DRAINAGE STRATEGY REPORT

113-117 North Road, Manchester

Date: 24.05.2023

Document Verification

Client Name:	Brindle & Yam Solicitors
Site Address:	113-117 North Road, Manchester
Date:	24.05.2023
Document Title:	Drainage Strategy
Document ref	23282-0001
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Reviewed by:	Jolyon Lacey CEng, MIStructE Director

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Background

1. The below Drainage Strategy Report has been created by SBS to support and inform detailed Planning Conditions for 113-117 North Road, Manchester.

2. The Report relates to the construction of 2No. residential dwellings with associated parking and landscaping.

Surface Water Drainage Strategy

3. Reference should be made to the Proposed Drainage GA: 23282-1001.

4. The drainage strategy for the proposed development should incorporate the principles of, and where appropriate, demonstrate compliance with, the NPPF and the SUDS Manual. In accordance with the requirements of these documents, the proposed surface water drainage scheme should demonstrate:

    - That there is no increase in flow rates discharged to watercourse / public sewer network.
    - That SUDS have been used as the preferred method for the disposal of surface water.
    - How run-off up to the 1 in 100 year event, plus an allowance for climate change, will be dealt with without increasing flood risk elsewhere.

5. Any proposed drainage works should be designed in accordance with BS EN 752 and Building Regulations Approved Document H (2010). Approved Document H indicates the following hierarchy for the disposal of surface water drainage from new development sites:

    - Discharge via infiltration
    - Discharge to watercourse
    - Discharge to sewer.

6. These options are discussed in further detail below.

7. **Surface water discharge via infiltration:** The online BGS plans and Site Investigation Report undertaken by Groundtech Consulting Ltd indicate that the site is directly underlain by made ground over Glacial Till which is not conducive to the use of soakaways & other infiltration techniques.

8. **Surface water discharge via watercourse:** A review of online mapping indicates that there are no open watercourses in the vicinity of the site.

9. **Surface water discharge via public sewer:** A review of the United Utilities (UU) Public Sewer Records confirm the presence of multiple public combined water sewers located within the adjacent highway network.

10. Given that disposal of surface water from the proposed development via infiltration and via a watercourse are not feasible solutions for this site, it will be necessary to construct a new connection to the public sewer network.

Surface Water Drainage Proposals

11. The drainage proposals outlined within this document and shown on SBS Proposed Drainage GA 23282-1001 are based upon disposal of all surface water from the development via a new connection to the existing UU public sewerage network.

12. The site is currently undeveloped and comprises scrubland with overgrown vegetation and is therefore classified as 'Greenfield'.

13. It is understood that LLFA policy is that any new development should aim to discharge surface water runoff at the pre-developed Greenfield runoff rate.

14. A Greenfield assessment has been undertaken for the existing development using MicroDrainage Software and has concluded the following pre-development runoff rates;

    1:1 Year – 0.1 l/s
    1:30 Year – 0.1 l/s
    1:100 Year – 0.2 l/s

15. Given the difficulties restricting surface water flows to the small greenfield rates noted above, it is considered that a maximum allowable flow of 1 l/s will be applied for all storm events up to and including the critical 100-year storm plus 40% climate change allowance, subject to approval by United Utilities.

16. In order to restrict surface water runoff from the new development to a maximum flow rate of 1 l/s, it has been necessary to incorporate an attenuation system to store all storm water below ground for the above storm durations.

17. It is proposed to collect roof water via traditional rainwater pipes and discharge via a new below ground drainage system located around the building footprint.

18. Surface water runoff from the private driveway will be drained via a tanked (wrapped) permeable paving solution which will store and transfer the captured surface water directly into the new below ground drainage system for disposal along with the roof water noted above. Please refer to drawing: 23282-1001 for further information.

19. Lastly all captured surface water runoff will pass through a Hydrobrake Optimum Flow Control Unit which will restrict the outgoing flow as noted above prior to the new connection with the UU sewerage network.

20. A review of the UU public sewer records indicate the presence of multiple combined water sewers located within the adjacent highway network. The proposals shown on drawing 23282-1001 propose a new connection is made to an existing combined water manhole located directly to the west of the new development.

21. At the time of writing no detailed survey information relating to the existing public sewer network was available. It is therefore recommended that a CCTV survey is undertaken prior to construction to identify all existing drainage infrastructure and obtain invert level information along with any existing outfalls from the current site that may be suitable for reuse by the new build development.

22. Given the end usage of the development is strictly residential with limited hardstanding and minimal vehicular movement, it is considered that the water quality leaving the site is suitable for disposal into the existing United Utilities combined sewer network and that no further treatment is required.

23. It should be noted however that the proposed permeable paving solution does comprise a stone sub-base filtration layer that will provide an element of treatment against pollutants in accordance with guidance outlined within the SUDs manual.

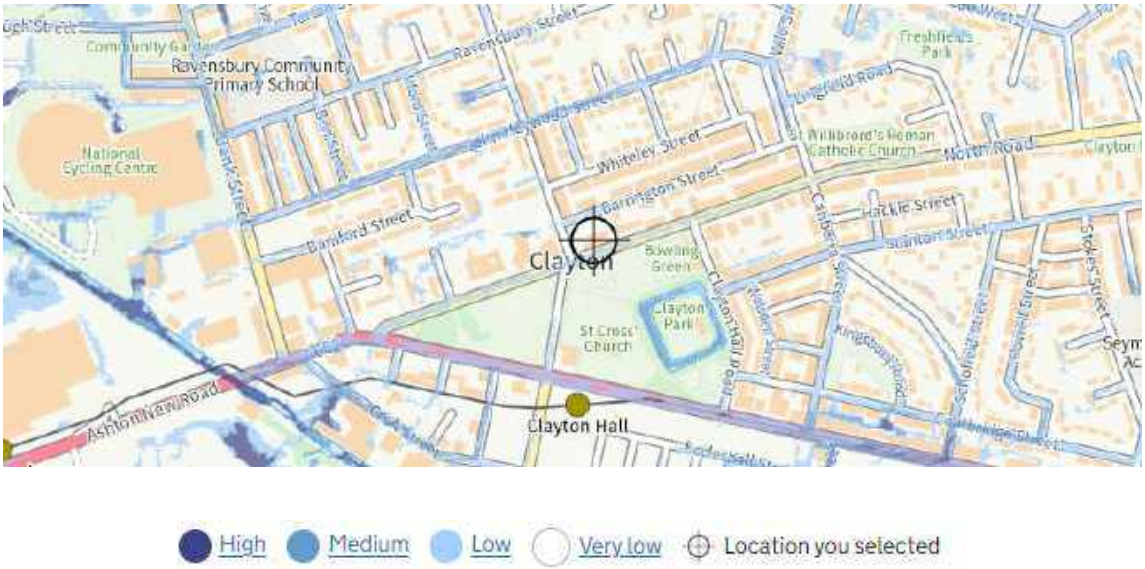
    In addition to the above, gully traps & sumps have also been incorporated within the drainage proposals for the site to prevent debris & pollutants entering the below ground drainage system and being discharged to the UU sewer.

Residual Flood Risk Mitigation

24. The site is located within the Environment Agency's Flood Zone 1 and is noted as being at a 'very low risk' of flooding from all sources.

25. A review of online flood mapping however does indicate that the neighbouring highway is susceptible to a 'low' risk of flooding from surface water runoff.

26. It is understood that the existing highway levels along Barrington Street fall east-west and therefore it is considered that any flows from surface water flooding would be conveyed away from the site and contained within the extent of highway.



Environment Agency Surface Water Flood Map

27. Whist the risk of surface water entering the site is considered to be low, it is recommended that finished floor levels are set at an appropriate freeboard above surrounding ground, and exterior ground levels around the site are contoured to ensure any overland flow routes in an extreme rainfall event are directed away from the proposed dwellings.

28. Given the above it is considered that the risk flooding to the proposed development during extreme storm events can be classified as <u>very low</u>.

Waste Water Drainage Strategy

29. As noted within the previous sections of this report, it is noted that there are multiple UU combined sewers located within the adjacent highway network.

30. Given the above it is proposed that all waste water from the site will be collected via traditional soil stacks & SVPs where it will then be transported via a separate below ground drainage system for disposal into the existing UU manhole located directly east of the new development.

SUDs Review

31. In accordance with current policies and guidelines, SUDs techniques have been considered for the development site's drainage proposals. The suitability of various SUDs techniques have been reviewed and are discussed below.

32. Storing water for later use could be a viable option for this site. Blue/green roof systems were deliberated as part of the design for the new dwellings, however due to the limited roof space available and the lightweight construction of the proposed structures, they were considered to be unsuitable solutions for this site.

33. Water buts located on the property RWPs could store water for domestic/gardening purposes and should be discussed with the client during detailed design.

34. Above ground SUDs features such as storage basins and swales were deliberated during the drainage design for this site, however due to the limited area of soft landscaping/shared open space available across the development to implement such features they have been considered to be not a practical solution for this project.

35. A tanked porous construction solution has been incorporated within the proposed private drive. The permeable paving system will drain, store and provide treatment to captured surface water runoff across the site.

Maintenance Plan

36. It is understood that the new drainage network will be privately owned and maintained by the property owners or an appointed maintenance company on their behalf and will not be offered up for adoption by United Utilities.

37. The proposed drainage system has been designed in accordance with the current standards and guidelines to achieve a minimum self-cleansing velocity, however excessive debris in the system could still result in loss of performance.

38. The proposed drainage design will consists of traditional manholes, pipes and channels.

39. It is proposed to check the underground drainage system and lift manhole/inspection chamber covers to ensure that the pipework associated with each chamber is operating correctly twice yearly and ensure drainage channels are free from debris.

40. Any problems encountered should be investigated by CCTV survey if required and any remedial works necessary carried out in a timely manner.

41. It is recommended that the biannual inspections take place in spring and autumn where there is additional risk of blockage from debris associated with fallen leaves etc.

42. Attenuation has been provided in the form of a new below ground storage crate system. A recommended maintenance schedule, checklist and a preferred cleaning procedure for the storage crate system should be included from the supplier in the O&M Manual however it is anticipated that this should include twice yearly checking that the upstream manholes are free from debris and ensure that no sediment is being passed into the storage crates.

43. Flow restriction has been achieved through the incorporation of a Hydrobrake Optimum Flow Control Unit. A recommended maintenance schedule, checklist and a preferred cleaning procedure should be included from the specialist supplier in the O&M Manual however it is anticipated that this should include twice yearly checking that the upstream manholes are free from debris and ensure that units are operating correctly.

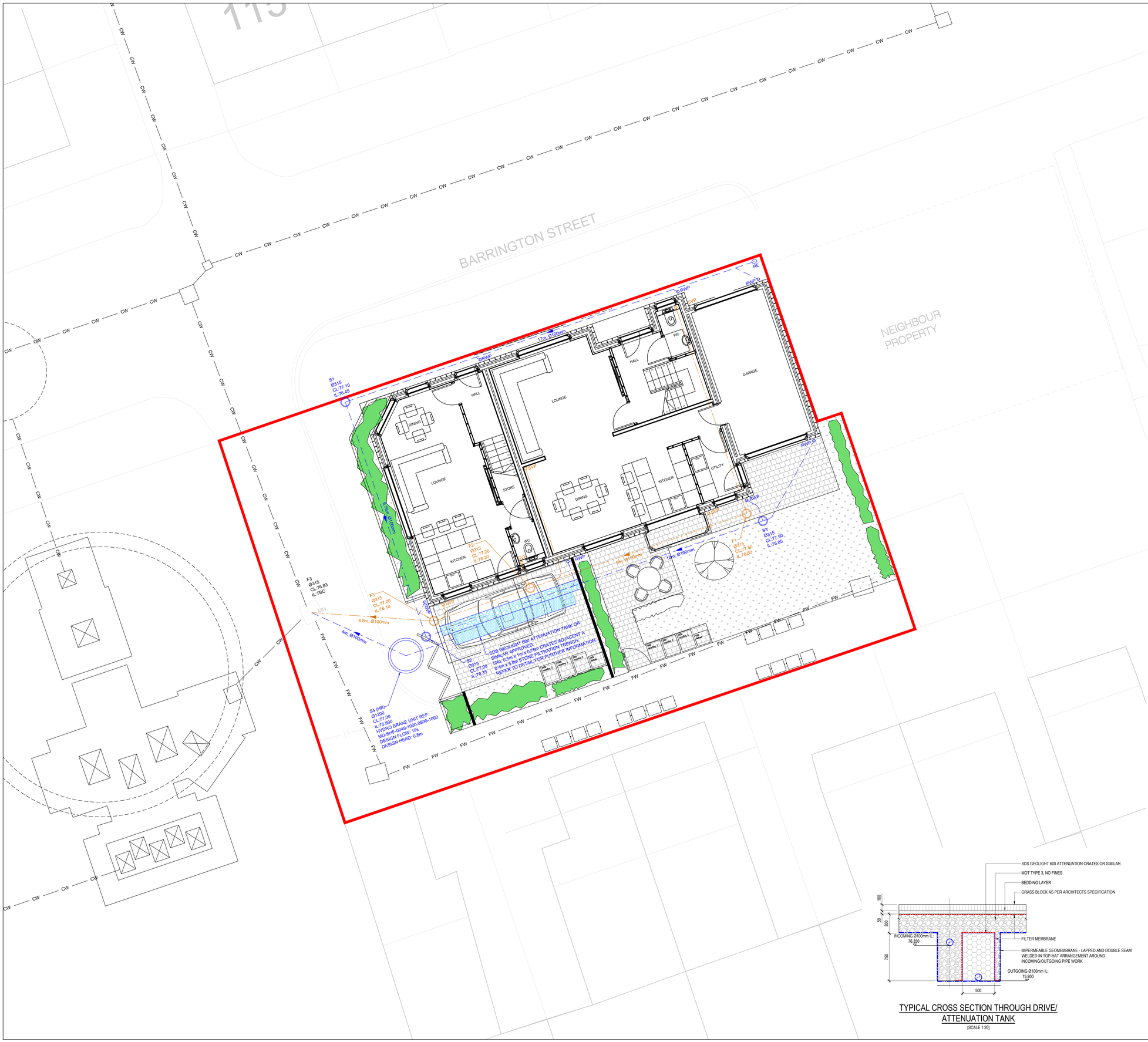
44. It is understood that specialist suppliers also offer maintenance agreements whereby they will provide such services as;

    a. Scheduled cleaning,
    b. Emergency breakdown assistance,
    c. On-site repairs,
    d. Equipment strip-down,
    e. Planned maintenance & planned spares replacements

45. The above should be considered by the Client upon first occupation of the development as part of the general site maintenance plan.

    Lastly, permeable driveway construction has been incorporated within the drainage proposals for this site. It is proposed to check and clean the permeable surfaces regularly to ensure that surface water runoff is not prevented from draining into the sub-base layer, especially during the autumn period where a build-up leaves could occur and result in a loss of performance.

Proposed Surface Water Drainage GA
23282-1001



DRAINAGE NOTES

EXISTING DRAINAGE IS SHOWN INDICATIVE ONLY AND BASED UPON UNITED UTILITIES SEWER RECORDS.

IT IS RECOMMENDED THAT A CCTV SURVEY IS UNDERTAKEN PRIOR TO CONSTRUCTION TO DETERMINE THE EXACT LOCATION, DEPTH AND CONDITION OF ALL EXISTING DRAINAGE INFRASTRUCTURE IN THE VICINITY OF THE PROPOSED DEVELOPMENT.

THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING THE EXACT LOCATION AND DEPTH OF ALL EXISTING DRAINAGE PRIOR TO CONSTRUCTION AND PROVIDE ADEQUATE PROTECTION DURING THE CONSTRUCTION WORKS.

ALL NEW MANHOLE LEVELS ARE INDICATIVE ONLY AND BASED UPON THE EXISTING TOPOGRAPHICAL SURVEY INFORMATION. THE ARCHITECT IS RESPONSIBLE FOR CONFIRMING ALL COVER AND EXTERNAL FINISHED GROUND LEVELS PRIOR TO CONSTRUCTION.

ALL RAINWATER PIPES ARE SHOWN INDICATIVE ONLY AND ARE SUBJECT TO CONFIRMATION BY ARCHITECT PRIOR TO CONSTRUCTION.

ALL SVP & WASTEWATER COLLECTION POINTS ARE SHOWN INDICATIVE ONLY AND ARE SUBJECT TO CONFIRMATION BY ARCHITECT/M&E ENGINEER PRIOR TO CONSTRUCTION.

THE PROPOSED DRAINAGE DESIGN SHOWN IS INDICATIVE ONLY AND IS SUBJECT TO APPROVAL BY UNITED UTILITIES PRIOR TO CONSTRUCTION. ANY WORKS UNDERTAKEN PRIOR TO THE RECEIPT OF APPROVAL FROM UU IS UNDERTAKEN AT THE CONTRACTORS OWN RISK.

LEGEND

CW	EXISTING UNITED UTILITIES COMBINED WATER SEWER
FW	EXISTING UNITED UTILITIES FOUL WATER SEWER
	PROPOSED PRIVATE FOUL DRAIN
	PROPOSED PRIVATE SURFACE WATER DRAIN
	DENOTES CELLULAR ATTENUATION TANK
	DENOTES 0.4m (W) STONE FILTRATION
BD	DENOTES EXTERNAL BACKDROP
RWP	DENOTES RAINWATER PIPE

GENERAL NOTES

DO NOT SCALE FROM THIS DRAWING WORK TO FIGURED DIMENSIONS ONLY.

NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS ALLOWED WITHOUT PRIOR PERMISSION IN WRITING.

ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.

THE CONTRACTOR SHALL INCORPORATE ALL THE REQUIREMENTS OF THE PRE-TENDER STAGE HEALTH AND SAFETY PLAN.

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH TYPICAL DRAINAGE DETAIL DRAWINGS.

THE CONTRACTOR IS RESPONSIBLE FOR CHECKING INVERT LEVELS AND POSITIONS OF ALL EXISTING DRAINS, SEWERS, INSPECTION CHAMBERS AND MANHOLES SHOWN ON THIS DRAWING IMMEDIATELY ON SITE ESTABLISHMENT. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER IMMEDIATELY.

WHERE THE NEW SITE DRAINAGE CONNECTS IN TO EXISTING MANHOLES IN CARRIAGEWAYS AND/OR EXISTING ADOPTED SEWERS, THE CONTRACTOR IS RESPONSIBLE FOR ALL LIAISON WITH THE RELEVANT STATUTORY UNDERTAKER AND LOCAL AUTHORITY WITH REGARD TO ROAD CLOSURES, TRAFFIC MANAGEMENT, PERMITS TO WORK, SUBMISSION OF CONTRACTORS METHOD STATEMENTS AND RISK ASSESSMENTS AND OTHER DOCUMENTATION AND CORRESPONDENCE ASSOCIATED WITH THE SITE STAGE (PART 2) ELEMENT OF THE WORKS.

ROCKER PIPES TO BE PROVIDED AT ALL CONCRETE CASED INTERFACES.

THE CONTRACTOR IS TO PROVIDE ADEQUATE PROTECTION TO MAINTAIN MINIMUM COVER TO DRAINS DURING THE CONSTRUCTION PERIOD.

COVER LEVELS ON THIS DRAWING ARE APPROXIMATE AND INDICATIVE ONLY. ARCHITECT TO CONFIRM COVER LEVELS TO ALL MANHOLES AND GULLIES PRIOR TO CONSTRUCTION.

THE LAYOUT OF DRAINAGE ON THIS DRAWING IS INDICATIVE ONLY ARCHITECT TO CONFIRM EXACT LOCATION OF MANHOLES AND GULLIES PRIOR TO CONSTRUCTION.

UNO. ALL DRAINAGE GOODS & FITTINGS TO BE:-

UPTO 300Ø (AND INCLUDING) TO BE TWINWALL STRUCTURED PLASTIC PIPES APPROVED BY THE ENGINEER OR SUPERSLEVE VITRIFIED CLAY PIPES.

ABOVE 300Ø TO BE CONCRETE BY STANTON BONNA OR SIMILAR.

ALL COVERS AND RODDING ACCESS POINTS TO BE SEALED AND SCREWED TIGHT.

ALL PIPEWORK TO BE INSTALLED WITH SOFFITS LEVEL (E.G. AT CHANGES IN PIPE SIZE) U.N.O.

ON COMPLETION OF DRAINAGE WORKS, THE NEW DRAINAGE SYSTEM IS TO BE THOROUGHLY CLEANED AND A CCTV SURVEY CARRIED OUT TO CONFIRM NO CONSTRUCTION DEBRIS OR BLOCKAGES REMAIN.

CONNECTIONS TO CARRIER DRAINS ARE TO BE 'Y' JUNCTIONS.

ALL PRIVATE DRAINAGE IS TO COMPLY WITH BS EN 752 AND BUILDING REGS. PART H.

PIPE GRADIENTS SHOWN ARE INDICATIVE MINIMUMS.

MANHOLES:

ALL PROPOSED NEW MANHOLES TO BE PRECAST RING MANHOLES TYPE B UNLESS NOTED OTHERWISE. INTERNAL DIAMETERS OF MANHOLES TO BE 1050Ø mm WHERE DEPTH TO PIPE SOFFIT IS LESS THAN 1.5m, AND 1200mm Ø ELSEWHERE UNLESS NOTED OTHERWISE. IC - DENOTES POLYPROPYLENE INSPECTION CHAMBER BY 'HEPWORTH' OR SIMILAR APPROVED INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

MANHOLE COVERS:

CARRIAGEWAYS GENERAL - EN124 CLASS D400
CARRIAGEWAYS WITHIN 0.5m OF KERB - EN124 CLASS C250
SLOW MOVING HGV [38t] - EN 124 CLASS B125 SLOW MOVING GLV [10t] - EN 124 CLASS B125 SLOW MOVING PRIVATE CARS - EN124 CLASS B125.

INTERNAL - JONES OF OSWESTRY - SUPRASTEEL DOUBLE SEALED WITH NEOPRENE GASKET AND COVER GREASE OR SIMILAR APPROVED.

REFER TO ARCHITECTS DRAWINGS FOR DETAILS OF ANY MANHOLE COVERS WHICH REQUIRE INSET PANELS.

SUBJECT TO APPROVAL FROM THE LOCAL AUTHORITY & UNITED UTILITIES

TYPICAL CROSS SECTION THROUGH DRIVE/ ATTENUATION TANK

[SCALE 1:20]

RESIDUAL RISK REGISTER -

REFER TO WML CIVIL / STRUCTURAL DESIGN RISK REGISTER IN ADDITION TO THE HAZARDS / RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORKS INDICATED ON THIS DRAWING. NOTE THE FOLLOWING:-

1. CONTRACTOR TO SCAN FOR SERVICES & CLEARLY MARK AT GROUND LEVEL PRIOR TO COMMENCEMENT OF EXCAVATION.
2. 'UNKNOWN' SERVICES TO BE TESTED TO SEE IF LIVE PRIOR TO COMMENCEMENT OF EXCAVATION.

REV	DATE	NAME	REVISION	REV CHECK
P01	24.05.23	DB	PRELIMINARY ISSUE	JNL

SBS
Consulting Structural & Civil Engineers

TITLE: PROPOSED DRAINAGE GA

PROJECT: 113-117 NORTH ROAD, MANCHESTER

CLIENT: BRINDLE & YAM SOLICITORS

DRAWN AT:	OFFICE:	DRAWN BY:	C.A.D.
	-	DB	
SCALE: 1:100 @ A0	DATE: JAN 2023	CHECKED BY: JNL	

CONTRACT No:	DRAWING No:
23282	1001

Surface Water Drainage Calculations
23282-0002

Surface Water Drainage Calculations

For a site referred to as

113-117 North Road, Manchester

Undertaken on Behalf of

Brindle & Yam Solicitors.

Client Name:	Brindle & Yam Solicitors
Site Address:	113-117 North Road, Manchester
Date:	24.05.23
Document Title :	Surface Water Drainage Calculations
Document ref	23282-0002
Revision:	P01

Prepared by:	Dan Baker, BEng(Hons) TMICE Senior Civil Engineer
Reviewed by:	Jolyon Lacey CEng, MIStructE Director

General Notes

1. The calculations within this document have been undertaken using MicroDrainage Software version 2020.

2. This document is to be read in conjunction with the following documents;

    a. 23282-1001 – Proposed Drainage GA
    b. 23282-0001 – Drainage Strategy Document

Summary of Results

3. As noted within the drainage strategy document, due to the difficulties restricting proposed flows from the new development to the below Greenfield Runoff Rates it has been considered that a maximum forward flow of 1 l/s should be used for all storm durations up to and including the critical 100-year event + 40% climate change allowance subject to approval by United Utilities.

4. The below summary table demonstrates that the above maximum design flow of 1 l/s is achievable based on the drainage design shown on drawing 23282-1001.

Greenfield Runoff Rate* (l/s)	Proposed Site Runoff Rate – Manhole S5 (l/s)
Q1: 0.1 Q30: 0.1 Q100: 0.2	1:1: 0.8 1:30: 0.9 1:100 + 40%: 1.0

Greenfield Runoff Calculation

Designed by DBaker
Checked by

Innovyze Source Control 2020.1.3

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	0.015	Urban	0.000
SAAR (mm)	860	Region Number	Region 10

Results	**l/s**
QBAR Rural	0.1
QBAR Urban	0.1
Q100 years	0.2
Q1 year	0.1
Q30 years	0.1
Q100 years	0.2

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Surface Water Network Calculation

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Innovyze Network 2020.1.3

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.360	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
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)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

« - Indicates pipe capacity < flow

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	9.756	0.100	97.6	0.007	5.00	0.0	0.600	o	100	Pipe/Conduit	
S1.001	3.139	0.000	0.0	0.002	0.00	0.0	0.600	o	100	Pipe/Conduit	
S2.000	10.861	0.500	21.7	0.005	5.00	0.0	0.600	o	100	Pipe/Conduit	
S1.002	4.155	0.000	0.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.003	4.075	0.050	81.5	0.000	0.00	0.0	0.600	o	100	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	46.00	5.21	76.450	0.007	0.0	0.0	0.0	0.78	6.1	0.9
S1.001	43.35	5.96	76.350	0.009	0.0	0.0	0.0	0.07	0.5«	1.1
S2.000	46.38	5.11	76.850	0.005	0.0	0.0	0.0	1.66	13.1	0.6
S1.002	40.34	6.96	75.800	0.014	0.0	0.0	0.0	0.07	0.5«	1.6
S1.003	40.12	7.04	75.800	0.014	0.0	0.0	0.0	0.85	6.7	1.6

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	77.100	0.650	Open Manhole	315	S1.000	76.450	100				
S2	77.000	0.650	Open Manhole	315	S1.001	76.350	100	S1.000	76.350	100	
S3	77.500	0.650	Open Manhole	315	S2.000	76.850	100				
S3	77.200	1.400	Junction		S1.002	75.800	100	S1.001	76.350	100	550
								S2.000	76.350	100	550
S4	77.000	1.200	Open Manhole	1200	S1.003	75.800	100	S1.002	75.800	100	
S	76.850	1.100	Open Manhole	0		OUTFALL		S1.003	75.750	100	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	387995.514	398690.108	387995.514	398690.108	Required	
S2	387998.686	398680.882	387998.686	398680.882	Required	
S3	388011.925	398685.433	388011.925	398685.433	Required	
S3	388001.654	398681.902			No Entry	
S4	387997.894	398680.133	387997.894	398680.133	Required	
S	387994.190	398681.831			No Entry	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	100	S1	77.100	76.450	0.550	Open Manhole	315
S1.001	o	100	S2	77.000	76.350	0.550	Open Manhole	315
S2.000	o	100	S3	77.500	76.850	0.550	Open Manhole	315
S1.002	o	100	S3	77.200	75.800	1.300	Junction	
S1.003	o	100	S4	77.000	75.800	1.100	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	9.756	97.6	S2	77.000	76.350	0.550	Open Manhole	315
S1.001	3.139	0.0	S3	77.200	76.350	0.750	Junction	
S2.000	10.861	21.7	S3	77.200	76.350	0.750	Junction	
S1.002	4.155	0.0	S4	77.000	75.800	1.100	Open Manhole	1200
S1.003	4.075	81.5	S	76.850	75.750	1.000	Open Manhole	0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.007	0.007	0.007
1.001	User	-	100	0.002	0.002	0.002
2.000	User	-	100	0.005	0.005	0.005
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.014	0.014	0.014

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.003	S	76.850	75.750	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
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

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.360		

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Innovyze Network 2020.1.3

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S3, DS/PN: S1.002, Volume (m³): 0.1

Unit Reference	MD-SHE-0049-1000-0800-1000
Design Head (m)	0.800
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	49
Invert Level (m)	75.800
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	1.0
Flush-Flo™	0.215	0.9
Kick-Flo®	0.437	0.8
Mean Flow over Head Range	-	0.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.8	1.200	1.2	3.000	1.8	7.000	2.7
0.200	0.9	1.400	1.3	3.500	1.9	7.500	2.8
0.300	0.9	1.600	1.4	4.000	2.1	8.000	2.9
0.400	0.8	1.800	1.4	4.500	2.2	8.500	2.9
0.500	0.8	2.000	1.5	5.000	2.3	9.000	3.0
0.600	0.9	2.200	1.6	5.500	2.4	9.500	3.1
0.800	1.0	2.400	1.6	6.000	2.5		
1.000	1.1	2.600	1.7	6.500	2.6		

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Storage Structures for Storm

Complex Manhole: S3, DS/PN: S1.002

Cellular Storage

Invert Level (m) 75.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	2.5	2.5	1.300	0.0	7.7
0.100	2.5	3.1	1.400	0.0	7.7
0.200	2.5	3.8	1.500	0.0	7.7
0.300	2.5	4.4	1.600	0.0	7.7
0.400	2.5	5.0	1.700	0.0	7.7
0.500	2.5	5.7	1.800	0.0	7.7
0.600	2.5	6.3	1.900	0.0	7.7
0.700	2.5	6.9	2.000	0.0	7.7
0.800	1.2	7.5	2.100	0.0	7.7
0.900	0.0	7.7	2.200	0.0	7.7
1.000	0.0	7.7	2.300	0.0	7.7
1.100	0.0	7.7	2.400	0.0	7.7
1.200	0.0	7.7	2.500	0.0	7.7

Infiltration Trench

Infiltration Coefficient Base (m/hr) 0.00000 Trench Width (m) 0.4
Infiltration Coefficient Side (m/hr) 0.00000 Trench Length (m) 5.8
Safety Factor 2.0 Slope (1:X) 0.0
Porosity 0.30 Cap Volume Depth (m) 0.800
Invert Level (m) 75.800 Cap Infiltration Depth (m) 0.000

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
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 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.000 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	1	+0%	100/30 Winter				76.475
S1.001	S2	15 Winter	1	+0%	100/15 Summer				76.386
S2.000	S3	15 Winter	1	+0%					76.864
S1.002	S3	30 Winter	1	+0%	1/15 Summer				75.920
S1.003	S4	30 Winter	1	+0%					75.824

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.075	0.000	0.15			0.8	OK	
S1.001	S2	-0.064	0.000	0.27			1.1	OK	
S2.000	S3	-0.086	0.000	0.05			0.6	OK	
S1.002	S3	0.020	0.000	0.20		15	0.8	SURCHARGED*	
S1.003	S4	-0.076	0.000	0.14			0.8	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
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 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.000 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	30	+0%	100/30 Winter				76.491
S1.001	S2	15 Winter	30	+0%	100/15 Summer				76.412
S2.000	S3	15 Winter	30	+0%					76.873
S1.002	S3	30 Winter	30	+0%	1/15 Summer				76.183
S1.003	S4	120 Winter	30	+0%					75.827

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.059	0.000	0.36			2.0	OK	
S1.001	S2	-0.038	0.000	0.69			2.7	OK	
S2.000	S3	-0.077	0.000	0.12			1.5	OK	
S1.002	S3	0.283	0.000	0.23		20	0.9	SURCHARGED*	
S1.003	S4	-0.073	0.000	0.16			0.9	OK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
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 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.000 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	60 Winter	100	+40%	100/30 Winter				76.708
S1.001	S2	60 Winter	100	+40%	100/15 Summer				76.704
S2.000	S3	15 Winter	100	+40%					76.882
S1.002	S3	60 Winter	100	+40%	1/15 Summer				76.701
S1.003	S4	60 Winter	100	+40%					75.829

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.158	0.000	0.35			2.0	SURCHARGED	
S1.001	S2	0.254	0.000	0.68			2.7	FLOOD RISK	
S2.000	S3	-0.068	0.000	0.23			2.8	OK	
S1.002	S3	0.801	0.000	0.26		46	1.0	SURCHARGED*	
S1.003	S4	-0.071	0.000	0.18			1.0	OK	

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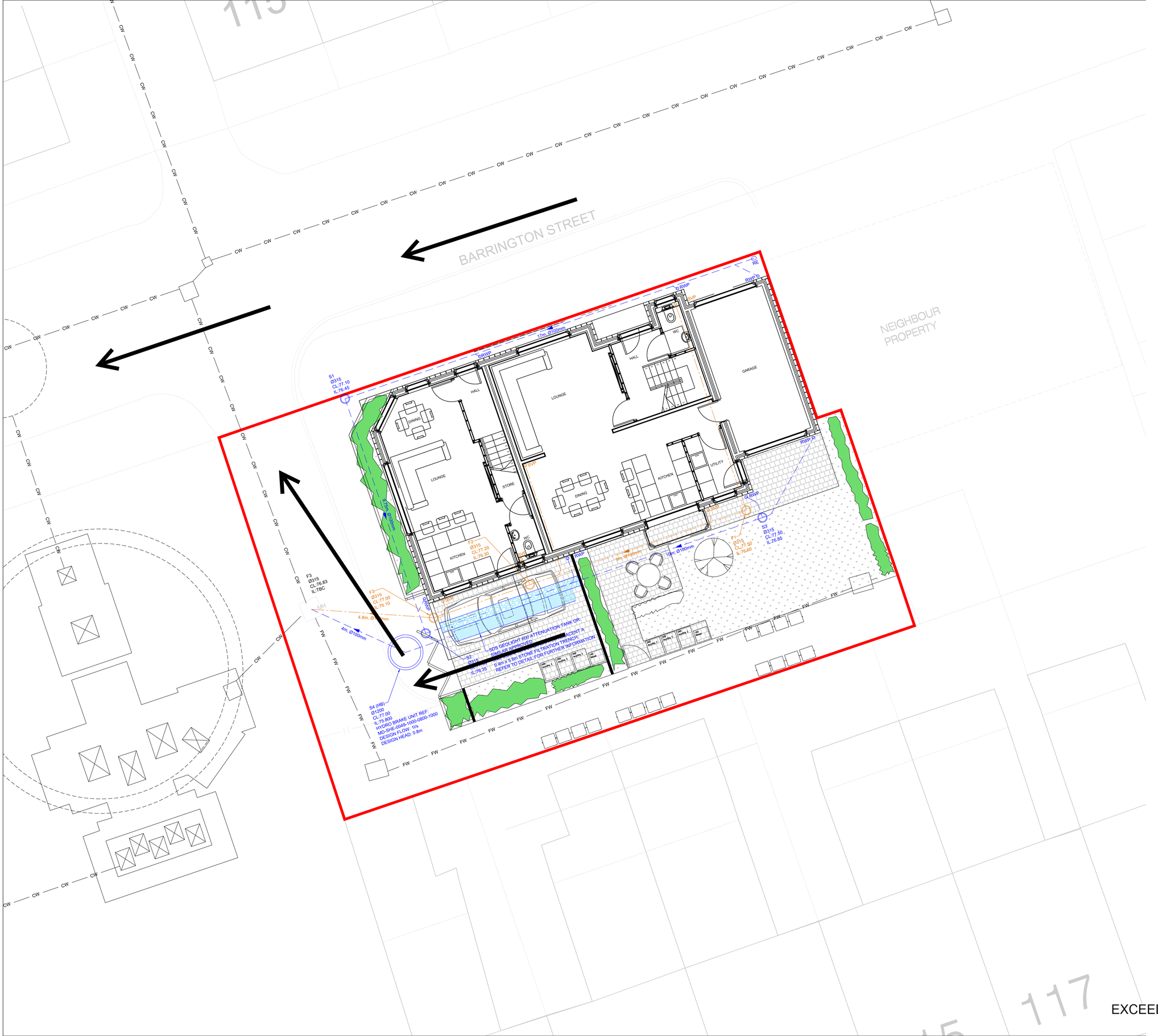
Exceedance Flow Route Plan



EXCEEDANCE FLOW ROUTE

United Utilities Public Sewer Records

United Utilities Maps for SafeDig

Date :	26/04/2023 11:56:29
Centre X:	387992
Centre Y:	398681
Scale :	500
UserName:	NETWRKPLS

Extract from maps of United Utilities' Underground Assets

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. The actual positions may be different from those shown on the plan and private service pipes may be shown by a blue broken line. United Utilities Water will not accept liability for any damage caused by the actual position being different from those shown.

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United Utilities
Water for the North West