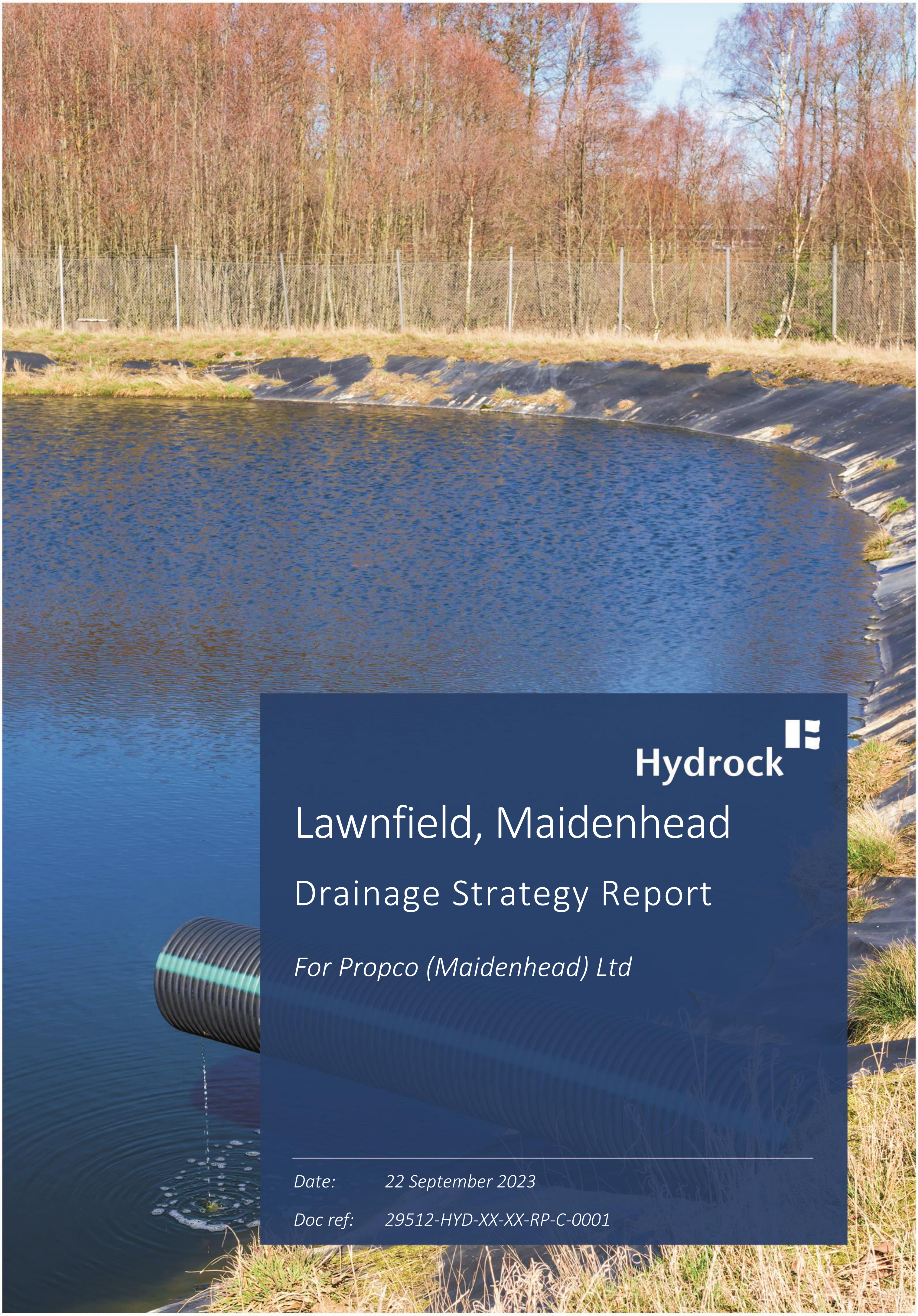

Hydrock

Lawnfield, Maidenhead

Drainage Strategy Report

For Propco (Maidenhead) Ltd

Date: *22 September 2023*

Doc ref: *29512-HYD-XX-XX-RP-C-0001*

DOCUMENT CONTROL SHEET

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Client	Propco (Maidenhead) Ltd	
Project name	Lawnfield, Maidenhead	
Title	Drainage Strategy Report	
Doc ref	29512-HYD-XX-XX-RP-C-0001	
Project no.	29512	
Status	For Planning	
Date	22/09/2023	

Document Production Record

Issue Number	P02	Name
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Document Revision Record

Issue Number	Status	Date	Revision Details
P01	S2	22.09.2023	First Issue
P02	S2	11.01.2024	Basement updated

Hydrock Consultants Limited has prepared this report in accordance with the instructions of the above named client for their sole and specific use. Any third parties who may use the information contained herein do so at their own risk.

CONTENTS

1. INTRODUCTION

This Drainage Strategy Report has been prepared by Hydrock Consultants Limited (Hydrock) on behalf of our client Propco (Maidenhead) Ltd in support of a Planning Application for the development of a residential care home located at Lawnfield House, Maidenhead. This report has been prepared to address the requirements for storm and foul water discharge and provide guidance on how the proposed development site could effectively drain through on-site sustainable drainage techniques and off-site foul drainage infrastructure.

The drainage strategy is a guide on how compliant drainage scheme could be designed on site in accordance with the Flood and Water Management Act 2010, National Planning Policy Framework (NPPF), the Lead Local Flood Authority (LLFA) and Local Planning Authority (LPA) requirements.

The information received is summarised within this report. In the event that the information is relied upon and is subsequently found to be incorrect, Hydrock Consultants Ltd accepts no responsibility for any direct and/or consequential loss that may occur as a result.

The information has been reviewed against the following industry design standard to ensure the drainage is compliant;

- Building regulations Part H: Drainage & Waste Disposal;
- Sewers for Adoption/Design and Construction Guidance;
- The requirements of Wessex Water;
- CIRIA C753: The SuDS Manual; and
- Lead Local Flood Authority requirements;
- BS EN 752 - Drain and Sewer Systems Outside Buildings.
- Local Authority Guidance.
- National Planning Policy Framework (NPPF).
- DEFRA Non-Statutory Technical Standards for Sustainable Drainage.

2. SITE INFORMATION

2.1 Location

The site is located in Maidenhead, with the A4 Bath Road to the North and Westmorland Road to the West. The site is bound by residential to the south and commercial properties to the east.

The site address and Ordnance Survey Grid Reference is provided in Table 1 with the site location included in Figure 1.

SITE REFERENCING INFORMATION	
Site address	Lawnfield House, Westmorland Road, Maidenhead, SL6 4HB
Grid Reference	487846, 181046

Table 1: Site referencing Information

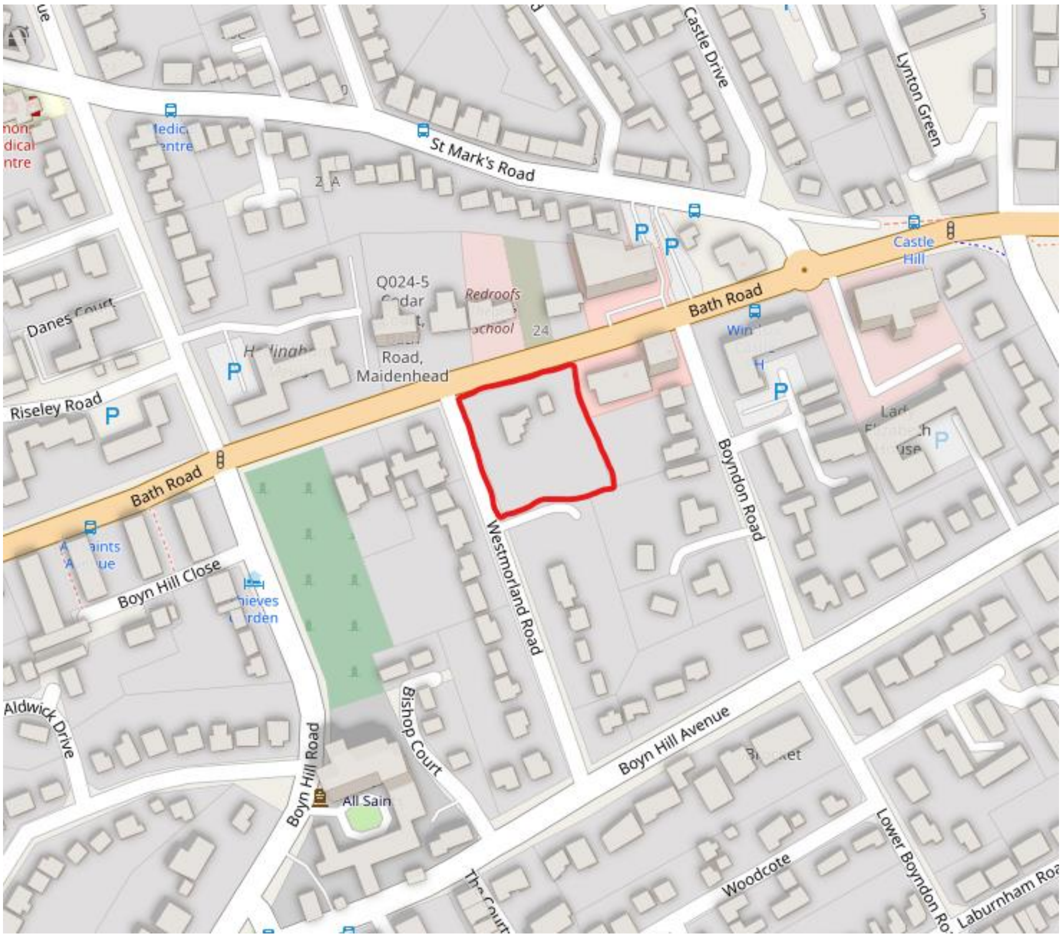


Figure 1: Site Location

Contains OS data © Crown copyright (2020)

2.2 Existing site conditions

The existing topography of the site generally slopes from east to west, with a fall at the north of the site of 50.600m AOD to 50.170m AOD over 84m to give a fall of 1:195. The levels fall away from the existing residential property.

A site investigation and ground assessment has been undertaken by bEk Enviro Ltd (ref. BEK-23079-2). The ground conditions consist of a reddish brown slightly clayey significantly gravelly sand/ greyish brown gravelly sand topsoil underlaid by gravelly sand. Further borehole logs within 250m of the site show firm rubbly chalk underlaying the clayey sandy gravel.

3. PROPOSED DEVELOPMENT

It is proposed to erect a 3-storey 71 bedroom residential care home with associated car parking, access, and landscaped areas.

4. FLOOD RISK

The Environment Agency flood risk mapping as shown within **Appendix C** of this report shows the site is located within flood risk zone 1 which is a low probability of flooding.

- The site is **not** bigger than 1 hectare (ha)
- The site is **not** in an area with critical drainage problems as notified by the Environment Agency
- The site is **not** identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- The site is **not** at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

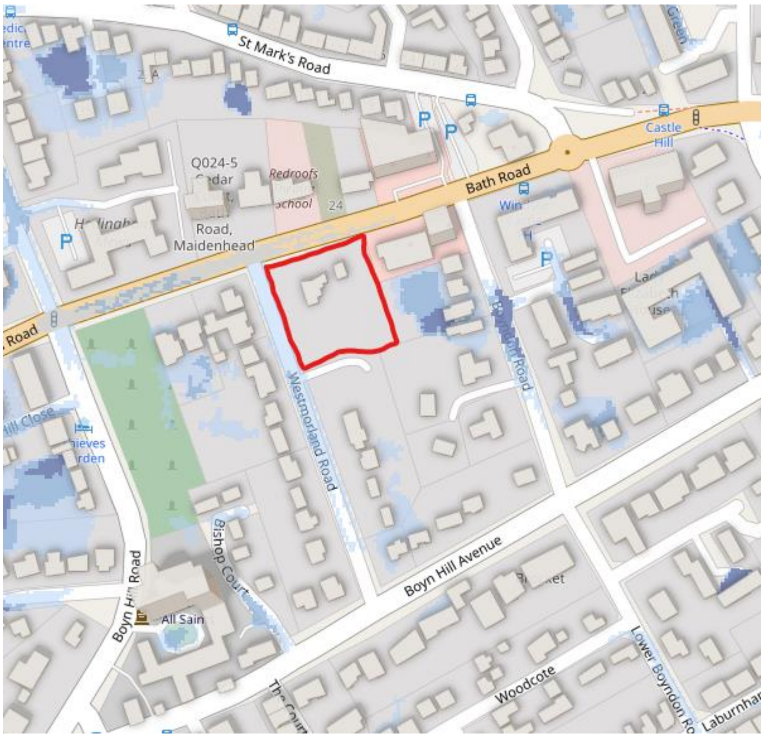


Figure 2: Surface water flooding map

Based on the above information no further flood risk assessments are required.

5. FOUL WATER DRAINAGE

5.1 Overview

Foul water drainage from the building is to discharge, via a gravity system, to a proposed manhole connecting into the existing Thames Water 150Ø foul sewer located in Westmorland Road. Refer to Appendix B for Thames Water sewer mapping. A Section 104 agreement will be required for the adoption of the foul pipe within the Highway and Section 106 agreement for connection to the Public Sewer.

A foul pumping system will be required to discharge the foul drainage from the proposed basement. The proposed pump will be within the site boundary, and the rising main will connect into private foul network.

The occupant number for the proposed development is 70 residents and 30 members of staff during peak hours. The flow rate for a residential care home is 350 litres per day per occupant, based on British Water Flows and Loads. The care home's foul discharge will peak for 8 hours of the day, which gives a peak foul discharge of 7.29 l/s. The part-full conditions of a 150Ø with a 1:150 gradient gives a pipe capacity of 10.57 l/s which is greater than the peak foul discharge rate.

The foul drainage layout and arrangement is shown in Appendix A.

6. STORM WATER DRAINAGE

6.1 Objective

The objective of the concept drainage strategy is to provide guidance on how the proposed development site could effectively drain through on-site sustainable drainage techniques and to off-site drainage infrastructure, based on the drainage and ground condition information collected and reviewed to date. This document includes a fixed and calculated drainage strategy, in line with current legislation. The design of a successful compliant drainage system for this site is entirely dependent on sustainable drainage principles and requirements being fully incorporated into the site layout to meet the provisions of the Local Planning Authority and the Flood and Water Management Act 2010.

6.2 Suitable Run-off Destinations

An appraisal has been undertaken to confirm the most suitable and sustainable method for managing surface water runoff from the development in accordance with the following hierarchy as highlighted in Part H of Building Regulations and the National Planning Policy Framework (NPPF). This assesses the different surface water management techniques that can avoid, reduce, or delay the surface water discharge from site. The options of discharging storm water off site in order of priority is as follows:

1. Infiltration to the ground using a sustainable drainage system.
2. If this is not feasible, discharge to a watercourse or river; generally, at a controlled rate unless it does not affect flood risk e.g., if to the sea or an estuary.
3. Discharge at a controlled rate to a surface water sewer or drain.
4. Discharge at a controlled rate to a combined sewer system, with the approval from the Water Authority.
5. Only if the above have all been investigated and it has been proved that none of these options are suitable will discharge at a controlled rate to a foul sewer system, with the approval from the Water Authority.

The techniques consider the use of soakaways in accordance with the Building Regulations Approved Document H order of priority. As mentioned in Section 2.2, the existing ground conditions are suitable for the use of soakaways and the proposed storm network will discharge using cellular soakaway crates.

Method	Reasoning	
Interception / Re-use	Deemed inappropriate	X
Infiltration	Ground is unsuitable for infiltration methods	✓
Surface water body	Will discharge into Dean Brook Tributary to the south.	X
To dedicated surface water sewer (public, highways or otherwise)	There are no storm water sewers in the vicinity	X
To a combined sewer	Not required	X
To a foul sewer	Not required	X

6.3 Infiltration Rates

The infiltration rates were recorded as part of the site's ground investigation report (REF BEK-23079-2) and the results are shown in Table 2 below. The results were taken from two trial pits with a repeated test undertaken at TP1. The location of TP1 is near the proposed soakaway location. Further infiltration testing will need to be undertaken at the exact location of the soakaway to ensure the effectiveness of the proposed soakaway.

Trial pit location	Recorded infiltration rate (m/hour)
TP1 – test 1	0.4607
TP1 – test 2	0.3877
TP2 – test 1	0.1300

Table 2: Infiltration rate results

A conservative approach has been used for the infiltration rate required for the storm water calculations. An infiltration rate of 0.3877 m/hour has been used.

6.4 Suitability of Sustainable Drainage Systems (SuDS) Components

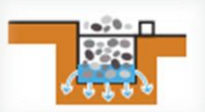
There is now a mandatory requirement to provide a sustainable drainage system throughout the development and not just at the "end" of the drainage system via length of pipe work. It is highly unlikely that the traditional "pipe and tank" system will be accepted by the LLFA and Local Planning Authority. The key points of the surface water drainage strategy will be to:

- Utilise the external areas of the site that will be subject to rainfall to treat and improve the water quality and to store the surface water flows as close to source as possible.
- Minimise the runoff from all impermeable areas through the widespread use of open SuDS drainage features.
- To enhance the biodiversity and amenity value by incorporating suitable SuDS features into the development.
- Avoid hard engineered pipes and tanks. The strategy described in this report is based on the principles of the CIRIA SuDS Manual C753

The implementation and selection of SuDS techniques is largely dependent on the site layout and context. Some SuDS techniques may be more appropriate than others.

The suitability of SuDS components has been assessed as follows:

Hierarchy	Description	Setting	Required area	Implemented	
Green roofs 	A planted soil layer is constructed on the roof of a building to create a living surface. Water is stored in the soil layer and absorbed by vegetation.	Building	Building integrated.	No. Recommend for Architect to include where possible.	X
Rainwater harvesting 	Rainwater is collected from the roof of a building or from other paved surfaces and stored in an over ground or underground tank for treatment and reuse locally. Water could be used for toilet flushing and irrigation.	Building	Water storage (Underground or above ground).	No. Recommend for Architect to include where possible.	X

Hierarchy	Description	Setting	Required area	Implemented	
Soakaway 	A soakaway is designed to allow water to quickly soak into permeable layers of soil. Constructed like a dry well, an underground pit is dug filled with gravel or rubble. Water can be piped to a soakaway where it will be stored and allowed to gradually seep into the ground.	Open space	Dependent on runoff volumes, water table and soils.	Yes, Soakaway will be used to discharge the storm water.	✓
Filter Strips 	Filter drains are shallow stone filled trenches that provide attenuation, conveyance, and treatment of runoff	Open space	Dependent on runoff volumes	No due to restricted space.	X
Permeable paving 	Paving which allows water to soak through. Can be in the form of paving blocks with gaps between solid blocks or porous paving where water filters through the block itself. Water can be stored in the sub-base beneath or allowed to infiltrate into ground below.	Street / open space	Can typically drain double its area.	Yes. Permeable paving will be used for the majority parking spaces.	✓
Bioretention area or Raingardens 	A vegetated area with gravel and sand layers below designated to channel, filter, and cleanse water vertically. Water can infiltrate into the ground below or drain to a perforated pipe and be conveyed elsewhere. Bioretention systems can be integrated with tree-pits or gardens.	Street / open space	Typically, surface area is 5-10% of drained area with storage below.	No due to restricted space.	X
Swale/Raingarden 	Swales and raingardens are shallow depressions designed to convoy and filter water. These can be 'wet' where water gathers above the surface, or 'dry' where water gathers in a gravel layer beneath. Can be lined or unlined to allow infiltration.	Street / open space	Account for width to allow safe maintenance typically 2–3 metres wide.	No, pond will be used	X
Hardscape storage 	Hardscape water features can be used to store run-off above ground within a constructed container. Storage features can be integrated into public realm areas with a more urban character.	Street / open space	Could be above or below ground and sized to storage need.	No. Soakaway will be utilised	X

Hierarchy	Description	Setting	Required area	Implemented	
Pond / Basin 	Ponds can be used to store and treat water. 'Wet' ponds have a constant body of water and run-off is additional, while 'dry' ponds are empty during periods without rainfall. Ponds can be designed to allow infiltration into the ground or to store water for a period before discharge.	Open space	Dependent on runoff volumes and soils.	No due to restricted space.	X
Wetland 	Wetlands are shallow vegetated water bodies with a varying water level. Specially selected plant species are used to filter water. Water flows horizontally and is gradually treated before being discharged. Wetlands can be integrated with a natural or hardscape environment.	Open space	Typically, 5–15% drainage area to provide good treatment.	No due to restricted space.	X
Underground storage 	Water can be stored in tanks, gravel, or plastic crates beneath the ground to provide attenuation.	Open space	Dependent on runoff volumes and soils.	No. Additional underground storage not required	X

6.5 Proposed Interception Storage

Interception can be defined as the capture and retention on site of the first 5mm of the majority of all rainfall events. Interception mechanisms have been assessed to show the site is compliant for zero run-off from the first 5mm for 80% of events during the summer and 50% in winter. (Ciria)

Systems	Reasoning	
Green roofs	All surfaces that have green / blue roofs	X
Rainwater harvesting	All surfaces drained to RWH systems designed whether for surface water management or just water supply, provided the RWH system design is based on regular daily demand for non-potable water	X
Soakaways / infiltration	Areas of the site drained to systems that are designed to infiltrate run-off for events greater than a 1 month return period.	✓
Permeable pavements	All permeable pavements, whether lined or not, can be assumed to comply, provided there is no extra area drained to the permeable pavement.	✓
Filter strips / swales	Roads drained by filters strips / swales, where the longitudinal gradient of the vegetated area is less than 1:100, are suitable for interception delivery for impermeable areas up to 5 times the base of the vegetated surface area receiving the runoff.	X
Infiltration trenches	Roads drained by infiltration trenches can be considered to provide interception	X
Detention basins	Areas of the site drainage to detention basin with a flat base can be assumed to comply. The area of the basin that is assumed to contribute to interception of run-off should be below the outlet of the basin.	X
Bioretention / rain gardens	Areas of the site drainage to unlined bioretention components can be assume to comply where the impermeable area is less than 5 times the vegetated surface area receiving run-off/ They can be designed to deliver interception for larger areas, where suitable infiltration capacity is available.	X
Ponds	Areas drained by ponds (with a permanent water pool that is effectively maintained by the outlet structure) are not assumed to deliver interception	X

6.6 Proposed Storm Water Strategy

The proposed residential care home will be positively drained which includes the roof area and the impermeable asphalt road connecting the car park to Westmorland Road. The storm network runs along the perimeter of the building before collecting into the cellular soakaway crates located in the car park. A D-rainclean bioretention channel will run across the site entrance from Westmorland Road to capture the storm runoff, before connecting into the soakaway. Catchpits chambers will be used prior to the soakaway to limit any pollutants entering the crates.

The network has been modelled using Microdrainage for all storm events up to and including the 1in100yr+40% climate change storm water event with the results shown within Appendix D of this report. The modelling shows no flooding for events up to and including the 1in100yr+40%CC event with the infiltration rate of 0.3877 (m/hour)

The storm network is subject to approval from the Lead Local Flood Authority and the EA.

The storm drainage layout and arrangement are shown in Appendix A.

6.7 Storm water Catchment areas

The site storm water catchment area has been calculated for the roof (1310m2) and impermeable asphalt road (51m2) which will be positively drained, totalling to 0.136 ha. The permeable paving in the car park will percolate to the existing ground. The hard landscaping will be permeable and infiltrate to the ground.

6.8 Exceedance Routes

Surface levels will be designed to ensure finished levels fall away from the building. It should be noted that permeable paving will infiltrate into the ground and hard landscaping surrounding the building will be permeable. The surface water runoff from the impermeable asphalt onto Westmorland Road will be collected via a linear channel to stop discharge to the public highway.

Refer to Appendix E for surface water exceedance routes.

6.9 Operation and maintenance

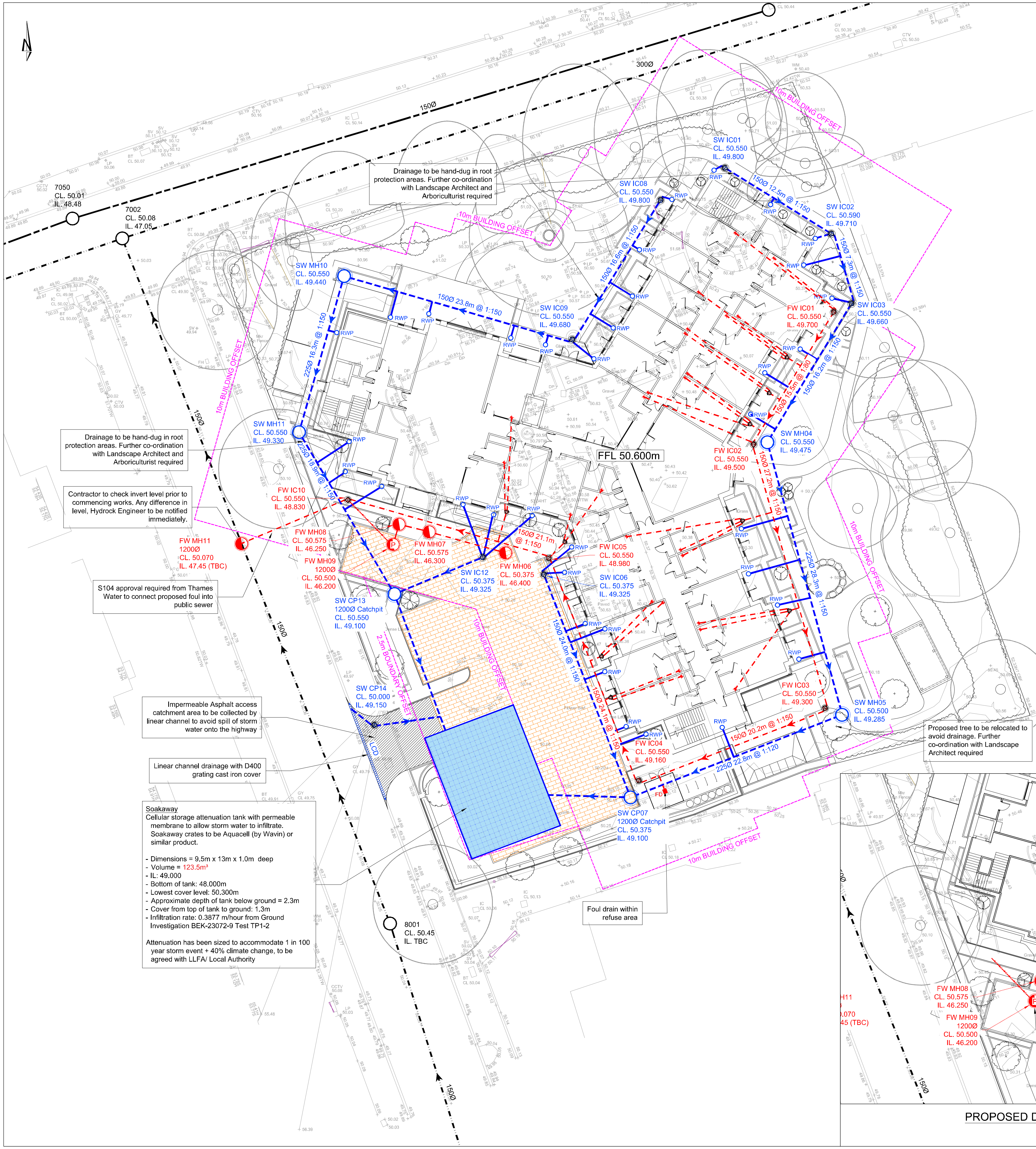
To ensure longevity and effective operation of SuDS they must be maintained in accordance with

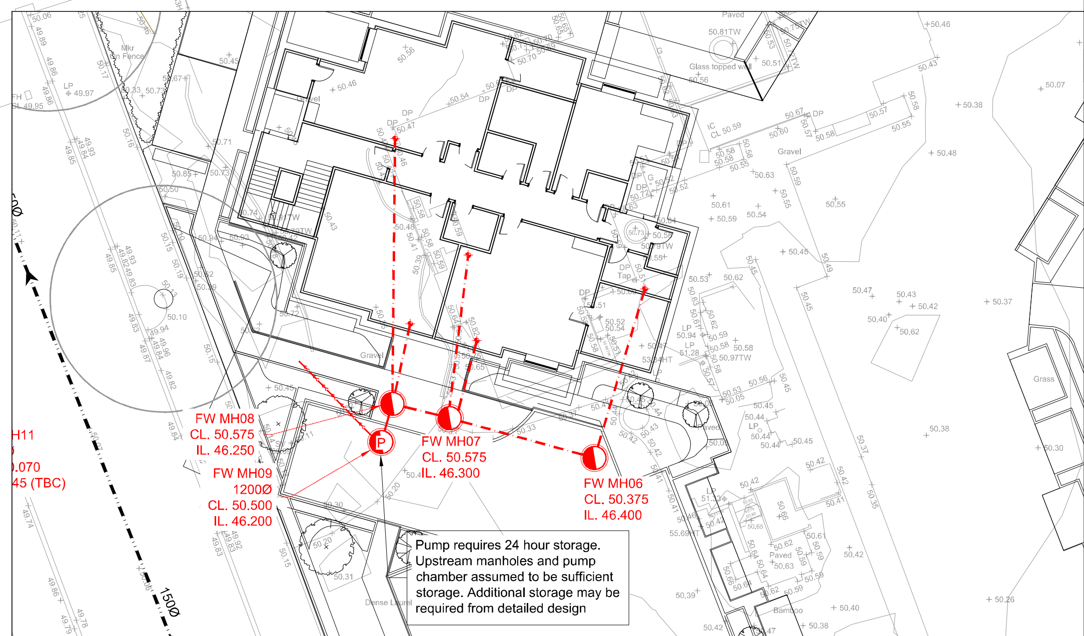
- CIRIA 753 guidance and operation and maintenance
- CIRIA report C768 - Guidance on the construction of SuDS
- Maintenance plan outlined in section 5.2

Refer to Appendix F operations and maintenance schedule

7. APPENDIX A

(PROPOSED DRAINAGE STRATEGY)





PROPOSED DRAINAGE STRATEGY - BASEMENT LEVEL
SCALE 1:200

KEY

- FOUL WATER MANHOLE (1200Ø PPC)
- FOUL WATER INSPECTION CHAMBER (PPIC 450Ø)
- FOUL WATER INSPECTION CHAMBER (PPIC 300Ø)
- RISING MAIN
- YG FOUL YARD GULLY
- FD FLOOR DRAIN
- STORM WATER MANHOLE (1200Ø PPC)
- STORM WATER INSPECTION CHAMBER (PPIC 450Ø)
- RWP RAIN WATER DOWNPIPE
- LCD SURFACE WATER DRAINAGE CHANNEL
- SURFACE WATER CELLULAR SOAKAWAY
- EXISTING PUBLIC FOUL SEWER
- EXISTING PUBLIC STORM SEWER
- PERMEABLE PAVING, (TYPE B INSIDE 10M BUILDING OFFSET AND TYPE C ELSEWHERE)
- ASPHALT ROAD IMPERMABLE AREA TO DRAIN TO LCD
- BUILDING OFFSET

CAVEATS AND RISK ITEMS

a. All RWPs and soil stacks are shown indicatively. Civil engineering proposals are to be coordinated with the wider design team following receipt of information.
b. Avoidance of existing services and utilities for new proposed drainage has not been completed. This to be detailed. An allowance for diversions to be made for costing purposes.
c. Drains through building slab and foundations shown indicatively. Further coordination with design team required to avoidance of structural foundations.
d. Drainage strategy subject approval from Thames Water & LLFA & RWBM authorties.
e. A direct S106 application will be required for foul water connection and S104 approval for adoption of foul .
f. Foul pump to be design by pump specialist.
g. Additional drainage for tree pits not shown. Further coordination with Landscape Architect required to verify where this is needed.
h. Finished floor level shown indicatively. Building finished floor level to be agreed with Client/ Architect.
i. Invert Levels of public sewers to be checked on site. Any difference in levels to be reported back to Hydrock immediately.
j. Clashes with TPOs to be reviewed by Landscape Architect and Arboriculturist. Drainage passing through TPOs to be hand-dug to avoid roots.
k. Additional allowance for 24 hour foul pump storage to be allowed for. Assumed proposed manholes and pump chamber will be sufficient but dependant on detailed design

NOTES

1. This drawing is to be read in conjunction with all relevant drawings, specifications and documentation.
2. The position, size and levels of all drains are to be confirmed on site prior to the commencement of the works and any discrepancies reported immediately to the Engineer.
3. Do not scale from this drawing, work to dimensions or co-ordinates provided. All levels are in metres and all dimensions are in millimeters, unless otherwise noted.
4. The Contractor shall allow for the protection, temporary and permanent support and diversion works as necessary, to all existing services to the satisfaction of the public utilities.
5. The Contractor shall allow for dealing with surface water run-off into excavations and from groundwater by means of sumps, pumping and de-watering as appropriate, in order to keep the excavation as reasonably dry as possible during the construction of the works.
6. All private drainage within the site is to comply with the requirements of the relevant British/European Standard and the Building Regulations Part H.
7. Concrete protection to pipework is to be provided as follows:
   a) All pipework within pedestrian/soft areas with less than 600mm cover.
   b) All pipework subject to vehicular overrun with less than 1.2m cover.
8. All pipework within manholes are to be laid soffit to soffit (U.N.O). All chamber invert levels are for the outgoing pipe levels. Backdrop pipework shall be connected at soffit to soffit with the rodding access level specified.
9. Any gradients of drains indicated are indicative only and the Contractor shall install the drains to the specified levels shown for each manhole (U.N.O). Catchpit invert levels are for the outgoing pipe with the sump level specified separately.
10. Co-ordinate setting out information for manholes is to the intersection the drains and not the centre of the manhole.
11. Cover levels of the manholes are provisional and subject to adjustment on site to suit the finished ground levels. All external works construction areas to be as located by the architect.
12. Manhole covers and frames are to be in accordance with the relevant British/European Standard and the following:
    a) Vehicular Areas: Class D400, double triangular, 150mm deep ductile iron cover and frame with three point cover seating, badged FW or SW for Foul or Surface Water drainage.
    b) Pedestrian Areas: Class B125, 100mm deep, badged FW or SW for Foul or Surface Water drainage.
13. Heavy duty cover slabs are to be used within vehicular trafficked areas.
14. Gully gratings and steel channel covers are to be in accordance with the relevant British/European Standard as follows:
    a) Areas subject to vehicular overrun: Class D400 minimum.
    b) Areas not subject to regular vehicle overrun (adjacent to kerbs etc): Class C250.
    c) Gully grates adjacent to kerbs shall be hinged on the side of the traffic direction (left hand side).
15. Positions and sizes of above ground foul and surface water drainage connections are to be confirmed prior to construction with the Architect and M&E Engineer.
16. All brickwork in connection with drainage is to be solid Class B Engineering Brick to the relevant British/European Standard.
17. All precast concrete pipes, chamber products and road gullies shall be to the relevant British/European Standard and should be Kite-marked/CE-marked accordingly.
18. Insitu concrete grades to be as stated on the drawings. Design chemical class for all precast concrete products shall be DC4 unless agreed otherwise.
19. All existing drainage/structures to be abandoned shall be broken out and where possible recycled and used on site, the excavation shall be backfilled with a suitable granular material to the required level. Alternatively, deep drains may be cleaned and grouted with a 1:10 cementitious grout, with structures broken down 1m below finished ground level and backfilled with a suitable granular material.
20. Where utility/land drainage trenches etc cross over drainage trenches, the Contractor shall construct an impermeable barrier to prevent groundwater infiltrating into the drainage trench.
21. Upon completion of the works the Contractor shall clean all drainage by jetting, removing all debris from site. no debris shall be permitted to enter the existing drainage system.
22. Backfill to all drainage trenches to be Class 6F1 material.

REVISIONS

Rev.	Revision Notes	Date	Drawn By	Checked | Approved
P02	BASEMENT UPDATED	11/01/24	RS	GJ |GJ
P01	FOR PLANNING	22/09/23	RS	GJ |GJ

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CLIENT
WHITBURY LTD

PROJECT
LAWNFIELD, MAIDENHEAD

TITLE
PROPOSED DRAINAGE STRATEGY

HYDROCK PROJECT NO.	SCALE @ A1
29512	1:200

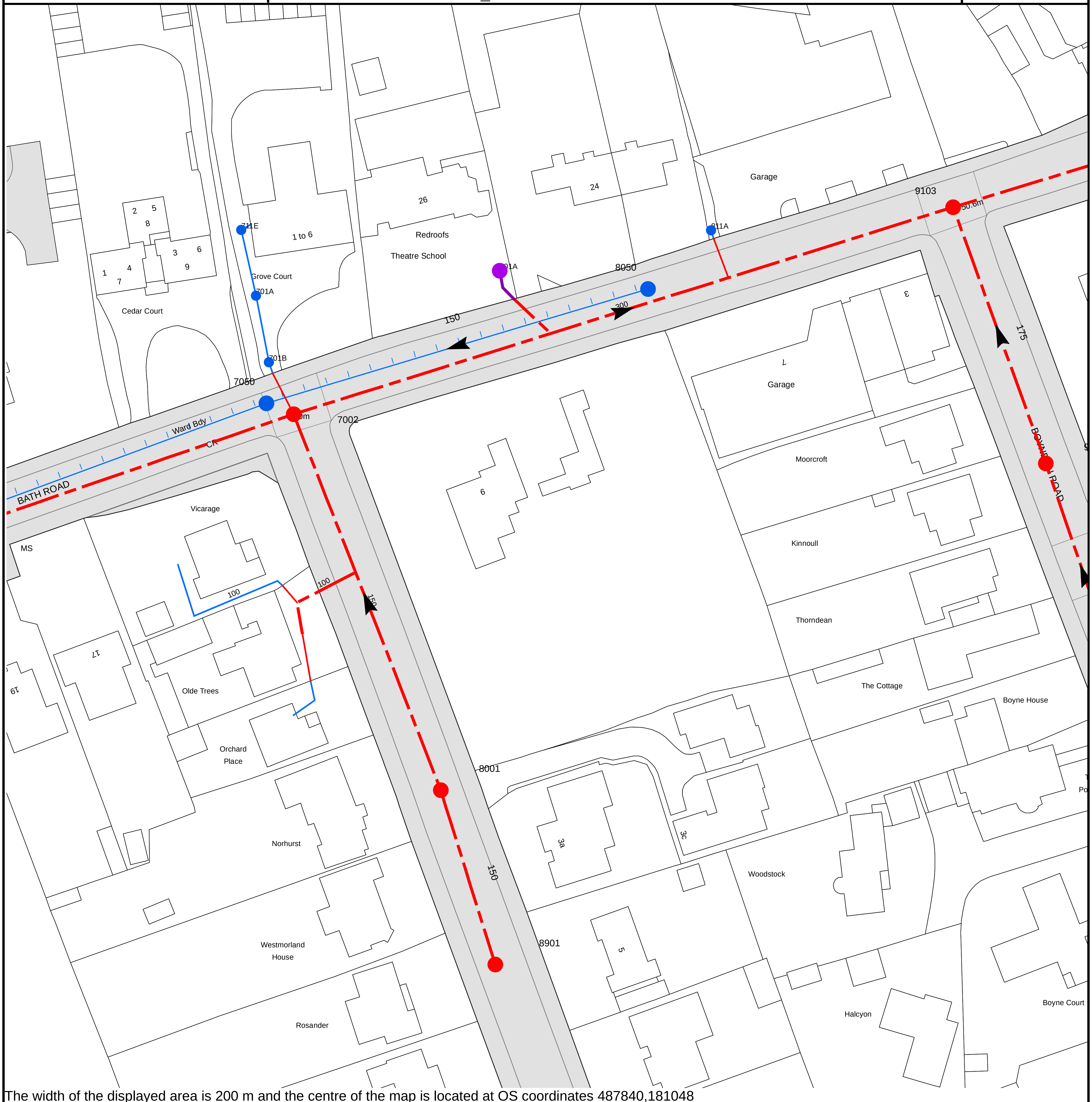
STATUS DESCRIPTION	STATUS
SUITABLE FOR INFORMATION	S2

DRAWING NO.	REVISION
29512-HYD-XX-XX-DR-C-7000	P02

8. APPENDIX B

(SEWER MAP)

Asset Location Search Sewer Map - ALS/ALS Standard/2023_4809041



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 487840,181048

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
9103	50.83	46.72
9001	49.97	47.13
8901	50.09	48.33
8001	50.45	n/a
7002	50.08	47.05
7050	50.01	48.48
701B	n/a	n/a
701A	n/a	n/a
8050	50.45	48.94
801A	n/a	n/a
811A	n/a	n/a
711E	n/a	n/a

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

9. APPENDIX C

(EA FLOOD MAP)

Flood map for planning

Your reference	Location (easting/northing)	Created
<Unspecified>	**487843/181046**	**28 Jul 2023 10:47**

Your selected location is in flood zone 1, an area with a low probability of flooding.

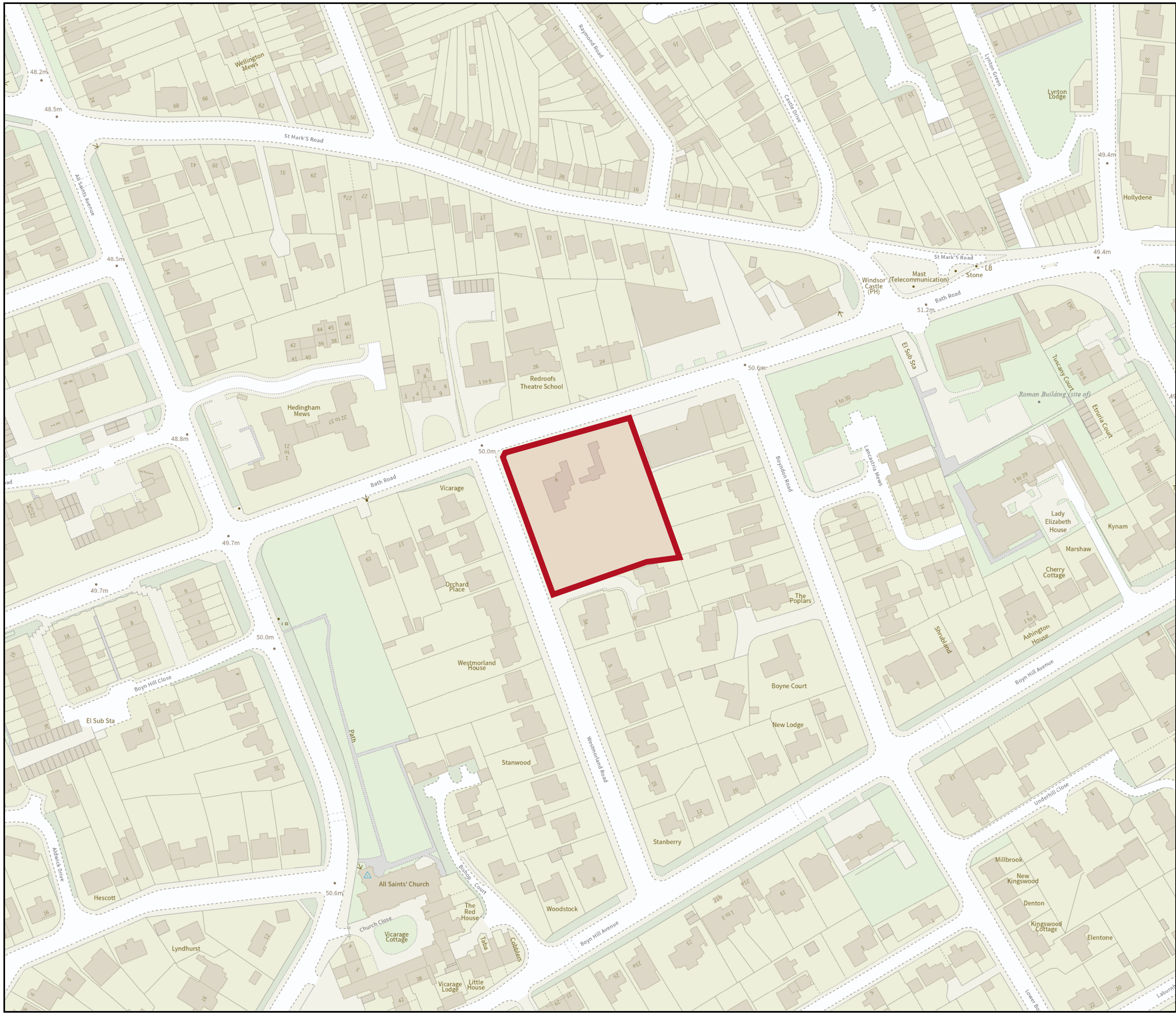
You will need to do a flood risk assessment if your site is **any of the following:**

- bigger that 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.



Environment Agency

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
487843/181046

Scale
1:2500

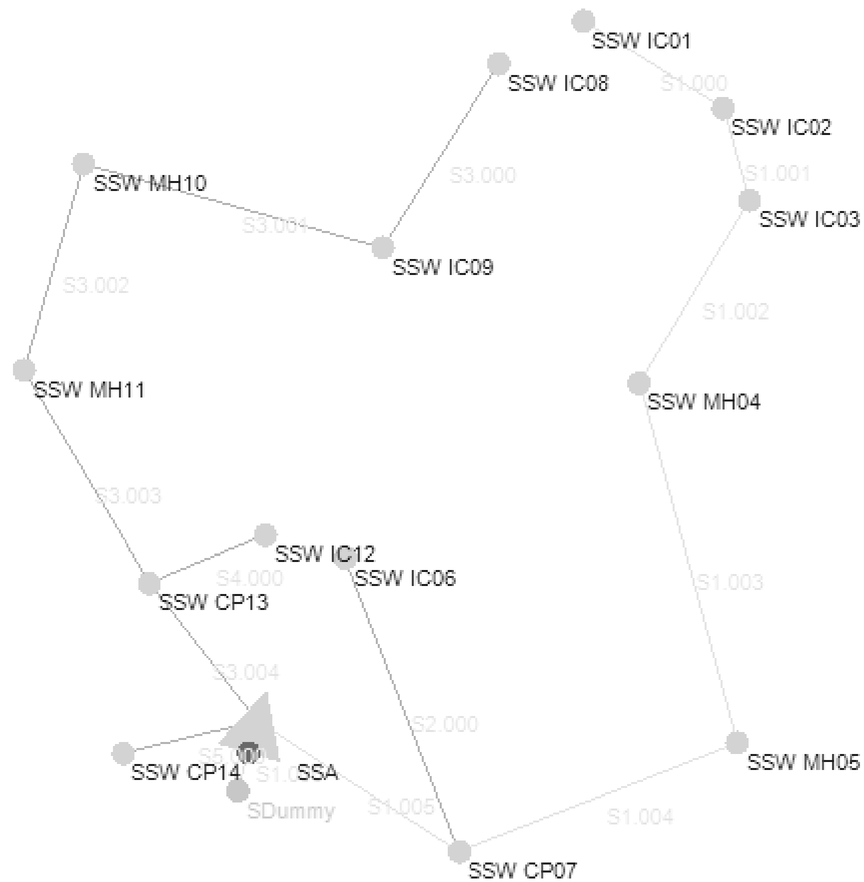
Created
28 Jul 2023 10:47

- Selected area
- Flood zone 3
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Water storage area

0 20 40 60m

10. APPENDIX D

(MICRODRAINAGE STORM MODELLING CALCULATONS)



SSW IC01
SSW IC08
S1.000
SSW IC02
SSW MH10
S3.000
S1.001
SSW IC03
S3.001
SSW IC09
S3.002
S1.002
SSW MH11
SSW MH04
S3.003
SSW IC12
SSW IC06
S4.000
SSW CP13
S1.003
S3.004
S2.000
SSW MH05
SSW CP14
SSA
S1.005
SDummy
S1.004
SSW CP07

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for LAWNFIELD MD MODEL.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	19.600	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for LAWNFIELD MD MODEL.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	12.557	0.090	139.5	0.003	5.00	0.0	0.600	o	150	Pipe/Conduit	🔒
S1.001	7.300	0.050	146.0	0.001	0.00	0.0	0.600	o	150	Pipe/Conduit	🔒
S1.002	16.272	0.110	147.9	0.015	0.00	0.0	0.600	o	150	Pipe/Conduit	🔒
S1.003	28.357	0.190	149.2	0.026	0.00	0.0	0.600	o	225	Pipe/Conduit	🔒
S1.004	22.799	0.185	123.2	0.001	0.00	0.0	0.600	o	225	Pipe/Conduit	🔒
S2.000	23.984	0.150	159.9	0.021	5.00	0.0	0.600	o	150	Pipe/Conduit	🔒
S1.005	18.342	0.100	183.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	🔒
S3.000	16.565	0.120	138.0	0.013	5.00	0.0	0.600	o	150	Pipe/Conduit	🔒
S3.001	23.772	0.165	144.1	0.021	0.00	0.0	0.600	o	150	Pipe/Conduit	🔒
S3.002	16.307	0.110	148.2	0.004	0.00	0.0	0.600	o	225	Pipe/Conduit	🔒

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.25	49.800	0.003	0.0	0.0	0.0	0.85	15.0	0.4
S1.001	50.00	5.39	49.710	0.004	0.0	0.0	0.0	0.83	14.7	0.5
S1.002	50.00	5.72	49.660	0.019	0.0	0.0	0.0	0.82	14.6	2.6
S1.003	50.00	6.16	49.475	0.045	0.0	0.0	0.0	1.07	42.5	6.1
S1.004	50.00	6.49	49.285	0.046	0.0	0.0	0.0	1.18	46.8	6.2
S2.000	50.00	5.50	49.325	0.021	0.0	0.0	0.0	0.79	14.0	2.8
S1.005	50.00	6.81	49.100	0.067	0.0	0.0	0.0	0.96	38.3	9.1
S3.000	50.00	5.32	49.800	0.013	0.0	0.0	0.0	0.85	15.1	1.8
S3.001	50.00	5.80	49.680	0.034	0.0	0.0	0.0	0.84	14.8	4.6
S3.002	50.00	6.05	49.440	0.038	0.0	0.0	0.0	1.07	42.6	5.1

Network Design Table for LAWNFIELD MD MODEL.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S3.003	18.861	0.240	78.6	0.010	0.00	0.0	0.600	o	225	Pipe/Conduit	🔒
S4.000	9.589	0.150	63.9	0.009	5.00	0.0	0.600	o	150	Pipe/Conduit	🔒
S3.004	13.373	0.100	133.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	🔒
S5.000	10.569	0.075	140.9	0.005	5.00	0.0	0.600	o	150	Pipe/Conduit	🔒
S1.006	5.449	0.053	102.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	🔒

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S3.003	50.00	6.26	49.330	0.048	0.0	0.0	0.0	1.48	58.7	6.5
S4.000	50.00	5.13	49.325	0.009	0.0	0.0	0.0	1.26	22.3	1.2
S3.004	50.00	6.46	49.100	0.057	0.0	0.0	0.0	1.13	44.9	7.7
S5.000	50.00	5.21	49.150	0.005	0.0	0.0	0.0	0.84	14.9	0.7
S1.006	50.00	6.88	49.000	0.129	0.0	0.0	0.0	1.29	51.3	17.5

Free Flowing Outfall Details for LAWNFIELD MD MODEL.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.006	SDummy	50.375	48.947	48.847	1200	0

Simulation Criteria for LAWNFIELD MD MODEL.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.600	Storm Duration (mins)	30
Ratio R	0.400		

Online Controls for LAWNFIELD MD MODEL.SWS

Weir Manhole: SSA, DS/PN: S1.006, Volume (m^3): 2.9

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 50.375

Storage Structures for LAWNFIELD MD MODEL.SWS

Cellular Storage Manhole: SSA, DS/PN: S1.006

Invert Level (m) 47.900 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.38770

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	125.0	0.0	1.001	0.0	0.0
1.000	125.0	0.0			

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for LAWNFIELD MD MODEL.SWS

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.400
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.600 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
DVD Status OFF
Inertia Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	SSW IC01	15 Winter	1	+0%				
S1.001	SSW IC02	15 Winter	1	+0%				
S1.002	SSW IC03	15 Winter	1	+0%				
S1.003	SSW MH04	15 Winter	1	+0%				
S1.004	SSW MH05	15 Winter	1	+0%				
S2.000	SSW IC06	15 Winter	1	+0%				
S1.005	SSW CP07	15 Winter	1	+0%	100/15 Summer			
S3.000	SSW IC08	15 Winter	1	+0%	100/15 Summer			
S3.001	SSW IC09	15 Winter	1	+0%	100/15 Summer			
S3.002	SSW MH10	15 Winter	1	+0%				
S3.003	SSW MH11	15 Winter	1	+0%				
S4.000	SSW IC12	15 Winter	1	+0%				
S3.004	SSW CP13	15 Winter	1	+0%	100/1440 Winter			
S5.000	SSW CP14	15 Winter	1	+0%	100/1440 Winter			
S1.006	SSA	1440 Winter	1	+0%	100/1440 Winter			

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for LAWNFIELD MD MODEL.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	SSW IC01	49.817	-0.133	0.000	0.03			0.4	OK
S1.001	SSW IC02	49.730	-0.130	0.000	0.04			0.5	OK
S1.002	SSW IC03	49.701	-0.109	0.000	0.17			2.2	OK
S1.003	SSW MH04	49.529	-0.171	0.000	0.13			5.2	OK
S1.004	SSW MH05	49.337	-0.173	0.000	0.12			5.3	OK
S2.000	SSW IC06	49.372	-0.103	0.000	0.21			2.8	OK
S1.005	SSW CP07	49.173	-0.152	0.000	0.23			8.0	OK
S3.000	SSW IC08	49.835	-0.115	0.000	0.13			1.8	OK
S3.001	SSW IC09	49.736	-0.094	0.000	0.30			4.2	OK
S3.002	SSW MH10	49.492	-0.173	0.000	0.12			4.6	OK
S3.003	SSW MH11	49.379	-0.176	0.000	0.11			5.7	OK
S4.000	SSW IC12	49.349	-0.126	0.000	0.06			1.2	OK
S3.004	SSW CP13	49.164	-0.161	0.000	0.18			6.9	OK
S5.000	SSW CP14	49.172	-0.128	0.000	0.05			0.7	OK
S1.006	SSA	48.181	-1.044	0.000	0.00			0.0	OK

PN	US/MH Name	Level Exceeded
S1.000	SSW IC01	
S1.001	SSW IC02	
S1.002	SSW IC03	
S1.003	SSW MH04	
S1.004	SSW MH05	
S2.000	SSW IC06	
S1.005	SSW CP07	
S3.000	SSW IC08	
S3.001	SSW IC09	
S3.002	SSW MH10	
S3.003	SSW MH11	
S4.000	SSW IC12	
S3.004	SSW CP13	
S5.000	SSW CP14	
S1.006	SSA	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for LAWNFIELD MD MODEL.SWS

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.400
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.600 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
DVD Status OFF
Inertia Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	SSW IC01	15 Winter	30	+0%				
S1.001	SSW IC02	15 Winter	30	+0%				
S1.002	SSW IC03	15 Winter	30	+0%				
S1.003	SSW MH04	15 Winter	30	+0%				
S1.004	SSW MH05	15 Winter	30	+0%				
S2.000	SSW IC06	15 Winter	30	+0%				
S1.005	SSW CP07	15 Winter	30	+0%	100/15 Summer			
S3.000	SSW IC08	15 Winter	30	+0%	100/15 Summer			
S3.001	SSW IC09	15 Winter	30	+0%	100/15 Summer			
S3.002	SSW MH10	15 Winter	30	+0%				
S3.003	SSW MH11	15 Winter	30	+0%				
S4.000	SSW IC12	15 Winter	30	+0%				
S3.004	SSW CP13	15 Winter	30	+0%	100/1440 Winter			
S5.000	SSW CP14	15 Winter	30	+0%	100/1440 Winter			
S1.006	SSA	1440 Winter	30	+0%	100/1440 Winter			

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for LAWNFIELD MD MODEL.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	SSW IC01	49.827	-0.123	0.000	0.07			1.0	OK
S1.001	SSW IC02	49.748	-0.112	0.000	0.11			1.3	OK
S1.002	SSW IC03	49.735	-0.075	0.000	0.49			6.6	OK
S1.003	SSW MH04	49.574	-0.126	0.000	0.40			15.7	OK
S1.004	SSW MH05	49.381	-0.129	0.000	0.37			15.9	OK
S2.000	SSW IC06	49.403	-0.072	0.000	0.52			6.9	OK
S1.005	SSW CP07	49.233	-0.092	0.000	0.66			22.6	OK
S3.000	SSW IC08	49.857	-0.093	0.000	0.31			4.3	OK
S3.001	SSW IC09	49.786	-0.044	0.000	0.83			11.6	OK
S3.002	SSW MH10	49.532	-0.133	0.000	0.34			12.9	OK
S3.003	SSW MH11	49.417	-0.138	0.000	0.31			16.2	OK
S4.000	SSW IC12	49.364	-0.111	0.000	0.15			3.0	OK
S3.004	SSW CP13	49.213	-0.112	0.000	0.50			19.4	OK
S5.000	SSW CP14	49.185	-0.115	0.000	0.12			1.7	OK
S1.006	SSA	48.480	-0.745	0.000	0.00			0.0	OK

PN	US/MH Name	Level Exceeded
S1.000	SSW IC01	
S1.001	SSW IC02	
S1.002	SSW IC03	
S1.003	SSW MH04	
S1.004	SSW MH05	
S2.000	SSW IC06	
S1.005	SSW CP07	
S3.000	SSW IC08	
S3.001	SSW IC09	
S3.002	SSW MH10	
S3.003	SSW MH11	
S4.000	SSW IC12	
S3.004	SSW CP13	
S5.000	SSW CP14	
S1.006	SSA	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for LAWNFIELD MD MODEL.SWS

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.400
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.600 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
DVD Status OFF
Inertia Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	SSW IC01	15 Winter	100	+40%				
S1.001	SSW IC02	15 Winter	100	+40%				
S1.002	SSW IC03	15 Winter	100	+40%				
S1.003	SSW MH04	15 Winter	100	+40%				
S1.004	SSW MH05	15 Winter	100	+40%				
S2.000	SSW IC06	15 Winter	100	+40%				
S1.005	SSW CP07	1440 Winter	100	+40%	100/15 Summer			
S3.000	SSW IC08	15 Winter	100	+40%	100/15 Summer			
S3.001	SSW IC09	15 Winter	100	+40%	100/15 Summer			
S3.002	SSW MH10	15 Winter	100	+40%				
S3.003	SSW MH11	15 Winter	100	+40%				
S4.000	SSW IC12	15 Winter	100	+40%				
S3.004	SSW CP13	1440 Winter	100	+40%	100/1440 Winter			
S5.000	SSW CP14	1440 Winter	100	+40%	100/1440 Winter			
S1.006	SSA	1440 Winter	100	+40%	100/1440 Winter			

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for LAWNFIELD MD MODEL.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	SSW IC01	49.836	-0.114	0.000	0.13			1.8	OK
S1.001	SSW IC02	49.778	-0.082	0.000	0.20			2.5	OK
S1.002	SSW IC03	49.771	-0.039	0.000	0.89			12.1	OK
S1.003	SSW MH04	49.619	-0.081	0.000	0.72			28.3	OK
S1.004	SSW MH05	49.422	-0.088	0.000	0.67			28.5	OK
S2.000	SSW IC06	49.473	-0.002	0.000	0.93			12.4	OK
S1.005	SSW CP07	49.355	0.030	0.000	0.05			1.9	SURCHARGED
S3.000	SSW IC08	50.083	0.133	0.000	0.56			7.9	SURCHARGED
S3.001	SSW IC09	50.045	0.215	0.000	1.46			20.5	SURCHARGED
S3.002	SSW MH10	49.568	-0.097	0.000	0.61			23.0	OK
S3.003	SSW MH11	49.450	-0.105	0.000	0.54			28.8	OK
S4.000	SSW IC12	49.379	-0.096	0.000	0.28			5.5	OK
S3.004	SSW CP13	49.354	0.029	0.000	0.04			1.6	SURCHARGED
S5.000	SSW CP14	49.357	0.057	0.000	0.03			0.4	SURCHARGED
S1.006	SSA	49.393	0.168	0.000	0.00			0.0	SURCHARGED

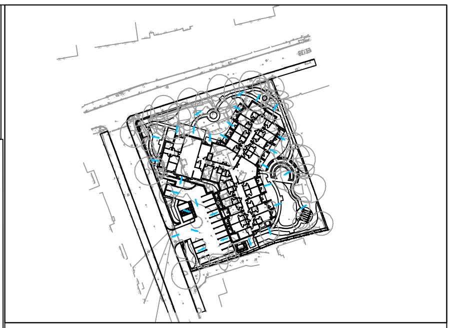
PN	US/MH Name	Level Exceeded
S1.000	SSW IC01	
S1.001	SSW IC02	
S1.002	SSW IC03	
S1.003	SSW MH04	
S1.004	SSW MH05	
S2.000	SSW IC06	
S1.005	SSW CP07	
S3.000	SSW IC08	
S3.001	SSW IC09	
S3.002	SSW MH10	
S3.003	SSW MH11	
S4.000	SSW IC12	
S3.004	SSW CP13	
S5.000	SSW CP14	
S1.006	SSA	

11. APPENDIX E

(SURFACE WATER EXCEEDANCE ROUTES)

KEY:

SURFACE WATER EXCEEDANCE ROUTE



NOTES

1. This drawing is to be read in conjunction with all relevant drawings, specifications and documentation.
2. The position, size and levels of all drains are to be confirmed on site prior to the commencement of the works and any discrepancies reported immediately to the Engineer.
3. Do not scale from this drawing, work to dimensions or co-ordinates provided. All levels are in metres and all dimensions are in millimeters, unless otherwise noted.
4. The Contractor shall allow for the protection, temporary and permanent support and diversion works as necessary, to all existing services to the satisfaction of the public utilities.
5. The Contractor shall allow for dealing with surface water run-off into excavations and from groundwater by means of sumps, pumping and de-watering as appropriate, in order to keep the excavation as reasonably dry as possible during the construction of the works.
6. All private drainage within the site is to comply with the requirements of the relevant British/European Standard and the Building Regulations Part H.
7. Concrete protection to pipework is to be provided as follows:
   a) All pipework within pedestrian/soft areas with less than 600mm cover.
   b) All pipework subject to vehicular overrun with less than 1.2m cover.
8. All pipework within manholes are to be laid soffit to soffit (U.N.O). All chamber invert levels are for the outgoing pipe levels. Backdrop pipework shall be connected at soffit to soffit with the rodding access level specified.
9. Any gradients of drains indicated are indicative only and the Contractor shall install the drains to the specified levels shown for each manhole (U.N.O). Catchpit invert levels are for the outgoing pipe with the sump level specified separately.
10. Co-ordinate setting out information for manholes is to the intersection the drains and not the centre of the manhole.
11. Cover levels of the manholes are provisional and subject to adjustment on site to suit the finished ground levels. All external works construction areas to be as located by the architect.
12. Manhole covers and frames are to be in accordance with the relevant British/European Standard and the following:
   a) Vehicular Areas: Class D400, double triangular, 150mm deep ductile iron cover and frame with three point cover seating, badged FW or SW for Foul or Surface Water drainage.
   b) Pedestrian Areas: Class B125, 100mm deep, badged FW or SW for Foul or Surface Water drainage.
13. Heavy duty cover slabs are to be used within vehicular trafficked areas.
14. Gully gratings and steel channel covers are to be in accordance with the relevant British/European Standard as follows:
   a) Areas subject to vehicular overrun: Class D400 minimum.
   b) Areas not subject to regular vehicle overrun (adjacent to kerbs etc): Class C250.
   c) Gully grates adjacent to kerbs shall be hinged on the side of the traffic direction (left hand side).
15. Positions and sizes of above ground foul and surface water drainage connections are to be confirmed prior to construction with the Architect and M&E Engineer.
16. All brickwork in connection with drainage is to be solid Class B Engineering Brick to the relevant British/European Standard.
17. All precast concrete pipes, chamber products and road gullies shall be to the relevant British/European Standard and should be Kite-marked/CE-marked accordingly.
18. Insitu concrete grades to be as stated on the drawings. Design chemical class for all precast concrete products shall be DC4 unless agreed otherwise.
19. All existing drainage/structures to be abandoned shall be broken out and where possible recycled and used on site, the excavation shall be backfilled with a suitable granular material to the required level. Alternatively, deep drains may be cleaned and grouted with a 1:10 cementitious grout, with structures broken down 1m below finished ground level and backfilled with a suitable granular material.
20. Where utility/land drainage trenches etc cross over drainage trenches, the Contractor shall construct an impermeable barrier to prevent groundwater infiltrating into the drainage trench.
21. Upon completion of the works the Contractor shall clean all drainage by jetting, removing all debris from site. no debris shall be permitted to enter the existing drainage system.
22. Backfill to all drainage trenches to be Class 6F1 material.

REVISIONS

Rev.	Revision Notes	Date	Drawn By	Checked | Approved
P01	FOR PLANNING	22/09/23	RS	GJ |GJ

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CLIENT

WHITBURY LTD

PROJECT

LAWNFIELD, MAIDENHEAD

TITLE

SURFACE WATER EXCEEDANCE ROUTES

HYDROCK PROJECT NO.	SCALE @ A1
29512	1:200

STATUS DESCRIPTION	STATUS
SUITABLE FOR INFORMATION	S2

DRAWING NO.	REVISION
29512-HYD-XX-XX-DR-C-7010	P01

Filename: U:\PROJECTS_RAPPORT\2023\29512 - Lawnfield, Maidenhead\01_WIP\M2_Model_2d\C\29512-HYD-XX-XX-DR-C-7010_01 Surface Water Exceedance Routes.dwg

12. APPENDIX F

(OPERATIONS AND MAINTENANCE SCHEDULE)

TECHNICAL DESIGN NOTE

Project name	Lawnfield, Maidenhead		
Design note title	Operation and Maintenance Schedule		
Document reference	29512-HYD-XX-XX-TN-C-0001		
Author	RS		
Revision	P01		
Date	22 September 2023	Approved	☐

1. MAINTENANCE SCHEDULE

1.1 Guidance

To ensure longevity and effective operation of SuDS they must be maintained in accordance with

- » CIRIA 753 guidance and operation and maintenance
- » CIRIA report C768 - Guidance on the construction of SuDS
- » Maintenance plan outlined in section 5.2
- »

1.2 Maintenance Plan

Feature	Maintenance	Frequency
Private Drains	Inspection	CCTV survey every 5-10 years.
	Regular Maintenance	Jet clean system fully every 5-10 years. (Recommend prior to CCTV drainage survey)
	Remedial / Occasional Maintenance	Carry out remedial works as identified in CCTV survey.
Outfall pipes, non-return pipe flaps, and anti-scour mat flow channel	Inspection	Visually - Quarterly
	Regular Maintenance	Clearance of silt and debris as necessary
	Remedial / Occasional Maintenance	Damage to pipes and headwall to be repaired as necessary

Gullies & Drainage Channels	Inspection	Quarterly
	Regular Maintenance	Remove silt and debris as necessary to prevent build up.
Catchpits	Inspection	Quarterly
	Regular maintenance	Remove silt and debris as necessary to prevent build up.
Soakaways, infiltration trenches and infiltration basins	Grass edges Mow 1m min. wide grass surround to drain at 100mm and 150mm maximum to filter runoff and protect infiltration structure from silt.	
	Infiltration Basins Protect grass surface from compaction and siltation and manage main area of basin for design function or appearance.	
	Infiltration Basins Where there is a build up of silt in the basin at inlets, i.e. 50mm or more above the design level then remove when the ground is damp in autumn or early spring and turf to the original design levels. Spread excavated material on site above SuDS design profile, e.g. top of banks, in accordance with E.A. Waste Exemption Guidance. Infiltration Trench Hand pull or spot treat individual weed growth only if necessary, ensuring weedkiller does not enter the drain and inhibit natural breakdown of pollutants.	
Overflows and flood routes	Overflows. Jet pipes leading from overflow structures annually and check by running water through the overflow. Check free flow at next SUDS feature – inlet to basin or chamber.	Annually
	Remove any accumulated grass cuttings or other debris on top of grass weirs or stone filled baskets overflows.	Monthly

	Flood Routes. Make visual inspection. Check route is not blocked by new fences, walls, soil or other rubbish. Remove as necessary.	Monthly
	Overflows. If overflow is not clear then dismantle structure and reassemble to design detail.	As required
Planting and existing vegetation	Amenity Grass - Mow all grass verges, paths and amenity grass at 35-50mm with 75mm max. All cuttings to remain in situ	16 visits
	Rough grass – Mow at 75-100mm but not to exceed 150mm All cuttings to wildlife piles	4 - 8 visits
	Wildflower areas strimmed to 50mm in Sept-Oct or Wildflower areas strimmed to 50mm July and Sept or Wildflower areas strimmed to 50mm on 3 year rotation 30% each year All cuttings to wildlife piles	1 visit 2 visit 1 visit
	Ornamental tree & shrub planting. Weed all shrub beds as detailed spec as necessary. Cut back planting from lights, paths and visibility sight lines in late autumn and as necessary. Cut hedges slightly tapered back from base with flat top at specified height. Do not mulch planting adjacent to permeable/ porous paving surfaces. Remove stakes and ties from trees when no longer needed for support and within 3 years of planting. Protect from strimmer damage and remove competitive growth until well established.	4 visits
	Native trees & shrub planting. Prune to shape in year 1. Protect trees from strimmer damage and remove competitive growth until well established.	1 visit

	Remove stakes and ties from trees when no longer needed for support and within 3 years from planting.	
	Existing trees Check existing trees for safety.	1 visit
	Replace trees and shrubs which fail in the first five years after planting. Carry out tree surgery as necessary.	
Cellular storage	Ensure catchpits are installed upstream and downstream of cellular storage. These are to be emptied.	Quarterly
	Jetting should be carried out along main carrier drain through system.	As required