

**Proposed carwash
Widewater Place
Moorhall Road
Uxbridge
UB9 6NS**

FRA and Drainage Strategy Report

Rev	Date	Purpose/Status	Document Ref.	QA
A	03.06.2026	For approval	First issue	RAC/STC
B				
C				
D				
E				

Disclaimer

This report is for the use of the Client only and is not for the use of any other parties without the express permission of the Client. All calculations and related quantified assumptions are indicative for planning purposes only and are based solely on the available design proposals and must be reassessed during detailed design with the appropriate compliance methodology.

Table of Contents

Executive Summary	4
1.0 Flood Risk.....	5
1.1 Flooding from Rivers.....	5
1.2 Flooding from Surface water	5
1.3 Flooding from Groundwater.....	6
1.4 Flooding from Sewers.....	6
1.5 Historic Flooding events	6
2.0 Existing Drainage.....	7
3.0 Proposed Drainage Strategy.....	7
3.1 Surface Water Drainage.....	7
3.1.3 Existing and proposed site run-off flows.....	8
3.2 Foul Water Drainage.....	9
4.0 Attenuation.....	10
5.0 Sustainable Urban Drainage Systems (SUDS).....	10
5.1 Infiltration Devices.....	11
5.2 Brown/Green Roofs	12
5.3 Rainwater Harvesting.....	13
5.4 Porous Paving	14
5.5 Below Ground Attenuation.....	15
5.6 Wetlands.....	16
5.7 Swales.....	16
5.8 Ponds/Rain gardens	16
6.0 Proposed SUDS solution.....	17
7.0 Management and Maintenance of SUDS	17
8.0 Contamination mitigation.....	18

Executive Summary

RCD Consultants Ltd has been appointed to design the surface water and foul water drainage aspects of the proposed carwash at Widewater Place, Moor Hall Road, Uxbridge, UB9 6NS.

This flood risk assessment has been completed in accordance with the National Planning Policy Framework (NPPF), the Ciria SUDS Manual (C753), the Planning Practice Guidance (Flood Risk and Coastal change) the London Plan and the Hillingdon Council Sustainable drainage requirements and SuDS.

The site is Brownfield with an area of approximately 0.007Ha (70m²). It is an existing carpark and is therefore 100% impermeable.

A carwash facility is proposed that will replace seven existing parking spaces therefore the impermeable areas will be like for like and there will be no increase in volume of runoff, other than that for Climate change.

It is advised that a combination of Sustainable Drainage Systems (SUDS) is used to reduce the risk of surface water flooding within and beyond the development site boundaries.

The flood warning information services website confirms that the site is located in Flood zone 1 and therefore not at risk of flooding. There is a high risk of surface water flooding, most likely caused in the extreme lowest parts of the carpark and central aisles associated with the linear channels. The website confirms that the risk of flooding to depths of 20cm and above is very low.

The BGS website shows the superficial deposits to be Alluvium over bedrock of the Seaford Chalk formation. Alluvium has very poor infiltration characteristics and the risk of groundwater leaching will be very low.

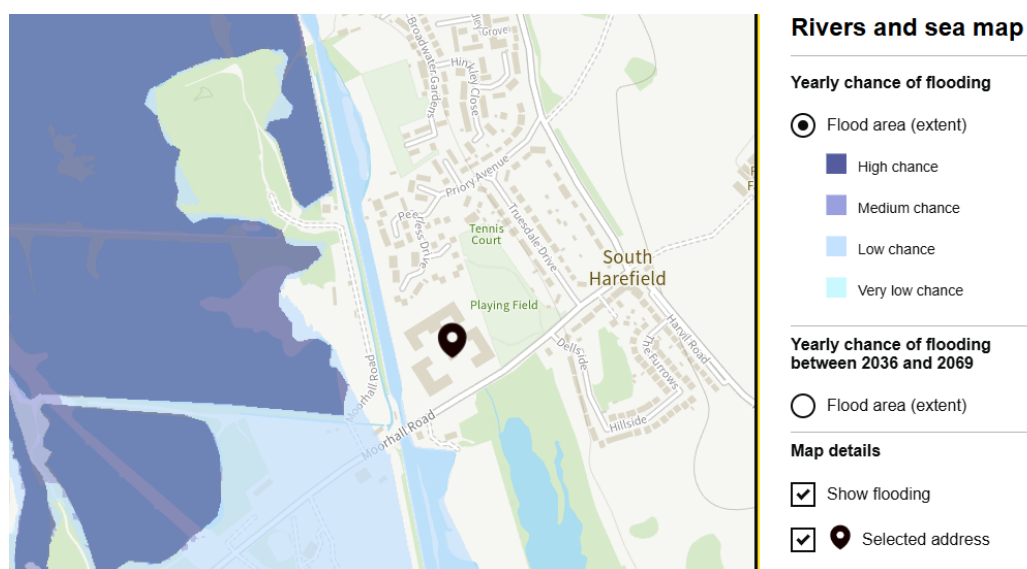
There is no risk of flooding from any other sources.

To accord with LLFA drainage requirements a flood exceedance plan is provided showing the route flood water will take in the unlikely event of SUDS failure.

1.0 Flood Risk

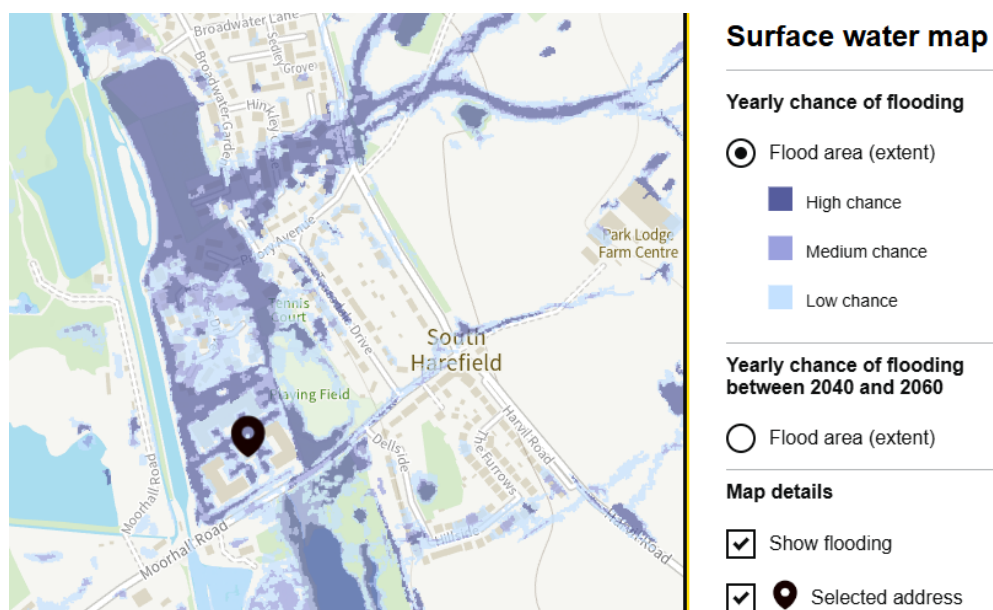
1.1 Flooding from Rivers

The flood warning information services website confirms that the site is located in Flood zone 1 and therefore not at risk of flooding.



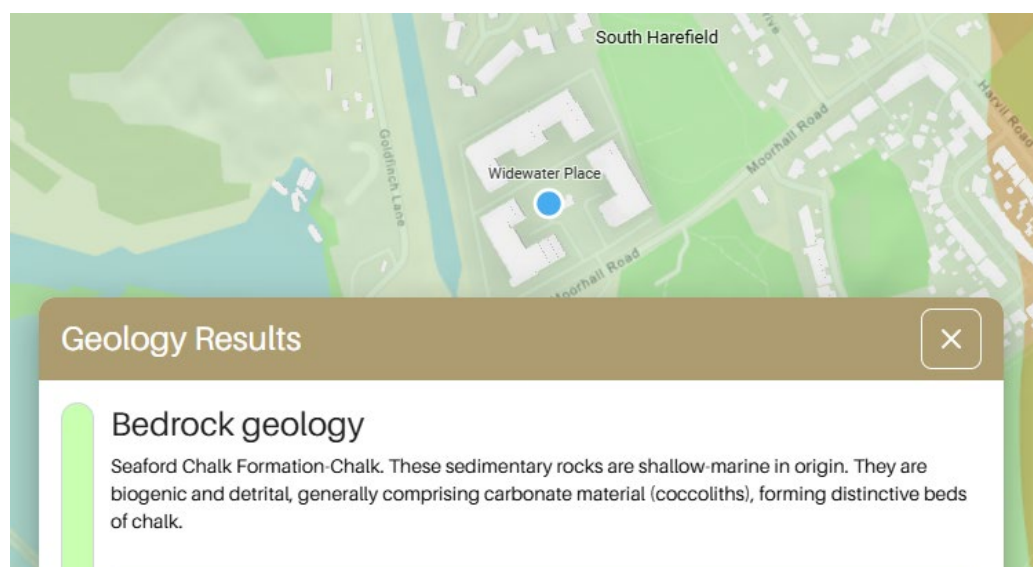
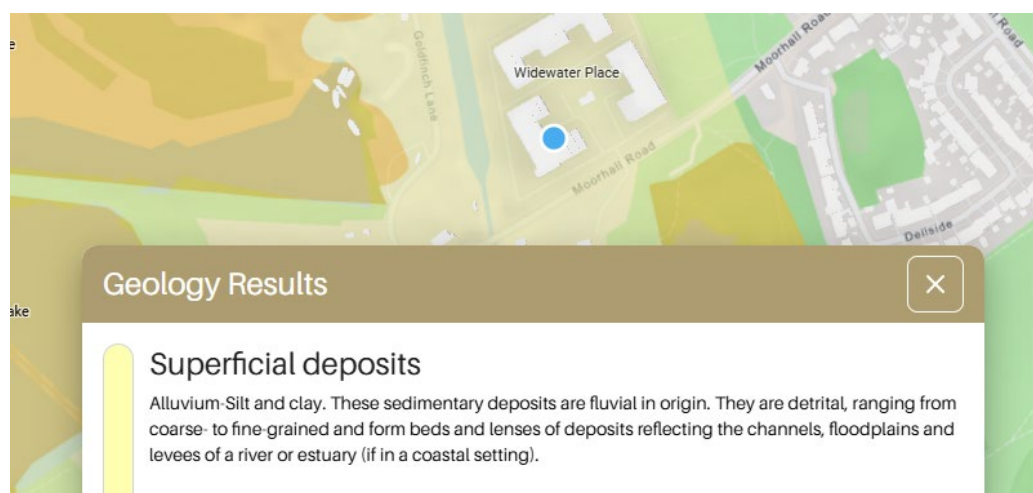
1.2 Flooding from Surface water

The flood warning information services website confirms that the site has a high risk of surface water flooding, most likely caused in the extreme lowest parts of the carpark and central aisles associated with the linear channels. The website confirms that the risk of flooding to depths of 20cm and above is very low.



1.3 Flooding from Groundwater

The BGS website shows the superficial deposits to be Alluvium over bedrock of the Seaford Chalk formation. Alluvium has very poor infiltration characteristics and the risk of groundwater leaching will be very low.



1.4 Flooding from Sewers

The existing sewers are maintained privately, and the public sewers are maintained by Thames Water Utilities so the risk of flooding is low.

1.5 Historic Flooding events

There are no recorded incidents of flooding within the Hillingdon SFRA.

2.0 Existing Drainage

The site is Brownfield with an area of approximately 0.007Ha (70m²). It is an existing carpark and is therefore 100% impermeable.

The nearest watercourse is the Grand Union Canal approximately 50m west from the site.

There are public sewers in Moorhall Road and private foul and surface water within the carpark.

The BGS website shows the superficial deposits to be Alluvium over bedrock of the Seaford Chalk formation. Alluvium has very poor infiltration characteristics and the risk of groundwater leaching will be very low.

3.0 Proposed Drainage Strategy

A carwash facility is proposed that will replace seven existing parking spaces therefore the impermeable areas will be like for like and there will be no increase in volume of runoff, other than that for Climate change.

Roof drainage will be collected via a network of pipes and surface water will discharge to the existing private surface water sewer. Discharge will be restricted to as close to Greenfield rates as possible to comply with the London Plan. Attenuation will be provided by cellular storage tanks

The Drainage Strategy Layout is shown in Appendix A.

3.1 Surface Water Drainage

Pre-development surface water calculations are shown in Appendix B and post-development surface water calculations are shown in Appendix D.

In accordance with Ciria 753, SUDS Manual, flooding is permitted above ground during the 1 in 100 year storm event + 40% climate change allowance but all flood water is to be contained within the site boundaries. A flood exceedance plan shown in Appendix E indicates the routes water will take in the unlikely event of SUDS failure.

3.1.2 Standards

The performance of the surface water drainage system will be designed to BS EN 752 Parts 3 and 4, and the most current issue of Part H of the Building Regulations.

The materials specification for the scheme will be in accordance with the Highways Agency Specification for Highway Works. For the purposes of the indicative design, the following material types have been assumed:

- Drainage pipes up to 300mm diameter – Vitrified clayware, plastic pipes will be permitted subject to ground conditions.
- Manholes and chambers - Precast concrete with concrete surround or PPIC
- Chamber covers – Class D400 infill type in hard paved areas.
- Pipe bedding - Imported granular material.
- Pipe Trench backfill - Selected as dug or imported material.
- Manholes should be located at every change of alignment or gradient; at the head of all sewers; at every junction of a public sewer.

The drainage shall be designed utilising the following criteria:

- Minimum flow velocity 1.0m/s for self-cleansing
- Standard pipe roughness “Ks” of 0.6.

3.1.3 Existing and proposed site run-off flows

A summary of the existing and proposed peak flows are detailed in Table 1 below and include the 40% climate change allowance for the worst case 1 in 100 year storm event.

Return Period	Greenfield l/s	Post-development l/s
1 in 1 year (2 years)	0.4	2.0
1 in 30 years (+35% CC)	1.1	(2.0)
1 in 100 years (+40% CC)	1.6	(2.0)

Table 1: Summary of Existing and Proposed Surface Water Flows

The pre-development surface water flow calculations are shown in Appendix B and the post-development calculations are shown in Appendix D.

3.2 Foul Water Drainage

Foul drainage from the carwash will be collected via pipes and will discharge to the existing private foul sewer. A petrol interceptor will be installed to remove contaminants.

In accordance with Sewers for Adoption average flows will be 0.25l/s.

3.2.1 Standards

The performance of the foul drainage system has been designed to Sewers for Adoption, BS EN 752 Parts 3 and 4, and the most current issue of Part H of the Building Regulations. The main criteria used are as follows.

- Drainage pipes up to 100mm diameter – Vitrified clayware, plastic pipes will be permitted subject to ground conditions.
- Manholes and chambers - Precast concrete with concrete surround or PPIC
- Chamber covers – Class D400 infill type in higher quality paved areas.
- Class D400 standard type in all other road / parking areas.
- Class C250 standard type in all footpath areas.
- Pipe bedding - Imported granular material.
- Pipe Trench backfill - Selected as dug or imported material.
- Manholes should be located at every change of alignment or gradient; at the head of all sewers; at every junction of a public sewer.

The drainage shall be designed utilizing the following criteria:

- Minimum flow velocity 0.75m/s for self-cleansing
- Standard pipe roughness “Ks” of 1.5.

4.0 Attenuation

It is proposed that Sustainable Urban Drainage Systems (SUDS) will be the primary consideration for surface water management. There are several different methods that may be used to provide sufficient attenuation of the surface water described in Section 5 below.

Attenuation should be positioned as close to the outfall as possible and would control the surface water discharge from the site. Implementation of one or all of the SUDS methods outlined in Section 5 of this report is highly recommended to reduce the requirement for below ground storage.

The proposed drainage design includes a geo-cellular storage tank.

5.0 Sustainable Urban Drainage Systems (SUDS)

The objective of SUDS is to minimise the impacts of the development on the quantity and quality of site runoff and maximise amenity and biodiversity opportunities. Surface water SUDS will be designed and installed in accordance with NPPF and associated technical guidance and associated CIRIA documents.

The mix of SUDS to be used is determined by the conditions on site, in this case a development with areas of external space which can be utilised for SUDS. The methodology of surface water control is to slow the entry of the surface water into the system by using flow control devices (orifice), then retain the runoff by using below ground storage (geo-cellular storage tank) that will release surface water into the watercourse. The reduced impact of the development upon the drainage infrastructure will therefore reduce the potential for flooding.

5.1 Infiltration Devices

Infiltration devices drain water directly into the ground. Infiltration trenches and soakaways are more practicable for urban sites with limited space available. Infiltration devices can be integrated into and form part of the landscaped areas.

Infiltration trenches are completely below ground, and water should not occur on the surface.

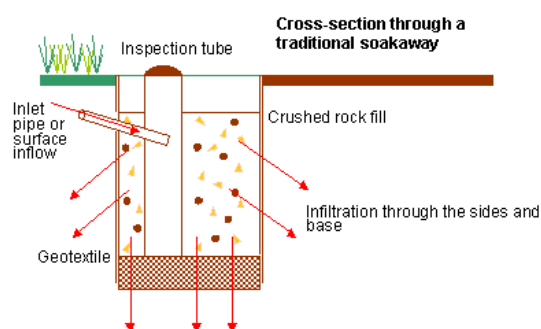


Figure 1 – Typical cross section through infiltration trench

Advantages – Reduces the volume of runoff, effective at pollutant removal, contributes to ground water recharge, simple and cost effective.

Disadvantages – Potentially high failure rates, comprehensive ground investigations required, offset from foundations (min. 5m away), risk of ground water pollution, reduced performance during prolonged wet periods.

Suitable for use – No, the British Geological Survey website indicates that the site is underlain by Alluvium superficial deposits that are known to have very poor infiltration characteristics.

5.2 Brown/Green Roofs

Green roofs comprise a multi-layered system that covers the roof of a building or podium structure with vegetation cover/landscaping over a drainage layer. They are designed to intercept and retain precipitation, increasing the time of concentration and reducing the volume of runoff and attenuation peak flows. Green roofs can be anything from a thin growing layer of sedums and mosses to plants, shrubs and large trees.

These roofs vary in specification and can be designed to attract bird and invertebrate species. Referring to CIRIA document C644, green and brown roofs also participate in attenuating rainwater. This would reduce the requirement for below ground storage attenuation on the site.

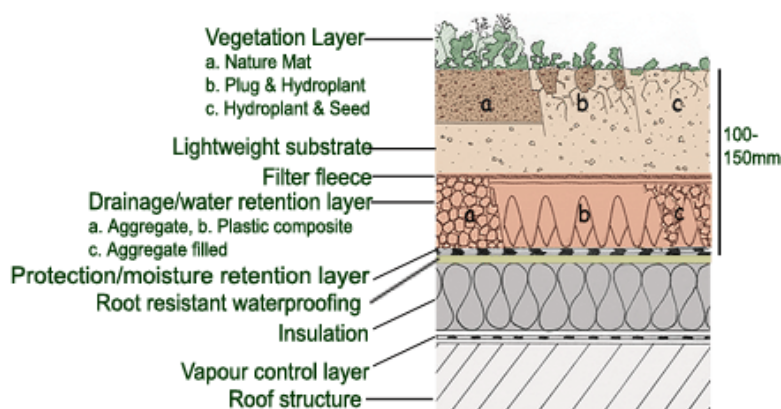


Figure 2 – Typical section through green roof build up

Advantages – Mimic greenfield state of building footprint, good removal of pollutants, ecological and amenity benefits, improve air quality, insulates building.

Disadvantages – Costs, increased structural loading, roof height, design, maintenance and exposure may preclude use.

Suitable for use – **No**, the types of roof proposed is not suitable to support a Green Roof.

5.3 Rainwater Harvesting

These tanks act as mini-storage chambers for surface water, reducing the extent of underground storage required. They provide a source of water for plant irrigation, washing machines and for flushing toilets.

Harvested rainwater is stored below ground and pumped to provide a substitute for potable mains water reducing both the site discharge and water consumption.



Figure 4 – Rainwater Harvesting

Advantages – Provided source control of storm water runoff, reduces demand on mains water.

Disadvantages – Costs, Risk to public health, use dependant on demand requirements and seasonal rainfall characteristics, maintenance of pumps & control systems.

Suitable for use – **No**, the cost of installing a rainwater harvesting tank will make the project unviable.

5.4 Porous Paving

Porous pavement is an alternative to conventional paving in which water permeates through the paved structure rather than draining off it. The surface water will be held in a reservoir structure (high void content sub-base) under the pavement for subsequent delayed discharge or infiltration into the sub-strata below.

The porous paving can be materials such as gravel, grasscrete, porous (no fines) concrete, concrete blocks or porous asphalt. Pollutant removal rates have been shown to be high, as the majority of the removal occurs as a result of the filtration of the water through the aggregate sub-base.

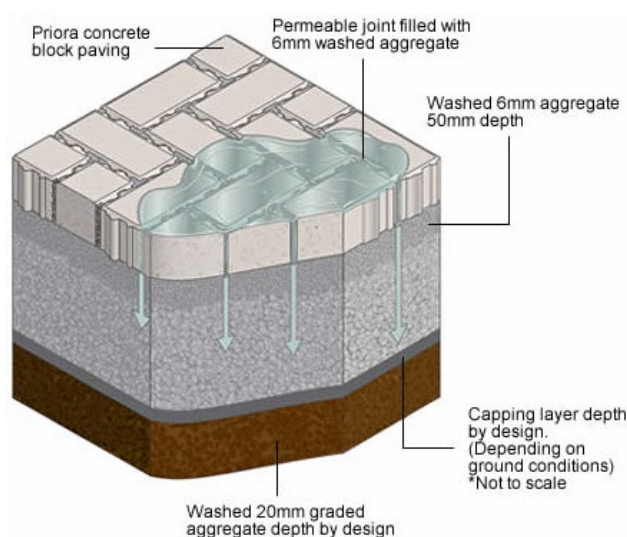


Figure 3 – Typical section through porous paving

Advantages – Effective in removing pollutants, lined systems can be used to avoid infiltration, reduces volume and rate of surface water runoff, suitable for high density developments. Mimics existing Greenfield conditions by filtering into the surrounding soft landscaped areas.

Disadvantages – Costs, used for low traffic volumes, low axle loads and speeds, risk of long-term clogging due to poor maintenance.

Suitable for use – **No**, this is a carwash area that needs to drain to a treatment system.

5.5 Below Ground Attenuation

Attenuation involves the storing of surface water within pipework or underground tanks prior to controlled discharge into the public system. Attenuation tanks can also provide off line storage.

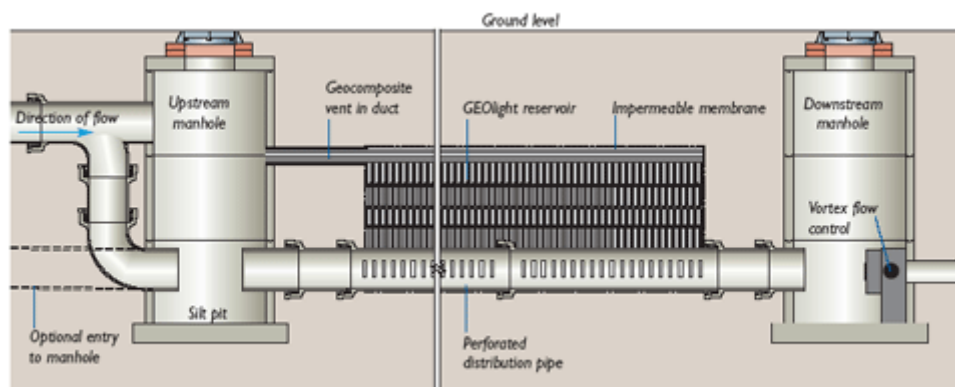


Figure 5 – Typical section through below ground attenuation chamber (cellular storage)

Advantages – Effective storage of surface water, can be used below trafficked areas, can be used below public open areas, minimum maintenance.

Disadvantages – No water quality treatment.

Suitable for use – **Yes**, cellular storage tanks are proposed.

5.6 Wetlands

Wetlands provide both stormwater attenuation and treatment. They comprise shallow ponds and marshy areas, covered in aquatic vegetation. Wetlands provide settlement of sediment and remove contaminants.

Advantages – Effective storage of surface water, good pollutant removal, ecological and amenity benefits.

Disadvantages – Requires large surface area. Health & Safety issues associated with large bodies of water.

Suitable for use – **No**, this is an existing carpark that will be reused as a carwash area.

5.7 Swales

Swales are vegetated drainage structures up to 500mm deep and used to provide flow control through attenuation. They can be used for infiltration, where possible.

Advantages – Can be incorporated into landscaping, good removal of contaminants, reduces discharge rates. Low costs.

Disadvantages – Requires large surface area. Limits extent of trees used in landscaping. Health & Safety issues associated with large bodies of water following heavy rainfall.

Suitable for use – **No**, this is an existing carpark that will be reused as a carwash area.

5.8 Ponds/Rain gardens

Ponds or rain gardens are irregular shaped vegetated drainage structures used to provide flow control through attenuation. They can be used for infiltration, where possible.

Advantages – Can be incorporated into landscaping, good removal of contaminants, reduces discharge rates. Low costs.

Disadvantages – Requires large surface area. Limits extent of trees used in landscaping. Health & Safety issues associated with large bodies of water following heavy rainfall.

Suitable for use – **No**, this is an existing carpark that will be reused as a carwash area.

6.0 Proposed SUDS solution

It is advised that a combination of Sustainable Drainage Systems (SUDS) is used to increase the time of concentration of the water before it discharges to the receiving surface water sewer.

The proposed drainage design includes a cellular storage tank that has been designed to attenuate the worst case 1 in 100 year storm event with a 40% climate change allowance.

Surface water discharge to the sewer will be restricted by an orifice plate flow control chamber to a maximum rate of 0.8l/s during the worst case 1 in 100 year storm event with a 40% climate change allowance.

7.0 Management and Maintenance of SUDS

The owner will be responsible for completion of routine maintenance of all SUDS features.

Refer to the SUDS operation and maintenance schedules in Appendix F.

8.0 Contamination mitigation

The British Geological Survey website indicates that the site is underlain by Alluvium superficial deposits that are known to have very poor infiltration characteristics.

The site lies above a principal bedrock aquifer, a secondary A superficial deposit aquifer and the Groundwater vulnerability is medium-high.

Ciria 753 Chapter 26 Mitigation indices:

Pre-development pollution indices:

Brownfield Commercial carpark use is identified in Table 26.2 as medium pollution hazard level;

Roofs: Total Solids = 0.7, Metals = 0.6 and Hydrocarbons = 0.7

The mitigation index is therefore $MI = 0.6 + 0.5 \times 0.7 + 0.5 \times 0.7 = 1.3$

Post-development

A commercial roof use is identified in Table 26.2 as low pollution hazard level;

Roofs: Total Solids = 0.3, Metals = 0.2 and Hydrocarbons = 0.05

The mitigation index is therefore $MI = 0.2 + 0.5 \times 0.2 + 0.5 \times 0.05 = 0.45$

The calculations show that the mitigation indices have been reduced therefore further mitigation is not required with regards to water quality.

Table 26.5 Risk matrix

Element Number	Description	Risk Score	Weighting Factor	Score
1	Pollution Hazard Traffic Density	1	15	15
2	Average annual rainfall	2	15	30
3	Type of SUDS	2	15	30
4	Unsaturated zone depth	1	20	20
5	Flow through sub-soils	1	20	20
6	Unsaturated zone material	1	10	10
7	Soil organic matter	1	5	5
8	Unsaturated zone ph	1	5	5
Total				135

Based upon the above table the risk to groundwater is low as the total value is less than 180.

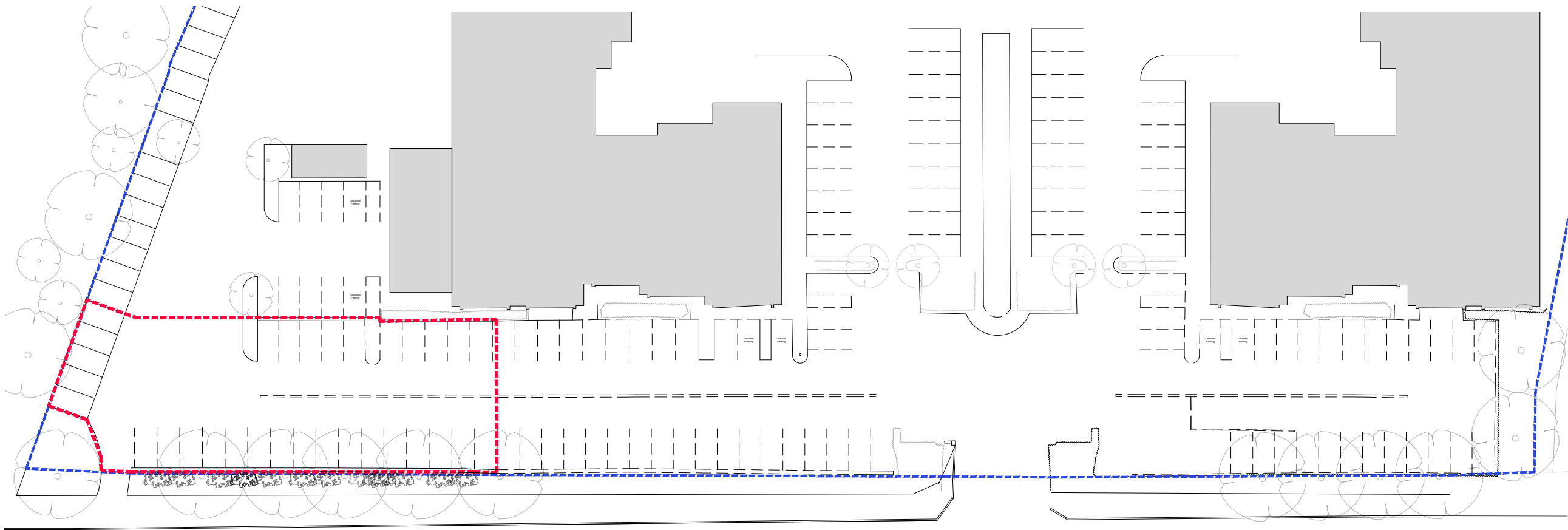
Appendix A

Site layout

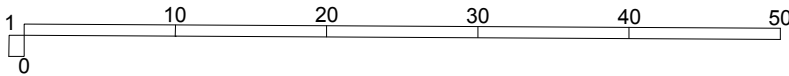
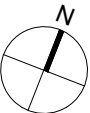
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All drawings subject to Statutory Authority Approval.



Existing Site plan
1:500



Rev B - Issued for information
Rev A - Issued to client
Revisions

- 17.12.25
- 02.12.25
Date

PROJECT TITLE: **Widewater Place, Moorhall Road, Uxbridge**

DRWG TITLE: **Existing site plan**

DRWG No: **2540_P001**

REV: **B**

SCALE: **1:100@A3** DATE: **02.12.25**

DRWG STATUS: **Information**

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Jorges Salman Architects Limited - Company Registration Number: 9081435

jorges salman architects

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Appendix B

Pre-Development surface water calculations

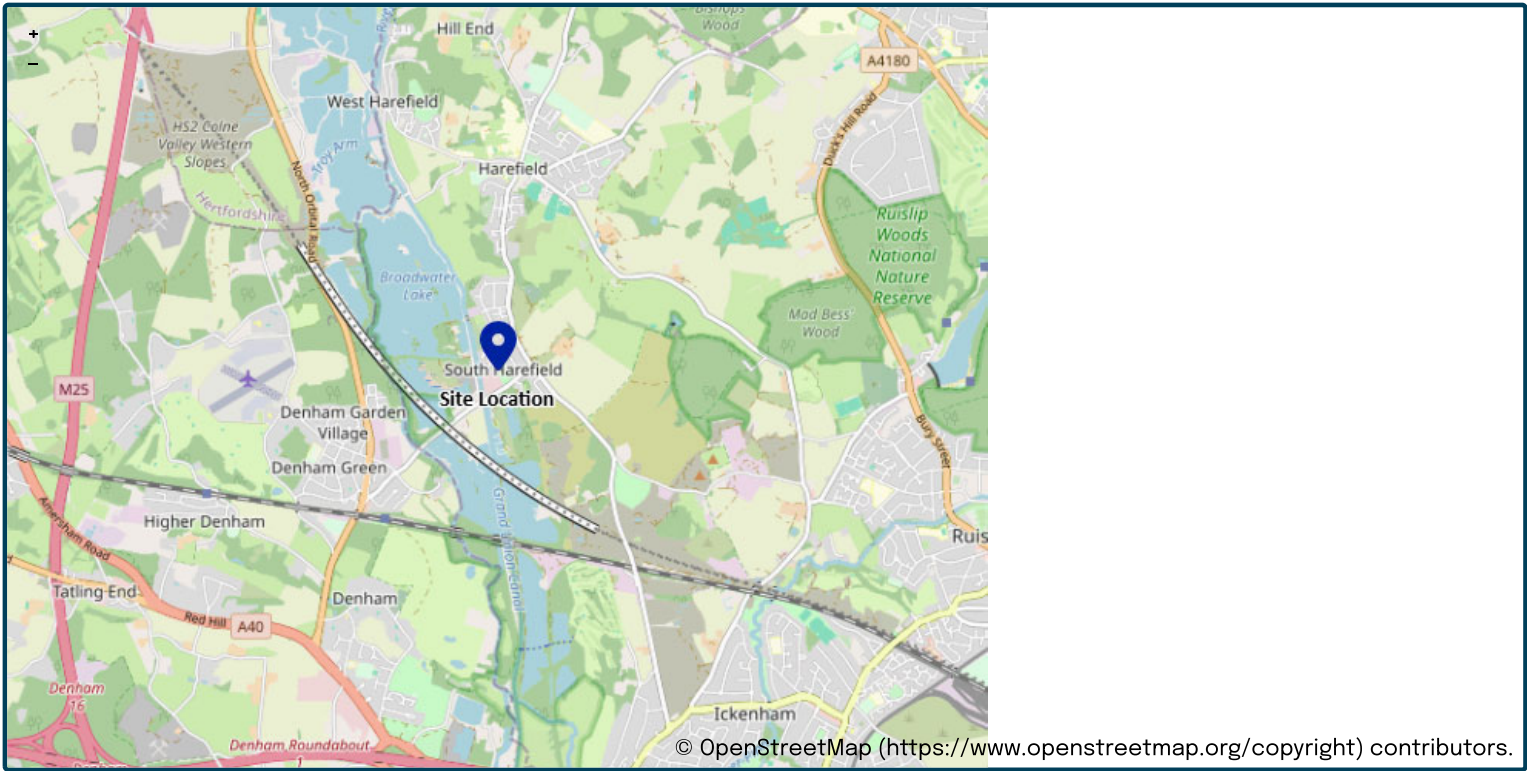
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). 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	02/06/2026
Calculated by	RAY CLARK
Reference	1111-2605
Model version	2.2.3

Location

Site name	PROPOSED CAR WASH
Site location	WIDEWATER PLACE



Site easting (British National Grid)	505100
Site northing (British National Grid)	188768

Site details

Total site area (ha)	0.007	ha
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Greenfield runoff

Method

Method	FEH statistical (2025)
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FEH statistical (2025)

	My value	Map value
SAAR9120 (mm)	651	mm
BFIHOST19scaled	0.43	
QMed-QBar conversion	1.136	1.136
QMed (l/s)	0.02	l/s
QBar (FEH statistical 2025) (l/s)	0.02	l/s

Growth curve factors

	My value	Map value
Hydrological region	6	6
1 year growth factor	0.85	
2 year growth factor	0.88	
10 year growth factor	1.62	
30 year growth factor	2.3	
100 year growth factor	3.19	
200 year growth factor	3.74	

Results

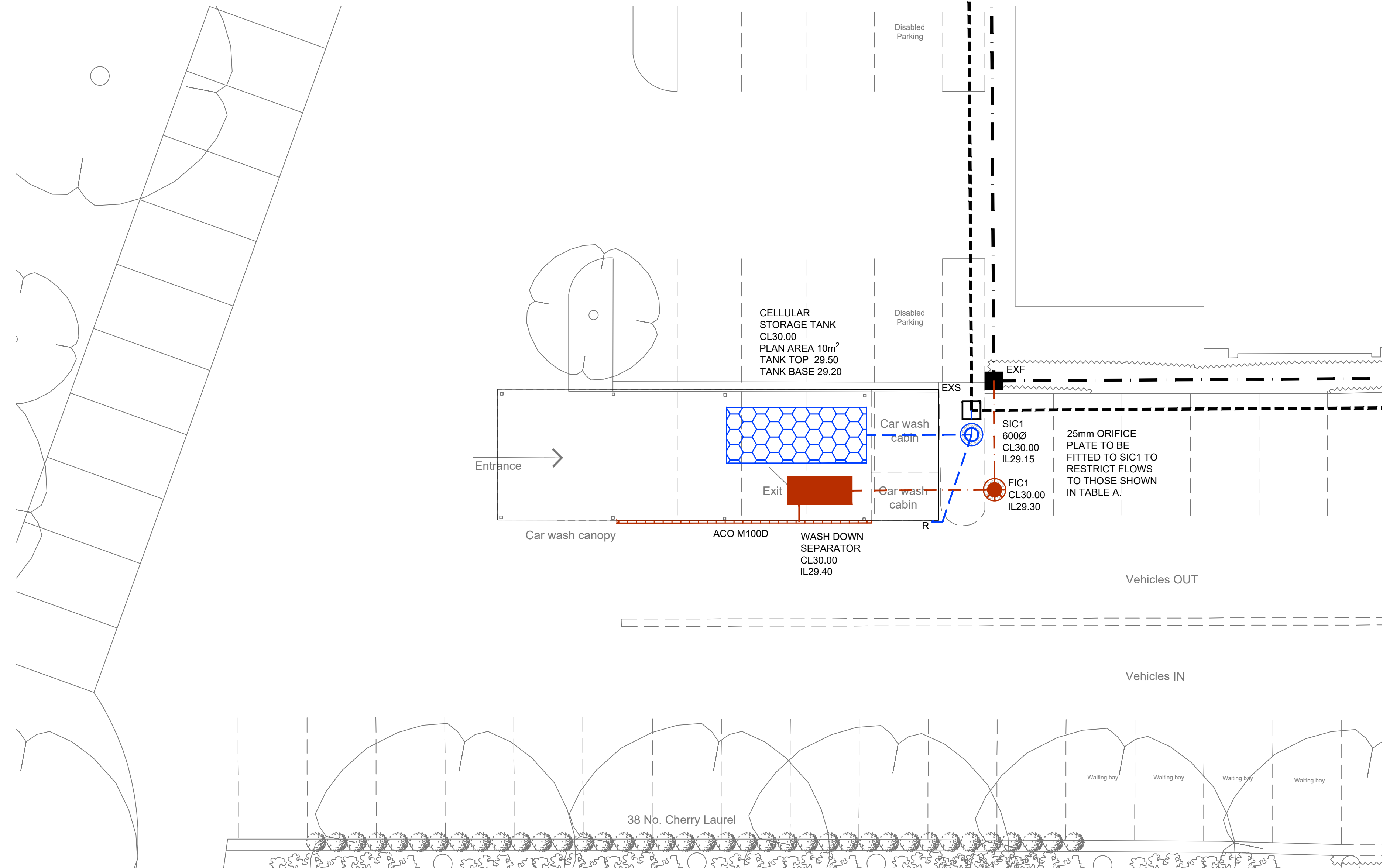
Method	FEH statistical (2025)
Flow rate 1 year (l/s)	0.02
Flow rate 2 year (l/s)	0.02
Flow rate 10 years (l/s)	0.04
Flow rate 30 years (l/s)	0.1
Flow rate 100 years (l/s)	0.1
Flow rate 200 years (l/s)	0.1

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.

Appendix C
Drainage Layout



DRAWING LEGEND	
SURFACE WATER DRAINAGE	
EXS	EXISTING SURFACE WATER MANHOLE
	EXISTING SURFACE WATER SEWER
SIC	INSPECTION CHAMBER CP DENOTES CATCHPIT
	SURFACE WATER SEWER
R	RAINWATER PIPE
FOUL WATER DRAINAGE	
EXF	EXISTING FOUL MANHOLE
	EXISTING PUBLIC FOUL WATER SEWER
FIC	INSPECTION CHAMBER
	FOUL WATER SEWER
	LINEAR CHANNEL

- NOTES
- CONTRACTORS MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING ANY WORK ON SHOP DRAWINGS
- DO NOT SCALE FROM THIS DRAWING
- RCD CONSULTANTS LTD COPYRIGHT
- NOTES
- ALL DIMENSIONS IN MILLIMETERS UNLESS NOTED OTHERWISE.
 - THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERING DRAWINGS AND CALCULATIONS ASSOCIATED WITH THIS PROJECT.
 - ALL COMPONENTS AND MATERIALS ARE TO BE MANUFACTURED AND SUPPLIED IN ACCORDANCE WITH THE RELEVANT BRITISH STANDARDS, AND LAID AND BACKFILLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND THE RELEVANT BRITISH STANDARDS.
 - THE CONTRACTOR SHALL, BEFORE COMMENCING THE WORKS, VERIFY ALL SITE AND SETTING OUT DIMENSIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE TRUE AND PROPER SETTING OUT OF THE WORKS AND FOR THE CORRECTNESS OF THE POSITION, LEVELS, DIMENSIONS, AND ALIGNMENT OF ALL PARTS OF THE WORKS.
 - ALL BUILDING DRAINAGE TO BE INSTALLED AND TESTED IN COMPLIANCE WITH THE BUILDING REGULATIONS 2000 DRAINAGE AND WASTE DISPOSAL APPROVED DOCUMENT H 2002 EDITION.
 - SMALL LIGHTWEIGHT ACCESS COVERS SHOULD BE SECURED (FOR EXAMPLE WITH SCREWS) TO DETER UNAUTHORISED ACCESS.
 - ALL ABOVE GROUND DRAINAGE TO INCORPORATE RODDING ACCESS FACILITIES.
 - INSITU CONCRETE FOR USE IN GENERAL DRAINAGE WORKS, GRADE TO BS: 5328.
 - FOR INTERNAL DRAINAGE POSITIONS REFER TO ARCHITECT'S CURRENT WORKING DRAWINGS.
 - FOR LANDSCAPING SURFACE MATERIAL FINISHES REFER TO ARCHITECT'S CURRENT WORKING DRAWINGS.
 - ALL PIPES TO BE 100mm DIAMETER UNLESS NOTED OTHERWISE.

TABLE A		
STORM EVENT (1 IN)	GREENFIELD FLOW RATE l/s	POST- DEVELOPMENT FLOW RATE l/s
QBAR	<1.0	-
2	<1.0	(0.3)
30 (+35%CC)	<1.0	(0.6)
100 (+40%CC)	<1.0	(0.8)

P1	PRELIMINARY ISSUE	16.01.2026	RAC
REV	AMENDMENT	DATE	CHKD

DRAWING STATUS

PRELIMINARY

RCD

RCD CONSULTANTS LTD
EMAIL: ray@rcd-consultants.com

CLIENT

PROJECT
PROPOSED CARWASH
WIDEWATER PLACE
MOORHALL ROAD, UXBRIDGE

DRAWING TITLE
DRAINAGE LAYOUT

CIVILS

SCALE 1:100 @ A1 1:200 @ A3	DRAWN BY STC	CHECKED RAC	DATE JAN 2026
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DRAWING NUMBER 1111-2605-CIV-10	REVISION P1
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Appendix D

Post-Development surface water calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	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	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
SIC1	0.007	5.00	30.000	600	0.800
EXSMH	0.000		30.000	100	0.850

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	SIC1	EXSMH	5.000	0.600	29.200	29.150	0.050	100.0	100	5.11	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)
1.000	0.769	6.0	1.3	0.700	0.750	0.007	0.0	31	0.605

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	5.000	100.0	100	Circular	30.000	29.200	0.700	30.000	29.150	0.750

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	SIC1	600	Manhole	Adoptable	EXSMH	100	Manhole	Adoptable

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SIC1	30.000	0.800	600	 0			
					1.000	29.200	100
EXSMH	30.000	0.850	100	 1			
					1.000	29.150	100

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0
Summer CV	1.000	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	1.000	Drain Down Time (mins)	10080	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	35	0	0
100	40	0	0

Node SIC1 Online Orifice Control

Flap Valve	x	Invert Level (m)	29.200	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Diameter (m)	0.025		

Node SIC1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	29.200
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	72

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	10.0	0.0	0.300	10.0	0.0	0.301	0.0	0.0

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Approval Settings

Node Size	✓	Minimum Full Bore Velocity (m/s)	
Node Losses	✓	Maximum Full Bore Velocity (m/s)	3.000
Link Size	✓	Proportional Velocity	✓
Minimum Diameter (mm)	150	Return Period (years)	
Link Length	✓	Minimum Proportional Velocity (m/s)	0.750
Maximum Length (m)	100.000	Maximum Proportional Velocity (m/s)	3.000
Coordinates	✓	Surcharged Depth	✓
Accuracy (m)	1.000	Return Period (years)	
Crossings	✓	Maximum Surcharged Depth (m)	0.100
Cover Depth	✓	Flooding	✓
Minimum Cover Depth (m)		Return Period (years)	30
Maximum Cover Depth (m)	3.000	Time to Half Empty	x
Backdrops	✓	Discharge Rates	✓
Minimum Backdrop Height (m)		Discharge Volume	✓
Maximum Backdrop Height (m)	1.500	100 year 360 minute (m ³)	
Full Bore Velocity	✓		

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 15 minute summer	103.552	29.302
2 year 15 minute winter	72.668	29.302
2 year 30 minute summer	66.619	18.851
2 year 30 minute winter	46.750	18.851
2 year 60 minute summer	43.991	11.625
2 year 60 minute winter	29.226	11.625
2 year 120 minute summer	32.696	8.641
2 year 120 minute winter	21.722	8.641
2 year 180 minute summer	26.819	6.901
2 year 180 minute winter	17.433	6.901
2 year 240 minute summer	21.824	5.767
2 year 240 minute winter	14.499	5.767
2 year 360 minute summer	16.930	4.357
2 year 360 minute winter	11.005	4.357
2 year 480 minute summer	13.296	3.514
2 year 480 minute winter	8.834	3.514
2 year 600 minute summer	10.814	2.958
2 year 600 minute winter	7.389	2.958
2 year 720 minute summer	9.564	2.563
2 year 720 minute winter	6.427	2.563
2 year 960 minute summer	7.745	2.040
2 year 960 minute winter	5.131	2.040
2 year 1440 minute summer	5.491	1.472
2 year 1440 minute winter	3.690	1.472
2 year 2160 minute summer	3.874	1.071
2 year 2160 minute winter	2.669	1.071
2 year 2880 minute summer	3.215	0.862
2 year 2880 minute winter	2.161	0.862
2 year 4320 minute summer	2.472	0.646
2 year 4320 minute winter	1.628	0.646
2 year 5760 minute summer	2.090	0.535
2 year 5760 minute winter	1.353	0.535
2 year 7200 minute summer	1.831	0.467
2 year 7200 minute winter	1.182	0.467
2 year 8640 minute summer	1.652	0.421
2 year 8640 minute winter	1.066	0.421
2 year 10080 minute summer	1.523	0.389
2 year 10080 minute winter	0.983	0.389
30 year +35% CC 15 minute summer	405.507	114.745
30 year +35% CC 15 minute winter	284.567	114.745
30 year +35% CC 30 minute summer	263.432	74.542
30 year +35% CC 30 minute winter	184.865	74.542
30 year +35% CC 60 minute summer	174.037	45.993
30 year +35% CC 60 minute winter	115.626	45.993
30 year +35% CC 120 minute summer	110.407	29.177
30 year +35% CC 120 minute winter	73.352	29.177
30 year +35% CC 180 minute summer	85.065	21.890
30 year +35% CC 180 minute winter	55.294	21.890
30 year +35% CC 240 minute summer	66.891	17.677
30 year +35% CC 240 minute winter	44.440	17.677
30 year +35% CC 360 minute summer	50.075	12.886
30 year +35% CC 360 minute winter	32.550	12.886

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year +35% CC 480 minute summer	38.539	10.185
30 year +35% CC 480 minute winter	25.605	10.185
30 year +35% CC 600 minute summer	30.895	8.451
30 year +35% CC 600 minute winter	21.110	8.451
30 year +35% CC 720 minute summer	27.012	7.240
30 year +35% CC 720 minute winter	18.154	7.240
30 year +35% CC 960 minute summer	21.476	5.655
30 year +35% CC 960 minute winter	14.226	5.655
30 year +35% CC 1440 minute summer	14.860	3.983
30 year +35% CC 1440 minute winter	9.987	3.983
30 year +35% CC 2160 minute summer	10.166	2.810
30 year +35% CC 2160 minute winter	7.005	2.810
30 year +35% CC 2880 minute summer	8.222	2.204
30 year +35% CC 2880 minute winter	5.526	2.204
30 year +35% CC 4320 minute summer	6.068	1.587
30 year +35% CC 4320 minute winter	3.996	1.587
30 year +35% CC 5760 minute summer	4.964	1.271
30 year +35% CC 5760 minute winter	3.213	1.271
30 year +35% CC 7200 minute summer	4.231	1.079
30 year +35% CC 7200 minute winter	2.731	1.079
30 year +35% CC 8640 minute summer	3.726	0.951
30 year +35% CC 8640 minute winter	2.405	0.951
30 year +35% CC 10080 minute summer	3.364	0.858
30 year +35% CC 10080 minute winter	2.171	0.858
100 year +40% CC 15 minute summer	541.480	153.220
100 year +40% CC 15 minute winter	379.986	153.220
100 year +40% CC 30 minute summer	354.963	100.442
100 year +40% CC 30 minute winter	249.096	100.442
100 year +40% CC 60 minute summer	236.126	62.401
100 year +40% CC 60 minute winter	156.876	62.401
100 year +40% CC 120 minute summer	147.760	39.049
100 year +40% CC 120 minute winter	98.168	39.049
100 year +40% CC 180 minute summer	113.772	29.277
100 year +40% CC 180 minute winter	73.955	29.277
100 year +40% CC 240 minute summer	89.625	23.685
100 year +40% CC 240 minute winter	59.545	23.685
100 year +40% CC 360 minute summer	67.396	17.343
100 year +40% CC 360 minute winter	43.809	17.343
100 year +40% CC 480 minute summer	52.066	13.760
100 year +40% CC 480 minute winter	34.592	13.760
100 year +40% CC 600 minute summer	41.810	11.436
100 year +40% CC 600 minute winter	28.567	11.436
100 year +40% CC 720 minute summer	36.570	9.801
100 year +40% CC 720 minute winter	24.577	9.801
100 year +40% CC 960 minute summer	29.009	7.639
100 year +40% CC 960 minute winter	19.216	7.639
100 year +40% CC 1440 minute summer	19.961	5.350
100 year +40% CC 1440 minute winter	13.415	5.350
100 year +40% CC 2160 minute summer	13.483	3.726
100 year +40% CC 2160 minute winter	9.290	3.726
100 year +40% CC 2880 minute summer	10.770	2.887
100 year +40% CC 2880 minute winter	7.238	2.887

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +40% CC 4320 minute summer	7.768	2.031
100 year +40% CC 4320 minute winter	5.115	2.031
100 year +40% CC 5760 minute summer	6.231	1.595
100 year +40% CC 5760 minute winter	4.033	1.595
100 year +40% CC 7200 minute summer	5.229	1.334
100 year +40% CC 7200 minute winter	3.375	1.334
100 year +40% CC 8640 minute summer	4.546	1.160
100 year +40% CC 8640 minute winter	2.934	1.160
100 year +40% CC 10080 minute summer	4.060	1.036
100 year +40% CC 10080 minute winter	2.621	1.036

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	SIC1	74	29.258	0.058	0.6	0.5633	0.0000	OK
15 minute summer	EXSMH	1	29.150	0.000	0.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Discharge Vol (m³)
120 minute summer	SIC1	Orifice	EXSMH	0.3	1.3

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	SIC1	80	29.421	0.221	2.1	2.1601	0.0000	SURCHARGED
15 minute summer	EXSMH	1	29.150	0.000	0.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Discharge Vol (m³)
120 minute summer	SIC1	Orifice	EXSMH	0.6	4.1

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	SIC1	80	29.563	0.363	2.7	2.9574	0.0000	SURCHARGED
15 minute summer	EXSMH	1	29.150	0.000	0.6	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Discharge Vol (m³)
120 minute summer	SIC1	Orifice	EXSMH	0.8	5.5

Appendix E
Flood exceedance plan

NOTES
CONTRACTORS MUST VERIFY ALL DIMENSIONS ON SITE BEFORE
COMMENCING ANY WORK ON SHOP DRAWINGS
DO NOT SCALE FROM THIS DRAWING
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EXISTING AND PROPOSED
FLOOD EXCEEDANCE ROUTE

P1	PRELIMINARY ISSUE	02.06.2026	RAC
REV	AMENDMENT	DATE	CHKD

DRAWING STATUS PRELIMINARY

RCD

RCD CONSULTANTS LTD
EMAIL: ray@rcd-consultants.com

CLIENT

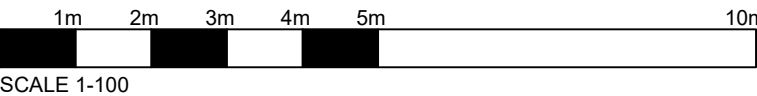
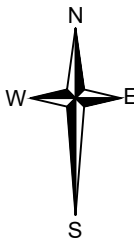
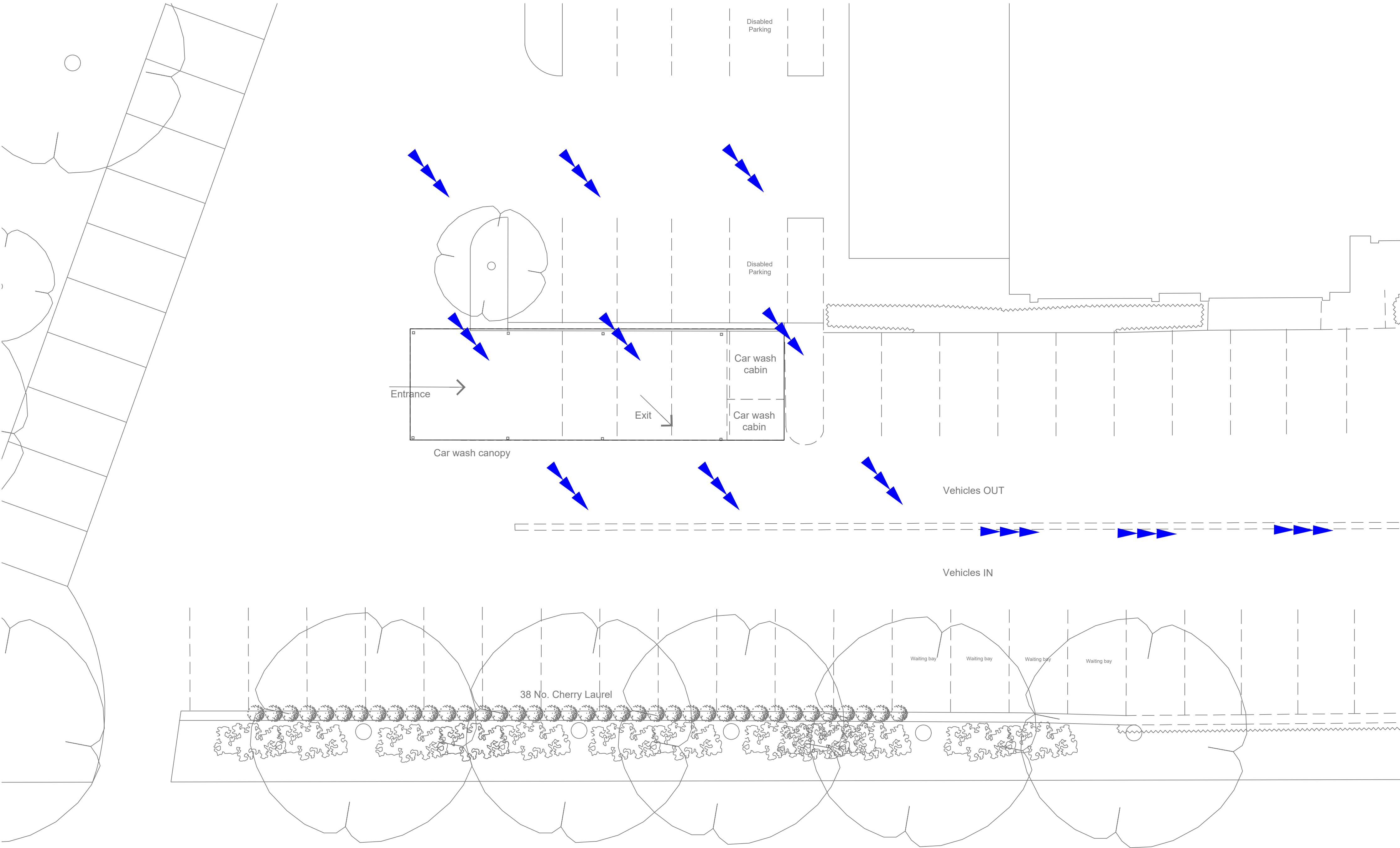
PROJECT
PROPOSED CARWASH
WIDEWATER PLACE
MOORHALL ROAD, UXBRIDGE

DRAWING TITLE
FLOOD EXCEEDANCE PLAN

CIVILS

SCALE 1:100 @ A1 1:200 @ A3	DRAWN BY STC	CHECKED RAC	DATE JUN 2026
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DRAWING NUMBER 1111-2605-CIV-12	REVISION P1
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Appendix F**SUDS operation and maintenance schedules**

Operation and Maintenance Schedule - Cellular Storage Tank		
Maintenance Schedule	Required action	Typical frequency
Regular maintenance	Clean all gutters and downpipes.	Annually.
	Check for sediment build-up or debris in the upstream chambers and the pipe running through the cellular storage tank. Remove all debris and sediment.	Annually.
Occassional Maintenance	Clean all gutters and downpipes. Check for sediment build-up or debris in the upstream chambers and the pipe running through the cellular storage tank. Remove all debris and sediment.	As required based upon inspections.
Remedial Actions	Reconstruct cellular storage tank and/or replace or clean void fill, if performace deteriorates or failure occurs.	As required based upon inspections.
	Replacement of damaged geotextile (will require reconstruction of cellular storage tank).	As required based upon inspections.
Monitoring	Inspect catch pits and note rate of sediment accumulation.	Monthly in first year and then annually, increase frequency of regular maintenancence if heavy siltation occurs more frequently.
	Check cellular storage tank to ensure emptying is occurring.	Annually.

Operation and Maintenance Schedule - Flow Control Chamber		
Maintenance Schedule	Required action	Typical frequency
Regular maintenance	Clean all gutters and downpipes.	Annually
	Inspect for sediment and debris in the chamber and remove.	Six monthly.
	Clean the orifice plate and hole.	As recommended by manufacturer
Remedial Actions	Replace malfunctioning parts or structures	As required.
Monitoring	Inspect for evidence of poor operation.	Six monthly.
	Inspect orifice plate and establish appropriate replacement frequencies	Six monthly.
	Inspect sediment accumulation rates and establish appropriate removal frequencies.	Monthly during first half year of operation, then every six months

Operation and Maintenance Schedule - catchpit		
Maintenance Schedule	Required action	Typical frequency
Regular maintenance	Clean all gutters and downpipes.	Annually
	Inspect for sediment and debris in the chamber and remove.	Six monthly
Occassional Maintenance	Inspect for sediment and debris in the chamber.	As required based upon inspections.
Remedial Actions	Replace chamber if damaged.	As required.
Monitoring	Inspect catchpit and take note of sedimentation.	Monthly in first year and then annually, increase frequency of regular maintenancence if heavy siltation occurs more frequently.

