

DRAINAGE CONDITION REPORT

for

Armistead Property Limited

at

**59 Upper Chorlton Road,
Manchester, M16 7RQ**

Quality Management

Job No	12830		
Project	59 Upper Chorlton Road		
Location	Manchester, M16 7RQ		
Title	Drainage Condition Report		
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Prepared by	R Andrew James MEng CEng MStructE	Signature (for file)	
Checked by	Mark B Donohue BEng(hons) CEng MStructE	Signature (for file)	

Revision History

Rev	Date	Issue / Purpose/ Comment	Prepared	Checked
01	30.11.21	Final Issue	AJ	MD
02	23.02.22	Updated to suit MCC comments	AJ	MD

CHANGES TO THIS REVISION SHOWN IN RED

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1 Introduction

- 1.1 In 2019 a planning application was submitted to Manchester City Council for the construction of a four storey extension to rear elevation, dormer extension and elevational alterations involved in refurbishment of 10 existing 1 bed/bedsit flats to provide 17 flats with associated car parking and landscaping works at 59 Upper Chorlton Road, Manchester, M16 7RQ. No Drainage information was submitted with the application. Planning approval was granted in December 2019 (Ref: 124976/FO/2019) subject to a number of planning conditions, including one condition relating to the drainage of the development.
- 1.2 This report has been prepared to remove the drainage related planning condition relevant to the application. This is condition No. 5.

2 Drainage Strategy

2.1 Existing Drainage

The United Utilities sewer records have been reviewed and confirms there are a number of large diameter combined water sewers located in Upper Chorlton Road.

There is also a 1350 x 1050mm surface water sewer at 6m depth.

The current site can be classed as brownfield and outfalls unrestricted to the combined sewer via a 150mm diameter connection.

Figure 1 below identifies the existing sewer records.

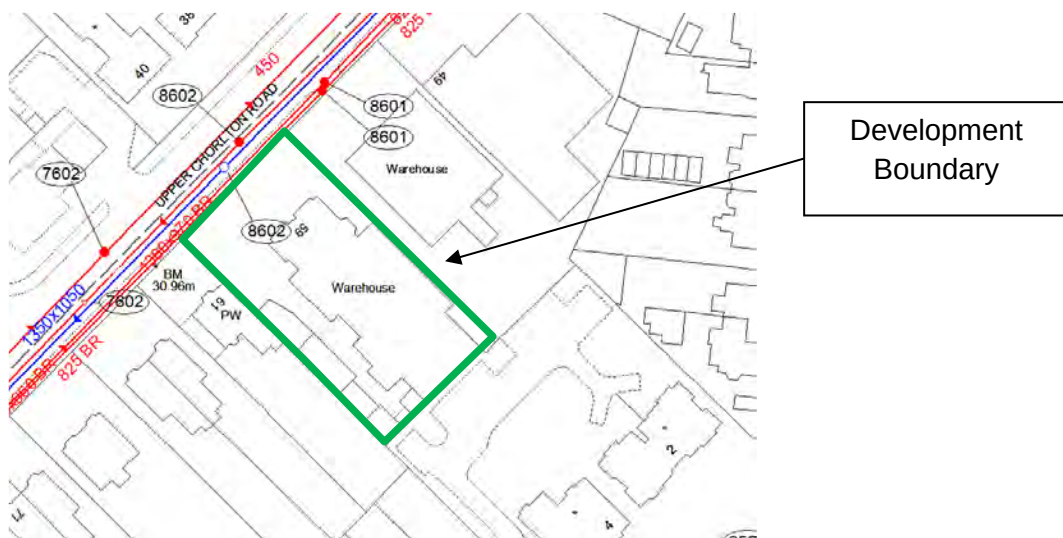


Figure 1: UU sewer Records

2.2 Geotechnical Assessment

A Phase 2 site investigation has not been completed at the site. However, a formal BRE 365 soakaway investigation has been undertaken. One pit with three fills were carried out in the area of the proposed infiltration device, within the sand sub strata. These defined the lowest rate at 2.87×10^{-5} m/s.

2.3 SuDS Hierarchal Approach

Based on the existing drainage configuration, plus an assessment of the local site conditions, the SuDS hierarchal approach for discharge of surface water at the development site is considered in detail below:

3

Method	Suitability	Suitability for Development
Infiltration to Ground	Yes	Investigation of local ground conditions has confirmed that the underlying ground is suitable for infiltration.
Connection to Watercourse	No	There is no watercourse in close proximity to the site.
Connection to Surface Water Sewer	No	Higher options possible.
Connection to Combined Water Sewer	No	Higher options possible.

Figure 2: SuDS Hierarchal Approach

2.4 Surface Water Drainage Strategy

The general principal of the surface water drainage strategy is to collect the runoff from the roofs of the main building and direct it to a number of new RWPs that will drop down to a new surface water network on either side. The access road will drain to the parking bays that will be constructed in a permeable surfacing and allow infiltration direct to the underlying sand. The new drainage will then outfall to a geocellular soakaway chamber in the centre of the rear car park.

Full calculations have been carried out and **show no flooding** up to and including the 100yr + 40% climate change storm event.

2.5 Maintenance

The drainage network encompasses standard pipework, manholes and geocellular infiltration tank. As long as the gullies at the base of the rainwater pipes are kept clear of leaves and detritus by regular inspection by the property owners then this should negate it passing into the network.

All management and maintenance of the drainage will be with a management company. This will involve general maintenance of the drainage network in accordance with best practice. All drainage will remain private and not be adopted by the local sewerage authority.

Typically the maintenance regime will be in line with the table below.

Future Maintenance of the Drainage System			
Responsibility	Feature	Maintenance	Frequency
Management Company	Drainage Channel.	Regular maintenance / removal of blockages and silts.	Ad-hoc flushing / jetting and emptying of silt traps required.
	Rainwater gutters, downpipes and above ground drainage.	Regular maintenance and inspections.	Ad-hoc sweeping and emptying of silt and debris required. Annual visual inspections to check for damage/leaks.
	Geocellular Infiltration Tanks	Regular maintenance / removal of blockages and debris.	Annual inspection and following significant rainfall events.
	Pipes, sewers, manholes	Regular maintenance / removal of blockages and debris.	Annual inspection and removal of silts if required.

Figure 3: Management & Maintenance Plan

3 Drainage Related Planning Condition and Responses

3.1 Planning Conditions

The specific condition is written below with the M&G response in Blue beneath

Condition 5.

No development shall take place until surface water drainage works, designed in accordance with Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015) or any subsequent replacement national standards, have been submitted to and approved in writing by the Local Planning Authority. In order to avoid/discharge the above drainage condition the following additional information has to be provided:

As described in Section 2, an assessment of the existing ground conditions and a full assessment of the SuDS Hierarchal approach has been considered. This has determined that the surface water discharge option is to outfall to a geocellular infiltration tank and perforated pipes into the underlying sand.

The drainage GA drawing in Appendix A and calculations in Appendix B define further.

Below is the M&G response to the further 6 points raised as part of the condition:

1. Infiltration testing has proven that the ground is suitable for soakaways which is on top of the SuDS hierarchal approach.
2. Appendix A provides the drainage GA. Calculations in Appendix B has proven there is no exceedance flooding. Note that although the model shows flooding for the 100yr + 40% CC peak storm event, this volume would be encompassed within the area of permeable surfacing and land drainage, thus not flooding the surface.
3. Attenuation will take the form of a geocellular infiltration tank. Thus no flows discharging off site.
4. The building is elevated above the adjoining pathways, access road and car park. Any exceedance from blockage will be retained on the access road and car park and not pose a risk to the new building or adjacent properties. Flood flow arrows are shown on the drainage GA.
5. Refer to Appendix B for the hydraulic calculations.
6. All the drainage is standard drainage pipes, manholes and gullies. Details for maintaining the geocellular soakaway will be in line with Ciria guidance. A management company will take on the responsibility for maintaining all the new drainage within the scheme. Final details of the management company have yet to be confirmed.

Appendix A – Marston & Grundy Drawings

DRAINAGE 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 MILLIMETRES, 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. 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.
7. 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.
8. 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.
9. 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 E600 & 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/C250, 100MM DEEP, BADGED FW OR SW FOR FOUL OR SURFACE WATER DRAINAGE.
13. DOUBLE SEAL MANHOLE COVERS AND FRAMES ARE TO BE USED ON INTERNAL FOUL WATER DRAINAGE CHAMBERS. FINISH TO BE CONFIRMED BY THE ARCHITECT.
14. HEAVY DUTY COVER SLABS ARE TO BE USED WITHIN VEHICULAR TRAFFICKED AREAS.
15. 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.
16. GULLY GRATES ADJACENT TO KERBS SHALL BE HINGED ON THE SIDE OF THE TRAFFIC DIRECTION (LEFT HAND SIDE).
17. 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.
18. DIAMETER OF PCC MANHOLES VARIES WITH PIPE SIZE, AND IS TO BE IN ACCORDANCE WITH THE TABLES SHOWN ON THE ACCOMPANYING MARSTON & GRUNDY STANDARD DETAILS DRAWINGS.
19. ALL BRICKWORK IN CONNECTION WITH DRAINAGE IS TO BE SOLID CLASS B ENGINEERING BRICK TO THE RELEVANT BRITISH/EUROPEAN STANDARD.

20. 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.
21. INSITU CONCRETE GRADES TO BE AS STATED ON THE DRAWINGS. DESIGN CHEMICAL CLASS FOR ALL PRECAST CONCRETE PRODUCTS SHALL BE DC4 UNLESS AGREED OTHERWISE.
22. ALL BELOW GROUND PLASTIC/GRP TANKS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS. THEY SHALL BE PROVIDED WITH SUFFICIENT CONCRETE SURROUND TO COUNTER FLOATATION AND SHALL HAVE A WALL THICKNESS ADEQUATE TO RESIST THE HIGHEST GROUND WATER LEVEL WHICH COULD BE ENCOUNTERED AT THEIR LOCATION.
23. ALL EXISTING DRAINAGE/STRUCTURES TO BE ABANDONED SHALL BE BROKEN OUT AND REMOVED FROM 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.
24. 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.
25. 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.
26. ALL WORKS ARE ASSUMED TO BE WITHIN PUBLIC HIGHWAY OR WITHIN LAND OWNERS LANDS & NO WORKS ARE REQUIRED ON THIRD PARTY LAND OWNERS PROPERTY.
27. ALL RWP, GULLY AND CHANNEL CONNECTIONS SHALL BE 150MM DIA U.N.O. WASTE/SOIL STACK CONNECTIONS SHALL BE 100MM DIA. UNO AND SHALL HAVE INTERNAL ABOVE GROUND RODDING EYES OR LARGE ACCESS FITTINGS IN ACCORDANCE WITH BUILDING REGULATIONS.

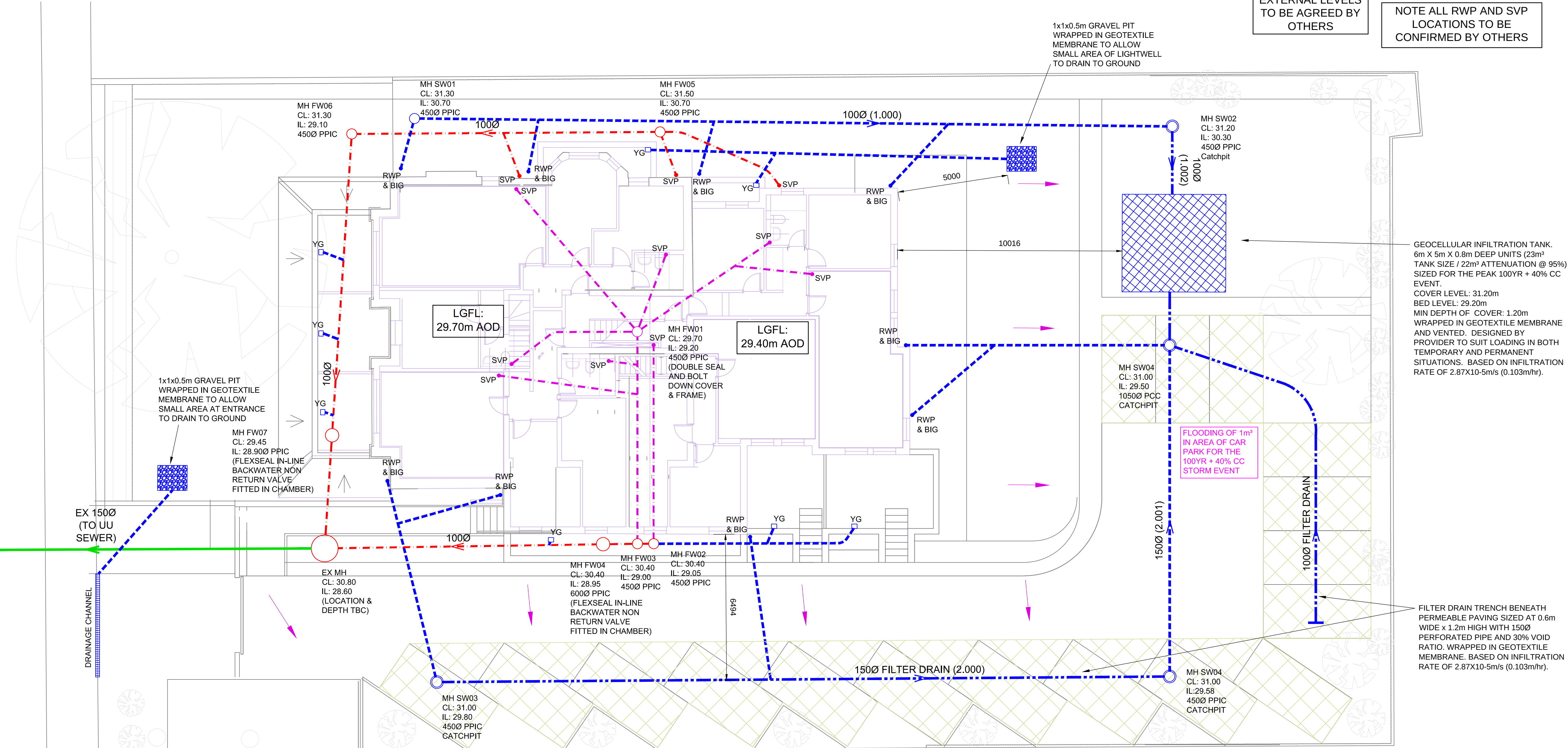
28. DESIGN ASSUMES THAT NO WATER AUTHORITY SEWERS OR OTHER DRAINAGE SYSTEMS REQUIRE MODIFICATION, DIVERSION OR ABANDONING.
29. BACKFILL TO ALL DRAINAGE TRENCHES TO BE CLASS 6F1 MATERIAL.
30. ALL WORKS WITHIN THE PUBLIC HIGHWAY TO BE REINSTATED TO HIGHWAY AUTHORITY REQUIREMENTS.
31. NO DEEP ROOTING TREES/VEGETATION SHOULD BE PLANTED WITHIN 5.0M OF ANY DRAINAGE WORKS.
32. ALL WPC'S, SRWP'S AND RWP'S ARE SHOWN INDICATIVELY. LOCATIONS SHALL BE CONFIRMED BY OTHERS.
33. ALL MANHOLES LESS THAN 1.5M DEEP ARE CONSIDERED AS NONE MAN ENTRY AND SHALL BE MAINTAINED FROM GROUND LEVEL.

ALL PIPEWORK TO BE 100Ø UNLESS NOTED OTHERWISE

EXTERNAL LEVELS TO BE AGREED BY OTHERS

LOCATIONS, DEPTH AND SIZE OF ALL EXISTING DRAINAGE TBC PRIOR TO WORKS COMMENCING

NOTE ALL RWP AND SVP LOCATIONS TO BE CONFIRMED BY OTHERS



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KEY

- EXISTING COMBINED WATER DRAINAGE
- PROPOSED FOUL WATER DRAINAGE
- PROPOSED BASEMENT FOUL WATER DRAINAGE
- PROPOSED SURFACE WATER DRAINAGE
- PROPOSED LAND DRAIN
- PROPOSED PERMEABLE SURFACING
- RWP RAINWATER PIPE
- SVP SOIL VENT PIPE
- BIG BACK INLET GULLY
- RG ROAD GULLY
- YG YARD GULLY
- RE RODDING EYE
- SG SUMP GULLY FOR DRAINAGE CHANNEL
- EXCEEDANCE FLOOD ARROW

P2	DRAINAGE LAYOUT UPDATED TO SUIT MCC COMMENTS	PG	23.02.22	MD
P1	PRELIMINARY ISSUE	PG	30.11.21	MD
Rev	Description	By	Date	Chkd

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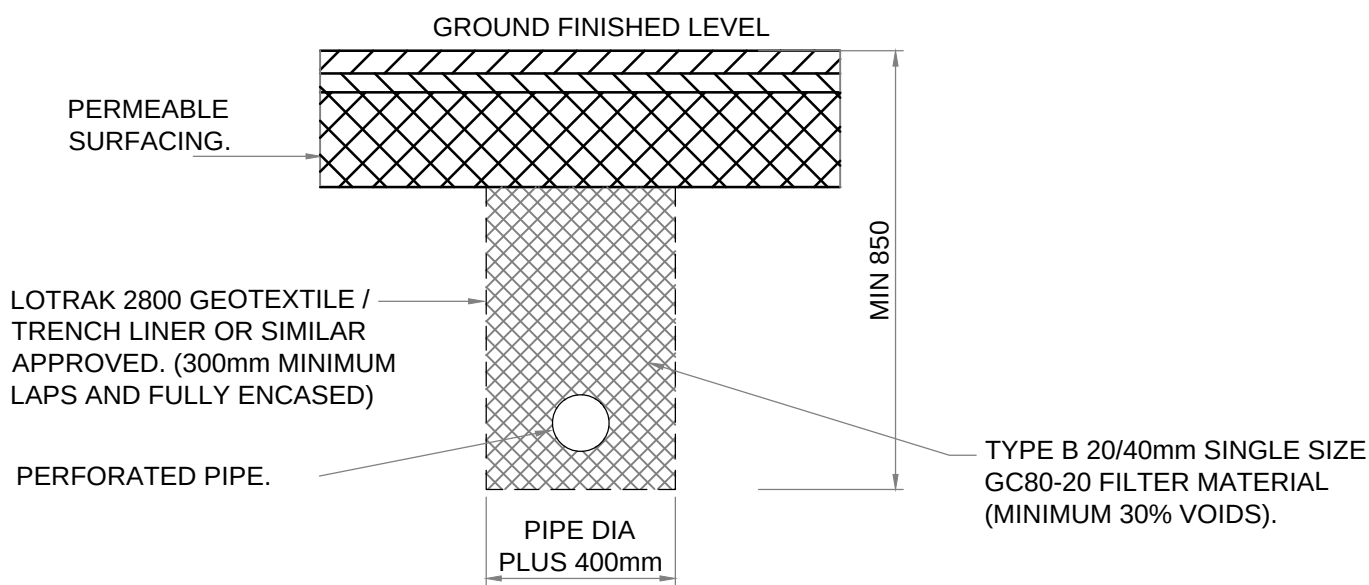
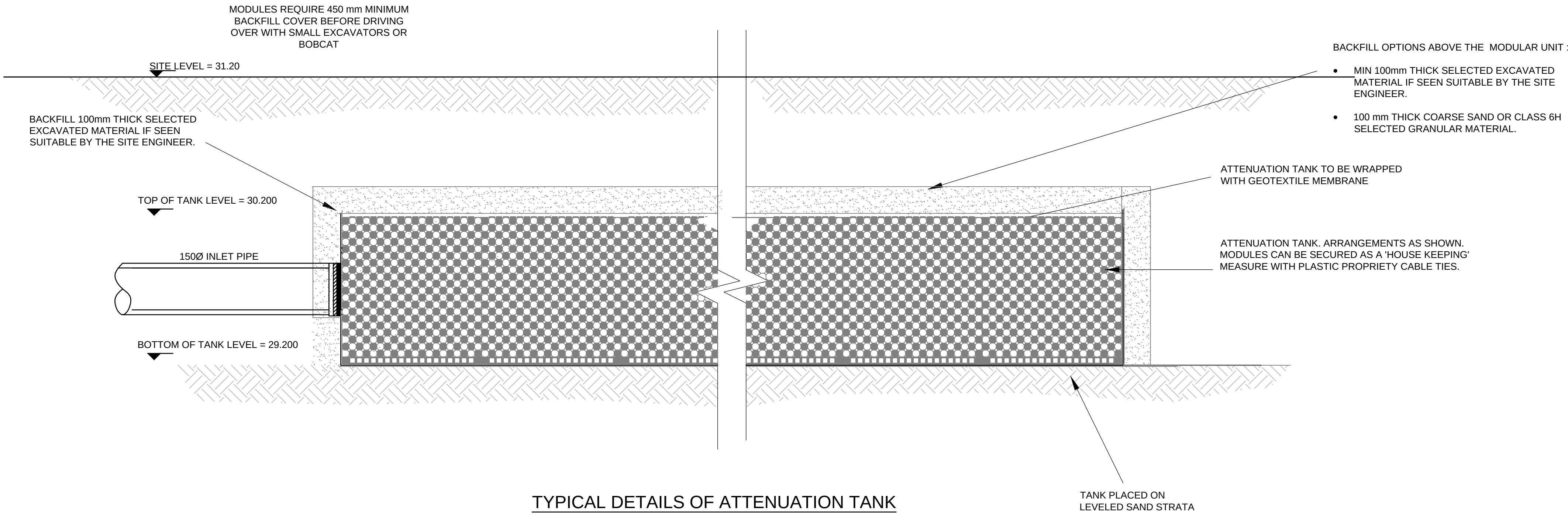
Client
ARMISTEAD PROPERTY LIMITED

Project
59 UPPER CHORLTON ROAD
WHALLEY RANGE, MANCHESTER

Drawing
DRAINAGE GA

Purpose of Issue
PRELIMINARY

Project No.	Scale @ A1	Date	Drawn	Checked			
12830	1:100	30.11.21	PG	MD			
Drawing Identifier							
project	origin	zone	level	file type	role	number	revision
UCR-MaG-ZZ-00-DR-C-00100							P2



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Rev	Description	By	Date	Chk'd



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Project
**59 UPPER CHORLTON ROAD
WHALLEY RANGE, MANCHESTER**

Drawing
DRAINAGE DETAILS

Purpose of Issue
PRELIMINARY

Project No.	Scale @ A1	Date	Drawn	Checked			
12830	NTS	23.02.22	PG	MD			
Drawing Identifier							
project	origin	zone	level	file type	role	number	revision
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Appendix B – Hydraulic Calculations

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	Upper Chorlton Road SW Network Rev 2 23.02.22	
Date 23/02/2022 File UCR - SW Network V2 23....	Designed by paulg Checked by	
Innovyze	Network 2017.1.2	

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)	2	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.370	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

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.065	4-8	0.017

Total Area Contributing (ha) = 0.082

Total Pipe Volume (m³) = 1.325

Network Design Table for Storm

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
1.000	33.000	0.400	82.5	0.015	4.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	3.000	0.040	75.0	0.005	0.00	0.0	0.600	o	100	Pipe/Conduit	
2.000	32.000	0.220	145.5	0.043	4.00	0.0	0.600	o	150	Pipe/Conduit	
2.001	14.000	0.095	147.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.002	3.000	0.020	150.0	0.019	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	4.65	30.700	0.015	0.0	0.0	0.0	0.85	6.7	2.0
1.001	50.00	4.71	30.300	0.020	0.0	0.0	0.0	0.89	7.0	2.7
2.000	50.00	4.64	29.800	0.043	0.0	0.0	0.0	0.83	14.7	5.8
2.001	50.00	4.92	29.580	0.043	0.0	0.0	0.0	0.83	14.6	5.8
2.002	50.00	4.99	29.500	0.062	0.0	0.0	0.0	0.82	14.5	8.4

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Upper Chorlton Road SW Network Rev 2 23.02.22		
Date 23/02/2022 File UCR - SW Network V2 23....		
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Checked by		
Innovyze		Network 2017.1.2

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., (mm)	L*W
1.000	o	100	SW01	31.300	30.700	0.500	Open Manhole		450
1.001	o	100	SW02	31.200	30.300	0.800	Open Manhole		450
2.000	o	150	SW03	31.000	29.800	1.050	Open Manhole		450
2.001	o	150	SW04	31.000	29.580	1.270	Open Manhole		450
2.002	o	150	SW05	31.000	29.500	1.350	Open Manhole		450
1.002	o	150	SW06	31.200	29.200	1.850	Open Manhole		300

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., (mm)	L*W
1.000	33.000	82.5	SW02	31.200	30.300	0.800	Open Manhole		450
1.001	3.000	75.0	SW06	31.200	30.260	0.840	Open Manhole		300
2.000	32.000	145.5	SW04	31.000	29.580	1.270	Open Manhole		450
2.001	14.000	147.4	SW05	31.000	29.485	1.365	Open Manhole		450
2.002	3.000	150.0	SW06	31.200	29.480	1.570	Open Manhole		300
1.002	10.000	100.0	dummy	31.000	29.100	1.750	Open Manhole		0

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)
1.002	dummy	31.000	29.100	29.000	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 * 10m ³ /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	3
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

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	Upper Chorlton Road SW Network Rev 2 23.02.22																					
Date 23/02/2022 File UCR - SW Network V2 23....	Designed by paulg Checked by																					
Innovyze	Network 2017.1.2																					
<u>Synthetic Rainfall Details</u> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Profile Type</td> <td>Summer</td> </tr> <tr> <td>Return Period (years)</td> <td>2</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>18.000</td> <td>Storm Duration (mins)</td> <td>30</td> </tr> <tr> <td>Ratio R</td> <td>0.370</td> <td></td> <td></td> </tr> </table>			Rainfall Model	FSR	Profile Type	Summer	Return Period (years)	2	Cv (Summer)	0.750	Region	England and Wales	Cv (Winter)	0.840	M5-60 (mm)	18.000	Storm Duration (mins)	30	Ratio R	0.370		
Rainfall Model	FSR	Profile Type	Summer																			
Return Period (years)	2	Cv (Summer)	0.750																			
Region	England and Wales	Cv (Winter)	0.840																			
M5-60 (mm)	18.000	Storm Duration (mins)	30																			
Ratio R	0.370																					
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Innovyze	Network 2017.1.2	

Online Controls for Storm

Pump Manhole: SW06, DS/PN: 1.002, Volume (m³): 0.2

Invert Level (m) 29.300

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	0.0000	1.800	0.0000	3.400	0.0000	5.000	0.0000
0.400	0.0000	2.000	0.0000	3.600	0.0000	5.200	0.0000
0.600	0.0000	2.200	0.0000	3.800	0.0000	5.400	0.0000
0.800	0.0000	2.400	0.0000	4.000	0.0000	5.600	0.0000
1.000	0.0000	2.600	0.0000	4.200	0.0000	5.800	0.0000
1.200	0.0000	2.800	0.0000	4.400	0.0000	6.000	0.0000
1.400	0.0000	3.000	0.0000	4.600	0.0000		
1.600	0.0000	3.200	0.0000	4.800	0.0000		

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	Upper Chorlton Road SW Network Rev 2 23.02.22	
Date 23/02/2022 File UCR - SW Network V2 23....	Designed by paulg Checked by	
Innovyze	Network 2017.1.2	

Storage Structures for Storm

Complex Manhole: SW04, DS/PN: 2.001

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.10300	Trench Width (m)	0.6
Infiltration Coefficient Side (m/hr)	0.10300	Trench Length (m)	30.0
Safety Factor	2.0	Slope (1:X)	150.0
Porosity	0.30	Cap Volume Depth (m)	1.200
Invert Level (m)	29.580	Cap Infiltration Depth (m)	1.200

Complex Manhole: SW05, DS/PN: 2.002

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.10300	Trench Width (m)	0.6
Infiltration Coefficient Side (m/hr)	0.10300	Trench Length (m)	16.0
Safety Factor	2.0	Slope (1:X)	150.0
Porosity	0.30	Cap Volume Depth (m)	1.200
Invert Level (m)	29.500	Cap Infiltration Depth (m)	1.200

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.20300	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	27.8	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	30.750	Membrane Depth (mm)	0

Cellular Storage Manhole: SW06, DS/PN: 1.002

Invert Level (m)	29.200	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.10300	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.10300		

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	30.0	30.0	4.000	0.0	47.5
0.400	30.0	38.8	4.400	0.0	47.5
0.800	30.0	47.5	4.800	0.0	47.5
0.801	0.0	47.5	5.200	0.0	47.5
1.600	0.0	47.5	5.600	0.0	47.5
2.000	0.0	47.5	6.000	0.0	47.5
2.400	0.0	47.5	6.400	0.0	47.5
2.800	0.0	47.5	6.800	0.0	47.5
3.200	0.0	47.5	7.200	0.0	47.5
3.600	0.0	47.5	7.600	0.0	47.5

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		Page 7																								
	Upper Chorlton Road SW Network Rev 2 23.02.22																									
Date 23/02/2022 File UCR - SW Network V2 23....	Designed by paulg Checked by																									
Innovyze	Network 2017.1.2																									
<u>Cellular Storage Manhole: SW06, DS/PN: 1.002</u> <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>8.000</td><td>0.0</td><td>47.5</td><td>9.200</td><td>0.0</td><td>47.5</td></tr><tr><td>8.400</td><td>0.0</td><td>47.5</td><td>9.600</td><td>0.0</td><td>47.5</td></tr><tr><td>8.800</td><td>0.0</td><td>47.5</td><td>10.000</td><td>0.0</td><td>47.5</td></tr></table>			Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	8.000	0.0	47.5	9.200	0.0	47.5	8.400	0.0	47.5	9.600	0.0	47.5	8.800	0.0	47.5	10.000	0.0	47.5
Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)																					
8.000	0.0	47.5	9.200	0.0	47.5																					
8.400	0.0	47.5	9.600	0.0	47.5																					
8.800	0.0	47.5	10.000	0.0	47.5																					
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Date	23/02/2022
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Network 2017.1.2

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	3
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	0.370
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      DVD Status ON
      Analysis Timestep    Fine Inertia Status ON
      DTS Status          OFF
```

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		Return Period	Climate Change	First (X)		First (Y)		First (Z)	Overflow Act.
	Name	Storm			Surcharge	Flood	Overflow			
1.000	SW01	15 Winter	1	+0%	100/15	Summer				
1.001	SW02	15 Winter	1	+0%	30/15	Summer	100/120	Winter		
2.000	SW03	15 Winter	1	+0%	100/15	Summer				
2.001	SW04	15 Winter	1	+0%	30/15	Summer				
2.002	SW05	15 Winter	1	+0%	30/15	Summer				
1.002	SW06	240 Winter	1	+0%	1/30	Winter	100/120	Summer		

PN	US/MH Name	Water	Surcharged	Flooded	Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)		
1.000	SW01	30.737	-0.063	0.000	0.29		1.9	OK
1.001	SW02	30.346	-0.054	0.000	0.43		2.4	OK
2.000	SW03	29.865	-0.085	0.000	0.39		5.5	OK
2.001	SW04	29.646	-0.084	0.000	0.40		5.3	OK
2.002	SW05	29.589	-0.061	0.000	0.65		6.8	OK
1.002	SW06	29.437	0.087	0.000	0.00		0.0	SURCHARGED

		Upper Chorlton Road SW Network Rev 2 23.02.22		Page 9				
Date 23/02/2022		Designed by paulg						
File UCR - SW Network V2 23....		Checked by						
Innovyze		Network 2017.1.2						
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 Coefficient 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 3				
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 0.370				
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		DVD Status ON				
Analysis Timestep		Fine		Inertia Status ON				
DTS Status		OFF						
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) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	SW01	15 Winter	30	+0%	100/15 Summer			
1.001	SW02	15 Summer	30	+0%	30/15 Summer	100/120 Winter		
2.000	SW03	15 Winter	30	+0%	100/15 Summer			
2.001	SW04	240 Winter	30	+0%	30/15 Summer			
2.002	SW05	240 Winter	30	+0%	30/15 Summer			
1.002	SW06	240 Winter	30	+0%	1/30 Winter	100/120 Summer		
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap.	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW01	30.764	-0.036	0.000	0.72	4.7	OK	
1.001	SW02	30.407	0.007	0.000	1.08	6.0	SURCHARGED	1
2.000	SW03	29.938	-0.012	0.000	0.94	13.2	OK	
2.001	SW04	29.775	0.045	0.000	0.19	2.5	SURCHARGED	
2.002	SW05	29.774	0.124	0.000	0.33	3.5	SURCHARGED	
1.002	SW06	29.773	0.423	0.000	0.00	0.0	SURCHARGED	11
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Date 23/02/2022
File UCR - SW Network V2 23....
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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	3
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	0.370
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      DVD Status ON
      Analysis Timestep    Fine Inertia Status ON
      DTS Status          OFF
```

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		Return Period	Climate Change	First (X)		First (Y)		First (Z)	Overflow Act.
	Name	Storm			Surcharge		Flood		Overflow	
1.000	SW01	15	Winter	100	+40%	100/15	Summer			
1.001	SW02	120	Winter	100	+40%	30/15	Summer	100/120	Winter	
2.000	SW03	120	Winter	100	+40%	100/15	Summer			
2.001	SW04	120	Winter	100	+40%	30/15	Summer			
2.002	SW05	120	Winter	100	+40%	30/15	Summer			
1.002	SW06	360	Winter	100	+40%	1/30	Winter	100/120	Summer	

PN	US/MH Name	Water	Surcharged	Flooded	Pipe			Level Exceeded	
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)		Status
1.000	SW01	31.062	0.262	0.000	1.17		7.6	FLOOD RISK	
1.001	SW02	31.200	0.800	0.030	0.65		3.6	FLOOD	1
2.000	SW03	30.754	0.804	0.000	0.54		7.7	FLOOD RISK	
2.001	SW04	30.745	1.015	0.000	0.43		5.8	FLOOD RISK	
2.002	SW05	30.775	1.125	0.000	0.76		8.1	FLOOD RISK	
1.002	SW06	31.201	1.851	1.026	0.00		0.0	FLOOD	11

Appendix C – Infiltration Test Results



CONSULTING ENGINEERS

Geotechnical
Environmental
Ecology
Geology
Drainage
Mining

OUR REF: A4610/22/LR

YOUR REF:

22nd February 2022

Mr. Paul Graveney
O/B Armistead Properties Ltd
1 Crossland Road
Chorlton-cum-Hardy
Manchester
M21 9GU

By Email (paul@pgcl.co.uk)

Dear Paul,

Soil Infiltration Rate Assessment Letter Report
59 Upper Chorlton Road, Manchester

Background and Scope of Work

A Site Investigation has been commissioned by PG Consulting, on behalf of Armistead Properties Ltd (the Client) to examine the soil infiltration rates of the ground at 59 Upper Chorlton Road.

This letter report provides information on the work undertaken including the sampling location plan, trial pit logs and soil infiltration testing results.

Reference

Earth Environmental and Geotechnical Ltd were commissioned by the client, in accordance with an email proposal dated 21st February 2021, to undertake a Geo-Environmental Investigation of the site with the following objectives:

- Assessment of ground conditions at one location for soakaway design.

Proposed Development

The proposed development includes the construction of a four-storey extension and renovation of an existing residential building, comprising flats, following the demolition of surrounding industrial units. Access to the site will be provided from Upper Chorlton Road to the west.

A development and drainage plan has been provided as Figure 1, overleaf.

Fieldwork

The fieldwork was carried out by EEG on the 8th February 2022 and comprised the logging and monitoring of one soakaway excavation to a depth of 2.00m bgl.

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Redcar
TS10 4RF
Tel: 01642 438125

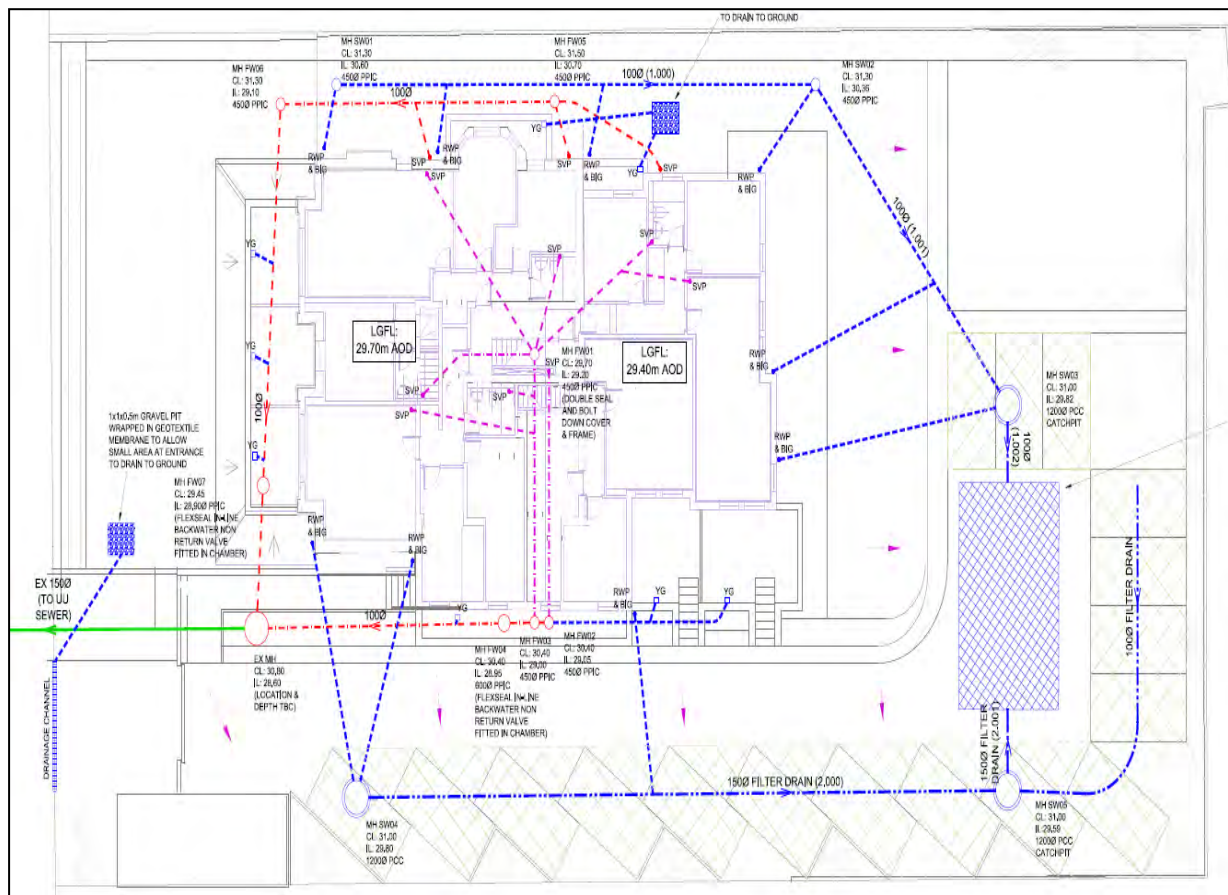
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Registered in England
No: 8436152

The trial pit log is presented in Appendix A and a summary of the ground conditions encountered are presented in Table 1, overleaf.

All site investigation work was supervised full time by a representative of EEG. The logging of soils and rocks has been carried out in accordance with BS5930^(2015+A1:2020) except where superseded by the soil and rock description methodology in BS EN14688-1⁽²⁰⁰²⁾, BS EN 14688-2⁽²⁰⁰⁴⁾ and BS EN 14689-1⁽²⁰⁰³⁾.

Figure 1: Proposed Development Plan

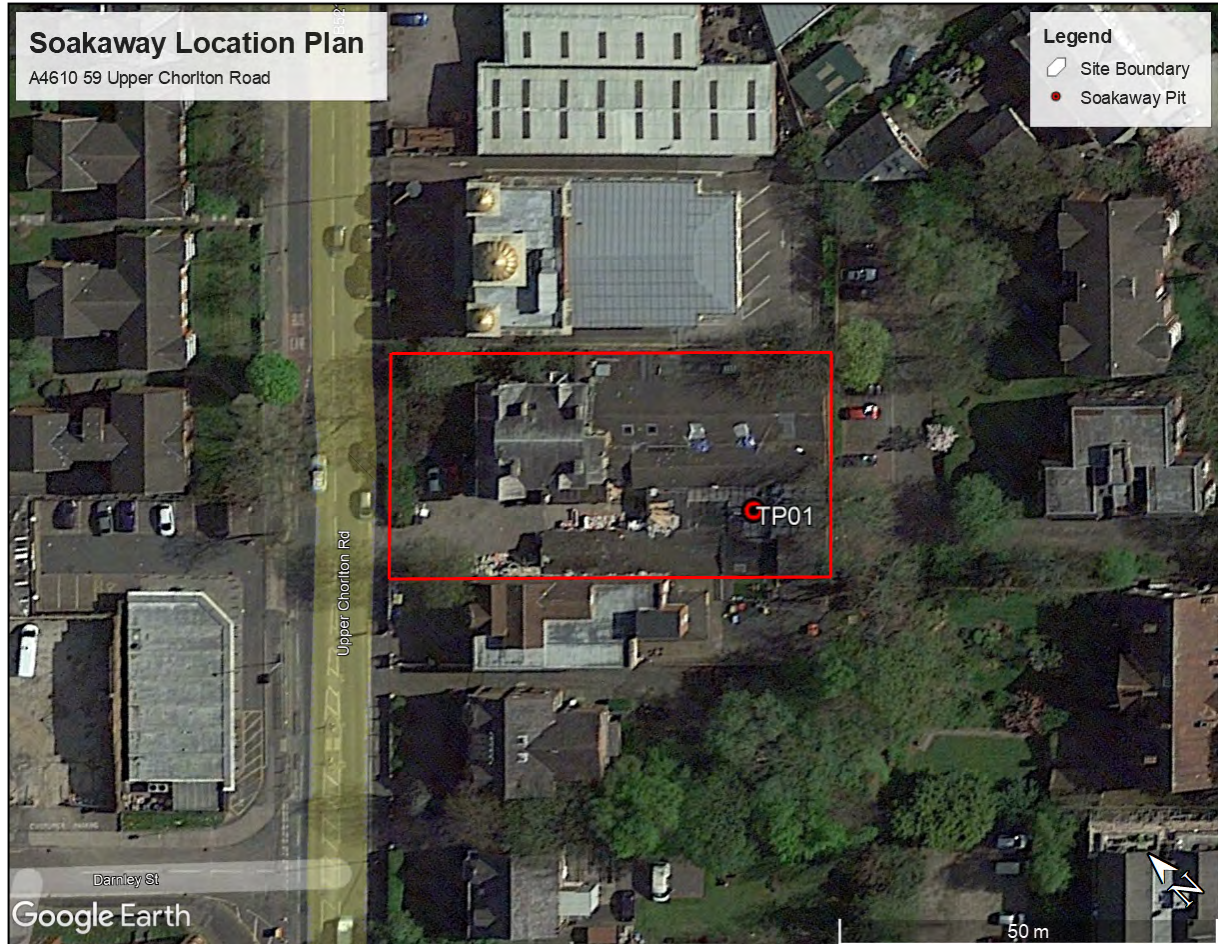


The pit was designated for infiltration/soakaway testing in accordance BRE365. Testing was carried out by filling the excavation with water from a 1000 litre bowser provided by the client.

The soil infiltration rate was calculated using the data collected from each test. The detailed testing results are presented in Appendix B with a summary in Table 2.

A soakaway testing location plan is presented in Figure 2, overleaf.

Figure 2: Soakaway Testing Plan



Ground Conditions Encountered

According to the BGS Geology of Britain Viewer, the site is underlain by superficial deposits consisting of Glaciofluvial Sheet Deposits comprising sand and gravel.

The depths of the various materials encountered in the exploratory hole are summarised in Table 1 below and with a detailed log included in Appendix A.

Table 1: Summary of Ground Conditions Encountered

Hole	Depth to Stratum (m)			Groundwater (m bgl)
	MADE GROUND	CLAY	GRAVELLY SAND	
TP01	GL-0.40	0.40-0.60	0.60-2.00	-

During the ground investigation, Made Ground containing gravel of brick, slate, mudstone and sandstone were observed in the trial pits.

No other evidence of visual or olfactory contamination was encountered during the site investigation.

Groundwater was not encountered during the field work.

Soakaway Testing

The soakaway pit was excavated into the natural strata and filled as rapidly as possible with water from a 1000 litre bowser.

Table 2 below summarises the results of the soakaway infiltration testing for each trial pit and repeat tests. An average infiltration rate for TP01, calculated from the 3no. tests was 4.29×10^{-5} metres/second.

Table 2: Soakaway Infiltration Rates

Location	Test No.	Test Depth (m bgl)	Test Duration (mins)	Fall in Water Level (m bgl)	Soil Infiltration Rate (m/s)
TP01	1	1.40 – 1.88	50	0.48	6.00×10^{-5}
TP01	2	1.30 – 1.62	82	0.68	3.99×10^{-5}
TP01	3	1.40 – 2.10	330	0.61	2.87×10^{-5}

Conclusions

The soakaway testing results revealed the Superficial Deposits encountered in the testing location is suitable for soakaway drainage with infiltration rates ranging from 2.87×10^{-5} to 6.00×10^{-5} .

Should you have any queries with respect to this letter report please do not hesitate to contact me.

Yours Sincerely,



Luke Glover
Principal GeoEnvironmental Consultant
For and on behalf of Earth Environmental & Geotechnical Ltd

Encl. Appendix A Soakaway Pit Log
 Appendix B Soakaway Testing Results



APPENDIX A

SOAKAWAY PIT LOG



APPENDIX B

SOAKAWAY TESTING RESULTS



EARTH ENVIRONMENTAL & GEOTECHNICAL
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Stockport, SK5 6DA
Tel: 0161 975 6088
Email: info@earthenvironmental.co.uk
Web: www.earthenvironmental.co.uk

SOAKAWAY PIT LOG

Project Name: 59 Upper Chorlton Road

Date: 08/02/2022

Project No.: A4610

Client: Armistead Properties Ltd

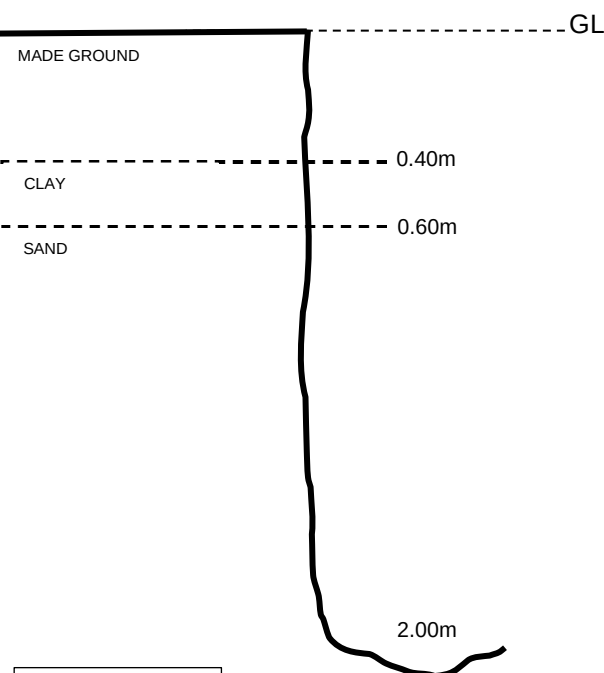
Hole Number: TP01

Logged By: A Graham

Total Depth: 2.00m bgl

Remarks:

Schematic Profile:



Legend	Depth (m)	Description
	0.00-0.40	MADE GROUND: Slightly silty, slightly gravelly SAND. Sand is fine to medium. Gravel is subangular to subrounded fine to medium of brick, slate, mudstone, and sandstone. Frequent rootlets.
	0.40-0.60	Light brown CLAY
	0.60-2.00	Light brown very gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, rounded to subrounded siltstone, mudstone and sandstone. Infrequent cobble content.

Trial pit terminated at 2.00m bgl.

Trial pit unstable below clay.
No groundwater encountered.

ES=Environmental Sample, D=Disturbed Sample, HVR=Hand Vane Reading

Pictures:



Soakaway Pit 1: Internal view of excavation



Soakaway Pit 1: Overview of excavated soils



Earth Environmental
& Geotechnical Ltd

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Email: adam@earthenvironmental.co.uk

SOAKAWAY TEST

(To: BRE 365 1991)

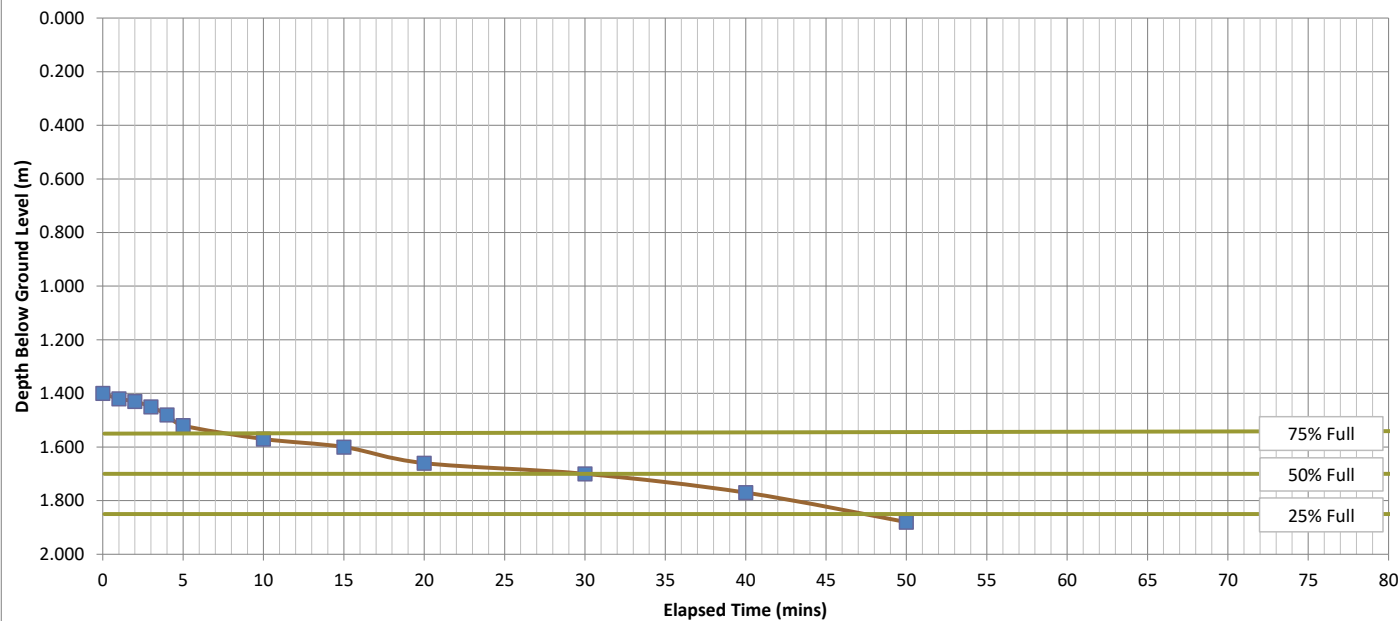
Job No: A4610
Site: 59 Upper Chorlton Road
Client: Armistead Properties Ltd

Location Reference:
Date
Geology in test section
Depth to Base of Hole
Effective Depth
Hole width
Hole length
Depth to water at start of test below ground level
Depth to water at end of test below ground level
Effective storage depth to 75% full
(Depth below GL)
Effective storage depth to 50% full
(Depth below GL)
Effective storage depth to 25% full
(Depth below GL)
Height to 50% depth
Effective Storage Volume Vp75-25
Time tp25 at which water is 75% of effective depth (minutes)
Time tp25 at which water is 25% of effective depth (minutes)
Time for water level to fall between Vp75 -25
Time for water level to fall between Vp75 -25
Internal surface area of hole up to 50% depth including base
Soil Infiltration Rate, f

SA1 Test 1	
08/02/2022	
Very Gravelly SAND	
2.00	m
0.60	m
0.80	m
1.80	m
1.40	m
1.88	m
0.45	m
1.55	m
0.30	m
1.70	m
0.15	m
1.85	m
0.30	m3
0.43	m3
8.00	mins
48.0	mins
40	mins
2400	secs
3.00	m2
6.00E-05	m/s

Assumes pit is not filled

Time Elapsed (mins)	Depth of Water below GL (m)	Measured Data
0	1.400	
1	1.420	
2	1.430	
3	1.450	
4	1.480	
5	1.520	
10	1.570	
15	1.600	
20	1.660	
30	1.700	
40	1.770	
50	1.880	





Earth Environmental & Geotechnical Ltd

Tel / Fax: 0161 975 6088
Web: www.earthenvironmental.co.uk
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SOAKAWAY TEST

(To: BRE 365 1991)

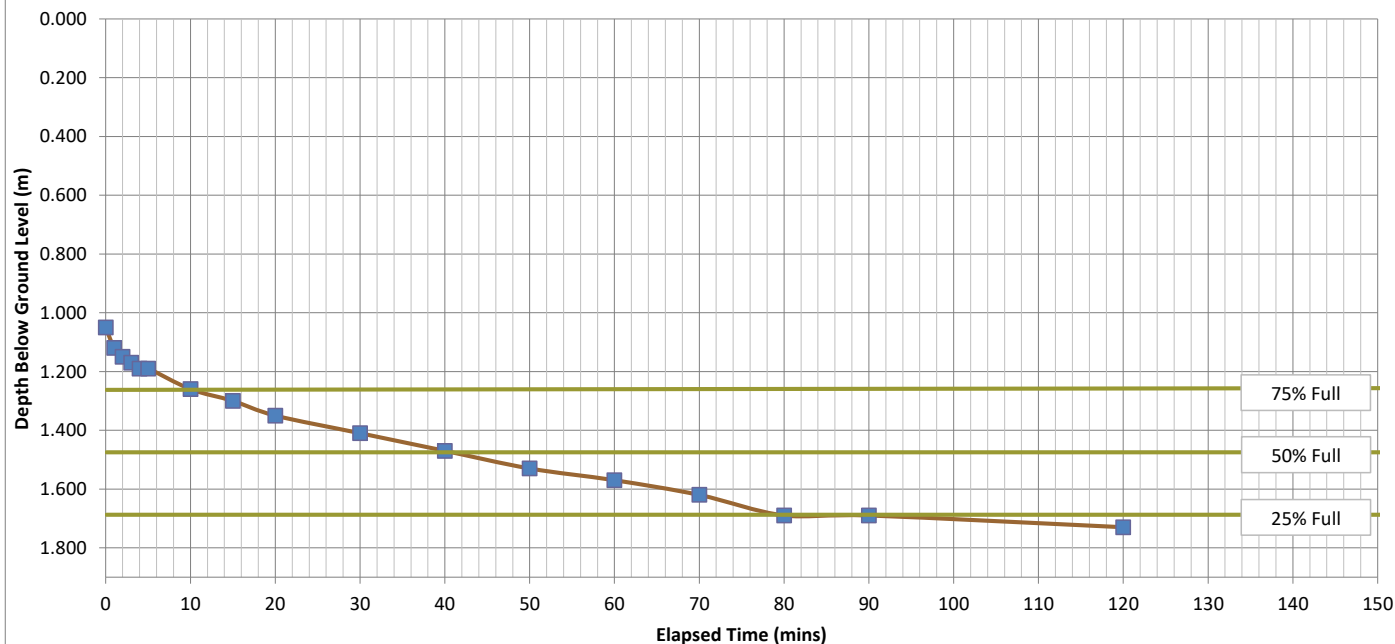
Job No: A4610
Site: 59 Upper Chorlton Road
Client: Armistead Properties Ltd

Location Reference:
Date
Geology in test section
Depth to Base of Hole
Effective Depth
Hole width
Hole length
Depth to water at start of test below ground level
Depth to water at end of test below ground level
Effective storage depth to 75% full
(Depth below GL)
Effective storage depth to 50% full
(Depth below GL)
Effective storage depth to 25% full
(Depth below GL)
Height to 50% depth
Effective Storage Volume Vp75-25
Time tp25 at which water is 75% of effective depth (minutes)
Time tp25 at which water is 25% of effective depth (minutes)
Time for water level to fall between Vp75 -25
Time for water level to fall between Vp75 -25
Internal surface area of hole up to 50% depth including base
Soil Infiltration Rate, f

SA1 Test 2	
08/02/2022	
Very Gravelly SAND	
1.90	m
0.85	m
0.80	m
1.80	m
1.05	m
1.73	m
0.64	m
1.26	m
0.43	m
1.48	m
0.21	m
1.69	m
0.43	m3
0.61	m3
10.0	mins
80.0	mins
70	mins
4200	secs
3.65	m2
3.99E-05	m/s

Assumes pit is not filled

Time Elapsed (mins)	Depth of Water below GL (m)	Measured Data
0	1.050	
1	1.120	
2	1.150	
3	1.170	
4	1.190	
5	1.190	
10	1.260	
15	1.300	
20	1.350	
30	1.410	
40	1.470	
50	1.530	
60	1.570	
70	1.620	
80	1.690	
90	1.690	
120	1.730	



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SOAKAWAY TEST

(To: BRE 365 1991)

Job No:	A4610
Site:	59 Upper Chorlton Road
Client:	Armistead Properties Ltd

Location Reference:
Date
Geology in test section
Depth to Base of Hole
Effective Depth
Hole width
Hole length
Depth to water at start of test below ground level
Depth to water at end of test below ground level
Effective storage depth to 75% full
(Depth below GL)
Effective storage depth to 50% full
(Depth below GL)
Effective storage depth to 25% full
(Depth below GL)
Height to 50% depth
Effective Storage Volume Vp75-25
Time tp25 at which water is 75% of effective depth (minutes)
Time tp25 at which water is 25% of effective depth (minutes)
Time for water level to fall between Vp75 -25
Time for water level to fall between Vp75 -25
Internal surface area of hole up to 50% depth including base
Soil Infiltration Rate, f

SA1 Test 3	
08/02/2022	
Very Gravelly SAND	
1.80	m
0.78	m
0.80	m
1.80	m
1.02	m
1.63	m
0.59	m
1.22	m
0.39	m
1.41	m
0.20	m
1.61	m
0.39	m3
0.56	m3
20.00	mins
114.00	mins
94	mins
5640	secs
3.47	m2
2.87E-05	m/s

Assumes pit is not filled

[illegible]