PREMIER INN, WREXHAM

PROPOSED SW DRAINAGE REPORT

NOVEMBER 2012

FAIRHURST

CONTROL SHEET

CLIENT: **Marcus Worthingtons & Co Ltd**

PROJECT TITLE: **Premier Inn, Wrexham**

REPORT TITLE: **Proposed SW Drainage Report**

PROJECT REFERENCE: **91568/08**

Issue and Approval Schedule:

ISSUE 1	Name	Signature	Date
Prepared by	A Branston / C Meredith	C Meredith	23/11/12
Reviewed by	Frazer Thompson	F Thompson	23/11/12
Approved by	P Ward	P Ward	23/11/12

Revision Record:

Issue	Date	Status	Description	By	Chk	App
2						
3						
4						
5						
6						
7						
8						

This report has been prepared in accordance with procedure OP/P02 of Fairhurst's Quality Management System

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DESIGN ASSESSMENT FORM

Project: Premier Inn, Wrexham	**Job No. 91568** **By/Date: A Branston 22/11/12** **Approved/Date: 22/11/12**
Fairhurst Scope of Works:	Civil design of proposed Premier Inn car park and access road with associated drainage.
Description:-	Works consist of design and construction of car park and access road along with surface water drainage systems.
Scope of Services	**Civil design of the proposed car park, access road and drainage within** • Levels/ Civils Design • Drainage Design
Design Philosophy:	The purpose of this calculation is to determine a schematic surface drainage network for the development and to calculate the amount of SW attenuation required.
Site Location	The site is in situated off Regent Street, Wrexham.
Site Restrictions	The site is bound by railway line to the East and West, public highway to the North and another development site to the South.
Drainage Issues	The SW drainage is required to discharge to a watercourse some 120m south of the site, and the SW sewer will be required to run through the adjacent development site.
Site Investigation	Site Investigation report issued by Fairhurst, February 2012

Project: Premier Inn, Wrexham	Job No. 91568
	By/Date A Branston 22/11/12
	Approved/Date 22/11/12

Fairhurst Scope of Works

Below Ground Surface Water Drainage System Design

Introduction

The existing site is a former scrap metal yard, approximately 1.17Ha in area. It comprises of impermeable hardstanding with some rough permeable ground.

The proposed site occupies part of the former scrapyard. It is to be a hotel with associated car park and delivery area. Access will be from Regent street via a new proposed junction and access road.

Design

The existing site hardstanding is approximately 2285m² or 0.229ha. Using the rational method this gives a 1 in 1 year run off from site of:-

0.229 x (50x2.75) = 31.8 l/s

SW runoff will discharge to the existing watercourse subject to approval by Wrexham County Council and the Environment Agency (EA). Following EA guidance the discharge from site is to be reduced by 30% post development from existing rates.

31.8 x 0.7 = 22 l/s. Allowable discharge from the whole site following development

The Proposed Premier Inn site has an impermeable area of approximately 4387m² or 0.439ha. The impermeable area for the adjacent development site is unknown. A layout of the site can be found in Appendix A.

The allowable surface water discharge above is for the Premier Inn site and the adjacent development. The discharge rate of 22 l/s will be divided as follows:

Premier Inn site = 12 l/s

Adjacent development site = 10 l/s

Each site will require attenuation to comply with discharge limit and discharge independently.

SW attenuation for the Premier Inn site will be sized based on the discharge limited to 12 l/s for storm events upto the 1 in 100 year return period with 20% climate change allowance. Discharge will be limited via a flow control device downstream of the attenuation and will flow to the open watercourse to the south of the site via a piped connection with flap valve.

Micro Drainage calculations can be found in Appendix B. These show that a maximum of 144.3 cubic metres of attenuation is required to satisfy requirements.

Project: Premier Inn, Wrexham	**Job No. 91568**
	By/Date A Branston 22/11/12
	Approved/Date 22/11/12

Checklist of potential operations and hazards

Potential Hazards	Present	Key Significant Hazards to be Addressed
Client operations		
Adjacent activities	X	
Restricted site		
Traffic		
Interface with public		
Near to highways	X	
Near to railways	X	
Near to waterways	X	
Tidal working		
Ground instability		
Contamination	X	Refer to Risk Register
Soil gas		
Ground water	X	
Inundation		
Sewage		
Fuel tanks		
Services	X	Refer to Risk Register
Overhead cables		
Demolition		
Unstable structures		
Explosives		
Asbestos		
Bird droppings		
Dust		
Hazardous materials		

Radiation		
Hot working		
Confined spaces	X	
Working at height	X	Refer to Risk Register
Manual handling	X	
Lifting operations	X	
Vibration	X	
Noise	X	
Other (state)		
Underground Structures		

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	By/Date: A Branston 22/11/12
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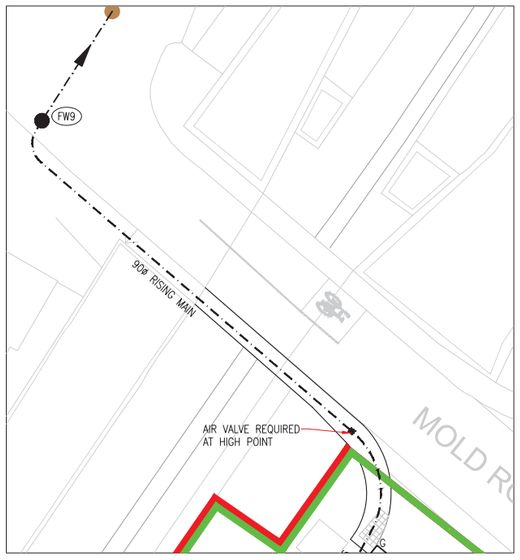
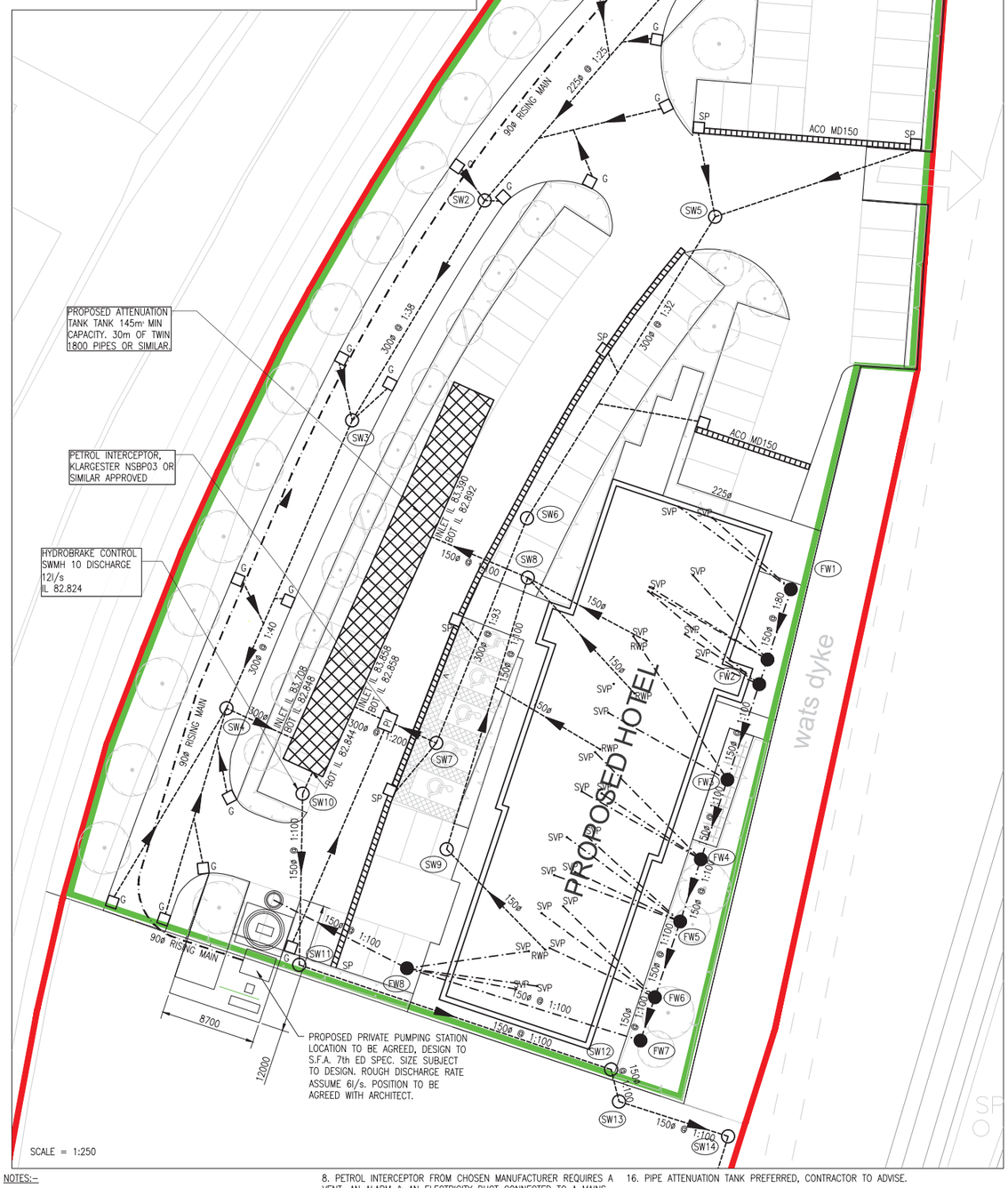
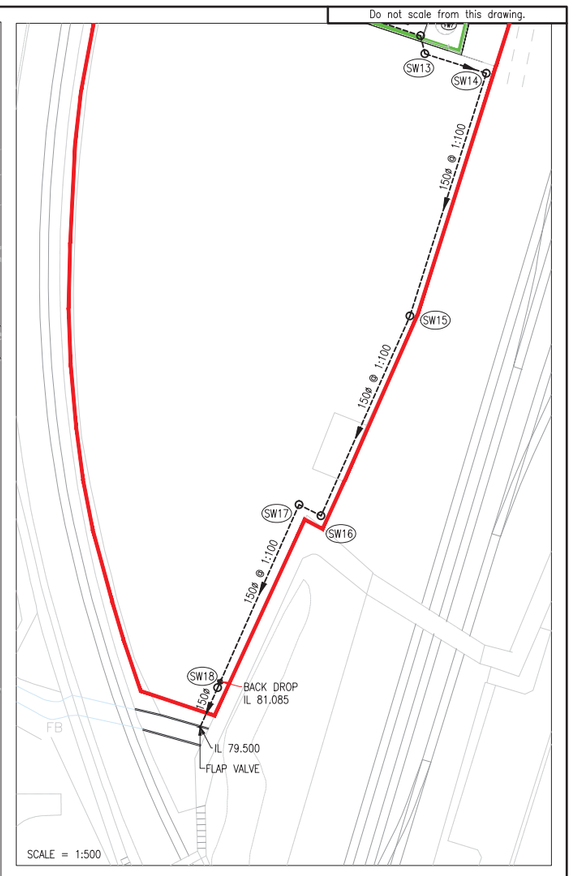
Stage		Sheet
Hazard	**Action by Designer**	**Residual Hazard**
Deep Excavations/ Working at Height	1. To eliminate hazard	
	2. To reduce hazard All manholes designed to be minimum depth and gradients kept to a minimum where possible.	Deep Excavations
Live Services	1. To eliminate hazard	
	2. To reduce hazard Utility company service records checked prior to design commencement to ensure no clashes. Trial pits have been dug to discover size, location and depth of existing BT, electric and water services	Live Services Crossing Site
Contamination	1. To eliminate hazard	
	2. To reduce hazard SI has been undertaken to establish type and location of contamination.	Low level contamination in made ground.

APPENDIX A

Do not scale from this drawing.







- PROPOSED FOUL SEWER
- PROPOSED SURFACE WATER SEWER
- EXISTING FOUL SEWER
- EXISTING SURFACE WATER SEWER
- EX. S.W. SEWER TO BE ABANDONED
- PROPOSED FOUL WATER SEWER DIVERSION
- PROPOSED SURFACE WATER SEWER DIVERSION
- PROPOSED CHANNEL DRAIN
- PROPOSED KERB DRAIN
- SP PROPOSED SILT PIT
- G PROPOSED GULLY
- RWP RAIN WATER PIPE
- SVP SOIL & VENT PIPE

THIS DRAINAGE LAYOUT IS BASED ON THE FOLLOWING INFORMATION	
ARCHITECTS LAYOUT	FLETCHER SMITH 3240/001 REV E
TOPO SURVEY	FLETCHER SMITH TOPO WITH SITE BOUNDARY 15-06-2012

ONGOING DESIGN

THIS REGISTER IS A NON-EXHAUSTIVE LIST OF RESIDUAL HAZARDS RELATING TO THE WORKS SHOWN ON THIS DRAWING THAT HAVE BEEN IDENTIFIED DURING THE DESIGN STAGE	
SIGNIFICANT RESIDUAL HAZARDS	DETAILS
CONTAMINATION	LOW LEVEL CONTAMINATION OF MADE GROUND. REFER TO S.I.
EXISTING UNDERGROUND SERVICES (LIVE CROSSING SITE)	REFER TO EXISTING RECORDS
UNDERGROUND STRUCTURES	LOCALISED OBSTRUCTIONS ASSOCIATED WITH HISTORICAL DEVELOPMENT
DEEP EXCAVATIONS	ALL MANHOLES TO BE DESIGNED TO MIN DEPTH
WORKING NEAR WATER	REFER TO PLANS
WORKING NEAR HIGHWAY	REFER TO PLANS
WORKING NEAR RAILWAY	REFER TO PLANS

NOTES:-

1. UNLESS NOTED OTHERWISE ALL EXISTING GULLYS ARE DRAINING EXISTING AREAS TO BE RETAINED SUBJECT TO CONDITION.

2. ALL MANHOLE COVERS TO BE GRADE D400 HEAVY DUTY.

3. EXISTING DRAINAGE INFORMATION IS REQUIRES SURVEYING PRIOR TO CONSTUCTION. ALL INVERT LEVELS TO BE CONFIRMED PRIOR TO ANY CONSTRUCTION OF PROPOSED DRAINAGE SCHEME.

4. ALL PIPES UP 300mm DIA. TO BE EITHER VITRIFIED CLAY OR UPVC(SOLID WALL OR CONCENTRIC RIB TO BRITISH. STANDARD). ALL PIPES OVER 300mm DIA. TO BE CONCRETE.

5. ALL MANHOLES TO BE CONSTRUCTED FROM CONCRETE UNLESS NOTED OTHERWISE ON DRAINAGE DETAILS.

6. ALL NEW GULLYS TO BE CONCRETE/CLAY TO HIGHWAYS SPECIFICATION.

7. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS.

8. PETROL INTERCEPTOR FROM CHOSEN MANUFACTURER REQUIRES A VENT, AN ALARM & AN ELECTRICITY DUCT CONNECTED TO A MAINS SUPPLY.

9. INVERT LEVELS RELATE TO THE LARGEST PIPE IN EACH MANHOLE ALL OTHER SMALLER PIPES ARE TO BE LAID WITH SOFFITS LEVEL TO LARGEST PIPE.

10. ALL EXISTING SEWERS/MANHOLES TO BE CHECKED & CLARIFIED TO CONFIRM INVERT LEVELS/POSITIONS.

11. IF ADVERSE GROUND CONDITIONS ARE ENCOUNTERED POSSIBLE TRENCH

12. STABILISATION WITH TERRAM LAYER/DE-WATERING COULD BE REQUIRED. CONTRACTOR TO NOTIFY FAIRHURST ENGINEER IMMEDIATELY.

13. ALL PIPES WITH LESS THAN 1200mm OF COVER TO CROWN TO HAVE A CONCRETE SURROUND WITH EXPANSION JOINTS.

14. ATTENUATION/DISCHARGE FIGURE SUBJECT TO ENVIRONMENT AGENCY ACCEPTANCE.

15. DRAINAGE CONNECTIONS FW/SW SUBJECT TO S106 AGREEMENT.

16. PIPE ATTENUATION TANK PREFERRED, CONTRACTOR TO ADVISE.

17. DOWNPIPES/SVP'S/RWP'S POSITIONS ARE INDICATIVE ONLY AWAITING DETAILS FROM ARCHITECT.

18. ALL NEW DRAINAGE TO BE CCTV'D, CLEANED OF ALL CONSTRUCTION DEBRIS AND COPY SENT TO FAIRHURST FOR AS BUILT PURPOSES.

19. ALL GULLYS & DRAINAGE CHANNELS WITHIN CAR PARK AND PEDESTRIAN AREAS TO BE FITTED WITH 'HEELGUARD' TYPE COVERS.

20. COVER LEVELS OF MANHOLES LABELED * ARE DEPENDANT ON GROUND LEVELS OF FUTURE DEVELOPMENT. COVER LEVELS LABELED ** ARE DEPENDANT ON LEVELS AGREED WITHING S278 AGREEMENT

THIS DRAWING HAS BEEN CREATED IN ABEYANCE OF THE FOLLOWING INFORMATION; WHEN RECEIVED ARRANGEMENTS SHOWN ON THIS LAYOUT MAY ALTER.	
CO-ORDINATED POP UP AND RWP POSITIONS	POSITIONS OF CONNECTIONS NOT AVAILABLE AT TIME OF DESIGN. POP UP/RWP POSITIONS WILL AFFECT POSITION OF THE DRAINAGE NETWORK. EXTRA MANHOLES MAY BE REQUIRED
FINISHED FLOOR LEVEL TO BE AGREED WITH ARCHITECT	FFL WILL AFFECT COVER LEVELS AROUND THE BUILDING. THIS MAY AFFECT POSITION OF SURFACE WATER DRAINAGE CHANNELS
FINALISED FOUNDATION PLAN	WILL AFFECT POSITION OF DRAINS RUNNING UNDER BUIILDINGS. AWAITING DETAILS FROM ARCHITECT
PUMPING STATION DESIGN	DEPTH, DESIGN AND POSITION OF PUMPING STATION TO BE AGREED WITH CLIENT AND ARCHITECT. SEE PUMPING STATION DETAIL 2012
S278/ROAD DESIGN	LEVELS AGREED WITHIN THE S278 AGREEMENT WILL AFFECT THE ROAD DESIGN WHICH IN TURN WILL AFFECT MANHOLE COVER LEVELS/ DEPTHS. ROAD DESIGN ON GOING

Rev.	Date	Description	Drawn	Checked	Approved
A	23/11/12	GULLEY ADDED. IL OF FLOW CONTROL AMMENDED	JAS	CM	PDW

Notes:

Client: MARCUS WORTHINGTON & CO. LTD. BUILDING CONTRACTORS

Project Title: SOLUS PREMIER INN HOTEL
JACQUES YARD
REGENT STREET
WREXHAM

Drawing Title: PROPOSED DRAINAGE LAYOUT

FAIRHURST
51a St. Pauls Street,
LEEDS, LS1 2TE
Tel: 0113 243 4671 Fax: 0844 381 4412

Scale at A1:	Status:	
1:500	For Information	
Drawn: JS	Checked: JS	Approved: FT
Date: 19/06/12	Date: 28/06/12	Date: 28/06/12
Drawing No.: 91568/2003		Revision: A

APPENDIX B

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	83.750	0.876	8.5	72.3	O K
30 min Summer	83.956	1.082	9.4	94.8	O K
60 min Summer	84.139	1.265	10.1	114.2	O K
120 min Summer	84.236	1.362	10.5	123.8	O K
180 min Summer	84.242	1.368	10.5	124.4	O K
240 min Summer	84.219	1.345	10.4	122.2	O K
360 min Summer	84.157	1.283	10.2	116.0	O K
480 min Summer	84.098	1.224	9.9	110.0	O K
600 min Summer	84.040	1.166	9.7	103.9	O K
720 min Summer	83.984	1.110	9.5	97.9	O K
960 min Summer	83.881	1.007	9.1	86.6	O K
1440 min Summer	83.703	0.829	8.3	67.1	O K
2160 min Summer	83.494	0.620	7.3	44.8	O K
2880 min Summer	83.323	0.449	6.6	27.9	O K
4320 min Summer	83.049	0.175	6.3	6.2	O K
5760 min Summer	82.970	0.096	5.4	2.0	O K
7200 min Summer	82.942	0.068	4.5	1.0	O K
8640 min Summer	82.927	0.053	3.9	0.6	O K
10080 min Summer	82.917	0.043	3.5	0.4	O K
15 min Winter	83.837	0.963	8.9	81.8	O K
30 min Winter	84.077	1.203	9.9	107.8	O K
60 min Winter	84.312	1.438	10.7	131.0	O K
120 min Winter	84.464	1.590	11.3	143.7	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
15 min Summer	97.985	21
30 min Summer	66.783	34
60 min Summer	43.553	62
120 min Summer	27.465	104
180 min Summer	20.664	136
240 min Summer	16.764	172
360 min Summer	12.403	240
480 min Summer	10.018	310
600 min Summer	8.481	378
720 min Summer	7.397	446
960 min Summer	5.956	578
1440 min Summer	4.379	836
2160 min Summer	3.212	1208
2880 min Summer	2.574	1564
4320 min Summer	1.880	2208
5760 min Summer	1.502	2936
7200 min Summer	1.262	3656
8640 min Summer	1.096	4336
10080 min Summer	0.972	5128
15 min Winter	97.985	21
30 min Winter	66.783	34
60 min Winter	43.553	62
120 min Winter	27.465	114

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Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
180 min Winter	84.472	1.598	11.3	144.3	O K
240 min Winter	84.434	1.560	11.2	141.4	O K
360 min Winter	84.320	1.446	10.8	131.7	O K
480 min Winter	84.217	1.343	10.4	122.0	O K
600 min Winter	84.123	1.249	10.0	112.6	O K
720 min Winter	84.037	1.163	9.7	103.5	O K
960 min Winter	83.883	1.009	9.1	86.9	O K
1440 min Winter	83.636	0.762	8.0	59.9	O K
2160 min Winter	83.348	0.474	6.7	30.3	O K
2880 min Winter	83.062	0.188	6.4	7.0	O K
4320 min Winter	82.952	0.078	4.9	1.3	O K
5760 min Winter	82.926	0.052	3.9	0.5	O K
7200 min Winter	82.912	0.038	3.3	0.3	O K
8640 min Winter	82.903	0.029	2.9	0.2	O K
10080 min Winter	82.896	0.022	2.5	0.1	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
180 min Winter	20.664	144
240 min Winter	16.764	182
360 min Winter	12.403	260
480 min Winter	10.018	334
600 min Winter	8.481	406
720 min Winter	7.397	476
960 min Winter	5.956	614
1440 min Winter	4.379	878
2160 min Winter	3.212	1256
2880 min Winter	2.574	1532
4320 min Winter	1.880	2204
5760 min Winter	1.502	2856
7200 min Winter	1.262	3560
8640 min Winter	1.096	4352
10080 min Winter	0.972	4992

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Shortest Storm (mins)	15
Ratio R	0.324	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+20

Time / Area Diagram

Total Area (ha) 0.440

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.220	4-8	0.220

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Model Details

Storage is Online Cover Level (m) 85.640

Double Pipe Structure

Diameter (m) 1.800 Length (m) 30.000
Slope (1:X) 500.000 Invert Level (m) 82.874

Hydro-Brake® Outflow Control

Design Head (m) 1.800 Hydro-Brake® Type Md5 SW Only Invert Level (m) 82.824
Design Flow (l/s) 12.0 Diameter (mm) 121

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.8	1.200	9.7	3.000	15.3	7.000	23.3
0.200	6.2	1.400	10.4	3.500	16.5	7.500	24.1
0.300	6.4	1.600	11.1	4.000	17.6	8.000	24.9
0.400	6.3	1.800	11.8	4.500	18.7	8.500	25.7
0.500	6.6	2.000	12.5	5.000	19.7	9.000	26.4
0.600	7.0	2.200	13.1	5.500	20.7	9.500	27.2
0.800	7.9	2.400	13.7	6.000	21.6		
1.000	8.8	2.600	14.2	6.500	22.5		

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