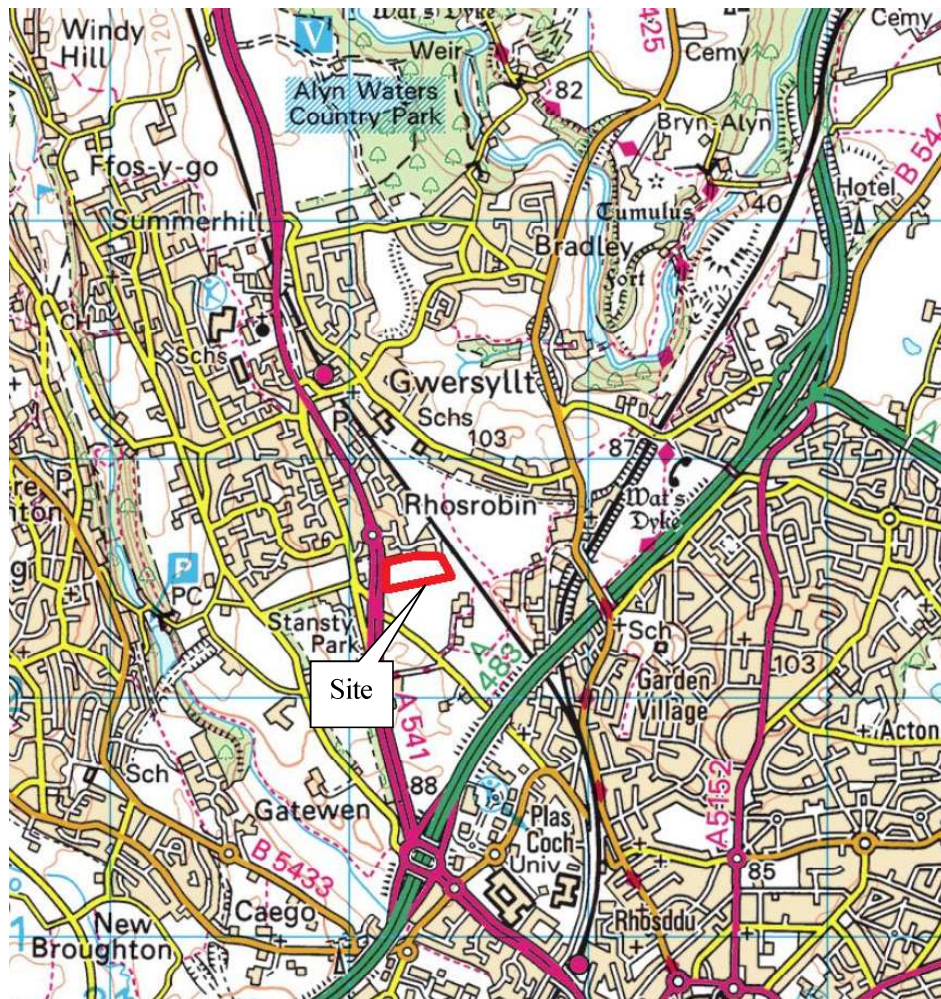


Figure 1 – Site Location

2.2 Site Description

The site covers an area of 3.13 Hectares and consists of a single agricultural field.

The topography of the site varies from a highpoint of 95.5m AOD at the western end of the site, which falls to 84.5m AOD to the east. Refer to topographical survey in Appendix 1.

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3.0 Sources of Flood Risk Information

3.1 The Welsh Government Development Advice Map

The Welsh Government Development Advice Map shows the site is located within Flood Zone A – an area considered to be at little or no risk of fluvial or tidal flooding, with a less than 1 in 1000 (0.1%) annual probability of flooding in any given year.

The proposed residential development is considered to be a ‘highly vulnerable’ development in accordance with Figure 2 of the Welsh Governments Technical Advice Note 15. Highly vulnerable development is considered to be appropriate within Flood Zone A.

3.2 Natural Resources Wales

The NRW Flood Map shows the site is located within Flood Zone 1 – an area considered to have the lowest probability of fluvial flooding. It is assessed as having a less than 0.1% annual probability of flooding in any given year.

It should be noted that the Flood Map only covers flooding from rivers and the sea. Flooding can occur at any time and in any place from sources such as rising groundwater levels, burst water mains, blocked road drains, run-off from hillsides, sewer overflows, etc.



Figure 2 – Natural Resources Wales Flood Map for Planning (River and Sea)

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The Natural Resources Wales long term flood risk map indicates the site has a low risk of flooding from Surface Water. There is a depression of approximately 0.5m deep located towards the eastern end of site which is currently shown to be at risk of surface water flooding. This is only taking flows from within the site and will be mitigated by regrading of the site. Post development there will be no surface water flood risk within the site and no increased flood risk outside the site boundary.



Figure 3 – Natural Resources Wales Surface Water Flooding Map

3.3 Wrexham LLFA

The Wrexham County Borough Council Local Flood Risk Management Strategy (June 2014) contains no records of any flooding at or near to the site. WCBC have confirmed they have no information of any known historical flooding within the vicinity of the site. Refer to Appendix 3 correspondence.

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4.0 Sources of Flood Risk

4.1 Fluvial

Extreme fluvial flood events have the potential to cause rapid inundation of the site whilst posing a threat to welfare and users. As outlined in Section 3.2; the site is within Flood Zone 1 and is therefore not at risk from extreme fluvial or tidal flooding. Therefore, the risk from extreme fluvial flooding to the site is considered to be low.

4.2 Infrastructure Failure (Existing and Proposed)

The failure of infrastructure such as culverts or bridges could increase the risk of flooding at the site. The risk of flooding is considered as very low.

4.3 Overland Flow

Overland flow occurs when the infiltration capacity of the ground is exceeded in a storm event. This can result in water travelling as a sheet flow overland or excess water being conveyed from location to another via local road networks. Due to the topography of the site sloping to the southern end of the site and the road layout / proposed public open space, overland flow is not considered a significant risk. Overland flows from the site will be significantly reduced post development with the incorporation of positive drainage and an internal road network.

4.4 Sewer Flooding

If the capacity of the sewers is exceeded in an extreme event, or a blockage occurs, surcharging of the network can result in surface flooding. Welsh Water sewer plans which are included in Appendix 3, indicate that there are currently no existing adopted sewers located within the site boundary.

We have requested any information Welsh Water may have on any known flooding within the vicinity of the site and are currently waiting for a response.

The overall risk from sewer flooding is considered as low.

4.5 Groundwater Flooding

Groundwater flooding occurs as a result of water rising up from the underlying superficial deposits, bedrock or from springs.

The Envirocheck Flood Report identifies the western portion of the site as having 'potential for groundwater flooding to occur at surface' according to the BGS Flood Data Map, with the eastern portion of the site having 'limited potential for groundwater flooding to occur. The GeoSmart Groundwater Flood map indicates the majority of the site as being at 'Negligible Risk' of groundwater flooding, and the central portion at 'Low Risk'.

The ground investigation and associated infiltration tests did not encounter any shallow groundwater.

The overall risk from groundwater flooding is considered as low.

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4.6 Coastal Flooding

The site is not located in proximity of any tidal waterway or within close proximity to the sea and is therefore not at risk from tidal inundation.

4.7 Reservoirs

The site is not located in proximity of any reservoirs. Additionally, the NRW maps indicate the site is not at risk of flooding from reservoirs.



Figure 4 – Natural Resources Wales Reservoir Flooding Map

5.0 Surface Water Drainage

5.1 General

The design for a surface water drainage system for the proposed development will be guided by the principles set out in the Welsh Government's 'Recommended non-statutory standards for sustainable drainage (SuDS) in Wales – designing, constructing, operating and maintaining surface water drainage systems' (2017)

The SuDS Standards Wales sets out the following hierarchy for surface water runoff destination:

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- Priority Level 1: Surface water runoff is collected for use;
Priority Level 2: Surface water runoff is infiltrated to ground;
Priority Level 3: Surface water runoff is discharged to a surface water body;
Priority Level 4: Surface water runoff is discharged to a surface water sewer, highway drain, or another drainage system;
Priority Level 5: Surface water runoff is discharged to a combined sewer.

Note that Priority Level 1 is the preferred (highest priority) and that 4 and 5 should only be used in exceptional circumstances.

5.2 Existing Surface Water Drainage

The site does not benefit from any existing drainage and will rely on infiltration and surface water runoff to dispose of surface water flows. The flows will follow topography and will fall in a easterly direction towards the watercourse located outside the site boundary.

5.3 Existing Site Runoff

The greenfield run-off rates for the site have been calculated using the HR Wallingford Greenfield runoff rate estimation tool. The default soil type for this location is 2 which would indicate a freely draining permeable soil (sand / gravel). However, the site investigation and infiltration tests have confirmed the ground conditions as clay and therefore the greenfield runoff calculations have been based on a Soil Type 4.

1-year	= 9.1 l/s
30-year	= 18.3 l/s
100-year	= 22.4 l/s
QBAR	= 10.3 l/s

Refer to Appendix 5 for calculations

5.4 Proposed Surface Water Drainage and Runoff Rates

Priority Level 1

Whilst rainwater harvesting has been considered for the proposed development it should be noted that any device enabling water re-use cannot be taken into account when sizing attenuation as the storage facility may be full when a storm event occurs. Therefore, an overflow to an infiltration device (where ground conditions allow) or to a watercourse / sewer will be required.

Castle Green Homes Ltd are not proposing to incorporate rainwater harvesting within the development; however, they are proposing to install a water butt to each dwelling which will allow for water collection for garden re-use.

Priority Level 2

Local geology mapping and knowledge of nearby sites indicates that there may be some potential for infiltration techniques to dispose of surface water flows from some the development. We understand the St Giles Park development to the north of the site has some plots of the western half draining to private soakaways with the remainder of the development draining to the watercourse along the eastern boundary alongside the railway.

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BGS borehole information available for the surrounding area shows a mix of till / sands and gravels.

Infiltration tests have been undertaken in August 2026 and all 3 test locations failed. Therefore, the site will be unsuitable for infiltration techniques to dispose of surface water flows from the development.

Refer to Appendix 3 for infiltration testing information.

Priority Level 3

The nearest main river is the River Alyn approximately 1.2km to the northeast of the site.

There is an ordinary watercourse flowing in a southeast direction along the eastern site boundary. This runs to the west of the railway and consists of infiltration basins, open watercourses / culverts and serves the 2 developments to the north developed by Morris Homes (St Giles Park) and Redrow Homes (Hardwick Drive). The development site drains towards this watercourse via overland flows as levels on the western end of the site are at 95.5m AOD falling to 84.5m AOD to the east. The greenfield flow rate and volume of surface water currently being passed forward to this watercourse will depend on the soil type and its permeability characteristics.

There is also a watercourse flowing southeast along the southern boundary of the development site. This takes flows from highway drainage from Old Mold Road and the Gower Homes development (Maes Gwyrdd). This watercourse discharges into the ordinary watercourse flowing in a southeast direction along the eastern site boundary.

Refer to topographical survey in Appendix 1 and Coopers Drawing No. 7956/SK01 for details of the existing drainage arrangement.

Priority Level 4

The nearest surface water sewers recorded on the Welsh Water sewer maps are within the St Giles Park development to the north of the development. These are part of a large diameter on-line attenuation system before the flows are passed forward to the ordinary watercourse. A gravity connection into the surface water sewers from the development site will not be achievable.

There will also be a highway drainage network within the A541 (Mold Road) to the west of the development site. However, this is unlikely to provide a gravity connection from surface water flows within the site due to site levels.

As a connection into a higher priority level is possible a connection into the surface water sewer / highway drain should not be considered.

Priority Level 5

The nearest combined sewer is approximately 200m north of the development in Hardwick Drive

(Redrow development). A gravity connection into the surface water sewers from the development site will not be achievable.

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As a connection into a higher priority level is possible a connection into the combined sewer should not be considered.

5.5 SuDS Approval Bodies

Since January 7th, 2019, all new developments will require sustainable drainage for surface water if there are at least 2 No. properties or the construction area is more than 100sq.m. The surface water

drainage systems must be designed and built to meet Welsh Government standards for sustainable drainage.

These systems must be approved by the local authority acting in its SuDS Approving Body (SAB) role before construction work begins. The SAB will have a duty to adopt compliant systems.

Every SuDS application should go to every attempt to satisfy the Principles and Standards of the legislation. When vetting an application, the SAB officer will look at the clear red line boundary area of the site when considering space for SuDS and water management features and not the space that's left on the proposed site layout.

The principles are as follows:

SuDS schemes should aim to:

- 1. manage water on or close to the surface and as close to the source of the runoff as possible;*
- 2. treat rainfall as a valuable natural resource;*
- 3. ensure pollution is prevented at source, rather than relying on the drainage system to treat or intercept it;*
- 4. manage rainfall to help protect people from increased flood risk, and the environment from morphological and associated ecological damage resulting from changes in flow rates, patterns and sediment movement caused by the development;*
- 5. take account of likely future pressures on flood risk, the environment and water resources such as climate change and urban creep;*
- 6. use the SuDS Management Train, using drainage components in series across a site to achieve a robust surface water management system (rather than using a single "end of pipe" feature, such as a pond, to serve the whole development);*
- 7. maximise the delivery of benefits for amenity and biodiversity;*
- 8. seek to make the best use of available land through multifunctional usage of public spaces and the public realm;*
- 9. perform safely, reliably and effectively over the design life of the development taking into account the need for reasonable levels of maintenance;*
- 10. avoid the need for pumping where possible; and*
- 11. be affordable, taking into account both construction and long-term maintenance costs and the additional environmental and social benefits afforded by the system.*

Applicants seeking SAB Approval must demonstrate how they have complied with these principles or provide justification for any departure.

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As noted in 5.4 the ground investigation report and infiltration tests have confirmed the site is unsuitable for infiltration techniques to dispose of surface water flows from the development. Therefore, we are proposing to discharge all surface water to the watercourse.

The surface water strategy presented in Appendix 1 is providing attenuation within a SuDS basin at the end of the network with a hydro brake flow control device to restrict the flows to the QBAR greenfield runoff rate of 10.3 l/s. Additional storage is also providing further up the network within buried cellular crates. This is generally considered to be a 'end of pipe solution' and whilst it complies with standards for quantity it provides limited compliance to other criteria such as water quality,

amenity and biodiversity. Therefore, incorporation of additional source control SuDS components such as water butts, permeable paving and bioretention (tree pits and rain gardens) will need to be considered further at detailed design stage.

5.6 Foul Drainage

We are proposing to discharge all foul flows into the foul gravity network within the St Giles Park development to the north of the development site. However, a gravity connection will not be achievable and therefore a foul pumping station will be required at the eastern (lower) end of the site allowing flows to then be pumped along a rising main to a suitable discharge point within the St Giles Park foul public sewer network, subject to Welsh Water approval.

6.0 Conclusions and Recommendations

The site is located in Flood Zone 1 and has been shown to be at low risk of flooding from rivers, surface water, groundwater, sewers and climate change. Therefore, mitigation measures are not considered necessary for any future development at the site.

All potential sources of flooding have been considered as part of this report. There are no known records of historical flooding at the site.

The site investigation and infiltration tests have confirmed the ground conditions are not suitable for infiltration; therefore, we have developed a strategy based on a restricted discharge to the watercourse.

The surface water strategy presented in Appendix 1 is providing attenuation within a SuDS basin at the end of the network with a hydro brake flow control device to restrict the flows. Additional storage is also providing further up the network within buried cellular crates.

All surface water run-off from highways, roof and private drives will be collected into gravity piped networks, temporarily stored in tanks and a SuDS basin, and will discharge at a restricted rate into the watercourse which mimics the existing situation.

Additional on-site source control components such as permeable paving and bioretention components (tree pits and rain gardens) should be considered further at detailed design stage for compliance with the 5mm interception criteria.

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The design flow rate has been based on greenfield flow rates using confirmed site investigation data and not a theoretical soil type.

The development will increase the impermeable area of the site. This results in an increase in surface water runoff rates and volumes. In order to ensure the increase in runoff will not have an impact elsewhere flow restrictions and on-site attenuation will be incorporated into the design.

The provision of trapped highway gullies, the SUDS detention basin and additional source control components will provide adequate treatment to surface water flows prior to discharge to the watercourse.

All foul sewers should be designed in accordance with Sewers for Adoption 7th Edition / Welsh Ministers Standards and will be subject to S104 Agreement.

A SuDS Maintenance and Management Plan should be produced to outline the activity and frequency of inspections and maintenance works required on any SuDS components subject to SAB Approval / Adoption.

This Flood Consequences Assessment and Drainage Strategy should be submitted to the Local Planning Authority in support of the planning application.

Since January 7th, 2019, all new developments will require sustainable drainage for surface water if there are at least 2 No. properties or the construction area is more than 100sq.m. The surface water drainage systems must be designed and built to meet Welsh Government standards for sustainable drainage.

These systems must be approved by the local authority acting in its SuDS Approving Body (SAB) role before construction work begins. The SAB will have a duty to adopt compliant systems.

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Appendix 1

Reference Drawings

<u>Drawing No.</u>	<u>Revision</u>	<u>Title</u>
B444-00_Figure 01	01	Topographic and GPR Utility Survey
7956 / SK01	J	Drainage Strategy
7956 / SK02	F	Highway and Drainage Longsections
7956 / SK03	F	SW Impermable Areas

Welsh Water Sewer Records

This information is confidential and the copyright property of CWLS Ltd. It is released on the condition that none of this information shall be disclosed or reproduced in whole or part to any third party without prior written consent from CWLS Ltd. Subject to Terms & Conditions a copy of which is available upon request.

Survey Control Markers have been established for Topographic Mapping purposes only and should not be used for Construction or Setting-Out without written approval from CWLS Ltd.

Legend

12	Road Sign	5	PCN Utility Control Station
13	Road Culvert	6	Manhole Cover Circular
14	Lighting Column or Post	7	Manhole Cover Rectangular
15	Block Transformer Pole	8	Red Chained Line
16	Cable Post	9	Red Chained Line
17	Cable	10	Red Trench
18	Tree Large Shrub	11	Vegetation
19	Stands of Vegetation Clusters	12	Vegetation

Station	Easting	Northing	Altitude
1	117 24 175	107 511 216	101.246
2	117 24 175	107 511 216	101.246
3	117 24 175	107 511 216	101.246
4	117 24 175	107 511 216	101.246
5	117 24 175	107 511 216	101.246
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7	117 24 175	107 511 216	101.246
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9	117 24 175	107 511 216	101.246
10	117 24 175	107 511 216	101.246

BURIED ASSETS DETECTED ON SITE:

Assets	Remarks
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97	07/12/21	CW	TB
98	07/12/21	CW	TB
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100	07/12/21	CW	TB

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Client
Castle Green Homes

Job Title
Land off Mold Road
Gwersyllt

Drawing Title
Topographic & GPR
Utility Surveys

Scale at A1
1:500

Plot No
1

Drawing Status
For Information

Job No
B444-00

Drawing No
Figure 01

Issue
01

Quality Level of Utility Survey Outputs

The drawing has been derived from the amalgamation of several data sets: utility service provider buried asset data, field confirmation by way of utility methods, and measuring depth, type and location of services, electromagnetic detection, and GPR scans.

All the data sets have been allocated a 'weighting' based upon the level of accuracy and confidence. The final amalgamation is performed by polynomial rubber sheet distortion of service provider assets plans for a 'best fit' to resemble on-site survey data. We try to do this as close as possible.

The accuracy of the horizontal location of each utility is defined by Table 1 'Quality level of survey outputs PAS 28 (formalised)' for GPR = +/-0.25m or +/-0.5m of detected depth, whichever is greater.

The accuracy of the vertical location of each utility as defined by Table 1 'Quality level of survey outputs PAS 28 (formalised)' for GPR = +/-0.25m of detected depth.

Care should be taken by designers when utilising the findings within this drawing, and should confirm depths to visual confirmation/verification using vacuum excavation or other trench technology. If a higher degree of accuracy is required to meet the design brief specification.

Utility Survey Disclaimers

We have introduced to keep as many buried services as possible using the best available technology (BAT) and applying the best available techniques as defined under guidance from the The Survey Association (ISA) and the British Standard PAS 128 for Utility Surveys.

However, the use of this drawing should be aware that the results found using best available technology are subject to errors and limitations resulting from physical properties of the subsurface which can be a significant limitation to the accuracy of the results. The use of this drawing is subject to the accuracy of the data and the accuracy of the data is subject to the accuracy of the data and the accuracy of the data is subject to the accuracy of the data.

The accuracy of the findings indicated within this drawing cannot be guaranteed or indemnified, and should only be used as a guide as defined by the Health & Safety (Excavations) (HSE) guidance - HSG47.

Lines on this drawing indicating the presence of buried services may actually be indicating the presence of buried services, cables or pipes, therefore the user of this drawing should not assume that a single line is indicative of the nature of services within the area. In addition services below detected utilities may be masked from detection by the shadow cast from shallow depth services.

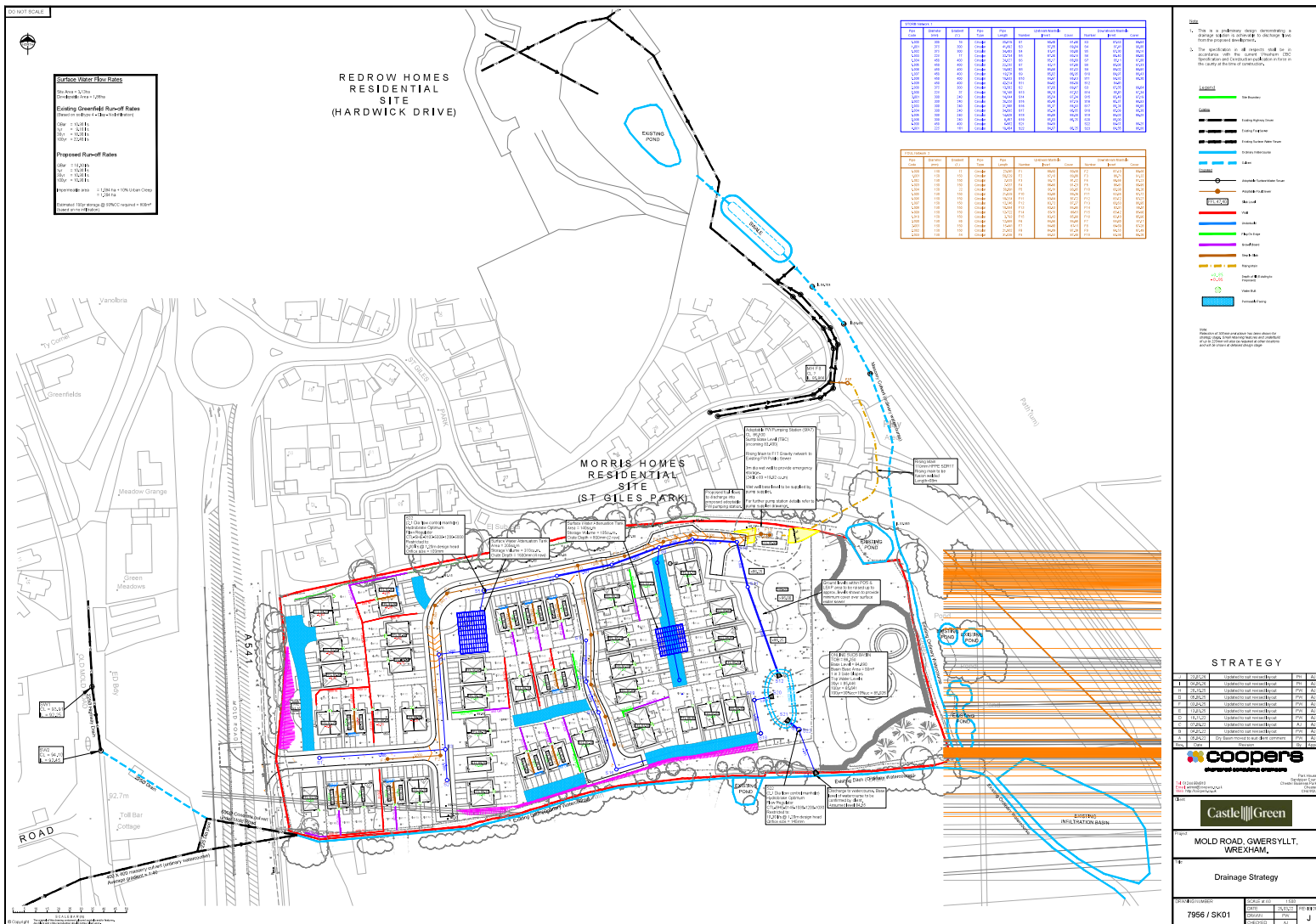
Metal pipes, communication cables and earth bonds can 'distort' electromagnetic fields similar to that of high voltage and low voltage cables under load. If alternative electromagnetic fields are shown proximity from other power cables or sub-stations etc.

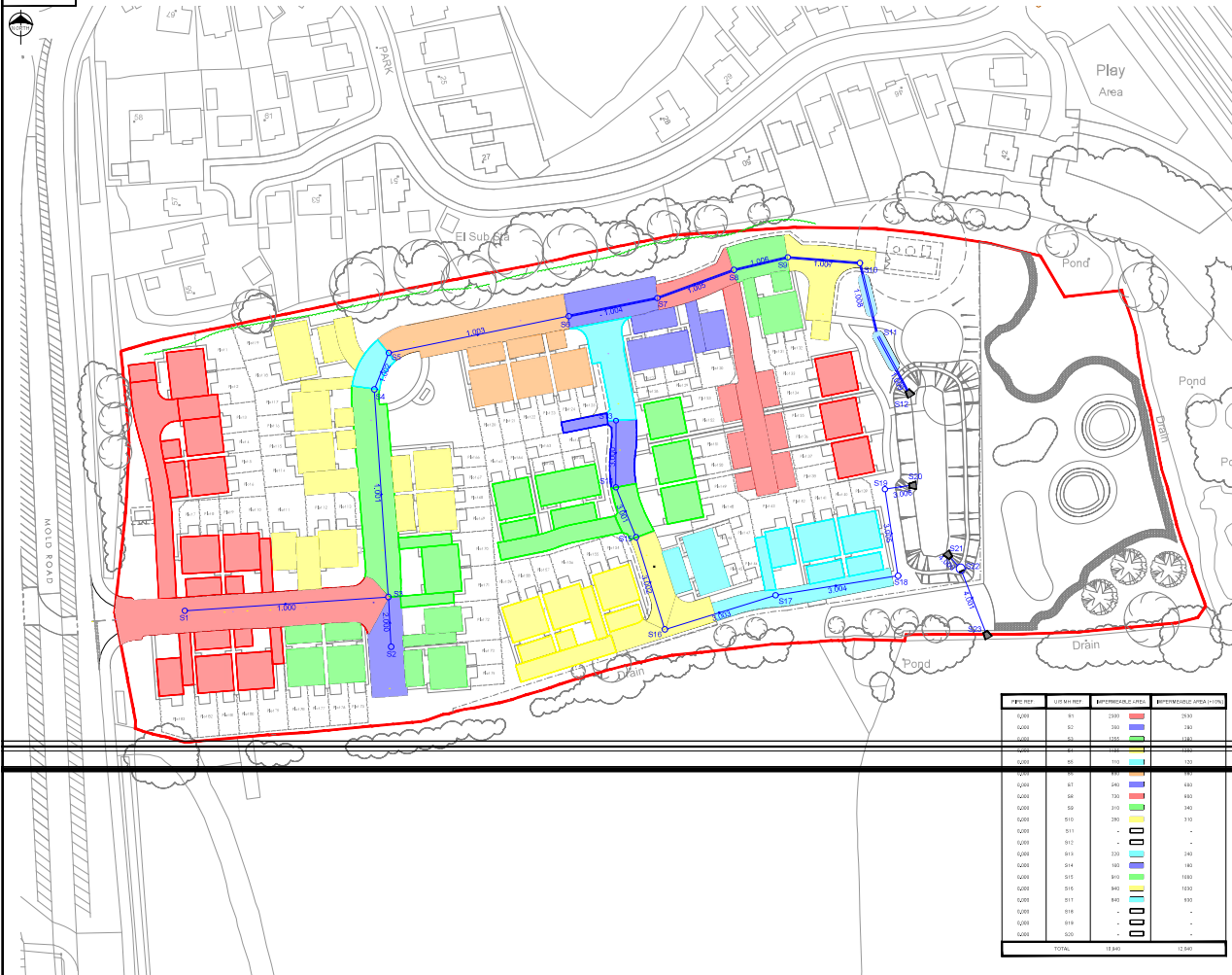
The detection of the services (i.e. is the detected service a water pipe or a gas pipe) is open to interpretation and is based upon a number of references such as visible surface features (water stop valves, or gas meter) and utility provider records (indicating whether high voltage or low voltage). The best technology deployed by BAT is the utility to define the exact type of service. The use of this drawing should prove, by means of reference, the type of service is called in the design.

Equipment Used:

RTS Grid Frequency Ground Penetrating Radar (GPR) with remote control interpretation.

Radiofrequency HDBase & T10 Electromagnetic Generator and Precision Cable Locator.





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E	20.10.25	Updated to suit revised layout	PW	AJ
D	05.06.25	Updated to suit revised layout	PW	AJ
C	13.03.25	Updated to suit revised layout	PW	AJ
B	21.11.22	Updated to suit revised layout	PW	AJ
A	07.09.22	Updated to suit revised layout	PW	AJ
Rev.	Date	Revision	By	Appd.

 **coopers**
chartered consulting engineers

Tel 01244 684910
Email admin@ccoopers.co.uk
Web: <http://ccoopers.co.uk>

Park House
Sunderpitt Court
Chester Business Park
Chester
CH4 9QU

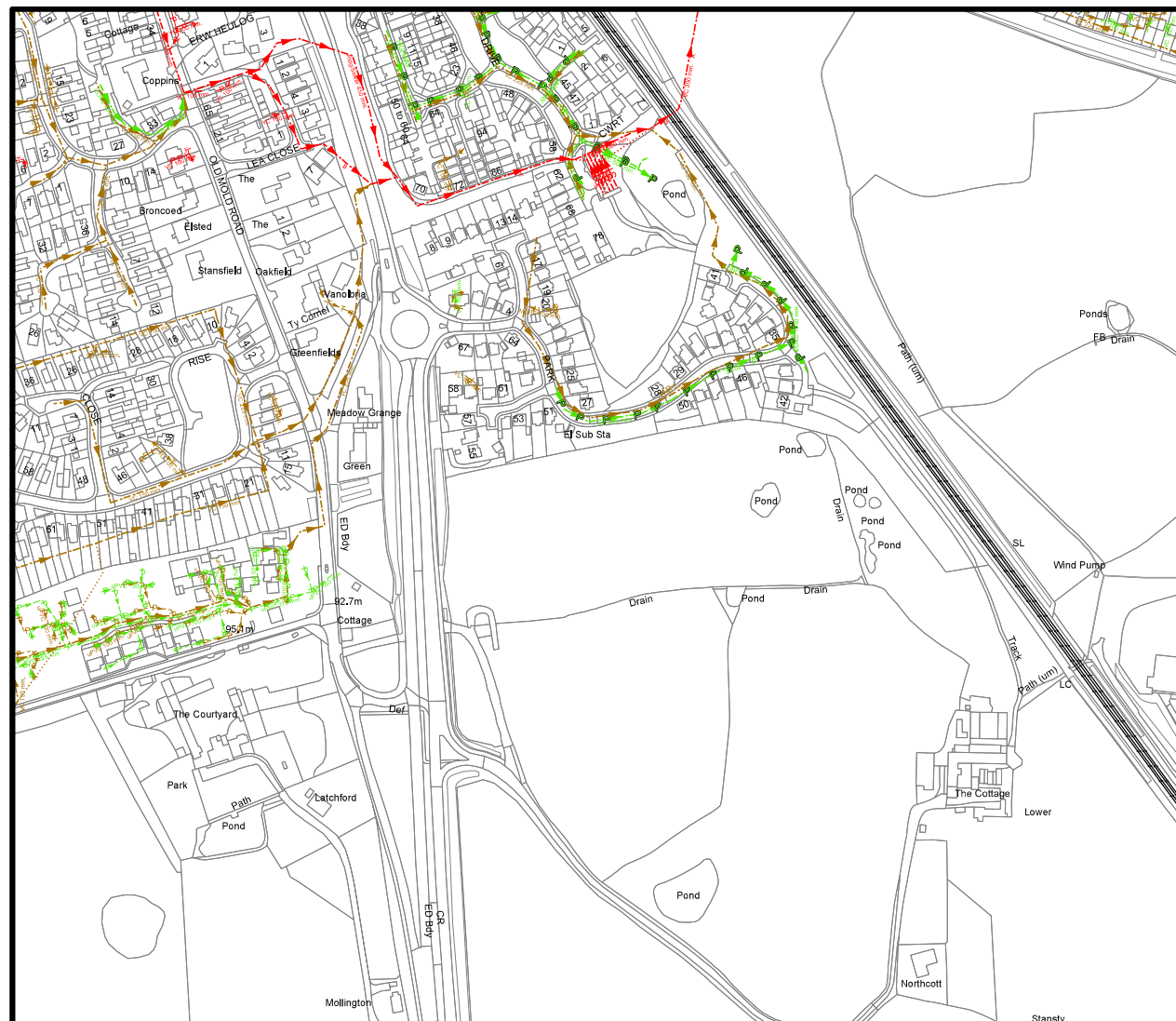
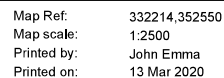


Project

MOLD ROAD, GWERSYLLT,
WREXHAM.

Impermeable Areas

DRAWING NUMBER 7956 / SK03	SCALE at A1 1:250		REVISION F
	DATE	29.03.22	
	DRAWN	PW	
	CHECKED	A.J	

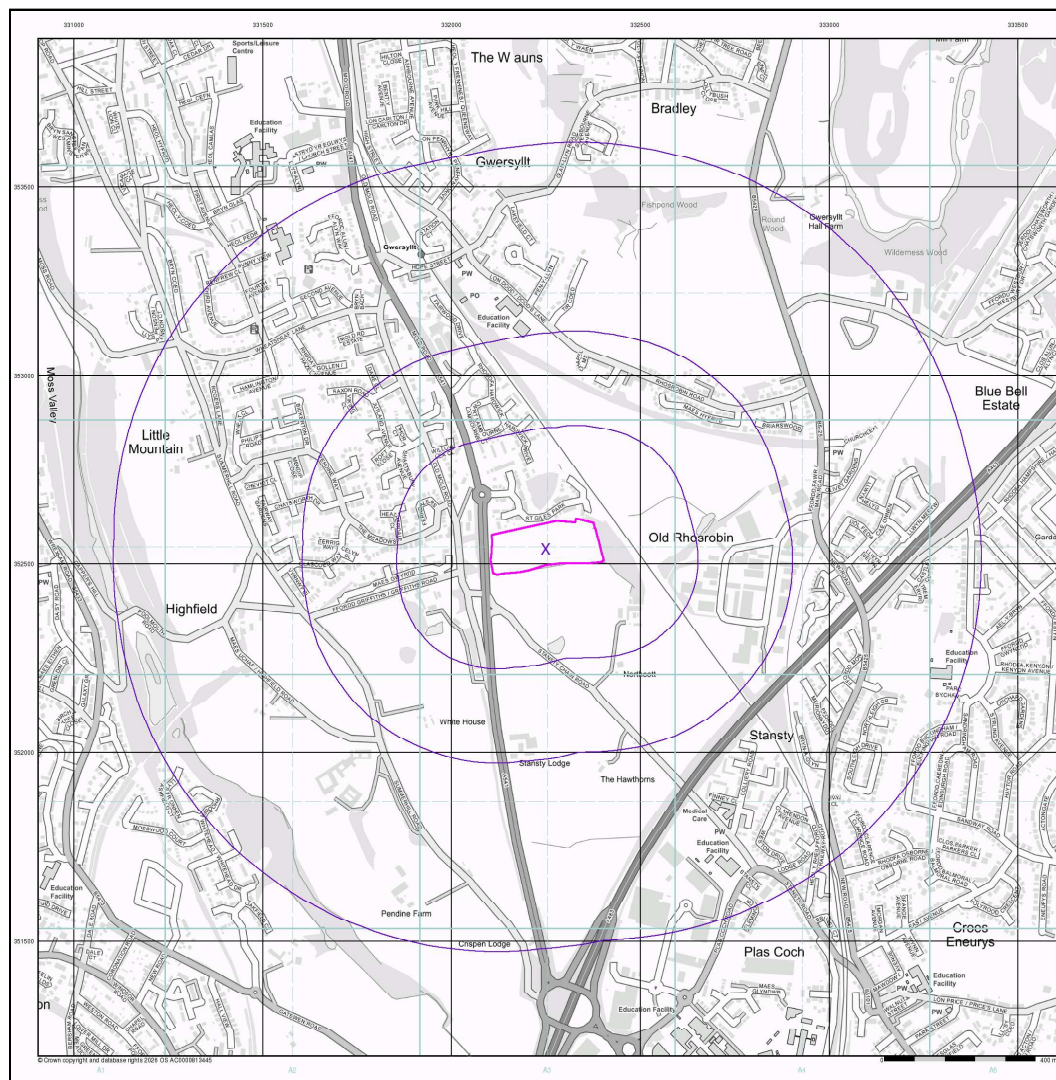


Flood Consequences Assessment and Drainage Strategy
for Land off Mold Road, Gwersyllt, Wrexham

Appendix 2

Envirocheck Flood Screening Report and Maps

Envirocheck Flood Report Ref: 411426264_1_1



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Envirocheck[®]

LANDMARK INFORMATION GROUP[®]

Agency and Hydrological (River Flood)

General

- Specified Site
- Specified Buffers
- Bearing Reference Point

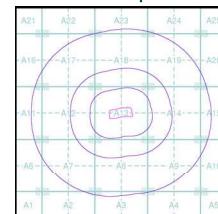
Flood Data

- NRW Rivers - Flood Zone 2
- NRW Rivers - Flood Zone 3
- TAN15 Defended Zones
- Reduction in Risk of Flooding from Rivers and Sea due to Defences
- Flood Water Storage Areas
- Flood Defences

Contours (height in metres)

- Standard Contour
- Master Contour
- Spot Height
- Mean Low Water
- Mean High Water

River Flood Data Map - Slice A



Order Details

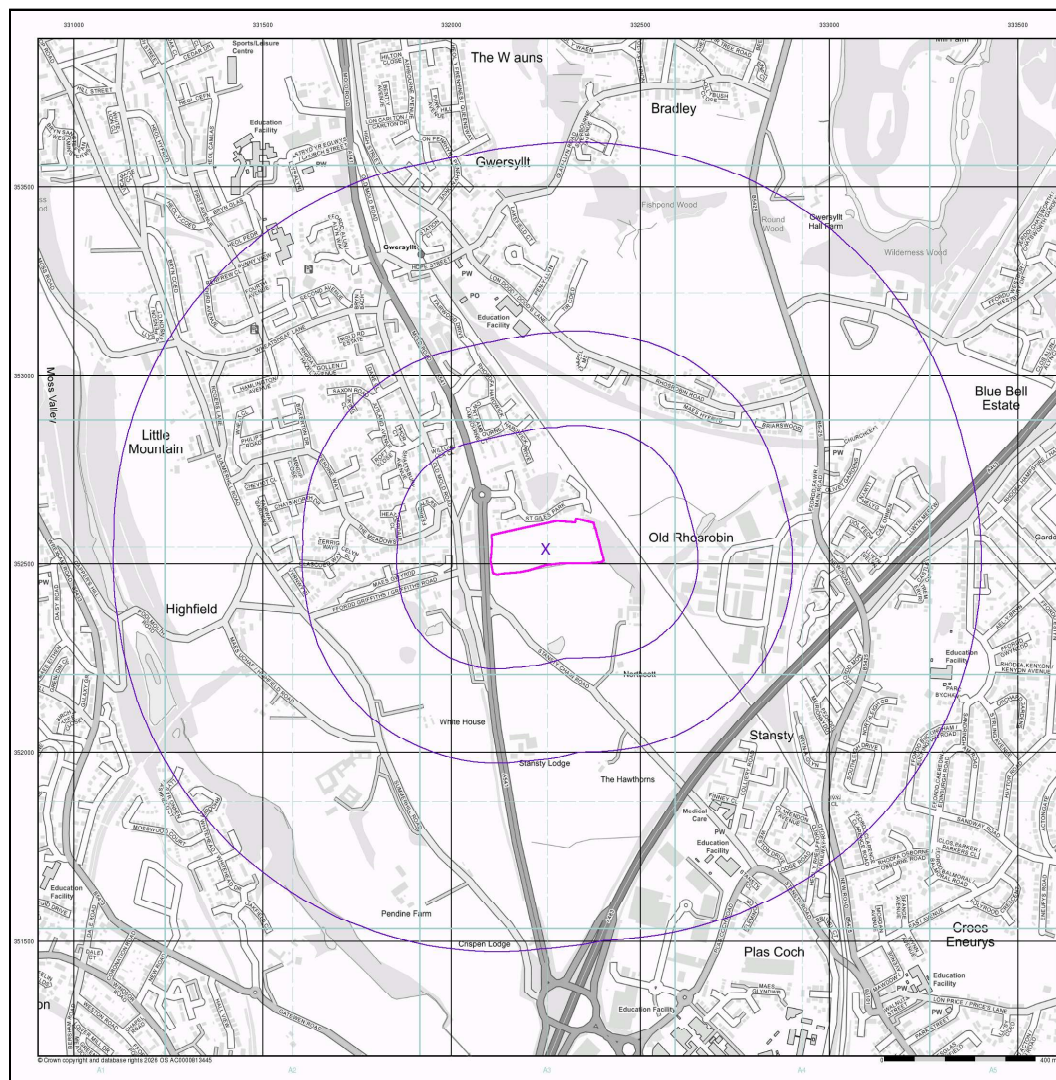
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Customer Ref: 7956
National Grid Reference: 332250, 352540
Slice: A
Site Area (Ha): 3.19
Search Buffer (m): 1000

Site Details

Mold Road, Wrexham, LL11 4AX

Landmark[®]
INFORMATION GROUP

Tel: 0230 036 6618
Fax: 0844 644 9951
Web: www.envirocheck.co.uk



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Envirocheck®

LANDMARK INFORMATION GROUP®

Agency and Hydrological (Sea Flood)

General

- Specified Site
- Specified Buffers
- Bearing Reference Point

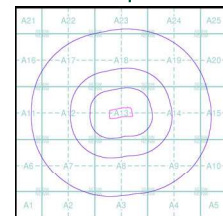
Flood Data

- NRW Sea - Flood Zone 2
- NRW Sea - Flood Zone 3
- TAN15 Defended Zones
- Reduction in Risk of Flooding from Rivers and Sea due to Defences
- Flood Water Storage Areas
- Flood Defences

Contours (height in metres)

- Standard Contour
- Master Contour
- Spot Height
- Mean Low Water
- Mean High Water

Sea Flood Data Map - Slice A



Order Details

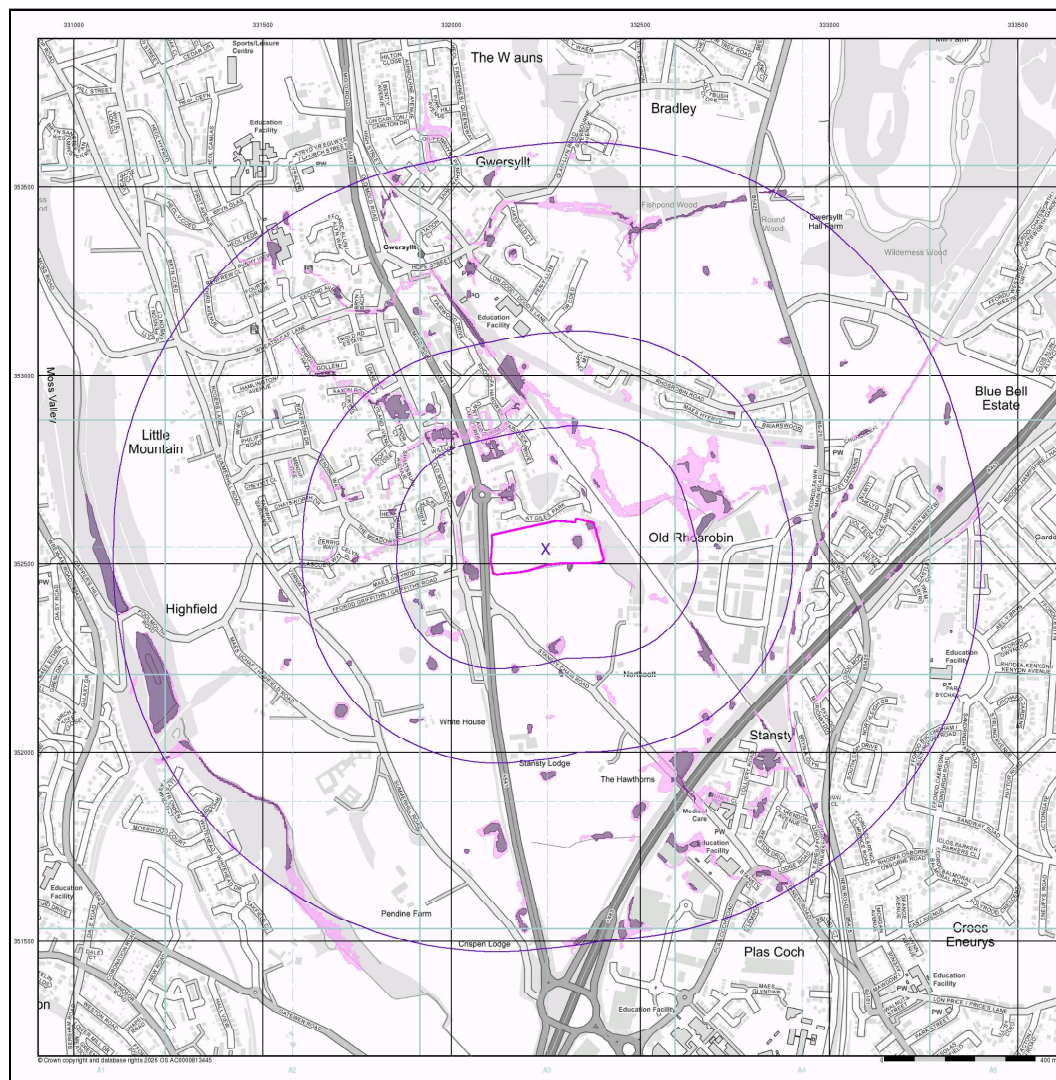
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Customer Ref: 7956
National Grid Reference: 332250, 352540
Slice: A
Site Area (Ha): 3.19
Search Buffer (m): 1000

Site Details

Mold Road, Wrexham, LL11 4AX

Landmark®
INFORMATION GROUP

Tel: 0230 036 6618
Fax: 0844 644 9951
Web: www.envirocheck.co.uk



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Envirocheck[®]

LANDMARK INFORMATION GROUP[®]

Agency and Hydrological (Surface Water Flood)

General

- Specified Site
- Specified Buffers
- X Bearing Reference Point

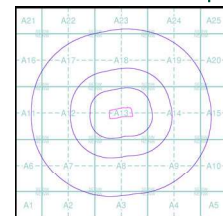
Flood Data

- NRW Surface Water - Flood Zone 2
- NRW Surface Water - Flood Zone 3
- TAN15 Defended Zones
- Reduction in Risk of Flooding from Rivers and Sea due to Defences
- Flood Water Storage Areas
- Flood Defences

Contours (height in metres)

- Standard Contour
- Master Contour
- Spot Height
- Mean Low Water
- Mean High Water

Surface Water Flood Data Map - Slice A



Order Details

Order Number: 411426264_1_1
Customer Ref: 7956
National Grid Reference: 332250, 352540
Slice: A
Site Area (Ha): 3.19
Search Buffer (m): 1000

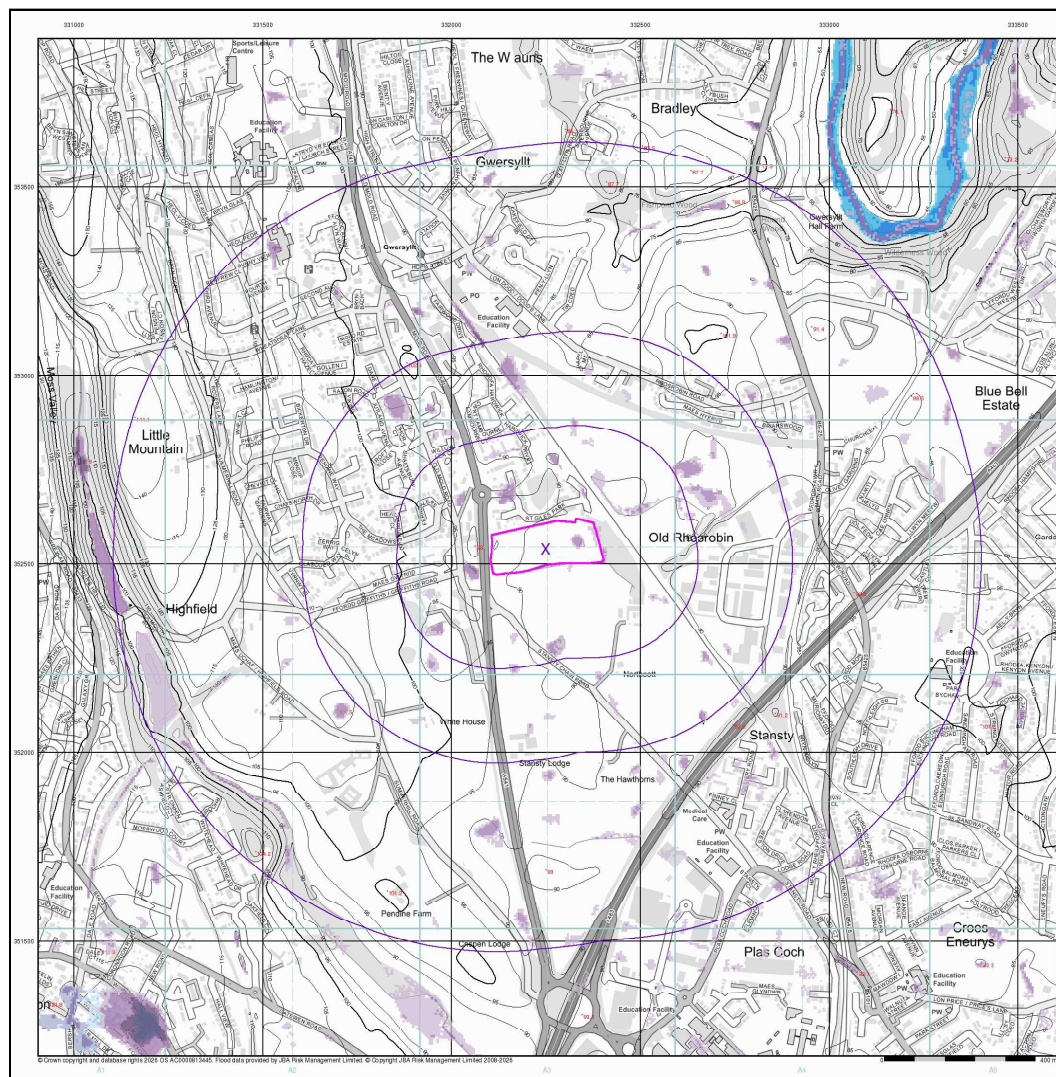
Site Details

Mold Road, Wrexham, LL11 4AX

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LANDMARK INFORMATION GROUP[®]

JBA 75 Year Return Flood Map (Unflooded) (1:10,000)

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

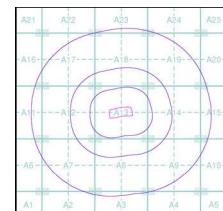
Modelled Flood Depth

Pluvial Depth	Fluvial Depth	Coastal Depth
0.1m	0.01m - 0.05m	0.01m - 0.05m
0.1m - 0.3m	0.05m - 0.1m	0.05m - 0.1m
0.3m - 1m	0.1m - 0.3m	0.1m - 0.3m
>1m	0.3m - 1m	0.3m - 1m
	>1m	>1m

Contours (height in metres)

- Standard Contour
- Master Contour
- Spot Height
- Mean Low Water
- Mean High Water

JBA 75 Year Return Flood Map (Unflooded) - Slice A



Order Details

Order Number: 411426264_1_1
Customer Ref: 7956
National Grid Reference: 332250, 352540
Slice: A
Site Area (Ha): 3.19
Search Buffer (m): 1000

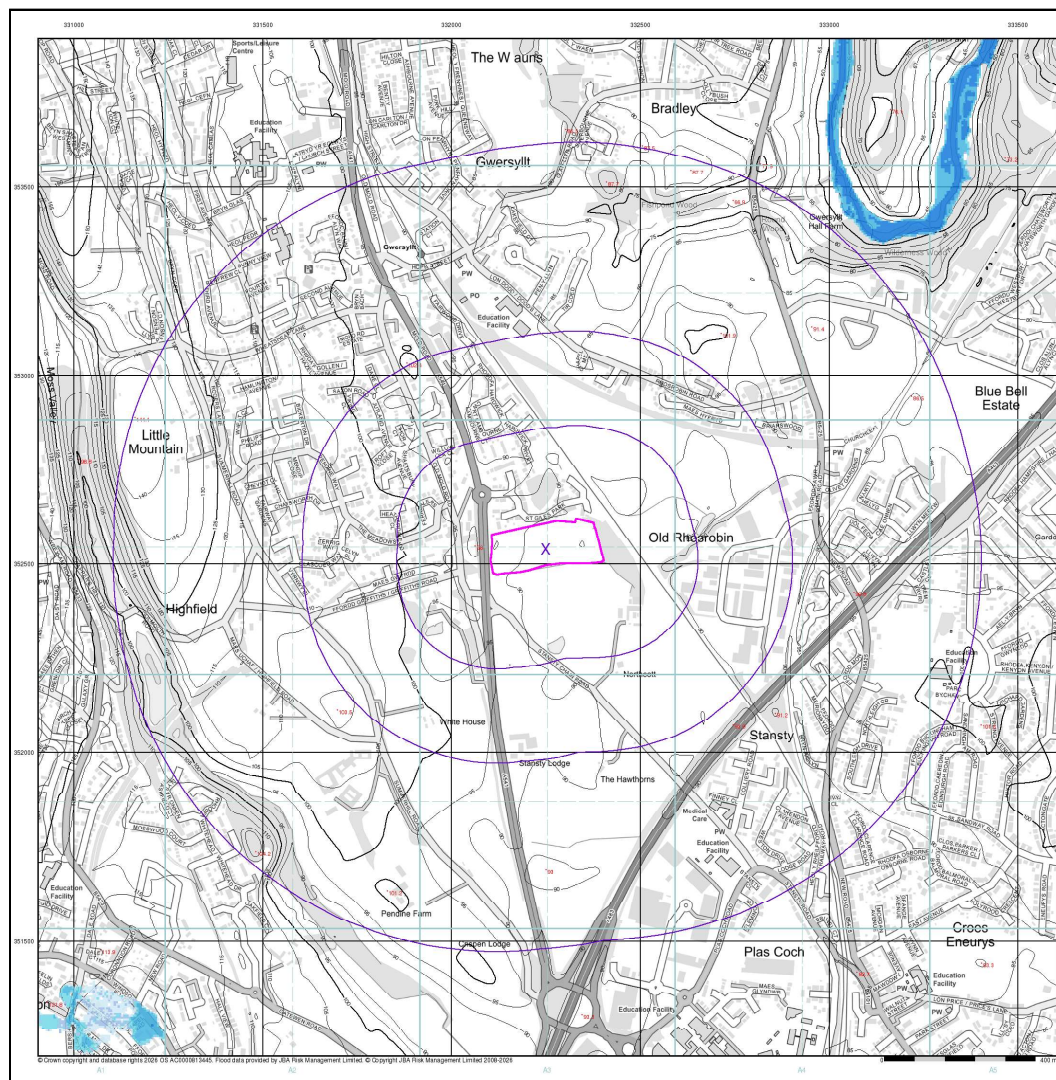
Site Details

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Envirocheck[®]

LANDMARK INFORMATION GROUP[®]

JBA 100 Year Return Flood Map (Undefended) (1:10,000)

General

- Specified Site
- Specified Buffer(s)
- Beating Reference Point

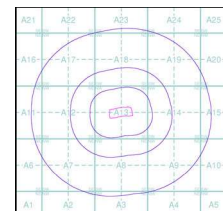
Modelled Flood Depth

Fluvial Depth	Coastal Depth
0.01m - 0.05m	0.01m - 0.05m
0.05m - 0.1m	0.05m - 0.1m
0.1m - 0.3m	0.1m - 0.3m
0.3m - 1m	0.3m - 1m
>1m	>1m

Contours (height in metres)

- Standard Contour
- Master Contour
- Spot Height
- Mean Low Water
- Mean High Water

JBA 100 Year Return Flood Map (Undefended) - Slice A



Order Details

Order Number: 411426264_1_1
Customer Ref: 7956
National Grid Reference: 332250, 352540
Slice: A
Site Area (Ha): 3.19
Search Buffer (m): 1000

Site Details

Mold Road, Wrexham, LL11 4AX

Landmark[®]

INFORMATION GROUP

Tel: 0230 036 6618
Fax: 0844 644 9951
Web: www.envirocheck.co.uk



Envirocheck®

LANDMARK INFORMATION GROUP®

JBA 200 Year Return Flood Map (Undefended) (1:10,000)

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

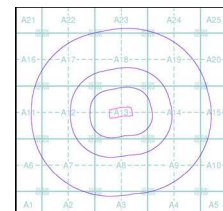
Modelled Flood Depth

Pluvial Depth	Fluvial Depth	Coastal Depth
0.1m	0.01m - 0.05m	0.01m - 0.05m
0.1m - 0.3m	0.05m - 0.1m	0.05m - 0.1m
0.3m - 1m	0.1m - 0.3m	0.1m - 0.3m
>1m	0.3m - 1m	0.3m - 1m
	>1m	>1m

Contours (height in metres)

- Standard Contour
- Master Contour
- Spot Height
- Mean Low Water
- Mean High Water

JBA 200 Year Return Flood Map (Undefended) - Slice A



Order Details

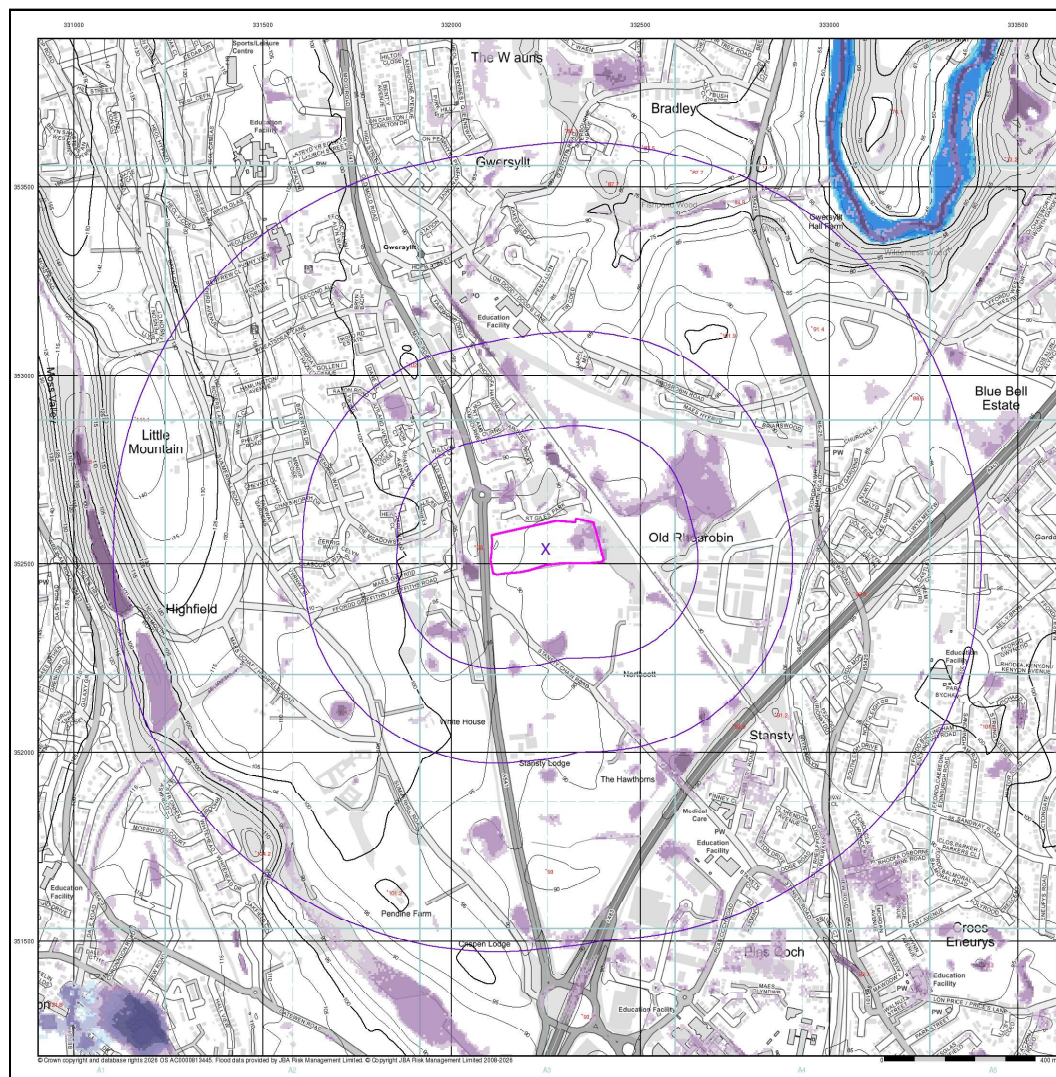
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Customer Ref: 7956
National Grid Reference: 332250, 352540
Slice: A
Site Area (Ha): 3.19
Search Buffer (m): 1000

Site Details

Mold Road, Wrexham, LL11 4AX

Landmark®
INFORMATION GROUP

Tel: 0230 036 6618
Fax: 0844 644 9951
Web: www.envirocheck.co.uk



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LANDMARK INFORMATION GROUP[®]

JBA 1000 Year Return Flood Map (Undefended) (1:10,000)

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

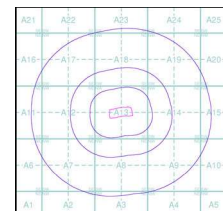
Modelled Flood Depth

Pluvial Depth	Fluvial Depth	Coastal Depth
0.1m	0.01m - 0.05m	0.01m - 0.05m
0.1m - 0.3m	0.05m - 0.1m	0.05m - 0.1m
0.3m - 1m	0.1m - 0.3m	0.1m - 0.3m
>1m	0.3m - 1m	0.3m - 1m
	>1m	>1m

Contours (height in metres)

- Standard Contour
- Master Contour
- Spot Height
- Mean Low Water
- Mean High Water

JBA 1000 Year Return Flood Map (Undefended) - Slice A



Order Details

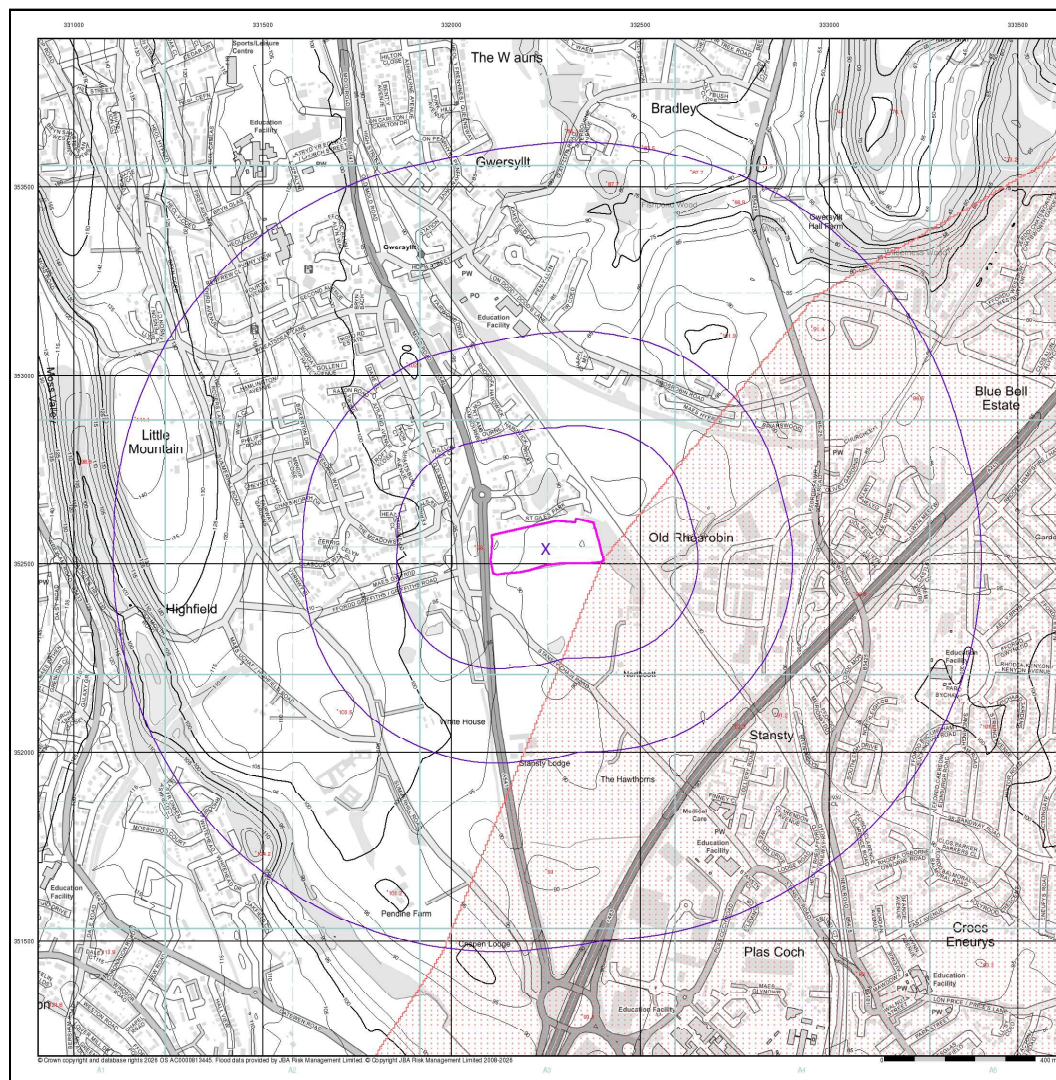
Order Number: 411426264_1_1
Customer Ref: 7956
National Grid Reference: 332250, 352540
Slice: A
Site Area (Ha): 3.19
Search Buffer (m): 1000

Site Details

Mold Road, Wrexham, LL11 4AX

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INFORMATION GROUP

Tel: 0230 036 6618
Fax: 0844 644 9951
Web: www.envirocheck.co.uk



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LANDMARK INFORMATION GROUP[®]

JBA Canal Failure Map (1:10,000)

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

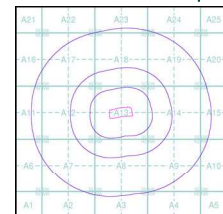
Flood Data

- Canal Failure
- Coverage

Contours (height in metres)

- Standard Contour
- Master Contour
- Spot Height
- Mean Low Water
- Mean High Water

JBA Canal Failure Flood Map - Slice A



Order Details

Order Number: 411426264_1_1
Customer Ref: 7956
National Grid Reference: 332250, 352540
Slice: A
Site Area (Ha): 3.19
Search Buffer (m): 1000

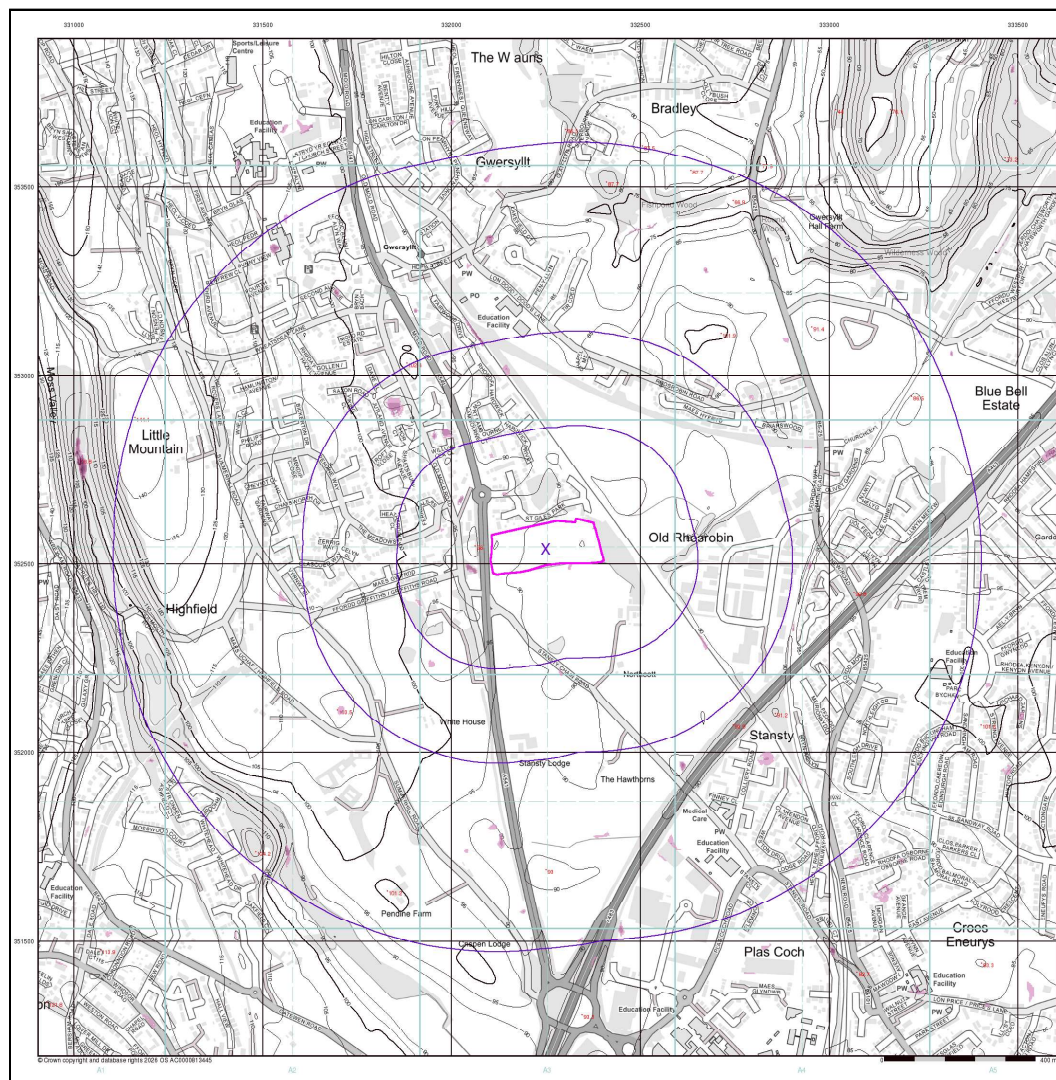
Site Details

Mold Road, Wrexham, LL11 4AX

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Tel: 0230 036 6618
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NRW Surface Water & Small Watercourses 30 Year Return Depth Map (1:10,000)

General

- Specified Site
- Specified Buffers
- Bearing Reference Point

NRW Surface Water & Small Watercourses 30 Year Return Depth

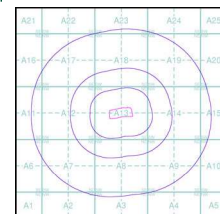
Contours (height in metres)

- 0 - 0.15m
- 0.15 - 0.30m
- 0.30 - 0.60m
- 0.60 - 0.90m
- 0.90 - 1.20m
- > 1.20m

Contours (height in metres)

- Standard Contour
- Master Contour
- Spot Height
- Mean Low Water
- Mean High Water

NRW Surface Water & Small Watercourses 30 Year Return Depth Map - Slice A



Order Details

Order Number: 411426264_1_1
Customer Ref: 7956
National Grid Reference: 332250, 352540
Slice: A
Site Area (Ha): 3.19
Search Buffer (m): 1000

Site Details

Mold Road, Wrexham, LL11 4AX

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NRW Surface Water & Small Watercourses 100 Year Return Depth Map (1:10,000)

General

- Specified Site
- Specified Buffers
- Bearing Reference Point

NRW Surface Water & Small Watercourses 100 Year Return Depth

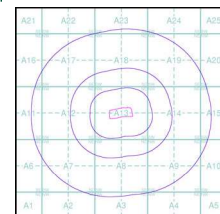
Contours (height in metres)

- 0 - 0.15m
- 0.15 - 0.30m
- 0.30 - 0.60m
- 0.60 - 0.90m
- 0.90 - 1.20m
- > 1.20m

Contours (height in metres)

- Standard Contour
- Master Contour
- Spot Height
- Mean Low Water
- Mean High Water

NRW Surface Water & Small Watercourses 100 Year Return Depth Map - Slice A



Order Details

Order Number: 411426264_1_1
Customer Ref: 7956
National Grid Reference: 332250, 352540
Slice: A
Site Area (Ha): 3.19
Search Buffer (m): 1000

Site Details

Mold Road, Wrexham, LL11 4AX

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NRW Surface Water & Small Watercourses 1000 Year Return Depth Map (1:10,000)

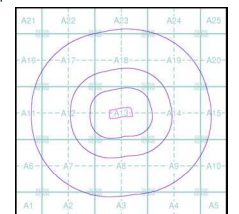
General
○ Specified Site
□ Specified Buffers
X Bearing Reference Point

NRW Surface Water & Small Watercourses 1000 Year Return Depth



Contours (height in metres)
Standard Contour — 105 — 100 — 95 — 90 — 85 — 80 — 75 — 70 — 65 — 60 — 55 — 50 — 45 — 40 — 35 — 30 — 25 — 20 — 15 — 10 — 5 — 0
Master Contour — 105 — 100 — 95 — 90 — 85 — 80 — 75 — 70 — 65 — 60 — 55 — 50 — 45 — 40 — 35 — 30 — 25 — 20 — 15 — 10 — 5 — 0
Spot Height 107.6

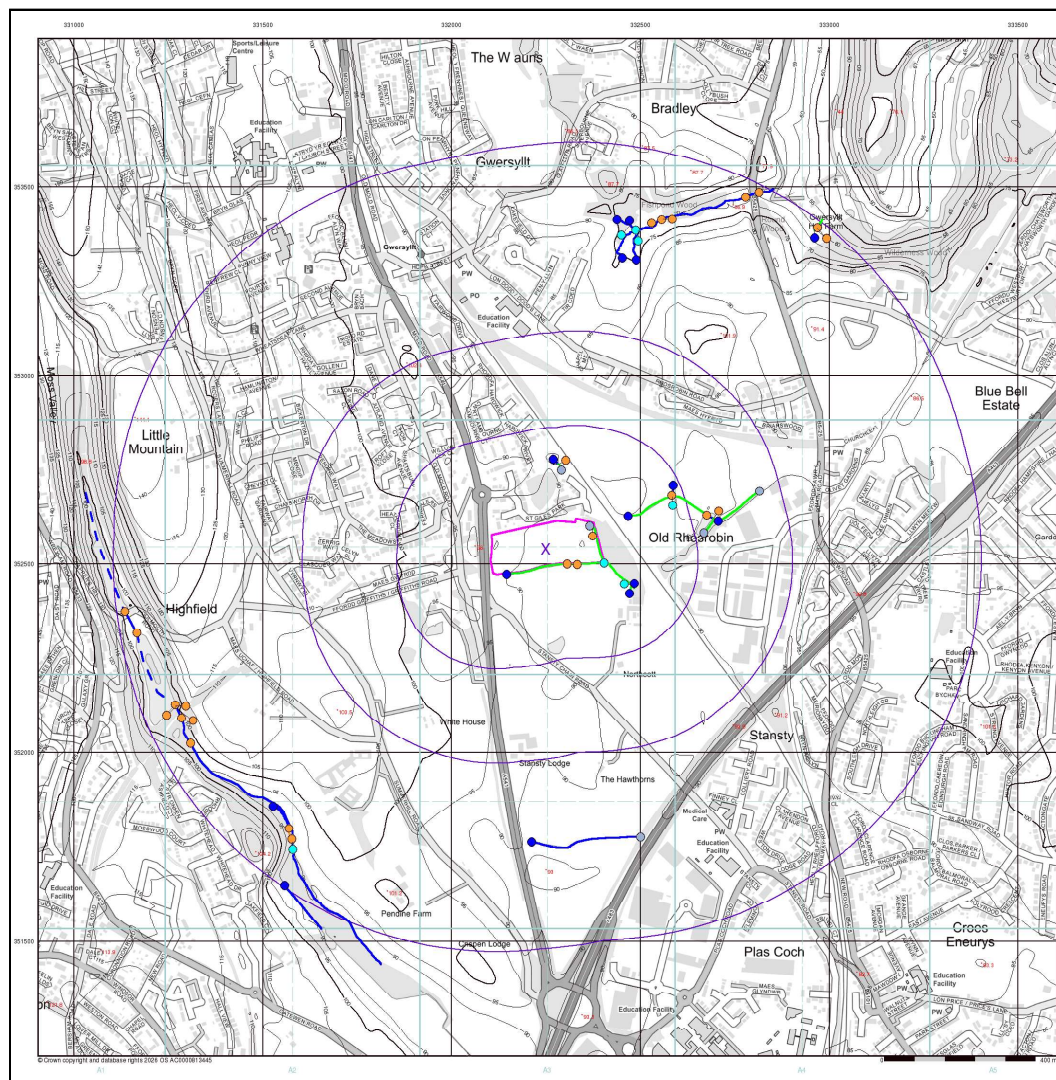
NRW Surface Water & Small Watercourses 1000 Year Return Depth Map - Slice A



Order Details
Order Number: 411426264_1_1
Customer Ref: 7956
National Grid Reference: 332250, 352540
Slice: A
Site Area (Ha): 3.19
Search Buffer (m): 1000

Site Details
Mold Road, Wrexham, LL11 4AX

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OS NGD Water Network Map (1:10,000)

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

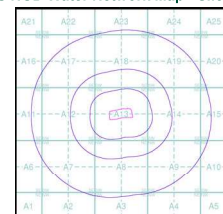
OS NGD Water Network Data

- | | |
|--------------|-------------|
| Canal | Drain |
| Canal Feeder | Other |
| Reservoir | Still Water |
| Foreshore | Leat |
| Marsh | Lock |
| Watercourse | Sea |
| Overflow | |
| Junction | Source |
| Outlet | Unknown |
| Pseudo | Other |
| Tidal Outlet | |

Contours (height in metres)

- Standard Contour: 1:10,000
Master Contour: 1:10,000
Spot Height: 1:10,000
- MEWL: Mean Low Water
MHWS: Mean High Water

OS NGD Water Network Map - Slice A



Order Details

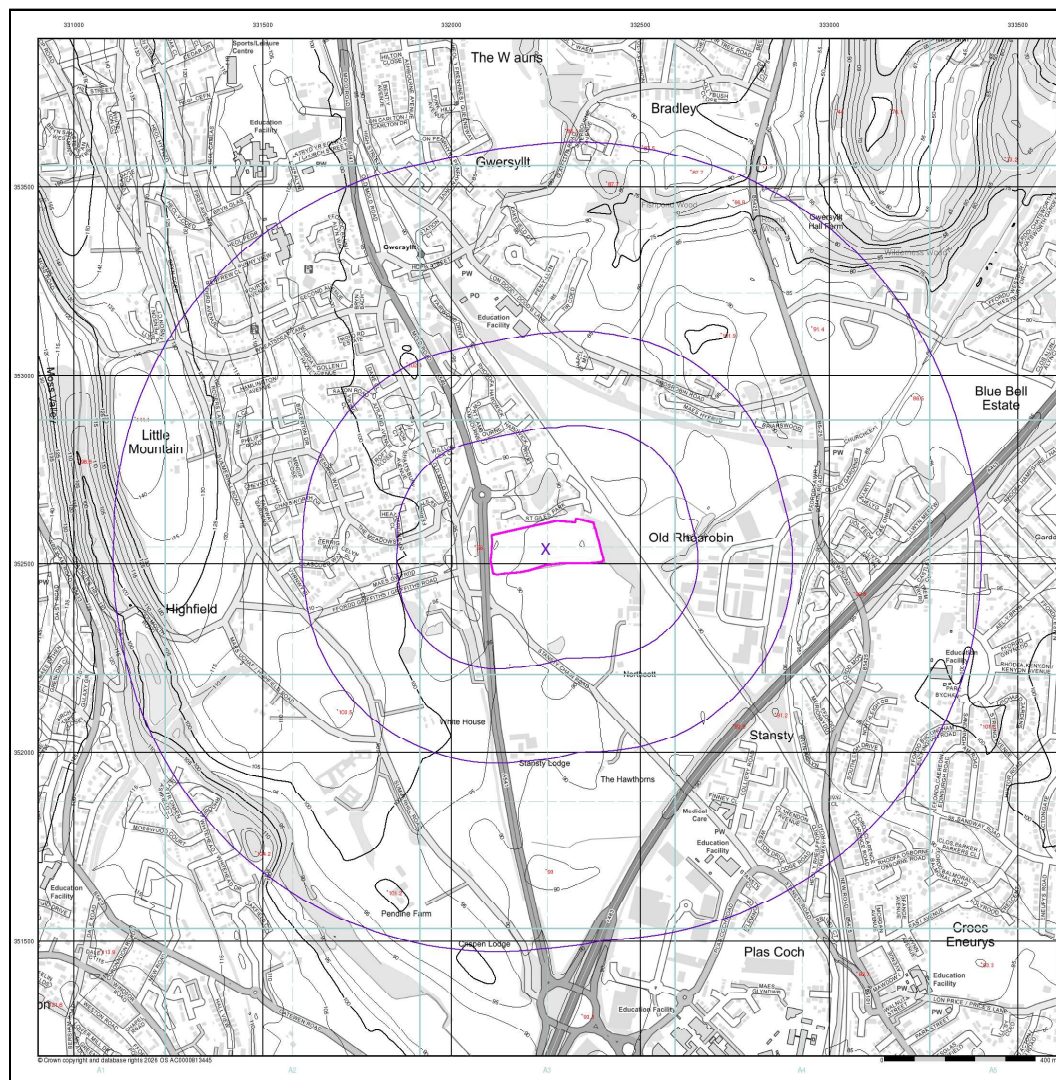
Order Number: 411426264_1_1
Customer Ref: 7956
National Grid Reference: 332250, 352540
Slice: A
Site Area (Ha): 3.19
Search Buffer (m): 1000

Site Details

Mold Road, Wrexham, LL11 4AX

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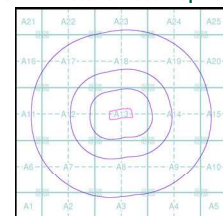
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LANDMARK INFORMATION GROUP®

EA/NRW Historic Flood Map (1:10,000)

- General**
- Specified Site
 - Specified Buffer(s)
 - Bearing Reference Point
 - Map ID
- Historic Flood Events Data**
- Channel Capacity Exceeded (no raised defences)
 - Channel Capacity Exceeded /Surface Water
 - Groundwater/High Water Table
 - Local Drainage/Surface Water
 - Mechanical Failure
 - Obstruction/Blockage - Bridge
 - Obstruction/Blockage - Channel
 - Obstruction/Blockage - Culvert
 - Obstruction/Blockage - Debris Screen
 - Operational Failure/Breach of Defence
 - Other
 - Overlapping of Defences
 - Surface Water
 - Unknown
 - Historical Flood Liabilities
- Contours (height in metres)**
- Standard Contour
 - Master Contour
 - Spot Height
 - MLW - Mean Low Water
 - MHW - Mean High Water

EA/NRW Historic Flood Map - Slice A



Order Details

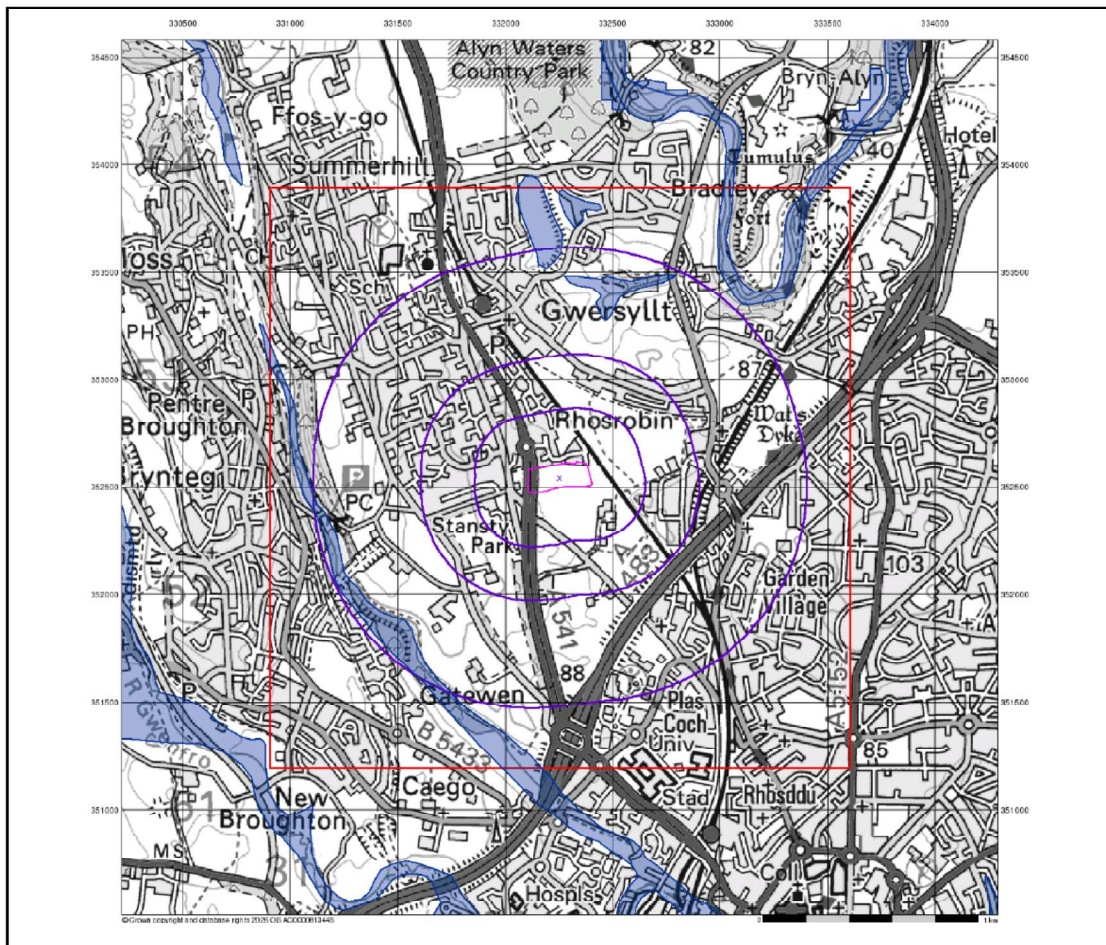
Order Number: 411426264_1_1
Customer Ref: 7956
National Grid Reference: 332250, 352540
Slice: A
Site Area (Ha): 3.19
Search Buffer (m): 1000

Site Details

Mold Road, Wrexham, LL11 4AX

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BGS Flood Data (1:50,000)

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Ellipsis
- Map ID

BGS Geological Indicators of Flooding

- Coastal
- Inland
- Bodies of Water

BGS Flood Data Map - Slice A

Order Details

Order Number: 411426264_1_1
Customer Ref: 7956
National Grid Reference: 332250, 352540
Slice: A
Site Area (Ha): 3.19
Search Buffer (m): 1000

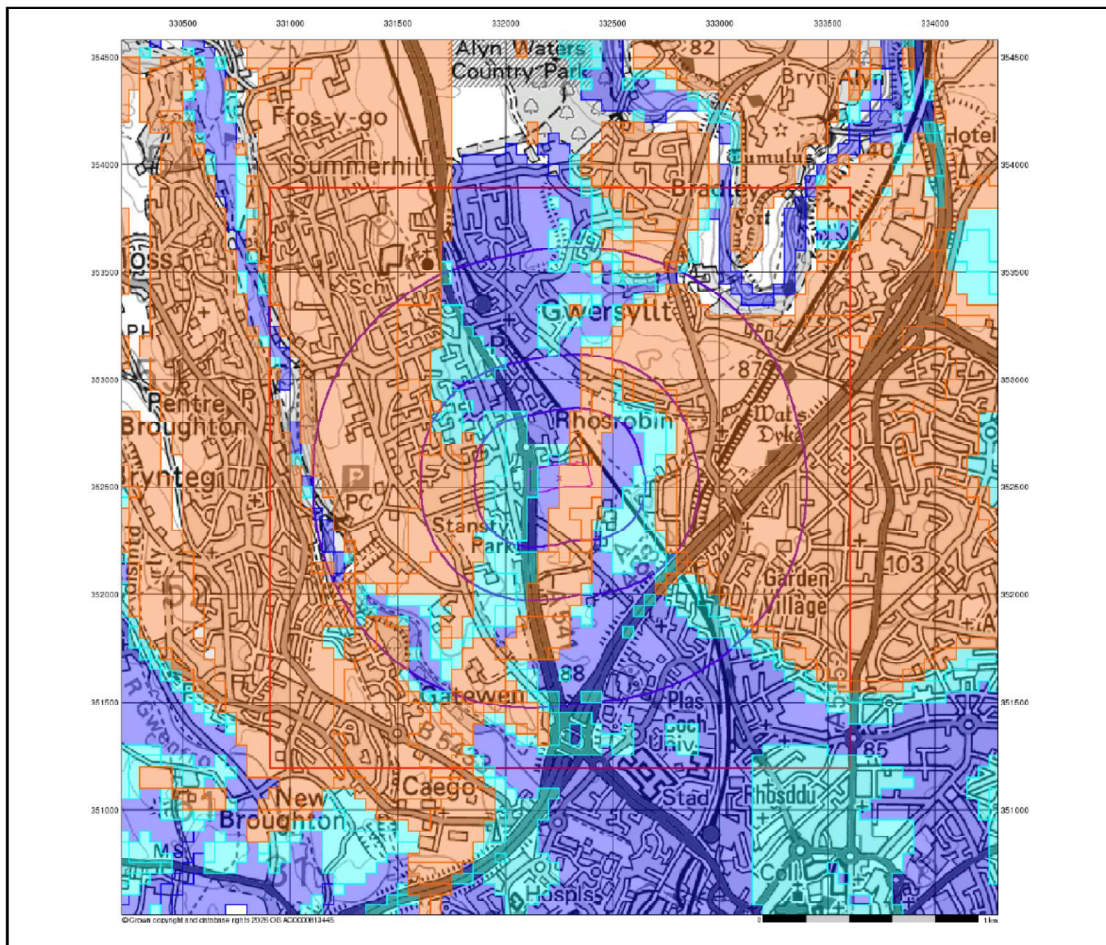
Site Details

Mold Road, Wrexham, LL11 4AX

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Web: www.envirocheck.co.uk

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BGS Flood Data (1:50,000)

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Site ID
- Map ID

BGS Groundwater Flooding Susceptibility

- Potential for Groundwater Flooding to Occur at Surface
- Potential for Groundwater Flooding of Property Situated Below Ground Level
- Limited Potential for Groundwater Flooding to Occur

BGS Flood Data Map - Slice A

Order Details

Order Number:	411426204_1_1
Customer Ref:	7956
National Grid Reference:	332250, 352540
Slice:	A
Site Area (Ha):	3.19
Search Buffer (m):	1000

Site Details

Mold Road, Wrexham, LL11 4AX

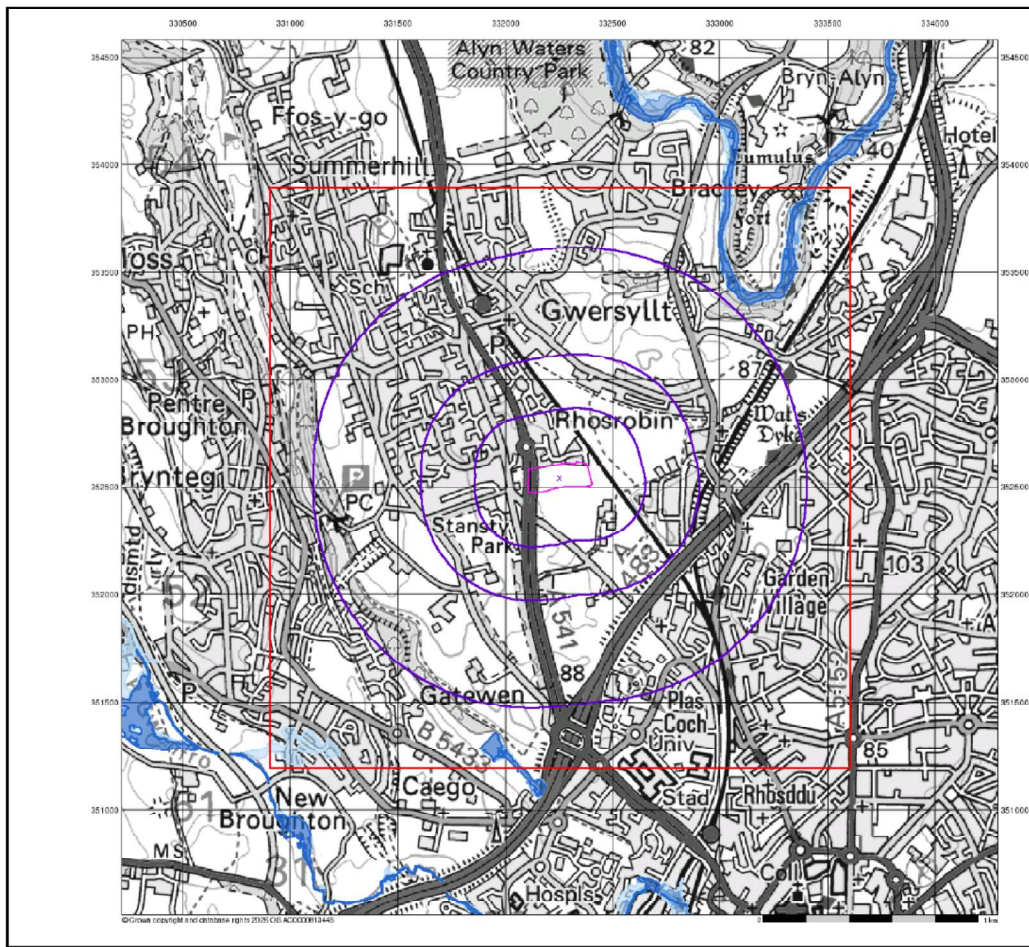
Landmark

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Page 2 of 5



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EA/NRW RoFRS Data (1:50,000)

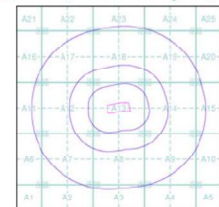
General

- Specified Site
- Specified Buffers(s)
- Bearing Reference Point
- Site
- Map ID

NRW Flood Risk Assessment Wales - River and Sea

- Rivers - High Risk
- Rivers - Medium Risk
- Rivers - Low Risk
- Sea - High Risk
- Sea - Medium Risk
- Sea - Low Risk

EA/NRW RoFRS Data Map - Slice A



Order Details

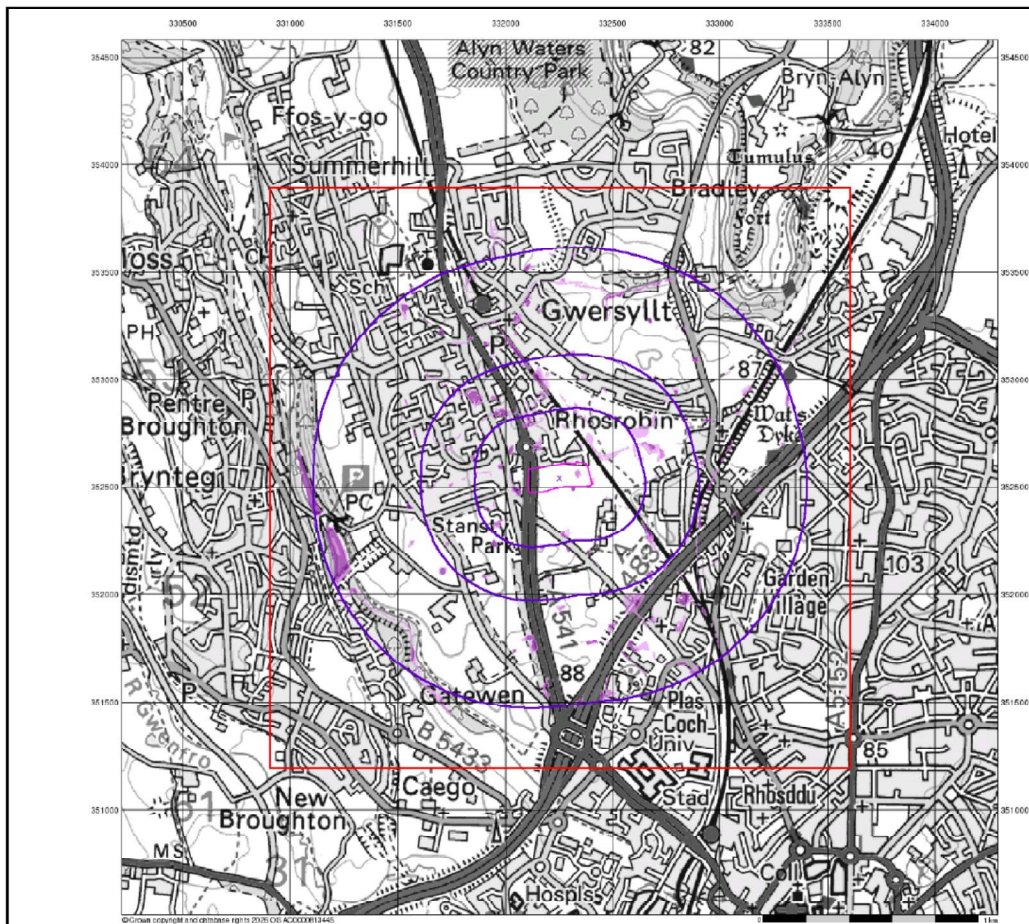
Order Number: 411426264_1_1
 Customer Ref: 7956
 National Grid Reference: 332250, 352540
 Slice: A
 Site Area (Ha): 3.19
 Search Buffer (m): 1000

Site Details

Mold Road, Wrexham, LL11 4AX

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Tel: 0330 038 6618
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NRW Flood Risk Assessment - Surface Water and Small Watercourses Data (1:50,000)

General

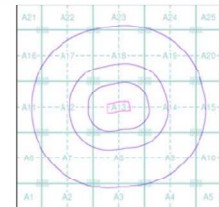
○ Specified Site
 ○ Specified Buffer(s)
 x Bearing Reference Point

□ Slice

NRW Flood Risk - Surface Water and Small Watercourses

■ High Risk
■ Medium Risk
■ Low Risk

NRW Flood Risk Assessment - Surface Water and Small Watercourses Data Map - Slice A



Order Details

Order Number: 411426264_1_1
 Customer Ref: 7956
 National Grid Reference: 332250, 352540
 Slice: A
 Site Area (Ha): 3.19
 Search Buffer (m): 1000

Site Details

Mold Road, Wrexham, LL11 4AX

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 LANDMARK INFORMATION GROUP

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 Fax: 0344 344 9951
 Web: www.envirocheck.co.uk

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Page 5 of 5

Flood Consequences Assessment and Drainage Strategy
for Land off Mold Road, Gwersyllt, Wrexham

Appendix 3

Infiltration Consideration

Infiltration testing undertaken by Betts Geo Environmental,

August 2026



Key:
Infiltration Test Location



Castle Green
Unit 20,
St. Asaph Business Park, St Asaph,
Denbighshire, LL17 0LJ.
Tel. 01745 536677

Site:
Mold Road, Gwersyllt

Title:
Infiltration Testing Locations

Scale: 1:500 at A1 Date: 28/08/2026
Ref: ITL-01 Rev: -



STRUCTURAL SOILS LTD
INSITU TESTING REPORT



1774

Report No. 785978R.01(00)

Office Location: Castleford

Date 05-August-2026 Contract: Stansty Chain Road, Gwersyllt
Client Betts Geo Environmental,
Address 6 Old Marsh Farm,
Welsh Road,
Sealand,
Flintshire,
CH5 2LY

For the Attention of: Gina Smith

Order received	31-July-2026	Client Reference	None
Testing Started	04-August-2026	Client Order No.	BG6263
Testing Completed	05-August-2026	Instruction Type	Written

Tests marked 'Not UKAS Accredited' in this report are not included in the UKAS Accreditation Schedule for our Laboratory.

UKAS Accredited Tests

Not UKAS Accredited Tests

* 3 no. Soakaway Testing to BRE Digest 365
Please note that 3 fills in each pit was not achievable due to time constraints/ground conditions

The results represent the ground conditions at the specified locations and depths at the time of testing.

Please Note: Remaining samples will be retained for a period of one month from today and will then be disposed of .
Test were undertaken on samples 'as received' unless otherwise stated.
Opinions and interpretations expressed in this report are outside the scope of accreditation for this laboratory.
Results relate only to items tested
This report shall not be reproduced except in full without written permission of SSL Laboratories

Structural Soils Ltd, The Potteries, Pottery Street, Castleford, WF10 1NJ Tel.01977552255, email Matthew Doran, matthew.doran@soils.co.uk

TESTING VERIFICATION CERTIFICATE

The test results included in this report are certified as:-

ISSUE STATUS: **FINAL**

In accordance with the Structural Soils Ltd Laboratory Quality Management System, results sheets and summaries of results issued by the laboratory are checked by an approved signatory. The integrity of the test data and results are ensured by control of the computer system employed by the laboratory as part of the Software Verification Program as detailed in the Laboratory Quality Manual.

This testing verification certificate covers all testing compiled on or before the following datetime: **05/08/2026 15:05:16**.

Testing reported after this date is not covered by this Verification Certificate.



Approved Signatory
Matthew Doran (Site Testing Manager)

(Head Office)
Bristol Laboratory
Unit 1A, Princess Street
Bedminster
Bristol
BS3 4AG

Castleford Laboratory
The Potteries, Pottery Street
Castleford
West Yorkshire
WF10 1NJ

Hemel Laboratory
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT



**STRUCTURAL
SOILS LTD**

Contract:

Stansty Chain Road, Gwersyllt

Job No:

785978

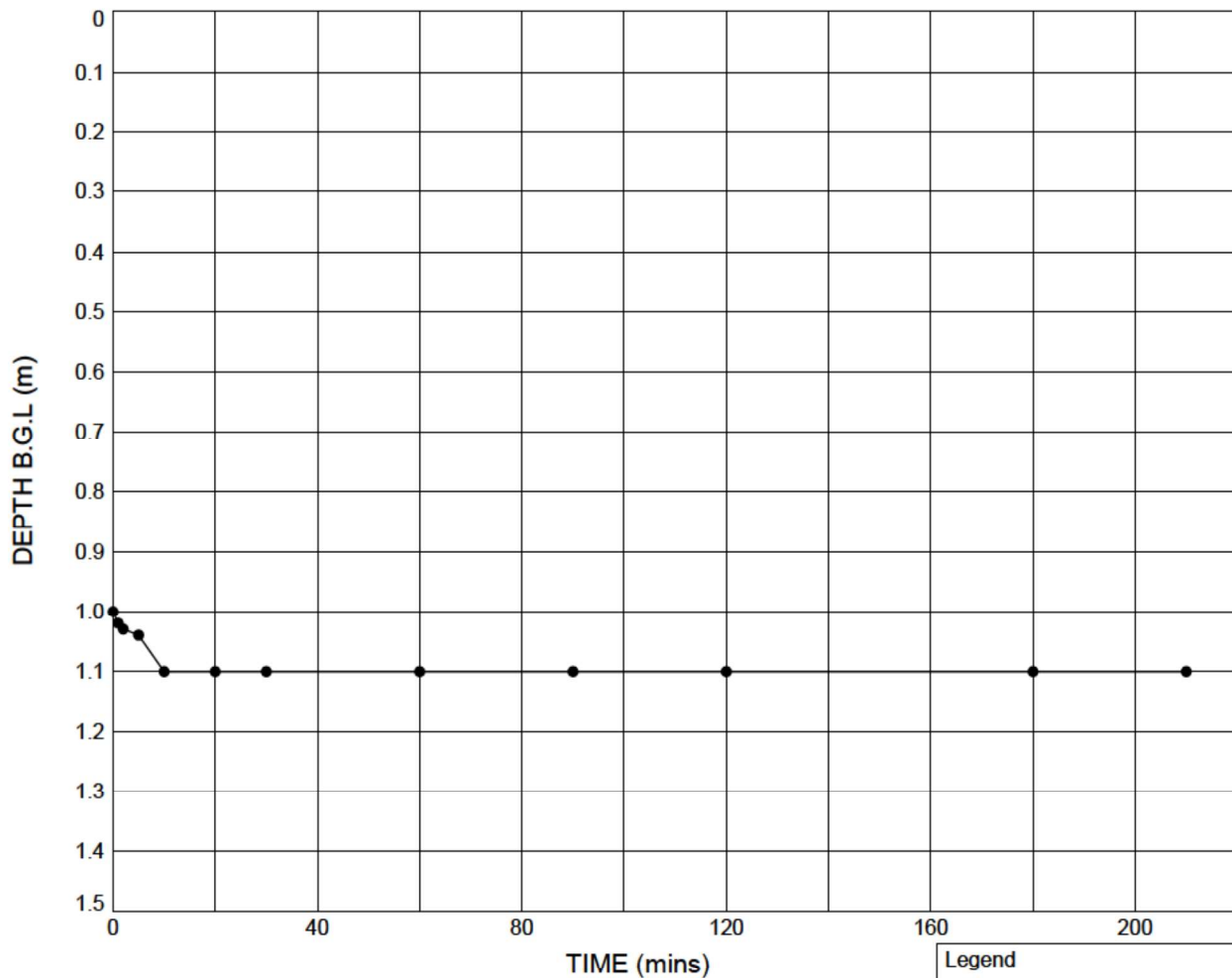


FULL SCALE SOAKAWAY TEST

Non-standard test

Soakaway Test - Position ID : SA01

PLOT OF DEPTH OF WATER BELOW GROUND LEVEL AGAINST TIME



Test 1

Pit start depth: = 1.50 m

Pit final depth: = 1.50 m

Effective depth, D_e = 0.50 m

Effective storage volume, V_{p75-25} = 0.1100 m³

Surface area, a_{s50} = 1.1900 m²

Time, t_{p75-25} = N/A secs

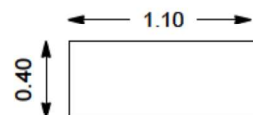
Infiltration rate, f = N/A m/s

Notes: Test 1 - Unable to calculate infiltration rate due to insufficient drop in water level.

Legend

● Test 1 (03.08.26)

Plan (Not to scale)



No Bearing Taken



STRUCTURAL SOILS
The Potteries
Pottery Street
Castleford
W. Yorkshire WF10 1NJ

Compiled By

Date

Kflunacher

04/08/26

Contract

Stansty Chain Road, Gwersyllt

Contract Ref:

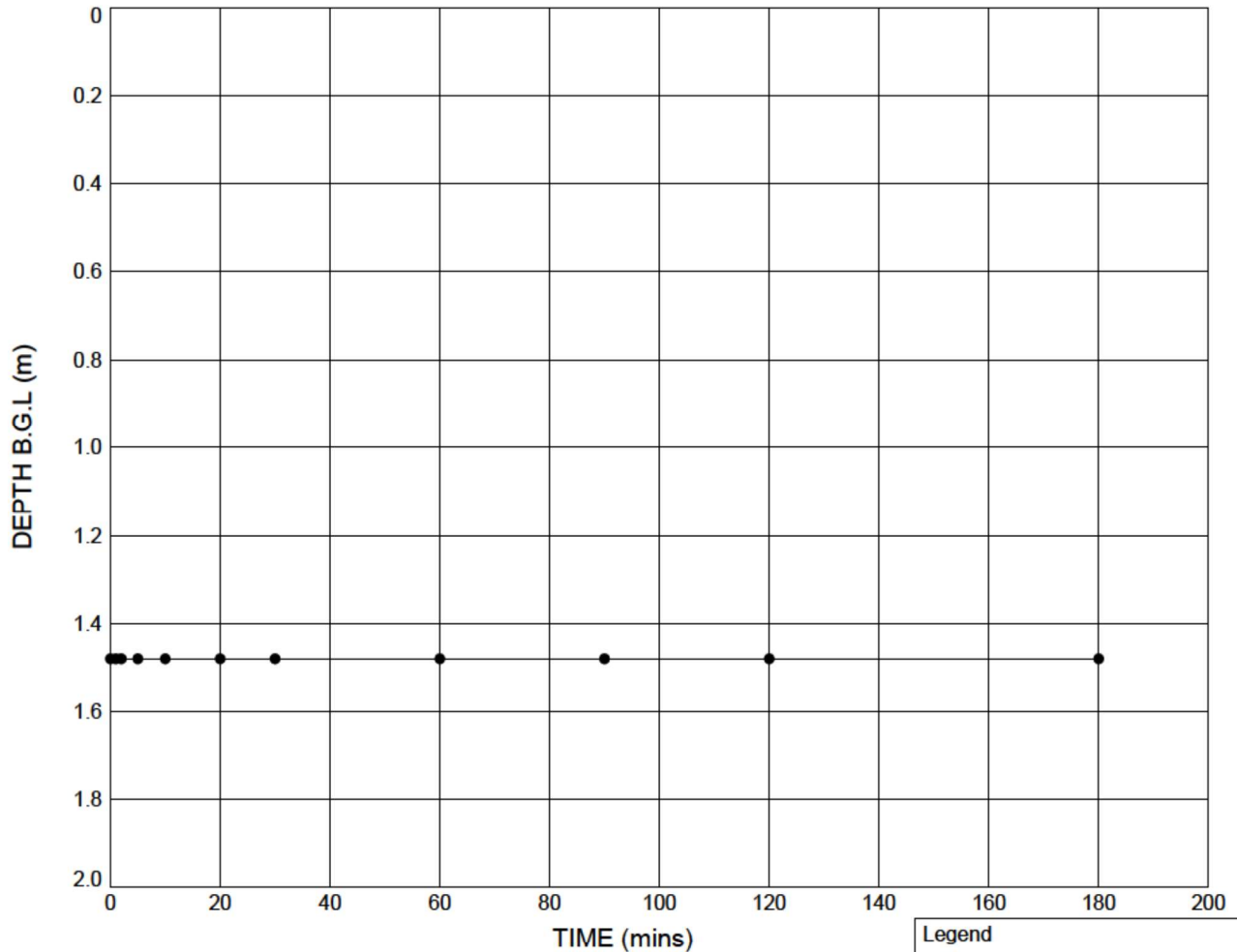
785978

FULL SCALE SOAKAWAY TEST

Non-standard test

Soakaway Test - Position ID : SA02

PLOT OF DEPTH OF WATER BELOW GROUND LEVEL AGAINST TIME



Test 1

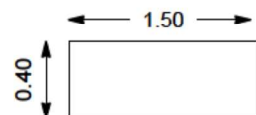
Pit start depth: = 2.00 m
Pit final depth: = 2.00 m
Effective depth, D_e = 0.52 m
Effective storage volume, V_{p75-25} = 0.1560 m³
Surface area, a_{s50} = 1.5880 m²
Time, t_{p75-25} = N/A secs
Infiltration rate, f = N/A m/s

Notes: Test 1 - Unable to calculate infiltration rate due to insufficient drop in water level.

Legend

● Test 1 (05.08.26)

Plan (Not to scale)



No Bearing Taken



STRUCTURAL SOILS
The Potteries
Pottery Street
Castleford
W. Yorkshire WF10 1NJ

Compiled By

Date

Date

K. L. W. L. W. L.

05/08/2

Contract

Stansty Chain Road, Gwersyllt

Contract Ref:

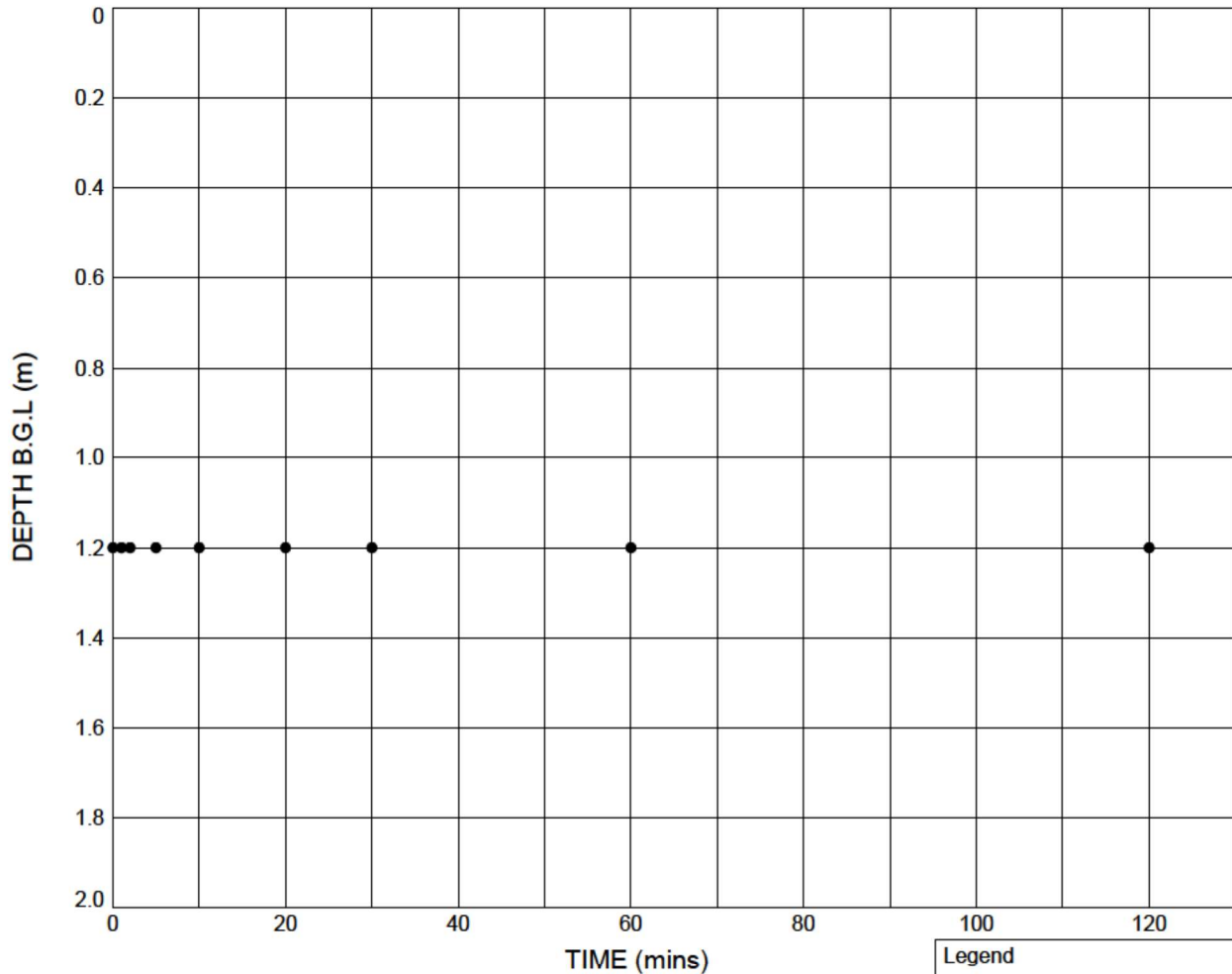
785978

FULL SCALE SOAKAWAY TEST

Non-standard test

Soakaway Test - Position ID : SA03

PLOT OF DEPTH OF WATER BELOW GROUND LEVEL AGAINST TIME



TIME (mins)

Test 1

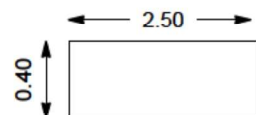
Pit start depth: = 2.00 m
 Pit final depth: = 2.00 m
 Effective depth, D_e = 0.80 m
 Effective storage volume, V_{p75-25} = 0.4000 m³
 Surface area, a_{s50} = 3.3200 m²
 Time, t_{p75-25} = N/A secs
 Infiltration rate, f = N/A m/s

Notes: Test 1 - Unable to calculate infiltration rate due to insufficient drop in water level.

Legend

● Test 1 (05.08.26)

Plan (Not to scale)



No Bearing Taken



STRUCTURAL SOILS
 The Potteries
 Pottery Street
 Castleford
 W. Yorkshire WF10 1NJ

Compiled By

Kflwacher

Date

05/08/

Date

Contract

Stansty Chain Road, Gwersyllt

Contract Ref:

785978

Flood Consequences Assessment and Drainage Strategy
for Land off Mold Road, Gwersyllt, Wrexham

Appendix 4

Correspondence

Dwr Cymru Welsh Water Historical Flooding

Wrexham County Borough Council Historical Flooding

Natural Resources Wales Historical Flooding

Andy Jones

From: Environmental Information Requests [REDACTED]
Sent: 11 March 2022 15:20
To: Andy Jones
Subject: RE: FCA Land off Mold Road, Gwersyllt, Wrexham

Dear Mr Jones

Request for information

We refer to your request for information which was received on 4th March 2022.

We are dealing with your request as one made under the Environmental Information Regulations 2004 ("the Regulations").

In accordance with the Regulations, we will respond to your request within 20 working days of the date of receipt.

For completeness, we advise that the Information Commissioner's Office states that the time period for responding should be calculated from the day after the request is received.

In the meantime, if you have any queries, please contact us on email at EnvironmentalInformationRequests@dwrcymru.com

We have assigned reference **EIR/1086/2022** to your request. Please kindly note this in all correspondence with us regarding this matter.

Yours sincerely,
Dŵr Cymru Welsh Water

From: Andy Jones [REDACTED]
Sent: 04 March 2022 10:53
To: Sewerage Services [REDACTED]
Subject: FCA Land off Mold Road, Gwersyllt, Wrexham

***** External Mail *****

7956 Land off Mold Road, Gwersyllt, Wrexham
FCA Historical Flood Information

To whom it may concern

We are undertaking a Flood Consequences Assessment and Drainage Strategy for the above site (see attached Site Location Plan) and request any information you may have in relation to historical flooding or any information you may consider relevant to assist with the production of the FCA report.

Please let me know if you require any further information or please contact me on the details below should you want to discuss further.

Regards

Andy Jones
Senior Infrastructure Engineer

COOPERS

Park House, Sandpiper Court, Chester Business Park, Chester, CH4 9QU



_____ Dwr Cymru Welsh Water is firmly committed to water conservation and promoting water efficiency. Please log on to our website www.dwrcymru.com/waterefficiency to find out how you can become water wise. Mae Dwr Cymru Welsh Water wedi ymrwymo i warchod adnoddau dwr a hyrwyddo defnydd dwr effeithiol. Mae cyngor i' ch helpu i ddefnyddio dwr yn ddoeth yn www.dwrcymru.com/waterefficiency

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Andy Jones

From: SAB [REDACTED]
Sent: 07 March 2022 13:59
To: Andy Jones
Subject: RE: FCA Land off Mold Road, Gwersyllt, Wrexham

Hi Andy,

I'll be dealing with these requests from now on.

Our systems are showing no historical flooding incidents and no underground sewers at the site.

The below map shows surface water flooding in relation to 1 in 30, 1 in 100 and 1 in 1000 year events.



If there is anything else you require let me know.

Regards,

James

From: Andy Jones [REDACTED]
Sent: 04 March 2022 11:07
To: SAE [REDACTED] >
Subject: FCA Land off Mold Road, Gwersyllt, Wrexham

Hi James

Any idea who this email should be directed to? Either a email address or person would be helpful

Thanks

Andy

7956 Land off Mold Road, Gwersyllt, Wrexham
FCA Historical Flood Information

To whom it may concern

We are undertaking a Flood Consequences Assessment and Drainage Strategy for the above site (see attached Site Location Plan) and request any information you may have in relation to historical flooding or any information you may consider relevant to assist with the production of the FCA report.

Please let me know if you require any further information or please contact me on the details below should you want to discuss further.

Regards

Andy Jones
Senior Infrastructure Engineer
COOPERS
Park House, Sandpiper Court, Chester Business Park, Chester, CH4 9QU

[REDACTED]

Rydym yn croesawu gohebiaeth yn Gymraeg. Byddwn yn ymateb i unrhyw ohebiaeth yn Gymraeg ac ni fydd hyn yn arwain at unrhyw oedi.

Ewch i weld - mi fedrwch chi dalu, rhoi gwybod, gwneud cais, dweud eich dweud, a dod o hyd i wybodaeth ar-lein yn www.wrecsam.gov.uk. Arbedwch bapur - meddyliwch cyn argraffu!

Mae'r neges e-bost hon ac unrhyw atodiadau wedi eu bwriadu ar gyfer yr unigolyn neu'r sefydliad y?i cyfeirir atynt yn unig. Am yr amodau llawn yngl?n ? chynnwys a defnyddio?r neges e-bost hon, ac unrhyw atodiadau, cyfeiriwch at www.wrecsam.gov.uk/top_navigation/disclaimersw.htm

From: Data Distribution [REDACTED]
Sent: 10 March 2022 15:13
To: Andy Jones
Subject: RE: ATI23023a Land off Mold Road, Gwersyllt, Wrexham

Dear Mr Jones,

Further to your recent email, please note that we do not have any detailed modelling for this location.

□□□□□**r**□□□□ □□□□ **D**□□□□

You can now make the most of open data provided **r**□□ □□□□□□

- Please see the [Flooding](#) pages on the NRW website for the NRW Flood Risk Map Viewer and the Development Advice Map/Flood Map for Planning. You will find many spatial risk layers including the Flood Risk Assessment Wales (FRAW) maps, reservoir hazard data, Recorded Flood Extents, flood defences and more.
- [D](#)□□□**M**□□□□ □□□□□ Spatial data is free to download, view and use within your own GIS system. The flood datasets include: Flood Risk Assessment Wales (FRAW) Maps, Flood Map for Planning (FMfP), Recorded Flood Extents, Flood Defences, Areas Benefitting from Flood Defences, FMfP TAN 15 Defences Zones and LIDAR data.
- Please note that you can find a GIS layer of our flood models in the Flood Map for Planning viewer. This is not an exhaustive list but does give a good idea as to the most relevant models for an area. This can be accessed via the following link: <https://flood-map-for-planning.naturalresources.wales/>. Select the 'Detailed Map' tab and the layer in question is called 'NRW Local Model Manager'.

□□□□□□ □□□□ □□□□ □□□□□□ □□□□

- Extreme Sea Level Information around the Welsh coastline is available from: [Coastal Design Sea Levels - Coastal Flood Boundary Gauge Data \(2018\)](#)
- All information supplied will need to be verified by the recipient **r**□□□**R** to using in a Flood Consequences Assessment (FCA). We would expect to see a review of hydrology, in-channel survey, floodplain topography etc. to demonstrate the data is suitable for the purposes of producing an FCA. Please see our website for further information on [Modelling for Flood Consequence Assessments](#) and [Developing hydraulic models for flood risk](#).
- Climate change allowances will need to be applied carefully to ensure compliance with [Welsh Government climate change allowances and flood consequence assessments](#).
- For Coastal and Estuarine sites NRW will require assessment of wave overtopping. It is up to the developer to justify why an assessment *isn't* required.
- Shoreline Management Plan (SMP) information is available on our website via our [Flood Risk Viewer Map](#) and also on Welsh Government's [DataMapWales Portal](#). You may need to consider the policy implications of the SMP when assessing the suitability and sustainability of new development on your site of interest. For proposed development sites in Gwynedd & Anglesey a Local Development Plan Policy (POLICY ARNA 1: Coastal Change Management)

sets out how the Local Planning Authority will consider new development proposals within a Coastal Change Management Area. We recommend that you contact the relevant Planning Authority for further information and guidance in relation to this.

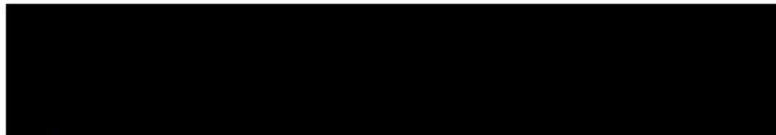
- **Discretionary Advice Service** As part of our advice service to developers, NRW offer a free initial opinion on your proposal. However, in cases where you would like to access any extra advice that falls outside of our statutory duties, we can only offer this as part of our Discretionary Planning Advice Service (DPA Service). For more information regarding free service and our discretionary planning can be found in the following links: [Welsh Version](#) / [English version](#).

Your request for our free or charged discretionary advice service needs to be accompanied by the relevant 'Request Form' which is available to download from our website. You will then need to send the form to northplanning@cyfoethnaturiolcymru.gov.uk who will coordinate our response.

Apologies we could not have been of any further assistance to you in this matter.

Yn gywir / Yours sincerely,

Michelle Lewis



Office Location Llys Afon, Hwlfordd / Office Location River Court, Haverfordwest
Cwsmer, Cyfarthrebu a Masnach - Customer, Communications and Commercial

Oriau gwaith arferol/Normal working hours – Mon-Fri, 9 to 5

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ac adnoddau naturiol yn gynaliadwy.**

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environment and natural resources sustainably.**

cyfoethnaturiol.cymru / naturalresources.wales

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From: Data Distribution
Sent: 07 March 2022 17:22
To: 'Andy Jones' <ajones@coopers.co.uk>
Subject: AT123023a Land off Mold Road, Gwersyllt, Wrexham

Dear Mr Jones,

Thank you for your email concerning the above.

For historical mapping, please see this datalink - <http://lle.gov.wales/catalogue/item/HistoricFI/?lang=en>

Please note that we do not produce product 4s anymore. Please see the attached documentation for further information on this.

We can provide if the data is available, a product 5 which is the flood model report which is free of charge. Also a product 6 if available, which is the flood model raw output data which is also free of

charge. You would need the appropriate software to analyse the results, more information on this is in the attached. We could also provide product 7 which is the full flood model for a fee of £180.00 inclusive of VAT.

Please also accept this as an acknowledgement that your request has been received.

It can take up to [20 working days](#) to supply data that is not available [online](#), therefore if you have any queries on your data request, please [contact us](#).

For further information on what you can expect from us, please visit our website:

[Natural Resources Wales / Contact us](#) or call the Customer Hub on 0300 065 3000 (open 9am-5pm, Monday to Friday).

We will therefore be in touch in due course and provide if available, products 5 & 6 and advise on product 7.

Yn gywir / Yours sincerely,

Michelle Lewis



Office Location Llys Afon, Hwlfordd / Office Location River Court, Haverfordwest
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From: Andy Jones [REDACTED]
Sent: 04 March 2022 10:54
To: Data Distribution <[REDACTED]>
Subject: FCA Land off Mold Road, Gwersyllt, Wrexham

7956 Land off Mold Road, Gwersyllt, Wrexham
FCA Historical Flood Information

To whom it may concern

We are undertaking a Flood Consequences Assessment and Drainage Strategy for the above site (see attached Site Location Plan) and request any information you may have in relation to historical flooding or any information you may consider relevant to assist with the production of the FCA report.

Please let me know if you require any further information or please contact me on the details below should you want to discuss further.

Flood Consequences Assessment and Drainage Strategy
for Land off Mold Road, Gwersyllt, Wrexham

Appendix 5

Drainage Calculation

Source Control Greenfield Run-off Calculation

Preliminary Surface Water Design

hrwallingford

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date

05/06/2026

Calculated by

AJ (Coopers)

Reference

/956

Model version

2.2.3

Location

Site name

Mold Road

Site location

Gwersyllt, Wrexham



Site easting (British National Grid)

332238

Site northing (British National Grid)

352537

Site details

Total site area (ha)

1.88

ha

Greenfield runoff

Method

IH124

IH124

My value

779

mm

Map value

779

How should SPR be derived?

WRAP soil type

WRAP soil type

4

2

SPR

0.47

QBar (IH124) (l/s)

10.3

l/s

Growth curve factors

My value

9

Map value

9

1 year growth factor

0.88

2 year growth factor

0.93

10 year growth factor

1.42

30 year growth factor

1.78

100 year growth factor

2.18

200 year growth factor

2.46

Results

Method

IH124

Flow rate 1 year (l/s)

9.1

l/s

Flow rate 2 year (l/s)

9.6

l/s

Flow rate 10 years (l/s)

14.6

l/s

Flow rate 30 years (l/s)

18.3

l/s

Flow rate 100 years (l/s)

22.4

l/s

Flow rate 200 years (l/s)

25.3

l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at uksuds.com (https://www.uksuds.com/). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	1	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.253	5.00	91.985	1500	332122.947	352506.950	1.500	90.485
2	0.029	5.00	89.500	1500	332179.195	352497.159	1.903	87.597
3	0.138	5.00	89.642	1500	332178.438	352510.720	2.090	87.552
4	0.130	5.00	90.897	1500	332175.599	352552.516	3.485	87.412
5	0.012	5.00	90.162	1500	332195.524	352580.660	2.865	87.297
6	0.098	5.00	88.605	1500	332227.597	352587.203	3.430	85.175
7	0.060	5.00	87.877	1500	332251.727	352592.125	2.764	85.113
8	0.080	5.00	87.332	1500	332272.602	352599.783	2.275	85.057
9	0.034	5.00	86.955	1500	332287.286	352603.226	1.936	85.019
10	0.031	5.00	86.600	1500	332306.953	352601.638	1.630	84.970
11	0.000		86.300	1500	332311.650	352582.266	1.380	84.920
12	0.000		86.250		332325.658	352542.444	1.450	84.800
13	0.024	5.00	87.525	1350	332240.435	352558.726	1.425	86.100
14	0.018	5.00	87.343	1500	332240.431	352540.578	1.804	85.539
15	0.100	5.00	87.188	1500	332245.940	352527.010	1.710	85.478
16	0.103	5.00	86.933	1500	332253.801	352501.885	1.565	85.368
17	0.093	5.00	86.650	1500	332283.967	352511.189	1.414	85.236
18			86.300	1500	332317.420	352517.772	1.206	85.094
19			86.250	1500	332314.538	352532.419	1.218	85.032
20			86.250		332322.836	352534.052	1.450	84.800
21		5.00	86.250		332328.773	352523.830	1.560	84.690
22			86.250	2100	332334.159	352519.419	1.577	84.673
23			86.000	1200	332341.139	352501.228	1.450	84.550

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	3	55.619	0.600	90.485	87.627	2.858	19.5	300	5.26	29.8
2.000	2	3	13.582	0.600	87.597	87.552	0.045	300.0	375	5.22	29.9
1.001	3	4	41.892	0.600	87.552	87.412	0.140	300.0	375	5.93	28.3
1.002	4	5	34.483	0.600	87.412	87.297	0.115	300.0	375	6.48	27.3
1.003	5	6	32.734	0.600	87.297	85.400	1.897	17.3	225	6.65	26.9

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	3.580	253.0	20.5	1.200	1.715	0.253	0.0	57	2.177
2.000	1.041	114.9	2.4	1.528	1.715	0.029	0.0	37	0.421
1.001	1.041	114.9	32.3	1.715	3.110	0.420	0.0	135	0.896
1.002	1.041	114.9	40.6	3.110	2.490	0.550	0.0	153	0.953
1.003	3.165	125.8	41.0	2.640	2.980	0.562	0.0	88	2.840

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.004	6	7	24.627	0.600	85.175	85.113	0.062	400.0	450	7.06	26.2
1.005	7	8	22.235	0.600	85.113	85.057	0.056	400.0	450	7.43	25.6
1.006	8	9	15.082	0.600	85.057	85.019	0.038	400.0	450	7.68	25.2
1.007	9	10	19.731	0.600	85.019	84.970	0.049	400.0	450	8.00	24.6
1.008	10	11	19.933	0.600	84.970	84.920	0.050	400.0	450	8.33	24.2
1.009	11	12	42.214	0.600	84.920	84.814	0.106	400.0	450	9.03	23.2
3.000	13	14	18.148	0.600	86.100	85.614	0.486	37.3	225	5.14	30.1
3.001	14	15	14.644	0.600	85.539	85.478	0.061	240.0	300	5.38	29.6
3.002	15	16	26.326	0.600	85.478	85.368	0.110	240.0	300	5.82	28.6
3.003	16	17	31.568	0.600	85.368	85.236	0.132	240.0	300	6.34	27.5
3.004	17	18	34.095	0.600	85.236	85.094	0.142	240.0	300	6.90	26.4
3.005	18	19	14.928	0.600	85.094	85.032	0.062	240.0	300	7.15	26.0
3.006	19	20	8.457	0.600	85.032	84.997	0.035	240.0	300	7.29	25.8
1.011	21	22	6.962	0.600	84.690	84.673	0.017	400.0	450	5.11	30.1
1.012	22	23	19.799	0.600	84.673	84.550	0.123	161.0	225	5.44	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.004	1.010	160.7	46.8	2.980	2.314	0.660	0.0	166	0.880
1.005	1.010	160.7	49.9	2.314	1.825	0.720	0.0	172	0.896
1.006	1.010	160.7	54.5	1.825	1.486	0.800	0.0	181	0.917
1.007	1.010	160.7	55.7	1.486	1.180	0.834	0.0	182	0.921
1.008	1.010	160.7	56.6	1.180	0.930	0.865	0.0	184	0.925
1.009	1.010	160.7	54.3	0.930	0.986	0.865	0.0	180	0.915
3.000	2.147	85.4	2.0	1.200	1.504	0.024	0.0	23	0.889
3.001	1.010	71.4	3.4	1.504	1.410	0.042	0.0	44	0.523
3.002	1.010	71.4	11.0	1.410	1.265	0.142	0.0	79	0.738
3.003	1.010	71.4	18.3	1.265	1.114	0.245	0.0	103	0.850
3.004	1.010	71.4	24.2	1.114	0.906	0.338	0.0	120	0.916
3.005	1.010	71.4	23.8	0.906	0.918	0.338	0.0	119	0.912
3.006	1.010	71.4	23.6	0.918	0.953	0.338	0.0	119	0.910
1.011	1.010	160.7	0.0	1.110	1.127	0.000	0.0	0	0.000
1.012	1.028	40.9	0.0	1.352	1.225	0.000	0.0	0	0.000

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	55.619	19.5	300	Circular_Default Sewer Type	91.985	90.485	1.200	89.642	87.627	1.715
2.000	13.582	300.0	375	Circular_Default Sewer Type	89.500	87.597	1.528	89.642	87.552	1.715
1.001	41.892	300.0	375	Circular_Default Sewer Type	89.642	87.552	1.715	90.897	87.412	3.110
1.002	34.483	300.0	375	Circular_Default Sewer Type	90.897	87.412	3.110	90.162	87.297	2.490
1.003	32.734	17.3	225	Circular_Default Sewer Type	90.162	87.297	2.640	88.605	85.400	2.980

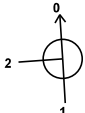
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	1500	Manhole	Adoptable	3	1500	Manhole	Adoptable
2.000	2	1500	Manhole	Adoptable	3	1500	Manhole	Adoptable
1.001	3	1500	Manhole	Adoptable	4	1500	Manhole	Adoptable
1.002	4	1500	Manhole	Adoptable	5	1500	Manhole	Adoptable
1.003	5	1500	Manhole	Adoptable	6	1500	Manhole	Adoptable

Pipeline Schedule

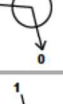
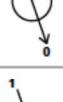
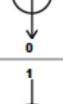
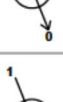
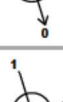
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.004	24.627	400.0	450	Circular_Default Sewer Type	88.605	85.175	2.980	87.877	85.113	2.314
1.005	22.235	400.0	450	Circular_Default Sewer Type	87.877	85.113	2.314	87.332	85.057	1.825
1.006	15.082	400.0	450	Circular_Default Sewer Type	87.332	85.057	1.825	86.955	85.019	1.486
1.007	19.731	400.0	450	Circular_Default Sewer Type	86.955	85.019	1.486	86.600	84.970	1.180
1.008	19.933	400.0	450	Circular_Default Sewer Type	86.600	84.970	1.180	86.300	84.920	0.930
1.009	42.214	400.0	450	Circular_Default Sewer Type	86.300	84.920	0.930	86.250	84.814	0.986
3.000	18.148	37.3	225	Circular_Default Sewer Type	87.525	86.100	1.200	87.343	85.614	1.504
3.001	14.644	240.0	300	Circular_Default Sewer Type	87.343	85.539	1.504	87.188	85.478	1.410
3.002	26.326	240.0	300	Circular_Default Sewer Type	87.188	85.478	1.410	86.933	85.368	1.265
3.003	31.568	240.0	300	Circular_Default Sewer Type	86.933	85.368	1.265	86.650	85.236	1.114
3.004	34.095	240.0	300	Circular_Default Sewer Type	86.650	85.236	1.114	86.300	85.094	0.906
3.005	14.928	240.0	300	Circular_Default Sewer Type	86.300	85.094	0.906	86.250	85.032	0.918
3.006	8.457	240.0	300	Circular_Default Sewer Type	86.250	85.032	0.918	86.250	84.997	0.953
1.011	6.962	400.0	450	Circular_Default Sewer Type	86.250	84.690	1.110	86.250	84.673	1.127
1.012	19.799	161.0	225	Circular_Default Sewer Type	86.250	84.673	1.352	86.000	84.550	1.225

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.004	6	1500	Manhole	Adoptable	7	1500	Manhole	Adoptable
1.005	7	1500	Manhole	Adoptable	8	1500	Manhole	Adoptable
1.006	8	1500	Manhole	Adoptable	9	1500	Manhole	Adoptable
1.007	9	1500	Manhole	Adoptable	10	1500	Manhole	Adoptable
1.008	10	1500	Manhole	Adoptable	11	1500	Manhole	Adoptable
1.009	11	1500	Manhole	Adoptable	12		Junction	
3.000	13	1350	Manhole	Adoptable	14	1500	Manhole	Adoptable
3.001	14	1500	Manhole	Adoptable	15	1500	Manhole	Adoptable
3.002	15	1500	Manhole	Adoptable	16	1500	Manhole	Adoptable
3.003	16	1500	Manhole	Adoptable	17	1500	Manhole	Adoptable
3.004	17	1500	Manhole	Adoptable	18	1500	Manhole	Adoptable
3.005	18	1500	Manhole	Adoptable	19	1500	Manhole	Adoptable
3.006	19	1500	Manhole	Adoptable	20		Junction	
1.011	21		Junction		22	2100	Manhole	Adoptable
1.012	22	2100	Manhole	Adoptable	23	1200	Manhole	Adoptable

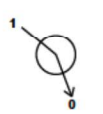
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	332122.947	352506.950	91.985	1.500	1500				
						0	1.000	90.485	300
2	332179.195	352497.159	89.500	1.903	1500				
						0	2.000	87.597	375
3	332178.438	352510.720	89.642	2.090	1500				
						1	2.000	87.552	375
						2	1.000	87.627	300
						0	1.001	87.552	375

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
4	332175.599	352552.516	90.897	3.485	1500	 1 0	1.001	87.412	375
5	332195.524	352580.660	90.162	2.865	1500	 1 0	1.002	87.297	375
6	332227.597	352587.203	88.605	3.430	1500	 1 0	1.003	85.400	225
7	332251.727	352592.125	87.877	2.764	1500	 1 0	1.004	85.113	450
8	332272.602	352599.783	87.332	2.275	1500	 1 0	1.005	85.057	450
9	332287.286	352603.226	86.955	1.936	1500	 1 0	1.006	85.019	450
10	332306.953	352601.638	86.600	1.630	1500	 1 0	1.007	84.970	450
11	332311.650	352582.266	86.300	1.380	1500	 1 0	1.008	84.920	450
12	332325.658	352542.444	86.250	1.450		 1 0	1.009	84.814	450
13	332240.435	352558.726	87.525	1.425	1350	 0 1	3.000	86.100	225
14	332240.431	352540.578	87.343	1.804	1500	 1 0	3.000	85.614	225
15	332245.940	352527.010	87.188	1.710	1500	 1 0	3.001	85.478	300
16	332253.801	352501.885	86.933	1.565	1500	 1 0	3.002	85.368	300

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
17	332283.967	352511.189	86.650	1.414	1500		1	3.003	85.236	300
							0	3.004	85.236	300
18	332317.420	352517.772	86.300	1.206	1500		1	3.004	85.094	300
							0	3.005	85.094	300
19	332314.538	352532.419	86.250	1.218	1500		1	3.005	85.032	300
							0	3.006	85.032	300
20	332322.836	352534.052	86.250	1.450			1	3.006	84.997	300
										
21	332328.773	352523.830	86.250	1.560			0	1.011	84.690	450
										
22	332334.159	352519.419	86.250	1.577	2100		1	1.011	84.673	450
							0	1.012	84.673	225
23	332341.139	352501.228	86.000	1.450	1200		1	1.012	84.550	225
										

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)
Rainfall Events	Singular	Skip Steady State	✓	Check Discharge Rate(s) ✓
Summer CV	0.750	Drain Down Time (mins)	240	Check Discharge Volume ✓
Winter CV	0.840	Additional Storage (m³/ha)	20.0	100 year 360 minute (m³)

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	30	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Region	1
Greenfield Method	IH124	Growth Factor 1 year	0.85
Positively Drained Area (ha)		Growth Factor 30 year	1.95
SAAR (mm)		Growth Factor 100 year	2.48
Soil Index	1	Betterment (%)	0
SPR	0.10	QBar	

Pre-development Discharge Rate

Q 1 year (l/s)	Q 100 year (l/s)
Q 30 year (l/s)	

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	0
Positively Drained Area (ha)		Storm Duration (mins)	360
Soil Index	1	Betterment (%)	0
SPR	0.10	PR	
CWI		Runoff Volume (m³)	

Node 22 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	84.673	Product Number	CTL-SHE-0145-1030-1200-1030
Design Depth (m)	1.200	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	10.3	Min Node Diameter (mm)	1500

Node 5 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	87.297	Product Number	CTL-SHE-0103-5000-1200-5000
Design Depth (m)	1.200	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node 21 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	43.958
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	84.690	Main Channel Slope (1:X)	400.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.035

Inlets

12 | 20

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	90.0	0.0	0.400	150.0	0.0	0.800	215.0	0.0	1.200	290.0	0.0
0.200	120.0	0.0	0.600	180.0	0.0	1.000	250.0	0.0			

Node 5 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	87.297
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	205.0	0.0	1.600	205.0	0.0	1.601	0.0	0.0

Node 8 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	85.057
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	139.0	139.0	0.800	139.0	172.4	0.801	0.0	172.4

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.92%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	90.542	0.057	20.3	0.2932	0.0000	OK
15 minute winter	2	11	87.685	0.088	2.3	0.1825	0.0000	OK
15 minute winter	3	11	87.686	0.134	32.4	0.4125	0.0000	OK
15 minute summer	4	10	87.595	0.183	40.1	0.4601	0.0000	OK
240 minute winter	5	176	87.517	0.220	13.3	43.3081	0.0000	OK
15 minute winter	6	11	85.241	0.066	7.9	0.1550	0.0000	OK
15 minute winter	7	10	85.200	0.087	12.5	0.1916	0.0000	OK
240 minute summer	8	136	85.134	0.077	11.2	10.4230	0.0000	OK
240 minute summer	9	136	85.099	0.080	10.5	0.1691	0.0000	OK
240 minute summer	10	136	85.052	0.082	11.2	0.1772	0.0000	OK
240 minute winter	11	180	85.029	0.109	10.5	0.1930	0.0000	OK
240 minute winter	12	180	85.028	0.228	10.5	0.0000	0.0000	OK
15 minute winter	13	10	86.123	0.023	1.9	0.0410	0.0000	OK
15 minute winter	14	11	85.582	0.043	3.2	0.0849	0.0000	OK
15 minute winter	15	11	85.556	0.078	11.2	0.2298	0.0000	OK
15 minute winter	16	11	85.473	0.105	18.8	0.3237	0.0000	OK
15 minute winter	17	11	85.364	0.128	25.8	0.3940	0.0000	OK
15 minute winter	18	12	85.227	0.133	25.4	0.2344	0.0000	OK
15 minute winter	19	12	85.160	0.128	25.4	0.2261	0.0000	OK
240 minute winter	20	184	85.028	0.228	8.0	0.0000	0.0000	OK
240 minute winter	21	180	85.027	0.337	13.9	0.0000	0.0000	OK
240 minute winter	22	180	85.027	0.354	10.2	1.2270	0.0000	SURCHARGED
240 minute winter	23	180	84.626	0.076	10.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	1.000	3	19.7	2.135	0.078	0.5221	
15 minute winter	2	2.000	3	2.5	0.118	0.022	0.3724	
15 minute winter	3	1.001	4	32.2	0.764	0.281	1.8237	
15 minute summer	4	1.002	5	43.3	1.714	0.377	0.9657	
240 minute winter	5	1.003	6	4.7	1.514	0.037	0.1014	
15 minute winter	6	1.004	7	7.8	0.440	0.049	0.4401	
15 minute winter	7	1.005	8	12.7	1.090	0.079	0.2923	
240 minute summer	8	1.006	9	9.7	0.524	0.060	0.2795	
240 minute summer	9	1.007	10	10.5	0.540	0.065	0.3827	
240 minute summer	10	1.008	11	11.2	0.581	0.070	0.3835	
240 minute winter	11	1.009	12	10.5	0.523	0.066	2.1935	
240 minute winter	12	Flow through Pond	21	13.9	0.071	0.002	31.6258	
15 minute winter	13	3.000	14	1.8	0.869	0.022	0.0386	
15 minute winter	14	3.001	15	3.2	0.319	0.045	0.1523	
15 minute winter	15	3.002	16	10.9	0.599	0.152	0.4810	
15 minute winter	16	3.003	17	18.8	0.746	0.264	0.7978	
15 minute winter	17	3.004	18	25.4	0.878	0.356	0.9867	
15 minute winter	18	3.005	19	25.4	0.865	0.355	0.4381	
15 minute winter	19	3.006	20	25.3	0.915	0.355	0.2343	
240 minute winter	20	Flow through Pond	21	13.9	0.071	0.002	31.6258	
240 minute winter	21	1.011	22	10.2	0.245	0.064	0.9097	
240 minute winter	22	1.012	23	10.2	0.842	0.249	0.2392	148.6

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.80%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	90.598	0.113	78.2	0.5806	0.0000	OK
360 minute winter	2	344	88.087	0.490	1.5	1.0147	0.0000	SURCHARGED
360 minute winter	3	344	88.087	0.535	20.9	1.6510	0.0000	SURCHARGED
360 minute winter	4	344	88.086	0.674	25.5	1.6947	0.0000	SURCHARGED
360 minute winter	5	344	88.086	0.789	24.8	155.2089	0.0000	SURCHARGED
480 minute winter	6	384	85.448	0.273	9.1	0.6386	0.0000	OK
480 minute winter	7	384	85.448	0.335	11.6	0.7372	0.0000	OK
480 minute winter	8	384	85.448	0.391	14.3	52.5785	0.0000	OK
480 minute winter	9	384	85.448	0.429	13.3	0.9079	0.0000	OK
480 minute winter	10	384	85.447	0.477	14.2	1.0256	0.0000	SURCHARGED
480 minute winter	11	392	85.447	0.527	13.5	0.9317	0.0000	SURCHARGED
480 minute winter	12	392	85.448	0.648	12.2	0.0000	0.0000	OK
15 minute winter	13	10	86.145	0.045	7.4	0.0800	0.0000	OK
15 minute winter	14	12	85.792	0.253	13.1	0.4984	0.0000	OK
15 minute winter	15	12	85.790	0.312	42.6	0.9177	0.0000	SURCHARGED
15 minute winter	16	12	85.758	0.390	65.3	1.2021	0.0000	SURCHARGED
15 minute winter	17	12	85.637	0.401	83.9	1.2378	0.0000	SURCHARGED
480 minute winter	18	392	85.446	0.352	14.0	0.6225	0.0000	SURCHARGED
480 minute winter	19	392	85.446	0.414	13.5	0.7320	0.0000	SURCHARGED
480 minute winter	20	392	85.447	0.647	13.2	0.0000	0.0000	OK
480 minute winter	21	392	85.446	0.756	16.8	0.0000	0.0000	SURCHARGED
480 minute winter	22	392	85.446	0.773	10.6	2.6781	0.0000	SURCHARGED
60 minute summer	23	270	84.626	0.076	10.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	1.000	3	77.4	2.274	0.306	2.6212	
360 minute winter	2	2.000	3	1.4	0.079	0.012	1.4981	
360 minute winter	3	1.001	4	19.4	0.635	0.169	4.6206	
360 minute winter	4	1.002	5	24.2	0.854	0.210	3.8034	
360 minute winter	5	1.003	6	5.0	1.542	0.040	0.1395	
480 minute winter	6	1.004	7	9.1	0.506	0.057	2.7971	
480 minute winter	7	1.005	8	11.1	0.518	0.069	3.0322	
480 minute winter	8	1.006	9	12.1	0.545	0.075	2.2771	
480 minute winter	9	1.007	10	13.1	0.554	0.081	3.0998	
480 minute winter	10	1.008	11	13.5	0.583	0.084	3.1583	
480 minute winter	11	1.009	12	12.2	0.513	0.076	6.6885	
480 minute winter	12	Flow through Pond	21	16.8	0.078	0.002	100.4754	
15 minute winter	13	3.000	14	7.5	1.261	0.088	0.3502	
15 minute winter	14	3.001	15	14.6	0.383	0.205	0.9804	
15 minute winter	15	3.002	16	37.4	0.732	0.524	1.8539	
15 minute winter	16	3.003	17	59.6	0.889	0.835	2.2230	
15 minute winter	17	3.004	18	82.5	1.172	1.155	2.4009	
480 minute winter	18	3.005	19	13.5	0.693	0.189	1.0512	
480 minute winter	19	3.006	20	13.2	0.717	0.185	0.5955	
480 minute winter	20	Flow through Pond	21	16.8	0.078	0.002	100.4754	
480 minute winter	21	1.011	22	10.6	0.257	0.066	1.1031	
480 minute winter	22	1.012	23	10.3	0.844	0.252	0.2413	359.6

Results for 100 year +30% CC Critical Storm Duration. Lowest mass balance: 99.64%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	90.634	0.149	127.6	0.7640	0.0000	OK
720 minute winter	2	585	88.793	1.196	1.5	2.4773	0.0000	SURCHARGED
720 minute winter	3	585	88.793	1.241	21.2	3.8310	0.0000	SURCHARGED
720 minute winter	4	585	88.792	1.380	26.9	3.4690	0.0000	SURCHARGED
720 minute winter	5	585	88.792	1.495	27.2	293.9463	0.0000	SURCHARGED
720 minute winter	6	690	85.928	0.753	9.4	1.7613	0.0000	SURCHARGED
720 minute winter	7	690	85.928	0.815	11.8	1.7936	0.0000	SURCHARGED
720 minute winter	8	690	85.928	0.871	15.2	107.8568	0.0000	SURCHARGED
720 minute winter	9	690	85.928	0.909	12.1	1.9245	0.0000	SURCHARGED
720 minute winter	10	690	85.927	0.957	12.6	2.0567	0.0000	SURCHARGED
720 minute winter	11	690	85.927	1.007	11.9	1.7799	0.0000	SURCHARGED
720 minute winter	12	690	85.928	1.128	10.9	0.0000	0.0000	OK
15 minute winter	13	12	86.618	0.518	18.0	0.9165	0.0000	SURCHARGED
15 minute winter	14	12	86.610	1.071	19.7	2.1063	0.0000	SURCHARGED
15 minute winter	15	12	86.610	1.132	57.4	3.3238	0.0000	SURCHARGED
15 minute winter	16	12	86.539	1.171	99.8	3.6098	0.0000	SURCHARGED
15 minute winter	17	12	86.288	1.052	130.5	3.2419	0.0000	SURCHARGED
720 minute winter	18	660	85.926	0.832	16.1	1.4709	0.0000	SURCHARGED
720 minute winter	19	660	85.926	0.894	15.9	1.5801	0.0000	SURCHARGED
720 minute winter	20	690	85.927	1.127	15.8	0.0000	0.0000	OK
720 minute winter	21	690	85.926	1.236	16.7	0.0000	0.0000	SURCHARGED
720 minute winter	22	690	85.926	1.253	10.6	4.3407	0.0000	SURCHARGED
15 minute summer	23	231	84.626	0.076	10.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	1.000	3	126.5	2.347	0.500	2.9262	
720 minute winter	2	2.000	3	1.3	0.081	0.011	1.4981	
720 minute winter	3	1.001	4	20.3	0.530	0.177	4.6206	
720 minute winter	4	1.002	5	26.6	0.770	0.232	3.8034	
720 minute winter	5	1.003	6	5.5	1.541	0.044	0.7071	
720 minute winter	6	1.004	7	8.9	0.503	0.056	3.9020	
720 minute winter	7	1.005	8	11.5	0.509	0.071	3.5230	
720 minute winter	8	1.006	9	11.1	0.534	0.069	2.3896	
720 minute winter	9	1.007	10	11.7	0.540	0.073	3.1262	
720 minute winter	10	1.008	11	11.9	0.557	0.074	3.1583	
720 minute winter	11	1.009	12	10.9	0.500	0.068	6.6885	
720 minute winter	12	Flow through Pond	21	16.7	0.056	0.002	215.8532	
15 minute winter	13	3.000	14	12.9	1.236	0.151	0.7218	
15 minute winter	14	3.001	15	23.8	0.382	0.333	1.0312	
15 minute winter	15	3.002	16	51.9	0.737	0.726	1.8539	
15 minute winter	16	3.003	17	88.5	1.257	1.239	2.2230	
15 minute winter	17	3.004	18	122.4	1.739	1.715	2.4009	
720 minute winter	18	3.005	19	15.9	0.658	0.223	1.0512	
720 minute winter	19	3.006	20	15.8	0.679	0.222	0.5955	
720 minute winter	20	Flow through Pond	21	16.7	0.056	0.002	215.8532	
720 minute winter	21	1.011	22	10.6	0.120	0.066	1.1031	
720 minute winter	22	1.012	23	10.3	0.845	0.252	0.2414	500.4