

Eliza Yard, Back of Ancoats, Manchester

Flood Risk and Drainage Strategy

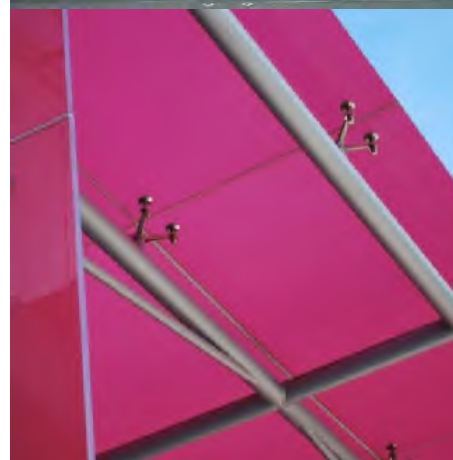
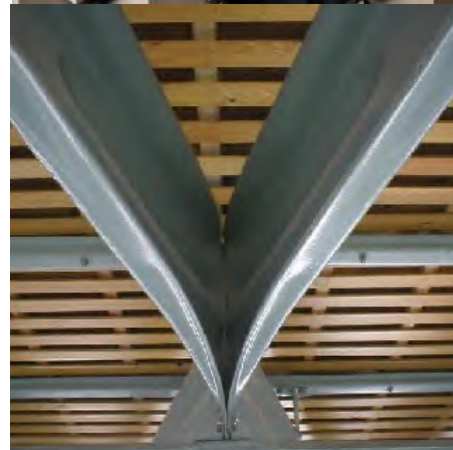
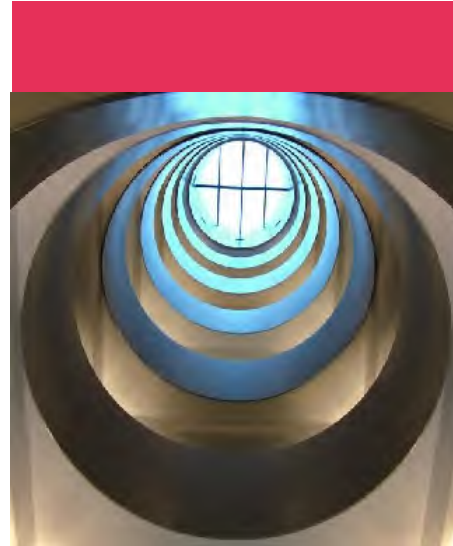
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Client Name: Manchester Life Development Company Limited

Site Address: Jersey Street, Manchester, M4 6JW



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Control Sheet

Rev	Description	Issued by	Checked	Date
P01	Issued for Planning	AH	CG	15/01/2021
P02	Updated following Deloitte's comments	AH	CG	02/02/2021
P03	Site Layout Updated	VC	CG	01/04/2021
P04	Updated following Manchester Life's comments	AH	CG	27/04/2021

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1.0 Introduction

1.1 Project Background

- 1.1.1 Curtins were appointed by Manchester Life Development Company² Limited, to provide a Flood Risk and Drainage Strategy for the proposed Eliza Yard development.
- 1.1.2 The report is based on currently available information and preliminary discussions.
- 1.1.3 Proposals contained or forming part of this statement represent the design intent and may be subject to alteration or adjustment in completing the detailed design for this project. Where such adjustments are undertaken as part of the detailed design and are deemed a material deviation from the intent contained in this document, prior approval shall be obtained from the relevant authority in advance of commencing such works.

1.2 Scope of Assessment

- 1.2.1 The total site area is approximately 0.24 hectares and following scrutiny of the Environment Agency flood maps it has been identified that site lies within Flood Zone 1. According to local council Strategic Flood Risk Assessment the site lies within a Critical Drainage Area (CDA). A Flood Risk Assessment is therefore not required to support a planning application.
- 1.2.2 In April 2015, the Government made changes to the National Planning Policy Framework which made Sustainable Urban Drainage Systems (SuDS) a material consideration in the determination of planning applications for 'major' developments.
- 1.2.3 A Drainage Strategy will therefore be required as part of the Planning Application for the development, as the site is considered to be 'major' development by the Town and Country Planning Order 2015.
- 1.2.4 This Drainage Strategy reviews the following information:
 - Environment Agency flood maps for rivers and sea flooding.
 - UK Government Flood Warning Information Service maps for surface water flooding and reservoir flooding.
 - Manchester City, Salford City and Trafford Councils Level 1 Hybrid Strategic Flood Risk Assessment (SFRA) published in March 2010.
 - Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA, User Guide, Final, dated May 2010.
 - Manchester City, Salford City and Trafford Councils Level 2 Hybrid Strategic Flood Risk Assessment (SFRA) published in March 2011.
 - Preliminary Flood Risk Assessment (PFRA) for Manchester County Council dated May 2011.
 - Manchester City Council SuDS Requirements for New Developments.

- United Utilities Public Sewer Records Extract.
- E3p, Phase II Geo-Environmental Site Assessment, document reference: 13-350-R3, dated February 2020.
- E3p, Ground Gas Addendum Report, document reference: 13-729-R3-B, dated April 2020.

1.3 Proposed Development

- 1.3.1 Development of land bounded by Poland Street to the west and Jersey Street to the south to deliver 118 residential units, ground floor commercial floorspace, and ancillary amenity space within an 8-storey building, cycle parking provision, hard and soft landscaping, access and servicing and other associated works.
- 1.3.2 The proposals will be complimented by a public realm strategy which is being prepared by Manchester City Council (MCC) for the Poland Street zone featured in the 2019 Ancoats and New Islington NDF update. The MCC public realm strategy will look to reconfigure footpaths and landscaping
- 1.3.3 The proposed development is approximately 0.24ha.
- 1.3.4 The proposed site layout is enclosed in *Appendix A*.

2.0 Existing Site Details

2.1 Site Location

- 2.1.1 The site is located in Ancoats, on the corner of Poland Street and Jersey Street, approximately 1.5km northeast of Manchester
- 2.1.2 The Site is bounded by Poland Street to the west, Jersey Street to the south, the City Court Trading Estate to the north, and a surface car park to the east. The Site can be accessed by pedestrians and vehicles via Jersey Street.
- 2.1.3 The Site is currently used as a surface car park accessed from Jersey Street. The Site is enclosed by various means including security fencing and a wall along Poland Street. The existing surfacing consists of areas of hardstanding with limited areas of self-seeded vegetation. Refer to Appendix A for the existing site location plan.
- 2.1.4 Modern industrial units lie to the north and west of the Site with the residential neighbourhood of Miles Platting further beyond to the east. The Rochdale Canal is located 0.1km south of the Site.

2.2 Existing Drainage

- 2.2.1 The United Utilities public sewer records have been obtained and show services within the vicinity of the site location. There is an existing 300 x 406 combined sewer located to the southeast of the site along Jersey Street. There is also an existing 470 x 600 combined sewer located to the west of the site, along Poland Street, which flows in a southeast direction and connects onto the combined sewer located along Jersey Street. There is a United Utilities manhole located along Jersey Street. United Utilities' sewer records can be found in Appendix F.
- 2.2.2 A topographical survey has been carried out on the site. The survey highlights that there are existing drainage features within the site boundary.
- 2.2.3 The topographical survey is enclosed in *Appendix B*.
- 2.2.4 A manhole cover is located within the central area of the existing carpark and three inspection chambers and a rodding eye are shown within the south-eastern area of the site. There are no gullies or other surface water drainage features indicated within the site boundary. It is therefore currently unknown where the surface water drains to.
- 2.2.5 A Ground-penetrating Radar (GPR) survey has been carried out on the site. The survey highlights an existing 300mm diameter connection from the United Utilities manhole, located in Jersey Street, heading upstream in the direction of the site.
- 2.2.6 The GPR survey is enclosed in Appendix C.

- 2.2.7 It is recommended that drainage survey works are carried out to confirm the existing drainage within the site boundary, and the existing 300mm connection from the site to the United Utilities manhole in Jersey Street.
- 2.2.8 Existing survey information suggests a private combined water drain runs below the proposed site. This is to be confirmed following receipt of additional CCTV survey information, which is expected after planning submission. Findings will be included in future design stages.

2.3 Topography

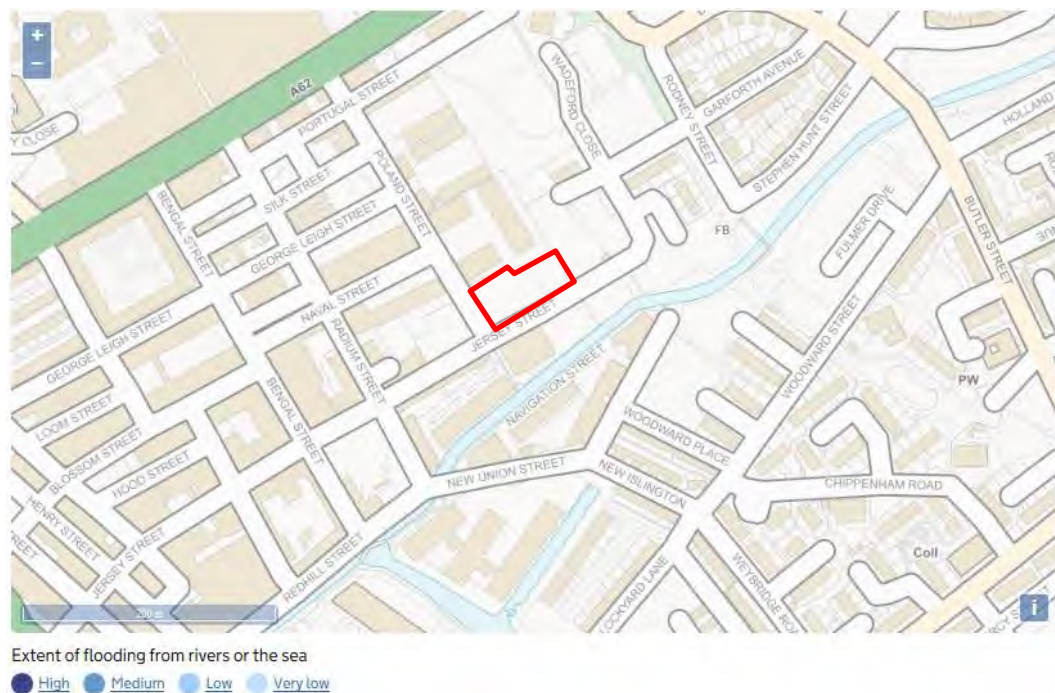
- 2.3.1 A topographical survey has been completed at the site and is included in Appendix B.
- 2.3.2 The levels recorded are generally flat across the site with levels ranging from c.50.38mAoD to the northwest of the site to c.50.56mAoD to the southeast of the site.

3.0 Flood Risk Summary

3.1 Fluvial Flooding (Rivers or Streams)

- 3.1.1 The Environment Agency flood map for planning is enclosed in Appendix D and identifies that the site is located within Flood Zone 1, which is land having less than a 1 in 1,000 annual probability of fluvial flooding.
- 3.1.2 As the site is both in Flood Zone 1 and is less than 0.50 hectares, a Flood Risk Assessment is not required as part of the planning application however, we have provided a summary of the flood risk to inform any potential mitigation measures in the Drainage Strategy.
- 3.1.3 Flooding to the site from rivers and sea is indicated below in Figure 1, taken from the UK Government's Long-Term Flood Risk Information.

Figure 1: Long Term Flood Risk Assessment Map – Flood Risk from Rivers or Sea (© Crown Copyright))



- 3.1.4 The entire area of the site is at a 'Very Low' risk of fluvial flooding. The site is not shown to be in an area which benefits from flood defences. The site has less than a 0.1% chance of fluvial flooding each year. Therefore, the proposed site is considered to be at a very low residual risk from fluvial flooding.

3.2 Tidal Flooding (Coastal or Estuarine)

- 3.2.1 There is currently no flood risk identified on the Environment Agency flood maps for the site and it is therefore regarded to be at low risk from tidal flooding.

3.3 Reservoir Flooding

- 3.3.1 The Long-Term Flood Risk Assessment (Flood Risk from Reservoirs) map shows the largest area that might be flooded if a reservoir were to fail and release the water it holds (see Figure 2).

Figure 2: Long Term Flood Risk Assessment Map - Flood Risk from Reservoirs (© Crown Copyright)



- 3.3.2 The site is located within an area that is not affected by reservoir flooding; and therefore, regarded to be at very low risk of reservoir flooding.

3.4 Canal Flooding

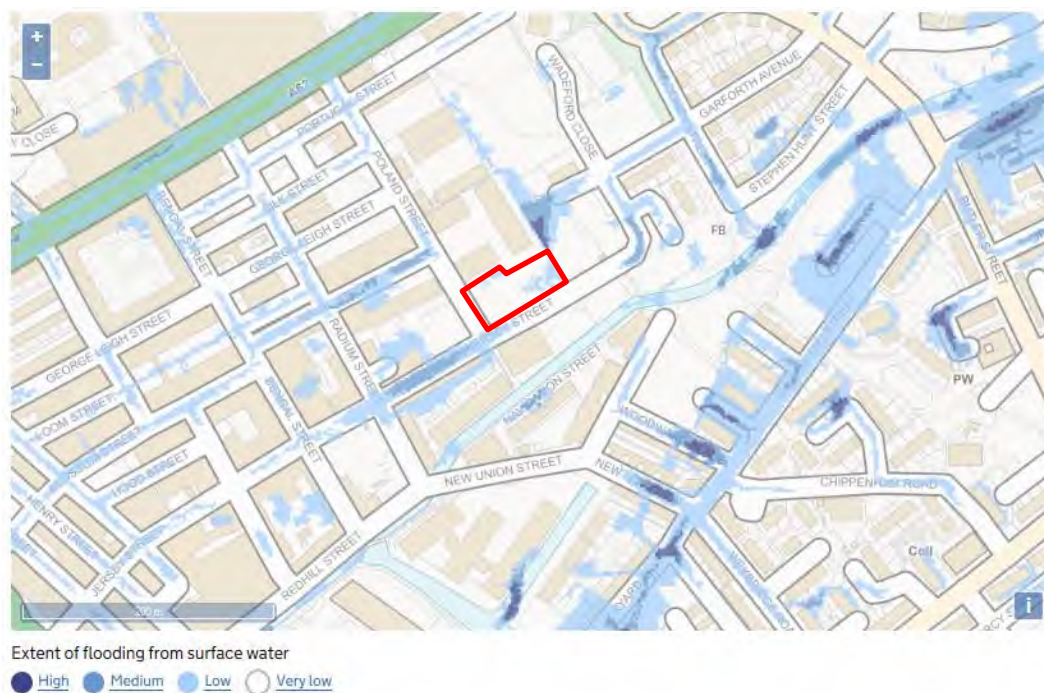
- 3.4.1 The nearest canal is the Rochdale Canal which is located approximately 50m southeast of the site.
- 3.4.2 The canals are identified in the Manchester City, Salford City and Trafford Councils Strategic Flood Risk Assessment (SFRA) as not generally posing a direct flood risk as they are a controlled water body. Therefore, the residual risk of canal flooding is usually associated with lower probability events such as overtopping and/or the breaching of embankments.

3.4.3 Given the above information, it is considered that there is low risk of canal flooding to the site.

3.5 Surface Water Flooding

3.5.1 The extent of flooding to the site from surface water is indicated in Figure 3. It can be seen that the majority of the site is identified as being at a 'very low' risk of flooding from surface water. There is an area 'Low Risk' identified within the site boundary, this is based on the local topography and the site being lower than the surrounding area.

Figure 3: Long Term Flood Risk Assessment Map - Flood Risk from Reservoirs (© Crown Copyright)



The proposed development drainage should be designed in accordance with Manchester City Council Guidance which will be designed to accommodate flows generated from within the site. External ground levels across the site should fall away from the proposed buildings and ensure that the creation of low points is avoided (other than those used intentionally for drainage features) in order that in the unlikely event of groundwater flooding, the flood water is safely routed away from the buildings on site. This will mitigate against flooding within the site.

3.5.2 Based on the above, it is considered that there is a very low risk of surface water flooding to the site.

3.6 Groundwater

3.6.1 Ep3 have undertaken a Phase II Geo-environmental survey for the site, document reference: 13-350-R3, dated February 2020.

- 3.6.2 The initial intrusive site investigation found that groundwater strikes were encountered as seepages, and what was considered to be water held within the former infilled canal. These were generally encountered between 0.70m and 2.20m below ground level (bgl).
- 3.6.3 A Ground Gas Addendum report, undertaken by Ep3, document reference: 13-729-R3-B, dated April 2020, includes ground water levels that were monitored across the site over a period of 4 months. The gas monitoring results show a minimum depth to water of 0.69m bgl recorded, and a maximum depth of 1.70m bgl.
- 3.6.4 Generally, the site has a potential for groundwater flooding as shallow groundwater strikes were recorded.
- 3.6.5 The proposed development does not include any below ground basement areas and it is recommended floor levels are at or above existing ground levels, as far as possible. It is noted that there are localised areas where the proposed finished floor levels (FFL) are below the existing ground levels, by a maximum of 0.40m, in order to facilitate tying in with existing ground levels along the development boundary. Although there are localised areas proposed to be set below the existing ground level, they are above the minimum groundwater depth of 0.69m below ground level, recorded within the Ground Gas Addendum report, and is therefore considered to be at a low risk.
- 3.6.6 External ground levels across the site should fall away from the proposed buildings and ensure that the creation of low points is avoided (other than those used intentionally for drainage features) in order that in the unlikely event of groundwater flooding, the flood water is safely routed away from the buildings on site.
- 3.6.7 It is recommended that further investigation work is completed, prior to the commencement of development, at the junction of the canal to ensure there is no link to the presence of groundwater and the Rochdale Canal.
- 3.6.8 Providing the above mitigation measures were imposed, the risk from groundwater flooding would therefore be considered low post development.

4.0 Drainage Strategy

4.1 Proposed Foul Water Drainage

- 4.1.1 The United Utilities public sewer records have been obtained and show services within the vicinity of the site location. There is an existing 300 x 406 combined sewer located to the southeast of the site, along Jersey Street. There is also an existing 470 x 600 combined sewer located to the west of the site, along Poland Street. United Utilities records can be found in Appendix F.
- 4.1.2 The proposed drainage should be a separate foul and surface water drainage system, before being combined and discharged to the existing drainage network.
- 4.1.3 The foul water is proposed to discharge to the combined water sewer located to the south of the proposed site, along Jersey Street. A CCTV survey is required to determine whether an existing connection from the site can be reused. If the existing connection is deemed unsuitable, discharge to the United Utilities manhole will be via a new backdrop connection.
- 4.1.4 The current peak foul flow rate has been calculated at 12.9l/s using The Discharge Unit method and is based on information provided by the Mechanical and Electrical (M&E) engineer. This peak flow rate requires confirming once the final internal layouts and number of appliances are confirmed.
- 4.1.5 United Utilities have confirmed in their pre-development response that their preferred point of discharge for foul water flows would be to the combined public sewer, to the south of the site, along Jersey Street and can be discharged at an unrestricted rate. Refer to the United Utilities correspondence enclosed in Appendix G.
- 4.1.6 It is assumed the site will remain under one ownership and therefore the drainage system will remain private within the development boundary.
- 4.1.7 The connection to the public sewer network will be subject to a Section 106 Agreement with United Utilities.
- 4.1.8 The proposed Drainage Layout is enclosed in Appendix E.

4.2 Proposed Surface Water Drainage

- 4.2.1 Any new development site drainage should be designed in accordance with current best practice to provide adequate capacity not to flood for the critical 1 in 30-year storm event and flood water generated for up to the critical 1 in 100-year plus climate change storm event shall be constrained within the areas on site so not to cause damage to buildings, essential services or adjoining developments and services.

- 4.2.2 In February 2016, the Environment Agency released updated climate change allowances for peak rainfall intensities which should be applied to new developments. Table 1 demonstrates the climate change allowances with central and upper end allowances being considered.
- 4.2.3 Based on the nature of the development, a lifespan in excess of up to 60 years is anticipated. Therefore, the potential climate change allowance for 2070-2115 ranges between 20% for the central allowance and 40% for the upper end allowance. As such, an allowance of 40% for climate change on peak rainfall intensity will be included in calculations.

Table 1: (Extract Environment Agency Guidance) Peak Rainfall Intensity Allowance in small and urban catchments

Applies across all of England	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Upper end	10%	20%	40%
Central	5%	10%	20%

- 4.2.4 In following the standard hierarchy of drainage solutions, consideration should firstly be given to the discharge of surface water runoff by sustainable methods such as infiltration.

Infiltration

- 4.2.5 The ground conditions comprise of made ground overlaying firm to stiff clay, therefore due to the limiting permeability of the clay, infiltration is not suitable. As part of the site investigation, falling head permeability testing has been completed utilising the monitoring well installations. This assessment confirms that the material does not have sufficient permeability characteristic to support an infiltrating drainage system.

Watercourse

- 4.2.6 The nearest watercourse is the Rochdale Canal which is located approximately 50m south of the site boundary. Discussions with the Canal and Rivers Trust has confirmed that the Rochdale Canal is unable to accept surface water discharge from the site due to capacity issues (Refer to Appendix G). Additionally, discharging to the canal would require various third-party land crossing. Therefore, discharging to the Rochdale Canal is not considered feasible.

Surface Water Sewer

- 4.2.7 There are no surface water sewers in the vicinity of the site.

Combined Water sewer

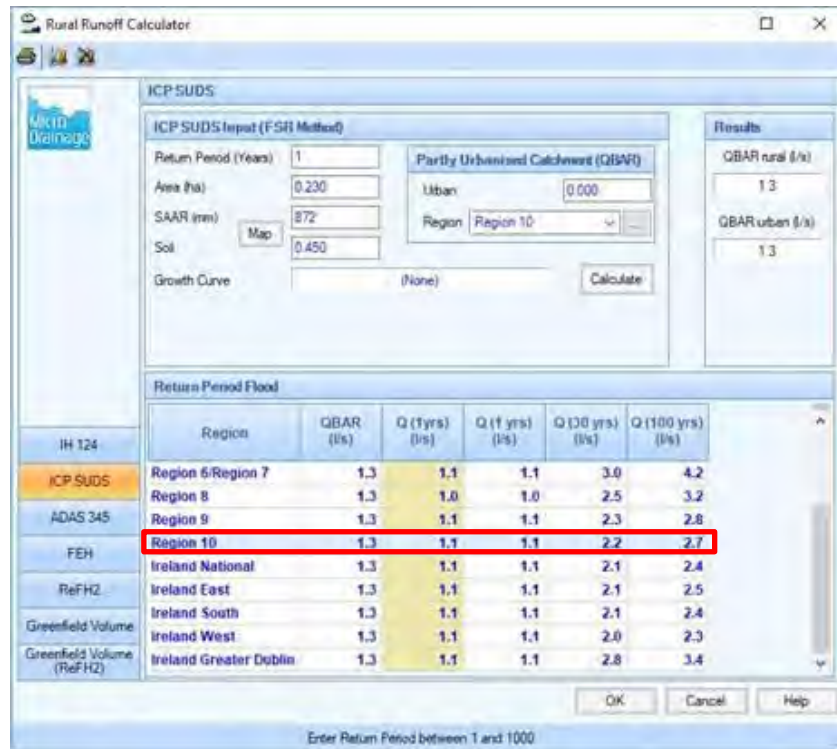
- 4.2.8 There is a 300x406 combined sewer located on Jersey street, immediately to the south of the site. Following the drainage hierarchy, the site is proposed to drain to this asset as agreed with United Utilities. Refer to Appendix G for United Utilities correspondence.
- 4.2.9 Table 2 summarises the options for surface water disposal.

Table 2: Surface Water Disposal

Surface Water Disposal	Potential	Description
Infiltration	X	It is assumed that the site will not be suitable for infiltration SuDS.
Watercourse	X	The Rochdale Canal is located approximately 50m south of the site. A new connection to the watercourse is not considered a viable option as it would have to pass through third-party land. Correspondence with the Canals and Rivers Trust, dated 25.02.21, has confirmed that the Rochdale Canal is unable to accept surface water discharge from the development due to capacity issues.
Surface Water Public Sewer	X	There are no surface water sewers in the vicinity of the site.
Combined Public Sewer	✓	There are various combined water sewers in the vicinity of the site. It is therefore proposed to connect to the existing combined sewers located on Jersey Street.

- 4.2.10 Following correspondence with United Utilities, their stance is that the proposed development is to be built on an existing car park with no building within the boundary of the development and therefore it should be considered that the site is not positively draining. As such, greenfield rates should be used for the purpose of calculations in the absence of evidence to support an existing positively draining connection from the site.
- 4.2.11 Greenfield run-off rates have been calculated using the Qbar method. (Figure 4).

Figure 4: Qbar Greenfield rate (Q100)



The screenshot shows the 'Rural Runoff Calculator' window. The 'ICP SUDS' section is active, displaying input fields for Return Period (Years), Area (ha), SAAR (mm), Soil, and Growth Curve. The 'Partly Urbanized Catchment (QBAR)' section shows 'Urban' as 0.000 and 'Region' as 'Region 10'. The 'Results' section shows 'QBAR rural (l/s)' as 1.3 and 'QBAR urban (l/s)' as 1.3. The 'Return Period Flood' table is displayed below, with 'Region 10' highlighted in red.

Region	QBAR (l/s)	Q (1 yrs) (l/s)	Q (10 yrs) (l/s)	Q (100 yrs) (l/s)
Region 6/Region 7	1.3	1.1	1.1	3.0
Region 8	1.3	1.0	1.0	2.5
Region 9	1.3	1.1	1.1	2.3
Region 10	1.3	1.1	1.1	2.2
Ireland National	1.3	1.1	1.1	2.1
Ireland East	1.3	1.1	1.1	2.1
Ireland South	1.3	1.1	1.1	2.1
Ireland West	1.3	1.1	1.1	2.0
Ireland Greater Dublin	1.3	1.1	1.1	2.8

4.2.12 The greenfield rates calculated are as follows:

1 Year = 1.10 l/s

30 Year = 2.20 l/s

100 Year = 2.70 l/s

4.2.13 Given the small nature of this site and the low greenfield flows, restricting to these flow rates via a flow control chamber could increase risk of blockages due to the small orifice sizes to the controls. It is therefore proposed that the surface is restricted to a maximum of 5l/s for storms up to and including the 1 in 100-year plus climate change event, as agreed with the Lead Local Flood Authority (LLFA) and United Utilities. Refer to Appendix G for LLFA/United Utilities correspondence.

4.2.14 Attenuation volumes have been calculated at c.76m³ for the 100-year event with 40% climate change discharging a maximum of 5l/s. Refer to Appendix H for the proposed drainage calculations

4.2.15 It is anticipated that the necessary attenuation volumes are to be attenuated within an on-site attenuation tank.

4.2.16 Where sewers remain private, connection to the public sewer network will be subject to a Section 106 Agreement with United Utilities.

- 4.2.17 The final design of the drainage networks shall be in accordance with the legislation set by the Environment Agency, Manchester City Council and United Utilities.
- 4.2.18 This proposed drainage strategy is subject to change following further survey works on the existing drainage within the site boundary. Receipt of further surveys are not expected prior to submission of the planning application therefore, a condition requiring confirmation of a detailed drainage strategy will be required.
- 4.2.19 The proposed Drainage Layout is enclosed in Appendix E.

4.3 Sustainable Drainage Systems and Green Infrastructure

- 4.3.1 In accordance with the National Planning Policy Framework (NPPF) a sustainable drainage system (SuDS) should be provided unless demonstrated to be inappropriate. The following options have been considered for the site:

Infiltration Systems:

- 4.3.2 Systems such as infiltration trenches and soakaways were considered as part of the surface water management strategy however, the ground conditions and the results of the falling head permeability testing indicate limiting permeability of the underlying clay. Therefore, infiltration systems are not considered suitable for the site.

Green/Blue roofs:

- 4.3.3 Green/Blue roofs were considered for the site however, found not viable due to all available roof area being utilised for Photovoltaic (PV) panels.

Swales, Wetlands and Attenuation Ponds:

- 4.3.4 Due to the small nature of the site (0.24ha) and the limited space available, pre-treatment steps and retention systems such as swales, wetlands and ponds are not considered suitable for the site due to their space requirements.

Permeable Paving and Tree pits:

- 4.3.5 Potential for proposed lined permeable paving and tree pits have been identified within the courtyard of the proposed development. These will act as a stage of pollution treatment for the surface water before being discharged into the public sewer network.

Other SuDS Considerations:

- 4.3.6 The amount of hard surfacing proposed has been minimised with areas of soft landscape being proposed within the courtyard, together with several planting beds.

SuDS Conclusion

- 4.3.7 The development is proposing potential options to include areas of permeable paving within the courtyard, alongside tree pit systems. Areas of hardstanding have been minimized with the introduction of soft landscaped areas to the north of the courtyard and the proposed planting beds.
- 4.3.8 The surface water discharge will be controlled by a flow control chamber, restricting the maximum flow to 5l/s for storm events up to and including the 1 in 100 year +40% climate change event. Below ground attenuation tanks will be utilised to deliver the controlled surface water discharge.
- 4.3.9 The proposed Drainage Layout is enclosed in Appendix E.

SuDS Conclusion

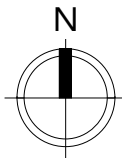
- 4.3.7 The development is proposing potential options to include areas of permeable paving within the courtyard, alongside tree pit systems. Areas of hardstanding have been minimized with the introduction of soft landscaped areas to the north of the courtyard and the proposed planting beds.
- 4.3.8 The surface water discharge will be controlled by a flow control chamber, restricting the maximum flow to 5l/s for storm events up to and including the 1 in 100 year +40% climate change event. Below ground attenuation tanks will be utilised to deliver the controlled surface water discharge.
- 4.3.9 The proposed Drainage Layout is enclosed in Appendix E.

Appendix A

Proposed Site Layout



Note:
Do not scale from this drawing.
Dimensions are to be checked on site.
If in doubt please ask.



— Planning Development Boundary

2	18 12 20	PB	Stage 3 Issue
1	11 12 20	PB	Issue to Deloitte
0	16 11 20	PB	First Issue

Rev	Date	Ints	Details
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Project Title	Eliza Yard
Client	MLDC
Location	Manchester

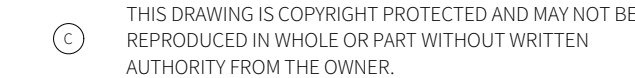
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Status **Stage 3**

Job No:	Origin:	Zone:	Level:	Type:	Disc:	Number:	Rev:
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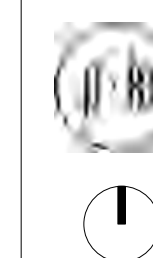


- NOTES:-**
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 2. Always work to noted dimensions.
 3. All dimensions are in millimetres unless otherwise stated.
 4. All setting out, levels and dimensions to be agreed on site.
 5. The dimensions of all materials must be checked on site before being laid out.
 6. This drawing must be read with the relevant specification clauses and detail drawings.
 7. Order of construction and setting out to be agreed on site.

KEY



S3-P01	29-03-21	Review and comment	SAB	KR
Revision	Date	Description	Drawn	Appr



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Client Manchester Life

Project	Plot B. Eliza Yard Manchester
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Drg Title	Landscape Masterplan
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Created on	Created by	Approved by
29.03.21	SAB	KR

Scale	Size	Workstage
1:150	A1	Stage 3

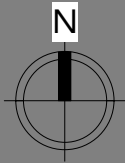
Drg No.	Suitability	Revision
2672-PLA-XX-XX-DR-L-0001	S3	P01

Appendix B

Topographical Survey



Note:
Do not scale from this drawing.
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Site Ownership Line

Future Site Ownership Line

Development Boundary

1	24 08 20	PB	Revised boundary
0	17 07 20	PB	First issue

Rev Date Intls Details

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E contact@buttress.net
W www.buttress.net

Project Title	Back of Ancoats Plot B
Client	MLSDC
Location	Manchester

Drawing Title Topographical Survey

Date	24/08/2020 12:38:04	Scale	1 : 500
Checked	MB	Orig Paper Size	A3

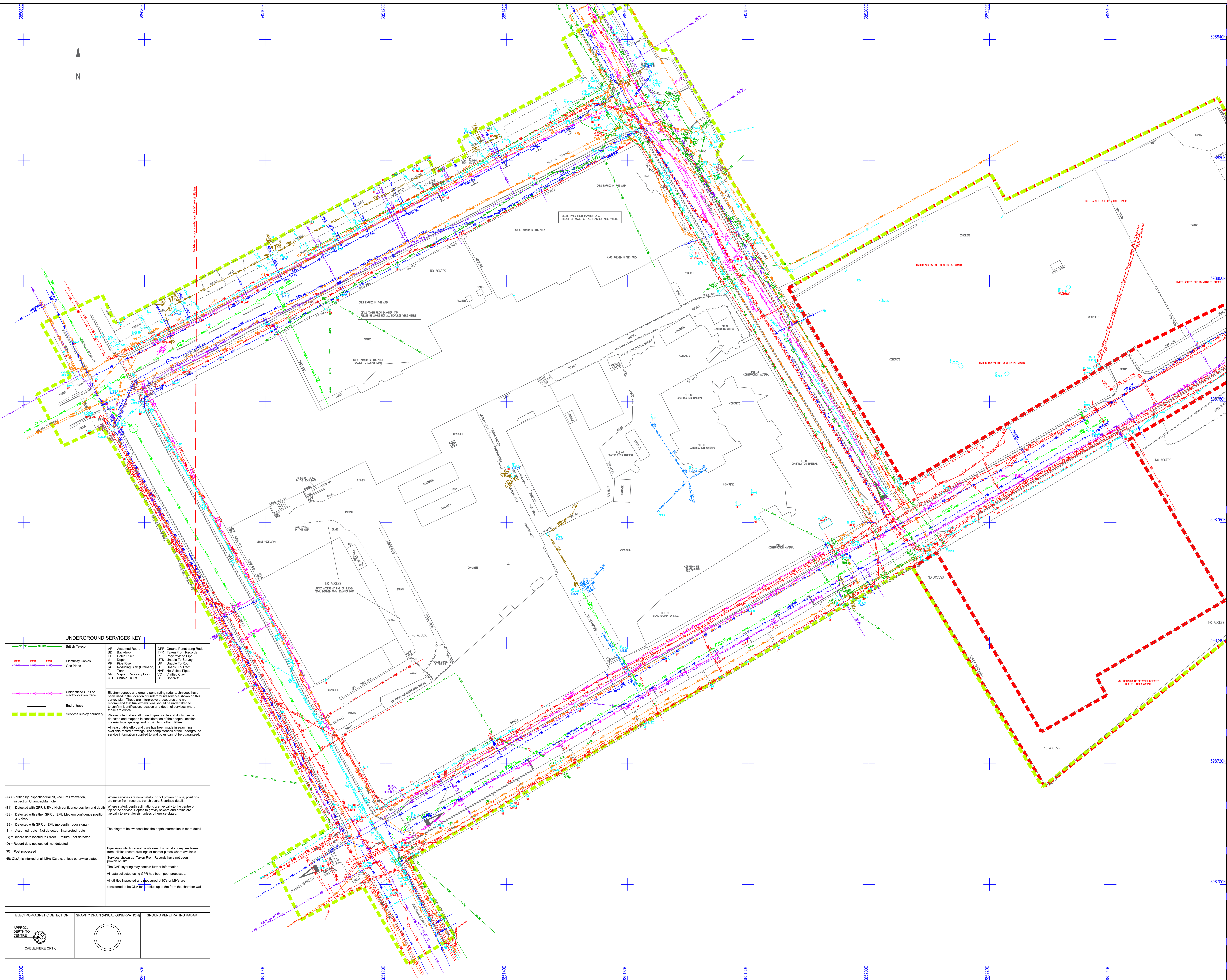
Status Information

Job No: Origin: Zone: Level: Type: Disc: Number: Rev:

9033-BA-XX-00-DR-A-(01)000- 1

Appendix C

GPR Survey.



Grid:	Local plane metric related to National Grid
Levels:	OS datum from GNSS positioning converted using the National Geoid Model OSGM15

[illegible]

Sheet Index

[illegible]

**MALCOLM
HUGHES**

**CHARTERED
LAND SURVEYORS**

2 Allen Road, Livingston, West Lothian
EH54 6TU, Tel: 01506 467 910
www.malcolmhughes.co.uk
livingston@mhls.co.uk

Accreditations

 **RICS**

 **THE SURVEY
ASSOCIATION**

 **ICES**

 **CIBS**

 **ICE**

Client

SCOTT HUGHES DESIGN

THE FLINT GLASS WORKS, 64 JERSEY STREET

MANCHESTER, M4 6JW

Project

MANCHESTER LIFE BACK OF ANCOATS

Drawing Title

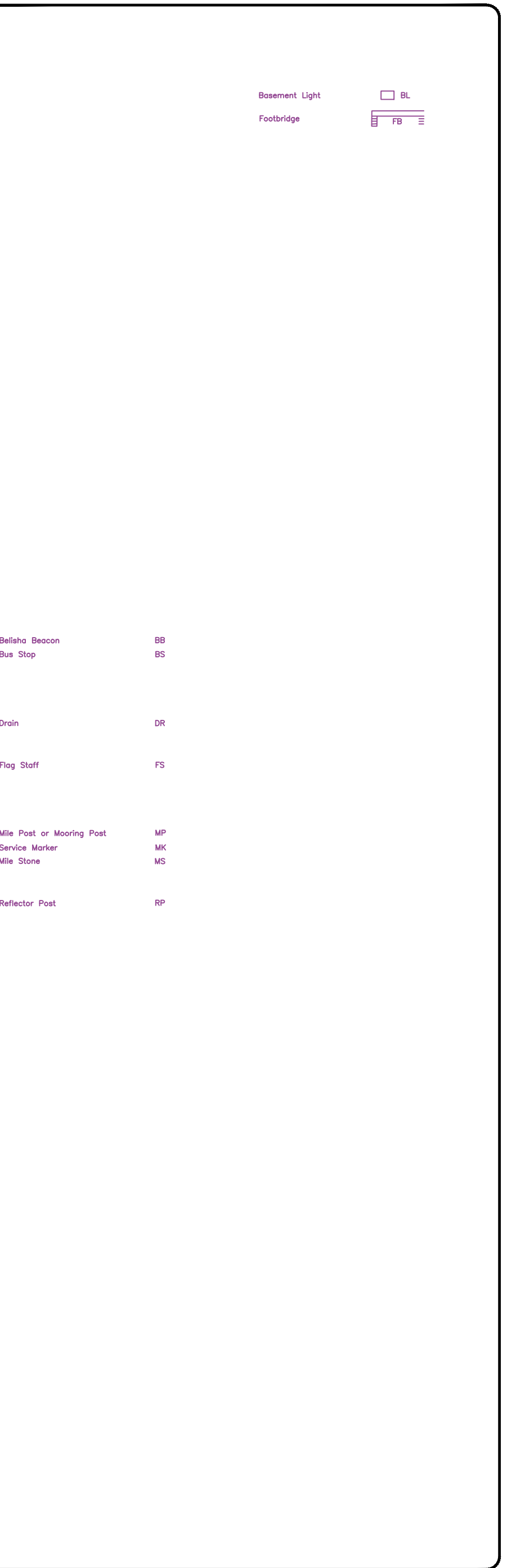
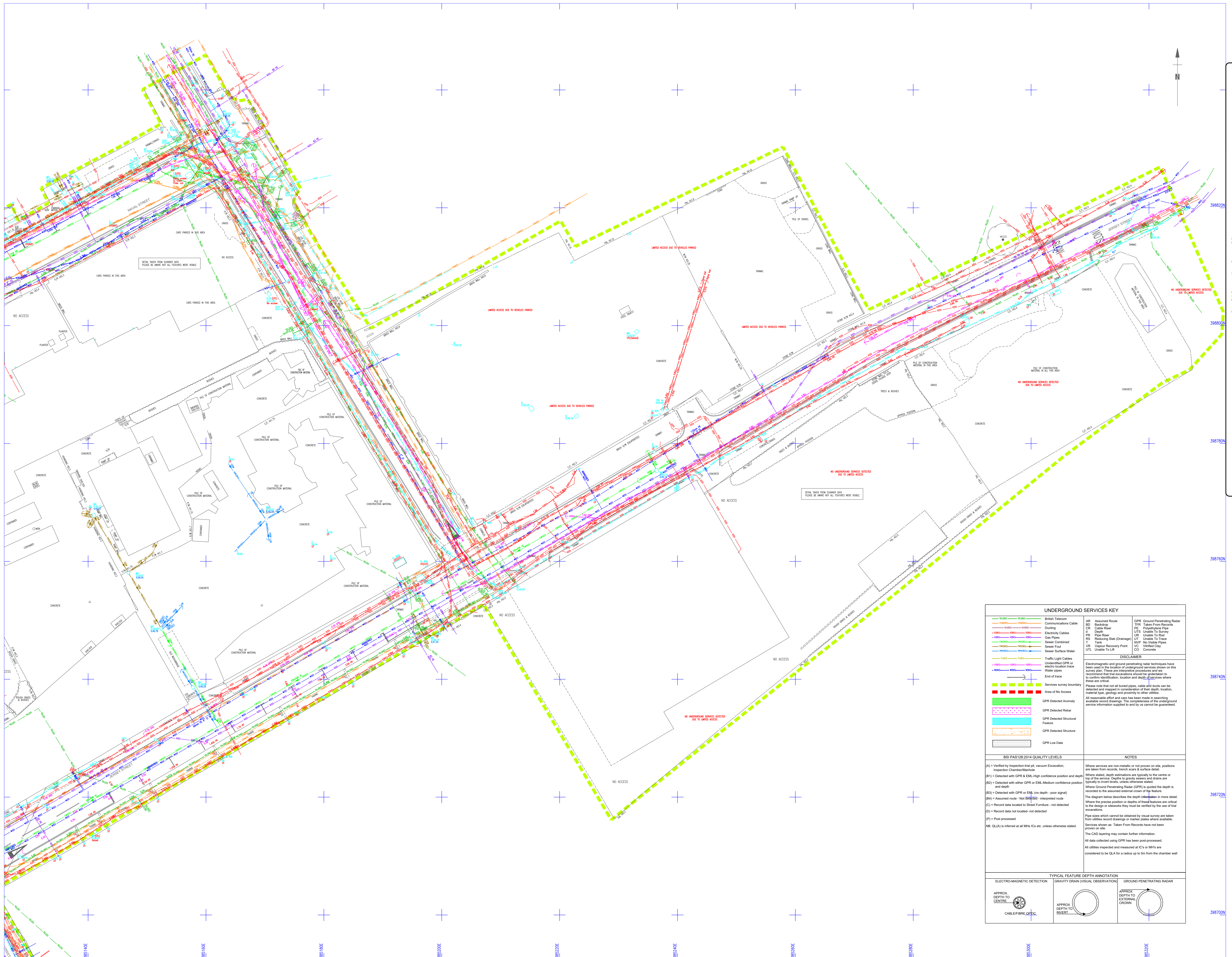
UNDERGROUND SERVICES

SURVEY

SHEET 1

Drawn By	PS	17/12/19	Survey Date	NOV 2019
Checked by	RB	18/12/19	Scale	1:100@A0
Drawing No			Revision	
54711_01_01				

UNDERGROUND SERVICES KEY	
N400 (H400) British Telecom (H400) (H400) Electricity Cables (H400) (H400) Gas Pipes	AR Assumed Risers BR Bonding Cable CR Cable Route D Depth PR Pipe Rise RE Redundant Site (Drainage) T Tank VR Vapor Recovery Port UL Unable To Lift GPR Ground Penetrating Radar TER Taken From Records PE Polyethylene Pipe UTE Unable To Survey UR Unable To Read UT Unable To Trace NP No Visible Pipes VC Verified Clay CO Concrete
+ (H400) — (H400) — (H400) — Unidentified GPR or electro location trace — — — — — End of trace — — — — — Services survey boundary	Electromagnetic and ground penetrating radar techniques have been used in the location of underground services shown on this survey plan. These are interpretive procedures and we warrant that the traced excavations should be undertaken to confirm identification, location and depth of services where there are critical. Where there are any buried pipes, cable and ducts can be detected and mapped in consideration of their size, location, material type, geometry and proximity to other utilities. All reasonable effort and care has been made in searching available record drawings. The completeness of the underground service information supplied to and by us cannot be guaranteed.
</	



UNDERGROUND SERVICES KEY			
	Telco	British Telecom	AR Assumed Route
	Fibre Optic	Communications Cable	BD Backdrop
	Cable TV	Ducting	CB Cable Bearer
	Power	Electricity Cables	GR Ground Penetrating Radar
	Gas Pipes	Pipes	I/F From Records
	Sewer Combined	Water pipes	PE Polyethylene Pipe
	Sewer Flow	Water mains	UPF Unknown To Survey
	Sewer Solved	Water pipes	UT Unable To Trace
	Sewer Surface Flow	Water pipes	NV Not Visible On Plan
	Unknown	Water pipes	VC Verified City
	Unknown	Water pipes	CO Confirmed
	Traffic Light Cables		
	Unsurveyed GPR or electro location trace		
	Water pipes		
	End of trace		
	Services survey boundary		
	Area of No Access		
	GPR Detected Anomaly		
	GPR Detected Road		
	GPR Detected Structural Feature		
	GPR Detected Structure		
	GPR Low Data		

BSI PAS128:2014 QUALITY LEVELS

- = Verified by Inspection-as-pip vacuum Extraction
- = Inspected Chamber/Manhole
- (1) = Detected with GPR EM-Low frequency position and depth
- (2) = Detected with either GPR or EM-Medium condition position
- (3) = Detected with GPR or EM-High (no depth - poor signal)
- (4) = Assumed route - Not detected - interpreted route
- = Record data located to Street/Furniture - not detected
- = Record data not located - not detected

P/I = Point informed

BSI PAS128 is performed at all MHG loc's unless otherwise stated.

NOTES	
Where services are non-mandatory or not proven on site, positions are taken from records, trench scans & surface detail. When stable, depth estimations are typically to the centre or base of the pipe. Depth to ground level may vary as it is typically to invert levels, unless otherwise stated. Ground Penetrating Radar (GPR) is utilized the depth is recorded to the assumed external crown height feature. The diagram below describes the depth information in more detail. The diagram shows how the depth features are related to the design or networks they must verify by the use of pit excavations. Pipe size which cannot be obtained by visual surveys you taken from utilities record drawings or market places where available. Service shown as Taken From Records have not been proven on site. The CAD mapping may contain further information. All data collected using GPR has been post processed. All utilities reported and measured at 10% or more are considered to be QLA for a radius up to 5m from the chamber wall	

TYPICAL FEATURE DETECT ANIMATION		
ELECTRO-MAGNETIC DETECTION	GRAVITY DRAIN (VISUAL OBSERVATION)	GROUND PENETRATING RADAR
APPROX DEPTH TO SENTINE	APPROX DEPTH TO INVERT	APPROX DEPTH TO EXTERNAL CROWN

Appendix D

Environment Agency Flood Map for Planning.

Flood map for planning

Your reference
076740- EY

Location (easting/northing)
385219/398792

Created
12 Jan 2021 13:44

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

This means:

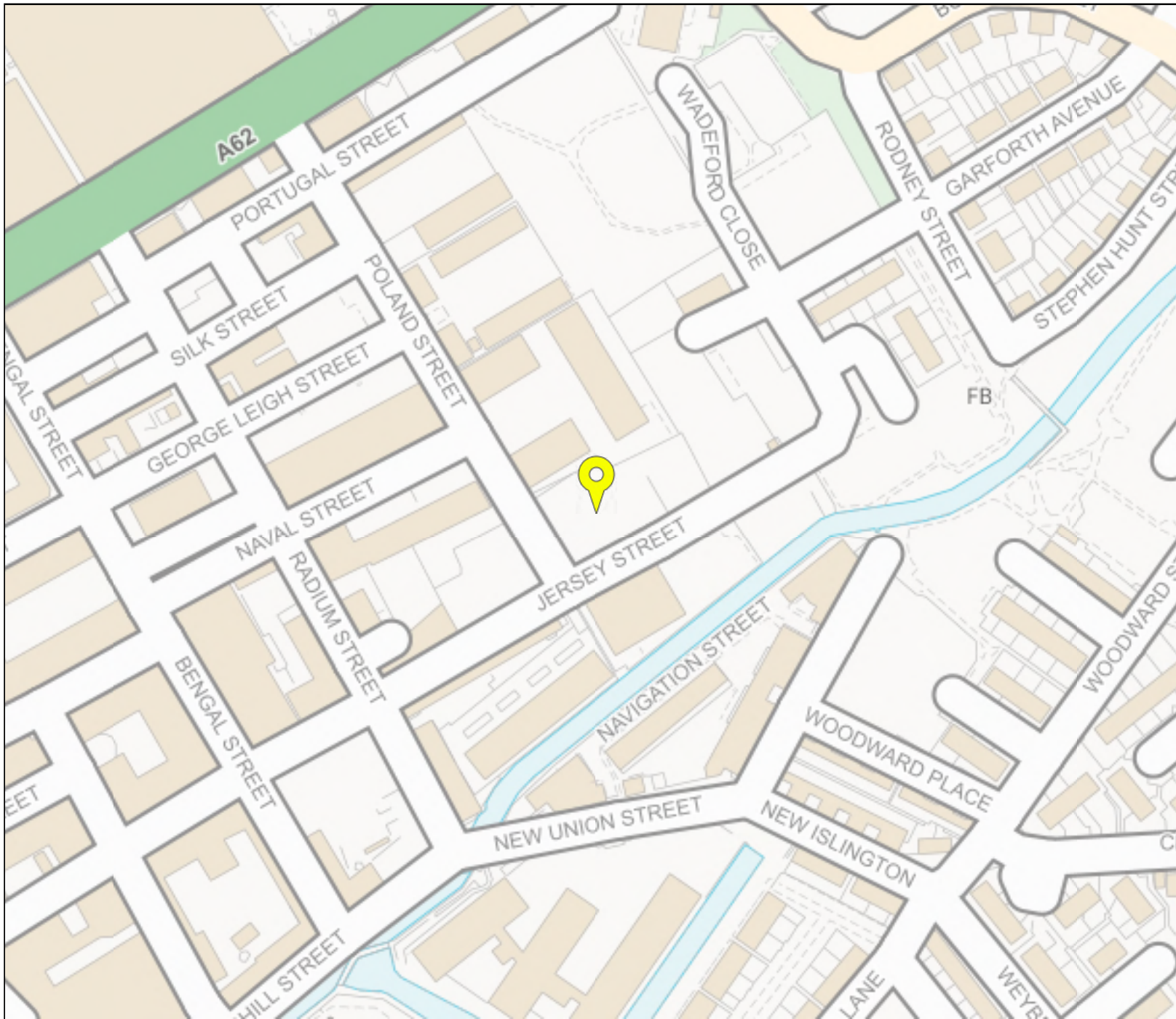
- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

Notes

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

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

The Open Government Licence sets out the terms and conditions for using government data.
<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>



Flood map for planning

Your reference

076740- EY

Location (easting/northing)

385219/398792

Scale

1:2500

Created

12 Jan 2021 13:44

-  Selected point
-  Flood zone 3
-  Flood zone 3: areas benefitting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Flood storage area

0 20 40 60m

Appendix E

Existing Catchment Plan

Proposed Catchment Plan

Proposed Drainage Layout



GENERAL NOTES:

- 1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
- 2. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
- 3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
- 4. EXISTING DRAINAGE SHOWN ON THIS DRAWING IS ASSUMED AND REQUIRES CONFIRMATION FOLLOWING RECEIPT OF THE CCTV SURVEY.

KEY:

PLANNING BOUNDARY

PROPOSED OWNERSHIP BOUNDARY

EXISTING PRIVATE COMBINED WATER SEWER/DRAIN

EXISTING COMBINED PUBLIC SEWER AND MANHOLE

EXISTING AREA WITHIN OWNERSHIP BOUNDARY USED FOR CALCULATING EXISTING GREENFIELD FLOWS.

AREA = 0.23ha

P01	ISSUED FOR INFORMATION	15/01/21	AH	CG
Rev:	Description:	Date:	By:	Chkd:

Curtins

Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG
0161 235 2354
manchester@curtins.com
www.curtins.com

Civils & Structures • Transport Planning • Environmental • Infrastructure • Geotechnical • Conservation & Heritage • Principal Designer
Birmingham • Bristol • Cambridge • Cardiff • Douglas • Dublin • Edinburgh • Glasgow • Kentville • Leeds • Liverpool • London • Manchester • Nottingham

Status: **FOR INFORMATION**

Project: **ELIZA YARD
BACK OF ANCOATS**

Orig Title: **EXISTING CATCHMENT PLAN**

Size:	Date:	Drawn By:	Designed By:	Checked By:
A1	15/01/21	AH	AH	CG
Scale: 1:200				
Project No:	Originator:	Volume:	Level:	Type:
076740 - CUR - 00	- XX	- DR	- C	- 92000 - P01



GENERAL NOTES:

- 1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
- 2. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
- 3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
- 4. EXISTING DRAINAGE SHOWN ON THIS DRAWING IS ASSUMED AND REQUIRES CONFIRMATION FOLLOWING RECEIPT OF THE CCTV SURVEY.

KEY:

PLANNING BOUNDARY

PROPOSED OWNERSHIP BOUNDARY

EXISTING COMBINED PUBLIC SEWER AND MANHOLE

EXISTING AREA WITHIN OWNERSHIP BOUNDARY USED FOR CALCULATING EXISTING GREENFIELD FLOWS.

PROPOSED SURFACE WATER DRAIN AND PPIC/MANHOLE.

PROPOSED ATTENUATION TANK

PROPOSED PERMEABLE PAVING.

P01	ISSUED FOR INFORMATION	15/01/21	AH	CG
Rev:	Description:	Date:	By:	Chkd:

Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG
0161 235 2354
manchester@curtins.com
www.curtins.com

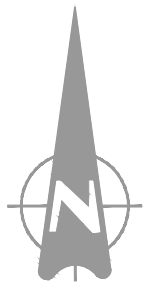
Civils & Structures • Transport Planning • Environmental • Infrastructure • Geotechnical • Conservation & Heritage • Principal Designer
Birmingham • Bristol • Cambridge • Cardiff • Douglas • Dublin • Edinburgh • Glasgow • Kentish • Leeds • Liverpool • London • Manchester • Nottingham

Status: FOR INFORMATION

Project: ELIZA YARD
BACK OF ANCOATS

Orig Title: PROPOSED CATCHMENT PLAN

Size:	Date:	Drawn By:	Designed By:	Checked By:
A1	15/01/21	AH	AH	CG
Scale: 1:200				
Project No:	Originator:	Volume:	Level:	Type:
076740 - CUR - 00	XX	DR	C	-
92000	P01			



DESIGN PHILOSOPHY
SURFACE WATER DESIGN
THE DESIGN PROVIDES CAPACITY UP TO THE 100 YEAR 40% CLIMATE CHANGE EVENT.
SW FLOW RATE: 5L/S (BASED ON AGREED RATES WITH THE LLFA AND UU)
APPROXIMATE STORAGE REQUIREMENT: 76M³
OUTFALL: TO EXISTING COMBINED SEWER (TO BE AGREED WITH UNITED UTILITIES)
LEVELS INDICATE THAT PUMPING WILL NOT BE REQUIRED. TBC FOLLOWING FURTHER DESIGN AND SURVEY WORK.
SUSTAINABLE DRAINAGE: PERMEABLE PAVING
INFILTRATION IS NOT CONSIDERED APPROPRIATE FOR THIS SCHEME. TESTING TO BRE DIGEST 365 ARE REQUIRED TO CONFIRM INFILTRATION RATES FOR DESIGN.
FOUL WATER DESIGN
FW PEAK FLOW RATE: 12.9L/S (BASED ON DISCHARGE UNITS)
OUTFALL: TO EXISTING COMBINED SEWER (TO BE AGREED WITH UNITED UTILITIES)
LEVELS INDICATE THAT PUMPING WILL NOT BE REQUIRED. TBC FOLLOWING

GENERAL NOTES:

GENERAL NOTES:

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
- DESIGN BASED ON TOPOGRAPHICAL SURVEY AND CCTV SURVEY INFORMATION AVAILABLE AT THE TIME OF DESIGN.
- ALL EXISTING SEWERS, CONNECTIONS, PIPE SIZES AND INVERT LEVELS TO BE CONFIRMED BY CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS TO ENSURE CONNECTIVITY. ANY VARIANCE FROM THE INFORMATION SHOWN SHOULD BE REPORTED TO THE ENGINEER FOR REVIEW.
- DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
- ALL DIMENSIONS ARE IN METRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE NOTED.
- WHERE EXISTING DRAINAGE IS BEING USED, ALLOWANCES SHOULD BE MADE TO REMEDIATE THIS DRAINAGE IN LINE WITH AVAILABLE CCTV SURVEY INFORMATION. IF NO SURVEY IS AVAILABLE, IT IS ADVISED TO OBTAIN ONE PRIOR TO COMMENCEMENT OF WORKS.
- ALL EXISTING SERVICES TO BE LOCATED PRIOR TO COMMENCEMENT OF ANY DRAINAGE WORKS, AND WHERE NECESSARY PROTECTION OR DIVERSIONS TO BE UNDERTAKEN TO AVOID CONFLICT WITH THE PROPOSED WORK.
- ALL RAINWATER AND FOUL POP UPS LOCATIONS AND SIZES INDICATIVE ONLY AND TO BE CONFIRMED BY THE ARCHITECT AND M&E ENGINEER.
- COVER LEVELS, GULLY POSITIONS, AND BUILDINGS LOCATION ARE APPROXIMATE AND SHALL BE CONFIRMED BY ARCHITECT/ LANDSCAPE ARCHITECT.
- ALL PIPE DIAMETERS GIVEN ARE NOMINAL INTERNAL PIPE DIAMETERS. THESE ARE TO BE CONFIRMED ONCE A DETAILED CAPACITY CHECK HAS BEEN UNDERTAKEN AT A LATER DESIGN STAGE.
- OUTFALL CONNECTION(S) SUBJECT TO AGREEMENT WITH THE APPROVING AUTHORITY.

NOTES:

- ALL PIPES 1000 UNLESS NOTED OTHERWISE.
- POP-UPS HAVE BEEN ASSUMED TO BE 1000. TBC BY ARCHITECT/M&E ENGINEER.
- LINEAR DRAINAGE POSITIONS SHOWN INDICATIVE AND ARE SUBJECT TO RECEIPT OF FINAL LEVELS PLAN.
- COVER LEVELS HAVE BEEN ASSUMED AND REQUIRE CONFIRMATION FROM ARCHITECT/LANDSCAPE ARCHITECT.
- EXTERNAL LEVELS ARE TO FALL AWAY FROM BUILDINGS.
- TREE PIT LOCATION, SIZE, AND ASSOCIATED DRAINAGE TO BE CONFIRMED BY THE ARCHITECT/LANDSCAPE ARCHITECT.
- EXTERNAL COURTYARD LEVELS TO FALL TOWARDS TREE PITS AND AREAS OF PERMEABLE PAVING.
- PRIVATE DRAINAGE WITHIN SITE HAS BEEN ASSUMED AND REQUIRES CONFIRMATION FOLLOWING RECEIPT OF ADDITIONAL CCTV SURVEY.

DRAINAGE DRAWING BASED ON:

BUTTRESS TOPOGRAPHICAL SURVEY:
9033-BA-XX-00-DR-A-(01)000-1, DATED AUGUST 20.
MALCOLM HUGHES UTILITIES SURVEY:
54711_01_01, DATED NOV 19.
BUTTRESS GROUND FLOOR-PROPOSED:
9033-BA-XX-00-DR-A-(04)000-4, DATED 01.01.20.
BUROHAPPOLD MEP SERVICES LAYOUT GF:
9033-BH-XX-00-DR-N-(00)1000
ERIC WRIGHT- DRAFT CRANE LOGISTICS SKETCH
'DRAFT SITE LOGISTICS PLAN: TWO CRANE OPTION',
RECEIVED 09.12.20.

P02	UPDATED TO LANDSCAPE LAYOUT	01/04/21	VC	CG
P01	ISSUED FOR STAGE 3	11/01/21	AH	MW
Rev:	Description:	Date:	By:	Chk:



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Status:

STAGE 3

Project:

BACK OF ANCOATS
ELIZA YARD

Orig Title:

PROPOSED DRAINAGE LAYOUT

Size:	Date:	Drawn By:	Designed By:	Checked By:
A1	11/01/21	AH	AH	MW
Scale:	1:150			
Project No:	Originator:	Volume:	Level:	Type:
076740 - CUR - 00 - XX - DR - C -				

076740 - CUR - 00 - XX - DR - C - 92500 - P02

KEY:

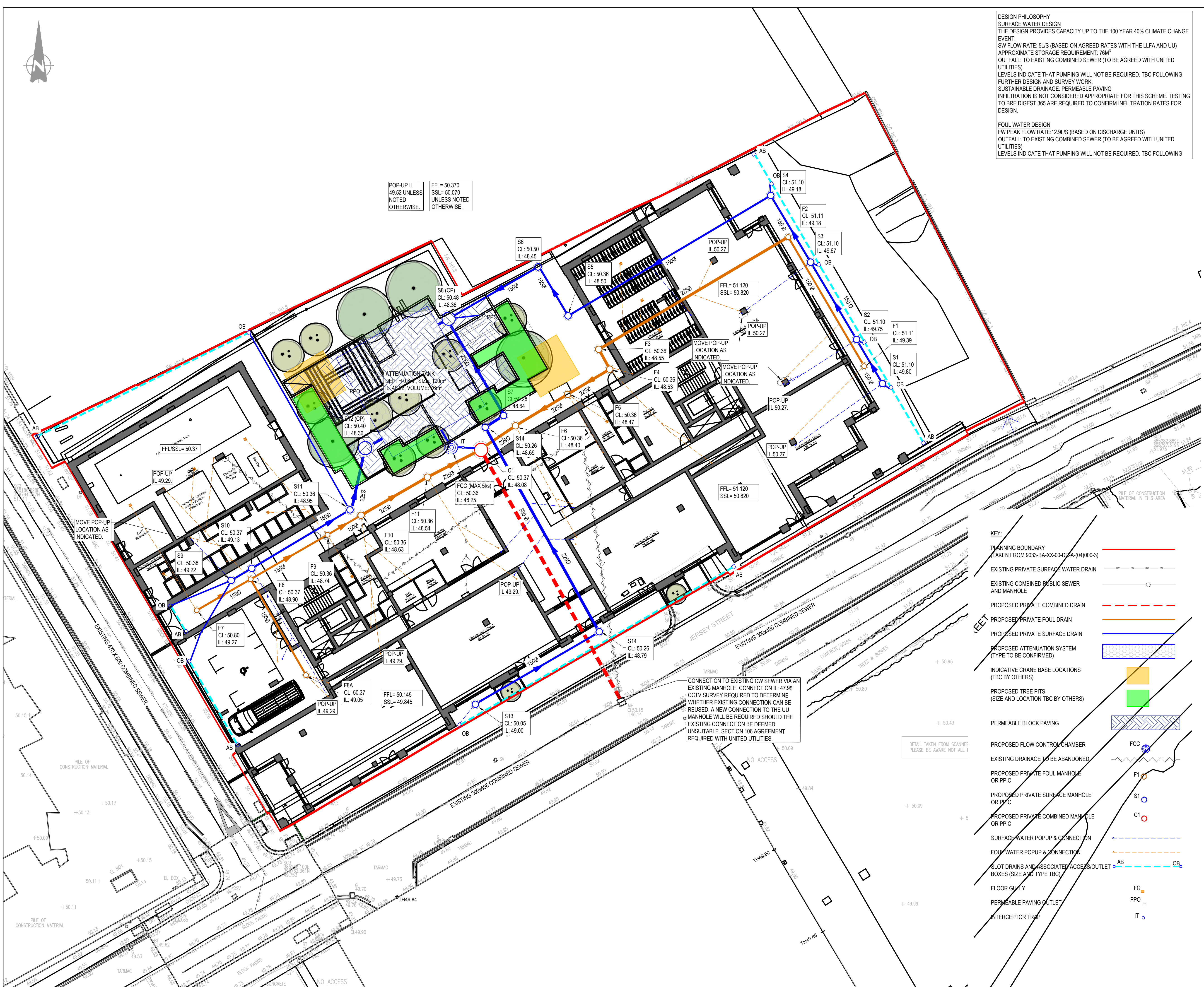
- PLANNING BOUNDARY
(TAKEN FROM 9033-BA-XX-00-DR-A-(04)000-3)
- EXISTING PRIVATE SURFACE WATER DRAIN
- EXISTING COMBINED PUBLIC SEWER
AND MANHOLE
- PROPOSED PRIVATE COMBINED DRAIN
- PROPOSED PRIVATE FOUL DRAIN
- PROPOSED PRIVATE SURFACE DRAIN
- PROPOSED ATTENUATION SYSTEM
(TYPE TO BE CONFIRMED)
- INDICATIVE CRANE BASE LOCATIONS
(TBC BY OTHERS)
- PROPOSED TREE PITS
(SIZE AND LOCATION TBC BY OTHERS)
- PERMEABLE BLOCK PAVING
- PROPOSED FLOW CONTROL CHAMBER
- EXISTING DRAINAGE TO BE ABANDONED
- PROPOSED PRIVATE FOUL MANHOLE
OR PPIC
- PROPOSED PRIVATE SURFACE MANHOLE
OR PPIC
- PROPOSED PRIVATE COMBINED MANHOLE
OR PPIC
- SURFACE WATER POPUP & CONNECTION
- FOUL WATER POPUP & CONNECTION
- SLOT DRAINS AND ASSOCIATED ACCESS/OUTLET
BOXES (SIZE AND TYPE TBC)
- FLOOR GULLY
- PERMEABLE PAVING OUTLET
- INTERCEPTOR TRAP

CONNECTION TO EXISTING CW SEWER VIA AN
EXISTING MANHOLE. CONNECTION IL: 47.95.
CCTV SURVEY REQUIRED TO DETERMINE
WHETHER EXISTING CONNECTION CAN BE
REUSED. A NEW CONNECTION TO THE UU
MANHOLE WILL BE REQUIRED SHOULD THE
EXISTING CONNECTION BE DEEMED
UNSUITABLE. SECTION 106 AGREEMENT
REQUIRED WITH UNITED UTILITIES.

DETAIL TAKEN FROM SCANNER
PLEASE BE AWARE NOT ALL I

POP-UP IL
49.52 UNLESS
NOTED
OTHERWISE.

FFL= 50.370
SSL= 50.070
UNLESS NOTED
OTHERWISE.



Appendix F

United Utilities records.



Curtins Consulting Ltd

**51-55
Tithebarn Street,
Liverpool,
L2 2SB**

FAO:

How to contact us:

**United Utilities Water Limited
Property Searches
Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP**

Telephone: 0370 7510101

E-mail: propertysearches@uuplc.co.uk

**Your Ref: CSMA 601 076740 Ancoats Plot B
Our Ref: UUPS-ORD-175968
Date: 23/07/2020**

Dear Sirs

Location: EASY EQUIPMENT LTD 66 JERSEY STREET, MANCHESTER, M4 6JW

I acknowledge with thanks your request dated 21/07/2020 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. <http://www.unitedutilities.com/work-near-asset.aspx>.

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,

Karen McCormack
Property Searches Manager

TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

TERMS AND CONDITIONS:

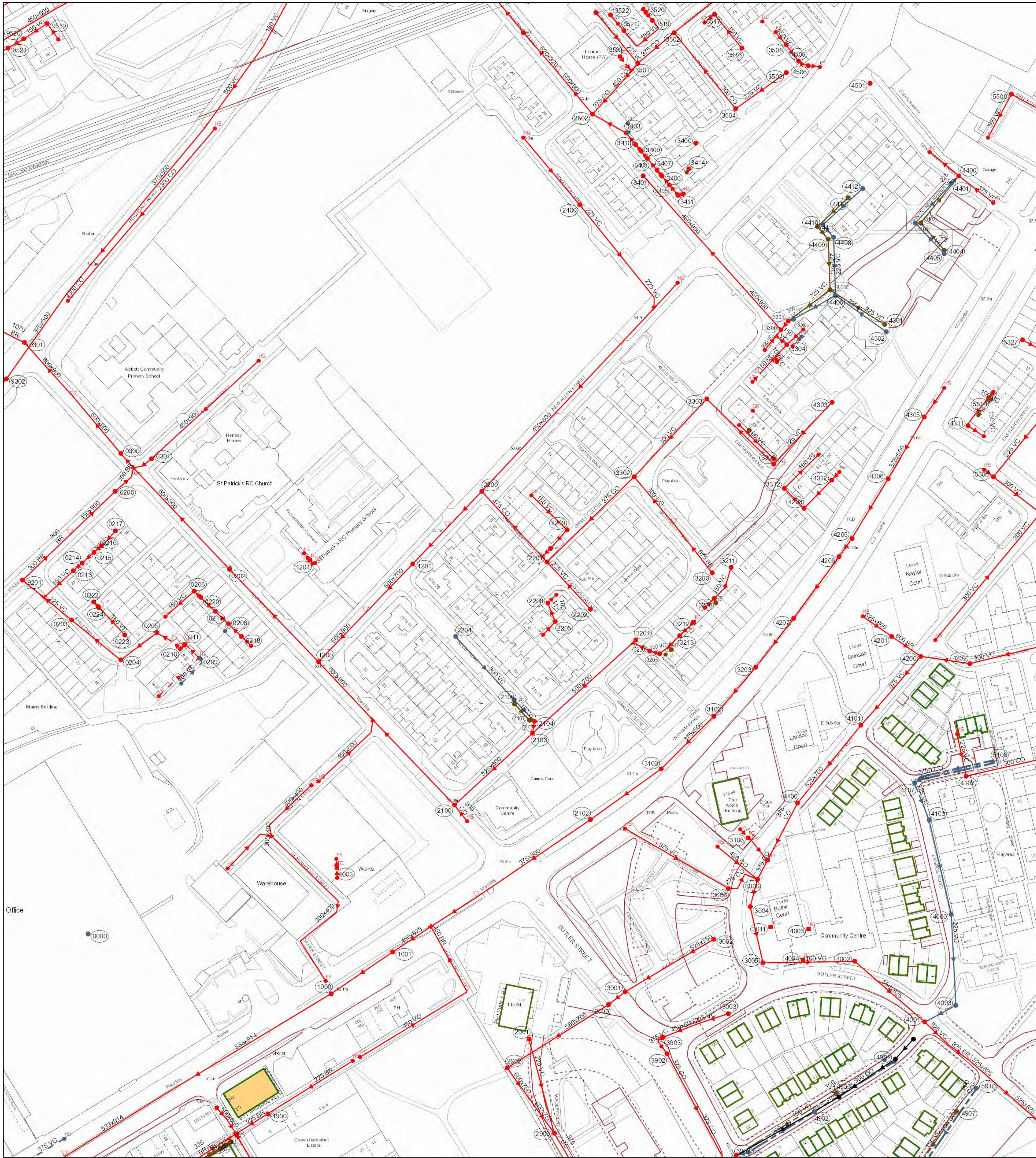
- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.



The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

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Reho	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
4803	50.85	SW	48.52	900		CO	14.0367	1 in 403	
4805	49.52	CO	46.32	225		CO	71.40572	1 in 193	
3800	51.18	CO	47.07	450		CO	71.40572		
4808	50.82	CO	46.32	470		BR	4.81465		
4202	53.63	CO	50.73	550		VC	51.05408		
4202	53.63	CO	50.73	550		VC	51.05408		
9701	50.48	CO	44.21	370		BR	40.49691		
9701	50.48	CO	44.21	370		BR	40.49691		
6700	50.39	CO	44.9	375		VC	15.26434		
4801	52.31	SW	47.82	800		CO	52.0643	1 in 400	
4901	52.31	SW	47.82	800		CO	52.0643	1 in 400	
4402	51.8	FO	49.44	600		VC	6.826793	1 in 7	
4402	51.8	FO	49.44	600		VC	6.826793	1 in 7	
4903	51.8	FO	49.44	600		VC	6.826793	1 in 7	
4903	51.8	FO	49.44	600		VC	6.826793	1 in 7	
5507		CO	0	100		VC	26.10942		
4510	50.31	CO	47.91	100		VC	13.42718		
4800	47.43	CO	44.78	450		CO	54.20332	1 in 151	
4103	53.65	SW	51.96	225		VC	53.33643	1 in 152	
4001		CO	0	825		VC	17.73393		
4001		CO	0	825		VC	17.73393		
2610	47.54	CO	44.47	450		PVC	1.067193		
1904		CO	0	470		BR	48.8774		
3808	46.96	CO	43.15	600		CO	39.81206		
0806	50.9	CO	0	457		BR	3		
0806	50.9	CO	0	457		BR	3		
4613	51.28	CO	47.88	375		VC	10.95113		
2900	51.28	CO	47.88	375		CO	62.76942		
1809		CO	0	425		BR	9.89375		
4703	49.03	CO	46.18	375		CO	20.39608	1 in 185	
4502	49.44	CO	46.87	225		VC	16.05242	1 in 134	
4910	50.86	FO	48.35	150		VC	27.11203	1 in 129	
5700	49.11	CO	46.36	150		VC	20.24846	1 in 34	
0705		CO	0	608		BR	8.442076		
3605	45.96	CO	46.38	1500		UN	37.40898		
1001	53.21	CO	46.38	450		BR	41.04875	1 in 373	
1001	53.21	CO	46.38	450		BR	41.04875	1 in 373	
0903	51.19	CO	49.17	225		BR	28.18145	1 in 224	
3811		CO	0	150		VC	11.04069		
2902	51.78	CO	49.93	600		BR	22.2036	1 in 19	
5608	48.11	CO	45.52	225		VC	49.84877		
3001	52.04	CO	49.22	580		BR	11.40175		
3001	52.04	CO	49.22	580		BR	11.40175		
1800	50.45	CO	49.07	150		VC	24.8411	1 in 79	
4805	50.49	SW	48.42	225		BR	8.154181	1 in 62	
3802	46.34	CO	43.75	300		VC	7.060821	1 in 141	
3005		CO	0	100		VC	50.6484	1 in 61	
0710	50.48	CO	45.94	600		BR	15.24797		
0710	50.48	CO	45.94	600		BR	15.24797		
9901	51.21	CO	43.93	400		BR	43.93		
0910		FO	0	100		GRC	2.288455		
0910		FO	0	100		GRC	2.288455		
3901	51.08	CO	47.14	450		CO	7.112387	1 in 102	
3901	51.08	CO	47.14	450		CO	7.112387	1 in 102	
3907	50.94	CO	47.51	150		VC	7.043519	1 in 101	
5402	50.4	CO	47.82	420		BR	19.18469		
0909		CO	0	100		VC	13.86026		
3906	50.94	SW	47.58	150		VC	6.960301	1 in 99	
3906	50.94	SW	47.58	150		VC	6.960301	1 in 99	
4702	48.61	CO	46.07	375		CO	61.40033	1 in 60	
5806	48.54	CO	45.51	300		VC	48.14488		
5702	48.17	CO	46.47	225		VC	15.26434	1 in 139	
4807	48.73	CO	46.45	900		VC	13.40712	1 in 447	
4807	48.73	CO	46.45	900		VC	13.40712	1 in 447	
0800	50.65	CO	47.34	525		BR	8.942722		
4907	51.83	FO	49.64	150		VC	45.97432	1 in 81	
4907	51.83	FO	49.64	150		VC	45.97432	1 in 81	
0908		CO	0	100		VC	11.03464		
0913		FO	0	100		GRC	3.723282		
0913		FO	0	100		GRC	3.723282		
3800	50.37	CO	45.46	525		CO	25.63201	1 in 35	
2000	52.34	CO	49.31	580		BR	66.03786		
2000	52.34	CO	49.31	580		BR	66.03786		
0711	50.53	CO	46.85	375		CO	2.877241		
0501	50.16	CO	44.29	600		BR	21.47091	1 in 41	
0501	50.16	CO	44.29	600		BR	21.47091	1 in 41	
0917		FO	0	100		VC	10.29758		
0917		FO	0	100		GRC	7.842798		
0916		FO	0	100		GRC	6.836255		
0916		FO	0	100		GRC	6.836255		
4902	51.55	SW	47.69	800		CO	42.84325	1 in 428	
4902	51.55	SW	47.69	800		CO	42.84325	1 in 428	
3601	46.69	CO	42.87	900		CO	32.9511	1 in 412	
5910	52.09	SW	48.74	900		CO	60.39719	1 in 403	
5910	52.09	SW	48.74	900		CO	60.39719	1 in 403	
5906		CO	0	225		VC	23.02173		
3903	51.55	CO	48.78	375		VC	3.695551	1 in 15	
3903	51.55	CO	48.78	375		VC	3.695551	1 in 15	
4000	53.11	SW	51.38	225		VC	50.30959	1 in 15	
4000	53.11	SW	51.38	225		VC	50.30959	1 in 15	
4505		CO	0	150		UN	27.24673		
0905	51.32	CO	48.92	470		BR	2.037535		
0905	51.32	CO	48.92	470		BR	2.037535		
3611	46.55	CO	40.28	225		VC	13.14941	1 in 103	
4500	46.27	CO	40.28	225		VC	24.71311	1 in 46	
4502	49.44	CO	46.87	225		VC	32.88858	1 in 409	
3704	46.23	CO	43.83	675		VC	18.02716	1 in 258	
4405		CO	0	600		CO	14.30672		
3801	50.45	CO	46.18	100		BR	17.34462	1 in 49	
0912		FO	0	100		GRC	3.318789		
0912		FO	0	100		GRC	3.318789		
4601	48.2	CO	45.03	375		CO	18.02716	1 in 82	
3600	46.49	CO	43.09	450		CO	25.30392		
4802		CO	0	75		VC	73.60027		
3703	48.41	CO	43.75	675		VC	16.76305	1 in 107	
4604	48.97	CO	46.15	225		CO	16.76305	1 in 107	
4906	51.24	SW	48.59	900		CO	28.39734	1 in 406	
4906	51.24	SW	48.59	900		CO	28.39734	1 in 406	
4003		SW	0	225		VC	19.44336		
4603	48.4	CO	46.54	225		VC	41.04875	1 in 108	
2404	46.87	CO	46.14	1500		BR	96.22354	1 in 116	
4705	48.85	CO	46.51	225		VC	80.80223	1 in 184	
3604		CO	0	400		VC	35.94798		
3004		CO	0	100		VC	31.7805		
5503	49.34	CO	47.52	225		VC	63.82098	1 in 100	
1700	50.44	CO	47.11	300		BR	31.63168	1 in 122	
3803	50.62	CO	47.84	550		BR	22.30688		
3622	47.86	CO	45.02	450		CO	11.84602		
3701	48.86	CO	44.33	510		VC	55.96925	1 in 28	
4614		CO	0	150		VC	7.618911		
1802	50.41	CO	47.46	225		BR	61.76727	1 in 221	
0911		GRC	0	100		GRC	3.020749		
4807	50.51	FO	48.55	150		VC	22.77997	1 in 124	
4802	48.2	CO	45.32	225		VC	33.96055	1 in 100	
3902	51.78	CO	49.32	375		CO	69.17107	1 in 37	
4400	49.5	CO	47.44	225		VC	82.91961	1 in 40	
2901	51.78	CO	49.85	225		VC	53.85165		
2901	51.78	CO	49.85	225		VC	53.85165		
0701	50.45	CO	46.42	375		CO	15.13275	1 in 151	
0900	51.43	CO	48.76	500		BR	8.219544	1 in 151	
0900	51.43	CO	48.76	500		BR	8.219544	1 in 151	
3702	49.49	CO	46.63	525		VC	43.94649	1 in 538	
3002	52.82	CO	49.92	525		BR	27.78489	1 in 79	
3002	52.82	CO	49.92	525		BR	27.78489	1 in 79	
4806	50.54	CO	48.37	225		VC	6.97234	1 in 139	
3003	52.01	CO	49.01	225		VC	18.97367	1 in 190	
3003	52.01	CO	49.01	225		VC	18.97367	1 in 190	
3802	50.78	CO	46.7	525		CO	64.53024	1 in 120	
4501	46.23	CO	45.34	225		VC	37.80212	1 in 140	
3403		CO	0	800		CO	41.62712		
0904		CO	0	100		VC	1.680086		
1900	51.32	CO	0	225		BR	21.62603		
1000	53.1	CO	46.27	533		BR	172.3675		
1000	53.1	CO	46.27	533		BR	172.3675		
0902	51.15	CO	49.25	225		BR	59.6825	1 in 63	
3610	47.44	CO	44.36	525		VC	11.6619	1 in 24	
6605		CO	0	150		VC	6.529777		
3700	47.03	CO	41.1	300		VC	45.90343		
0810		CO	0	4					



Reho	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
218593	150	VC	50.87	225			VC	7.571001	
3304	CO	CO	50.87	225			VC	34.82815	1 in 10
0203	53.35	CO	50.87	225			VC	6.878755	1 in 51
4302	56.7	SW	54.9	225			VC	34.4093	1 in 81
2103	BR	CO	50.86	525			VC	51.05408	
4002	53.53	CO	50.73	550			VC	6.403124	
4002	53.53	CO	50.73	550			VC	15.52417	
3301	56.13	CO	53.53	225			VC	35.4653	
3203	53.81	CO	49.48	375			VC	52.0643	1 in 400
4901	52.31	SW	47.82	800			CO	52.0643	1 in 400
4901	52.31	SW	47.82	800			VC	3.162278	
4300	56.11	SW	53.53	300			VC	65.12257	1 in 125
4903	51.8	FO	46.44	150			VC	65.12257	1 in 125
4903	51.8	FO	46.44	150			VC	65.12257	1 in 125
4506	55.77	CO	53.82	150			VC	6.323258	1 in 92
4103	53.55	SW	51.86	225			VC	17.77393	
4001	CO	CO	0	825			VC	28.42534	1 in 129
4205	57.69	CO	47.38	500			VC	12.15387	
4205	57.69	CO	47.38	500			VC	40.59557	1 in 406
2106	50.94	CO	48.27	150			VC	76.27592	
5106	54.15	SW	52.18	750			VC	62.76842	
2102	CO	CO	0	375			VC	11.54142	
2900	51.28	CO	47.68	375			VC	9.219544	1 in 154
2900	51.28	CO	47.68	375			VC	34.4093	1 in 191
4411	56.85	FO	54.39	225			VC	26.24891	1 in 80
2209	52.34	CO	48.27	150			BR	114.0219	1 in 35
3503	56.43	CO	54.28	225			VC	26.41969	1 in 38
3503	56.43	CO	54.28	225			VC	24.83949	1 in 65
3300	56.11	CO	52.05	450			VC	19.84943	1 in 68
4406	56.38	SW	54.22	300			VC	32.80244	1 in 82
4200	54.69	CO	51.47	375			BR	19.41469	1 in 78
4404	57.68	FO	55.28	225			BR	41.04875	1 in 373
3102	53.21	CO	46.38	450			BR	41.04875	1 in 373
5306	55.89	CO	51.75	300			BR	77.10393	
4201	54.98	CO	47.19	600			VC	70.72482	1 in 51
1001	53.21	CO	46.38	450			VC	23.1583	
0202	53.23	CO	48.58	600			BR	29.18145	1 in 224
1200	53.07	CO	48.58	600			VC	32.25584	
3008	52.04	CO	48.27	150			BR	22.2036	1 in 19
0903	51.19	CO	49.17	225			BR	22.2036	1 in 19
3519	51.78	CO	49.83	600			VC	27.29469	1 in 210
2902	51.78	CO	49.83	600			VC	11.40175	
4202	54.92	CO	51.6	300			BR	11.40175	
5500	57.38	CO	54.32	300			BR	11.40175	
3001	52.04	CO	49.22	580			BR	18.43916	1 in 13
3001	52.04	CO	49.22	580			BR	36.06938	1 in 82
3501	56.02	CO	53.18	450			BR	11.50214	
8201	53.13	CO	47.48	300			VC	34.20266	
0203	53.32	CO	46.51	375			VC	50.6484	
4207	CO	CO	0	100			VC	50.6484	
3005	CO	CO	0	100			VC	33.42155	1 in 307
3005	CO	CO	0	100			VC	54.0703	1 in 139
4402	57.37	FO	54.99	225			VC	47.54259	
4410	56.78	SW	54.96	225			VC	2.288455	
3504	56.58	CO	54.01	300			GRC	34.20266	1 in 76
2204	54.11	FO	51.29	100			VC	11.51871	
0910	FO	FO	0	100			VC	5.737083	
3200	54.11	FO	51.29	100			VC	28.0007	1 in 57
3520	CO	CO	0	100			VC	7.043519	1 in 101
4407	56.54	FO	54.03	225			VC	7.043519	1 in 101
3907	50.94	CO	47.51	150			VC	42.2019	
4209	CO	CO	0	375			VC	6.850301	1 in 99
3517	CO	CO	0	150			VC	6.850301	1 in 99
3906	50.94	SW	47.58	150			VC	40.59152	1 in 406
3906	50.94	SW	47.58	150			VC	17.14091	
5106	54.15	SW	52.18	750			VC	6.384964	
0200	53.43	CO	46.59	300			VC	58.72919	
2210	CO	CO	0	150			VC	25	1 in 69
3303	CO	CO	0	300			VC	45.87432	1 in 81
0205	53.23	CO	51.79	225			VC	3.722392	
4807	51.83	FO	46.84	150			VC	20.81553	
4807	51.83	FO	46.84	150			VC	66.03786	
0913	FO	FO	0	100			BR	66.03786	1 in 86
4400	57.72	CO	53.35	375			CO	47.41308	1 in 69
2000	52.34	CO	49.31	580			CO	11.52801	
2000	52.34	CO	49.31	580			CO	48.01041	
4100	53.7	CO	50.03	375			CO	7.842798	
1208	CO	CO	0	100			GRC	6.636525	
4403	57.39	SW	55.45	225			GRC	6.636525	
3103	CO	CO	0	375			VC	2.766462	
0917	FO	FO	0	100			VC	42.84325	1 in 428
0916	FO	FO	0	100			VC	42.84325	1 in 428
4902	51.55	SW	47.69	800			CO	60.39719	1 in 403
4902	51.55	SW	47.69	800			CO	60.39719	1 in 403
5910	52.09	SW	48.74	900			VC	4.931631	
5910	52.09	SW	48.74	900			VC	5.695854	
4401	57.67	SW	55.02	400			BR	8.52102	400
2104	CO	CO	0	400			BR	37.48333	1 in 234
1201	52.8	CO	48.89	500			VC	3.605551	1 in 15
3903	51.55	CO	48.78	375			VC	3.605551	1 in 15
3903	51.55	CO	48.78	375			VC	50.30699	
4000	53.11	SW	51.38	225			VC	50.30699	
4000	53.11	SW	51.38	225			VC	36.25334	1 in 77
2501	56.21	CO	53.86	225			VC	48.82	470
0905	51.32	CO	48.82	470			BR	2.037535	
0905	51.32	CO	48.82	470			BR	8.762789	
0215	CO	CO	0	150			VC	6.153465	
4005	CO	CO	0	375			VC	39.44617	
4305	CO	CO	0	375			VC	21.60025	
0912	FO	FO	0	100			GRC	3.318789	
0912	FO	FO	0	100			GRC	23.34524	
4405	55.23	SW	53.31	225			BR	40.45986	
0216	CO	CO	0	150			BR	27.58623	1 in 1379
2200	53.11	CO	48.92	400			VC	35.36381	
2202	53.86	CO	0	225			VC	5.270839	
0216	CO	CO	0	150			VC	19.44336	
4003	SW	SW	0	225			BR	38.59756	
4003	SW	SW	0	225			VC	21.85461	1 in 219
9301	53.6	CO	44.64	1070			CO	29.53287	1 in 90
4106	53.67	SW	49.01	0			VC	0.278681	
4413	57.1	FO	54.64	225			VC	23.34524	1 in 93
3521	50.16	CO	46.01	150			VC	11.38956	
3004	CO	CO	0	100			VC	31.7805	
4306	CO	CO	0	375			VC	38.59756	
4408	56.82	SW	54.83	225			VC	32.01562	1 in 52
0214	CO	CO	0	150			VC	6.519656	
4101	54.18	CO	50.71	525			BR	55.44366	1 in 82
4412	57.42	SW	55.25	225			VC	29.7214	1 in 76
4301	56.08	FO	54.5	225			VC	35.51056	1 in 76
0208	CO	CO	0	150			VC	10.04528	
3902	51.78	CO	49.32	375			BR	69.17107	1 in 37
3902	51.78	CO	49.32	375			CO	69.17107	1 in 37
2901	51.78	CO	49.85	225			VC	53.85165	
2801	51.78	CO	49.85	225			VC	53.85165	
4409	56.83	FO	54.53	225			VC	28.07785	
0900	51.43	CO	48.76	500			BR	8.219544	
0900	51.43	CO	48.76	500			BR	53.07575	1 in 49
2201	53.61	CO	50	375			CO	27.78489	1 in 79
3002	52.82	CO	49.92	525			BR	27.78489	1 in 79
3002	52.82	CO	49.92	525			BR	67.71886	1 in 177
3002	52.82	CO	49.92	525			VC	18.97367	1 in 190
3003	52.01	CO	46.01	225			VC	51.62364	
3003	52.01	CO	46.01	225			VC	11.55683	
3305	56.15	CO	53.1	225			BR	21.62003	
0217	CO	CO	0	150			VC	21.1242	
1900	51.32	CO	0	225			BR	172.3675	
0206	CO	CO	0	150			VC	23.91858	
1000	53.1	CO	46.27	533			BR	72.3675	
3516	CO	CO	0	150			VC	90.24411	1 in 113
4102	54.11	CO	50.58	300			BR	76.6396	1 in 108
3201	54.05	CO	51.57	500			VC	10.20473	
3206	CO	CO	0	150			VC	5.23651	
0204	53.35	CO	51.43	225			VC	34.82815	1 in 76
0223	CO	CO	0	150			VC	20.76079	
0224	CO	CO	0	150			VC	4.226566	
2400	57.65	CO	54.12	225			VC	71.43699	
2100	53.05	CO	50.14	600			BR	108.6306	
3213	CO	CO	0	150			VC	14.88799	
5314	CO	CO	0	150			VC	19.33843	
4311	CO	CO	0	150			VC	10.40183	
4312	CO	CO	0	100			VC	10.49903	
3312	CO	CO	0	100			VC	21.76589	
8620	CO	CO	0	150			VC	26.45841	
9521	CO	CO	0	150			VC	8.827451	
9519	CO	CO	0	150			VC	42.23491	
5327	CO	CO	0	150	</				

From: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Sent: 04 January 2021 16:29
To: Adam Hogan
Cc: Chloé Grimsley
Subject: Re: Back of Ancoats, Plot B, Jersey Street, Manchester

Hi Adam,

Thanks for the email, I hope you had a good Christmas and New Year.

Regarding your enquiry, based on the information provided from UU and within your email below, we would have no objection with the site discharging at 5l/s into the UU sewer.

Thanks,

Oliver

Lead Local Flood Authority
Highways
Growth & Development and Neighbourhoods Directorate
Manchester City Council
PO Box 532 Town Hall
Manchester
M60 2LA

From: Adam Hogan <Adam.Hogan@curtins.com>
Sent: Wednesday, December 16, 2020 8:15 PM
To: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Cc: Chloé Grimsley <Chloe.Grimmsley@curtins.com>
Subject: Back of Ancoats, Plot B, Jersey Street, Manchester

Dear Sir/Madame.

The below refers to a new scheme we are looking at, Eliza Yard, Jersey Street, Manchester and is for pre planning advise for our Drainage proposals. Proposed plans are not yet available, however we will provide this information once available.

Nearest postcode to the site: M4 6JW

Location and site use

The new development site located to the north east of Ancoats, off the Junction of Jersey Street and Poland Street, Manchester. The existing site is occupied by a car park and an access road which provides access from Jersey St. The site is bounded by Jersey Street to the south, Poland Street to the west, an existing yard/storage area to the north and an existing car park to the east. Please refer to the attached site location plan.

Proposed Development.

The proposed development for Eliza Yard (Plot B), is to construct a new residential development consisting of approximately 100 dwellings with commercial units proposed on the ground floor along Jersey St.

Foul Drainage (FW)

It is anticipated that the system will drain via a gravity connection at this time, as levels suggest pumping is not required. Connection will be made to the existing combined public sewer located along Jersey Street, as agreed with United Utilities.

Proposed Foul Flows are anticipated to be c.4.63 l/s based on 4000l/day/dwelling. These flows will be confirmed following final dwelling numbers and appliances.

Surface Water (SW) Drainage

The existing site is occupied by parking facilities. It is assumed that SW does not currently discharge to the public sewer, as this has not yet been proven by CCTV surveys. It is therefore considered Greenfield until proven otherwise, in line with United Utilities Pre-Development Enquiry response (Attached for your reference).

In following the standard hierarchy of drainage solutions, consideration should firstly be given to the discharge of surface water runoff by sustainable methods such as infiltration.

Infiltration - The ground conditions comprise of made ground overlaying firm to stiff clay, therefore due to the limiting permeability of the clay, infiltration is not suitable. This will be revisited following receipt of the SI.

Watercourse – The nearest watercourse is the Rochdale Canal located approximately 55m to the south of the development. Draining to a watercourse is also not considered viable for the site as to do so would involve crossing third part land and highways to do so.

SW Public Sewer - The site is not near to any public surface water sewers and so this is not a viable method of drainage.

Combined Public Sewer - It is therefore proposed to discharge both SW and FW to the combined public sewer – via an existing 300dia connection to the site located on Jersey Street.

The existing site is considered to be Greenfield, until proven otherwise therefore, greenfield discharge rates will be used. The site area within the planning boundary has been calculated at approximately 2300m². Greenfield run-off rates have been calculated using the Qbar method (refer to below screenshot).

Rural Runoff Calculator

Micro Drainage

ICP SUDS

ICP SUDS Input (FSR Method)

Return Period (Years) 1

Area (ha) 0.230

SAAR (mm) 872

Soil 0.450

Growth Curve (None)

Partly Urbanised Catchment (QBAR)

Urban 0.000

Region Region 10

Calculate

Results

QBAR rural (l/s) 1.3

QBAR urban (l/s) 1.3

Return Period Flood

Region	QBAR (l/s)	Q (1 yrs) (l/s)	Q (10 yrs) (l/s)	Q (30 yrs) (l/s)	Q (100 yrs) (l/s)
Region 6/Region 7	1.3	1.1	1.1	3.0	4.2
Region 8	1.3	1.0	1.0	2.5	3.2
Region 9	1.3	1.1	1.1	2.3	2.8
Region 10	1.3	1.1	1.1	2.2	2.7
Ireland National	1.3	1.1	1.1	2.1	2.4
Ireland East	1.3	1.1	1.1	2.1	2.5
Ireland South	1.3	1.1	1.1	2.1	2.4
Ireland West	1.3	1.1	1.1	2.0	2.3
Ireland Greater Dublin	1.3	1.1	1.1	2.8	3.4

OK Cancel Help

Enter Return Period between 1 and 1000

1 year = 1.1 l/s
 30 year = 2.2 l/s
 100 year = 2.7 l/s

Please note the above rates are assumed subject to receipt of a CCTV survey to prove an existing connection.

Given the small nature of this site and as the greenfield flows are low, restricting these flow rates via a flow control chamber could increase risk of blockages due to the small orifice sizes to the controls, it is therefore proposed that the SW is restricted to maximum of 5l/s for storms up to and including the 1 in 100 year events + CC.

Please confirm you are happy with the above strategy and the proposed flows?

If you require any further information then do not hesitate to contact me.

Kind regards

Adam Hogan
 Project Engineer
 T. 0161 236 2394
adam.hogan@curtins.com

Merchant Exchange
 17-19 Whitworth Street West
 Manchester M1 5WG





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This footnote also confirms that this email message has been swept for the presence of computer viruses.

From: Wastewater Developer Services
<WastewaterDeveloperServices@uuplc.co.uk>
Sent: 14 September 2020 11:04
To: Adam Hogan
Cc: Wastewater Developer Services
Subject: RE: PDE 4200033426 due 14/9 -Proposed Dwellings at land off Poland/Jersey Street, Ancoats, Manchester

Good Morning Adam,

Pre Development Enquiry for: Proposed Dwellings at land off Poland/Jersey Street, Ancoats, Manchester UU Reference Number: 4200033426

We have carried out an assessment of your application which is based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your drainage strategy will need to be reviewed by other competent authorities as part of the planning process, and we advise that you carry out the necessary site investigations to confirm the viability of your proposals.

If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 3723223 or refer to the link below:

<https://www.unitedutilities.com/builders-developers/working-near-our-assets/>

Foul Water

Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.

Our preferred point of discharge would be to the 300mm diameter public combined sewer within Jersey Street located to the South of your proposed development at an unrestricted rate

If you are able to identify an alternative, more suitable point of discharge, we request that you contact us at your earliest convenience so that we can assess suitability.

Surface Water

All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80, (Reference ID: 7-080-20150323), of the National Planning Practice Guidance. We also recommend you prioritise the use of multi-functional sustainable drainage systems for the management of surface water in accordance with national planning policy.

Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.

This is outlined as follows, in order of priority:

- 1. into the ground (infiltration);**
- 2. to a surface waterbody;**
- 3. to a surface water sewer or highway drain;**
- 4. to a combined sewer.**

For guidance, The North West SuDS Pro-Forma provides information on the appropriate evidence required at each stage of the hierarchy, to demonstrate how each level has been discounted.

The Lead Local Flood Authority has responsibility for all surface water drainage concerns and their input to your proposal is critical. You should also consider whether it is necessary to discuss your proposal with the Environment Agency, or Internal Drainage Board (if operating in your area).

The Local Planning Authority are the determining authority for any application for planning permission and the appropriate authority for determining cost viability of a proposed drainage scheme, such assessments are outside of the jurisdiction of United Utilities.

Infiltration

Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible.

A detailed evidence based feasibility assessment must be carried out in line with Chapter 25 of the CIRIA SuDS Manual 2015 to determine whether infiltration is a suitable method of surface water disposal.

Particular attention must be paid to Ground Water Source Protection Zones to ensure that the risk of pollution to these valuable resources is not compromised. Details can be obtained from the government website:

<https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs#find-groundwater-spzs>

If your site is in a Groundwater Source Protection Zone, you should have regard to the Environment Agency's approach to Groundwater Protection. Information on this is available via the link below:

<https://www.gov.uk/government/publications/groundwater-protection-position-statements>

Please note that such a location could have implications for the principle of your development and the need for additional mitigating measures to protect the groundwater environment and public water supply in the detailed design of your site.

Public Sewer

The proposed development is to be built on an existing car park with no building with the boundary of the development. Therefore the site is not positively drained and is considered greenfield for the purposes of the calculations. United Utilities will assess any further information provide. For example if an initial flow rate was set as part of the wider development and revise the rate if necessary. However the below will remain our position unless evidence is provided.

In accordance with the hierarchy of drainage options within the National Planning Practice Guidance, both discharge to ground via infiltration and discharge to a waterbody should be discounted prior to consideration of discharging surface water to the public sewer system. Evidence should be provided to demonstrate how these have been discounted, as outlined in the North West SuDS pro-forma.

Once evidence is provided as outlined above, United Utilities will consider a connection to the 300mm diameter public combined sewer located South of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities request that any agreed rate does not exceed 5 l/s.

As a Water Company, we have no obligation to accept highway drainage into our public sewer network. However, should your proposals include runoff from highways, we would request that consideration is given to SuDS components that deliver source control are incorporated within the design of the scheme to reduce the volume and frequency of discharges of these flows to the public sewer.

Levels

For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist, we recommend that you contact us to discuss further. It could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Existing Water Assets Crossing the Site

It is the developer responsibility to identify utilities on-site. Where clean water assets are shown on our records, we recommend that you contact our Water Pre-Development Team, via the following email address: DeveloperServicesWater@uuplc.co.uk. Further information for this service can be found on our website via the link below:

<https://www.unitedutilities.com/builders-developers/larger-developments/pre-development/water-pre-dev/>

Connection Application

Although we may discuss and agree discharge points and rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below:

<https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sewer-connections/>

We recommend that the detailed design should confirm the locations of all utilities in the area and ensure that any proposed drainage solution considers routing and clash checks where required.

If I can be of any further assistance please don't hesitate to contact me.

Regards,



Matthew Dodd
Developer Engineer
Developer Services & Metering
Customer Services
T: 07468 758244
[unitedutilities.com](https://www.unitedutilities.com)

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From: Adam Hogan [<mailto:Adam.Hogan@curtins.com>]

Sent: 02 September 2020 14:26

To: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Subject: Proposed Dwellings at land off Poland/Jersey Street, Ancoats, Manchester

Good Afternoon Sir/Madam,

Please find attached the Pre-Development Enquiry for the above development site.

The proposal is for a new residential development consisting of approximately 100 dwellings.

Foul Water

Proposed Foul Flows are anticipated to be c.4.63 l/s based on 4000l/day/dwelling. These flows will be confirmed following final dwelling numbers and appliances.

Surface Water

The existing site is occupied by parking facilities. It is assumed that SW currently discharges to the public sewer system. In following the standard hierarchy of drainage solutions, consideration should firstly be given to the discharge of surface water runoff by sustainable methods such as infiltration. The ground conditions comprise of made ground overlaying firm to stiff clay, therefore due to the limiting permeability of the clay, infiltration is not suitable.. This will be revisited following receipt of the SL.

It is therefore proposed to discharge both SW and FW to the combined public sewer – via an existing 300dia connection to the site located on Jersey Street.

We currently have limited information on the existing private drainage network within the site, therefore to calculate brownfield discharge an existing network has been modelled in microdrainage using a 2 pipe network consisting of 150mm dia pipes. See below existing discharge rates;

1 year: 23.8l/s

30 year: 59.1l/s

100 year: 73.8l/s

We therefore propose the following maximum discharge rate, based on 50% reduction of existing brownfield flows.

1 year: 11.9 l/s

30 year: 29.55 l/s

100 year plus CC: 36.9 l/s

Please advise if the total flow can be restricted to the 100 year rate or if a complex control will be required to restrict flows to the 1, 30 and 100 year values.

The above figures will be revisited following the receipt of drainage survey information.

Attenuation will be required within the site and will remain private. SuDS within the proposed development site will be explored.

We have currently indicated that existing connections will look to be reused, this potential location have been indicated on the attached markup (CUR SW Drainage Sketch 200825 AH). New connections to the combined sewer maybe required. Again, this will be confirmed following receipt of survey information.

Please could you confirm if the flows and connection points are acceptable to United Utilities (subject to S106 Approval).

Please could you also confirm If United Utilities hold any records of the depth of the public sewers in this location.

If you require any further information, please let me know.

Adam Hogan
Project Engineer
T. 0161 236 2394
adam.hogan@curtins.com

Merchant Exchange
17-19 Whitworth Street West
Manchester M1 5WG



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From: Victoria Checkley
Sent: 25 February 2021 13:57
To: Adam Hogan; Chloé Grimsley
Cc: Laura Rodriguez
Subject: FW: MCR Life Projects - C&RT drainage statement
Attachments: Manchester Life - phase 3 sites.pdf

Hi,

Please find below confirmation that the CRT will not accept surface water flows from the developments.

Regards

Victoria

Victoria Checkley Technical Director

Curtins

T. 0161 236 2394 | M. 07855 109421 | victoria.checkley@curtins.com

From: Ian Knight <ian.knight@mcrlife.co.uk>
Sent: 25 February 2021 12:08
To: Victoria Checkley <Victoria.Checkley@curtins.com>; Hutton, Helen <Helen.Hutton@macegroup.com>; Shane Desmond <shane.desmond@mcrlife.co.uk>
Subject: FW: MCR Life Projects - C&RT drainage statement

Victoria,

The below might be a bit more helpful.

Thanks

Ian



Ian Knight

Programme Manager

Manchester Life Development Company Limited

Unit 5, Royal Mill, 17 Redhill Street, Manchester M4 5BA

M+44 (0)7798 500 438

ian.knight@mcrlife.co.uk

www.mcrlife.co.uk

From: Deborah McCormick <Deborah.McCormick@canalrivertrust.org.uk>
Sent: 25 February 2021 12:03
To: Ian Knight <ian.knight@mcrlife.co.uk>
Cc: Gareth Taylor <Gareth.Taylor@canalrivertrust.org.uk>
Subject: RE: MCR Life Projects - C&RT drainage statement

Ian,

To confirm, at this time, the Trust is unable to accept SWD into the Rochdale canal at the location of your developments.

Regards
Deborah

Deborah McCormick

BSc(Hons) Utilities Surveyor

North West Region

I work Monday to Thursday

T 01942 405766 **M** 07768 447444

E deborah.mccormick@canalrivertrust.org.uk

Canal & River Trust

Trencherfield Mill, Heritage Way, Wigan, WN3 4BN



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Rainbow Ally

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Joe,

Of course, thank you.

Debbie,

Please find attached a simple google earth mark up of the proposed sites coming forward as well as the original attachment to my Friday email to Joe.

Please let us know if you need anything else.

Thanks

Ian



Ian Knight

Programme Manager

Manchester Life Development Company Limited

Unit 5, Royal Mill, 17 Redhill Street, Manchester M4 5BA

M+44 (0)7798 500 438

ian.knight@mclife.co.uk

www.mclife.co.uk

From: Joe Hildred <Joe.Hildred@canalrivertrust.org.uk>

Sent: 23 February 2021 15:44

To: Ian Knight <ian.knight@mclife.co.uk>; David J. George <David.George@canalrivertrust.org.uk>; Deborah McCormick <Deborah.McCormick@canalrivertrust.org.uk>

Cc: Hutton, Helen <Helen.Hutton@macegroup.com>; Edwards, Amelia <Amelia.Edwards@macegroup.com>

Subject: RE: MCR Life Projects - C&RT drainage statement

Hi Ian

Yes sorry I was consulting with some colleagues yesterday and today.

Can I connect you with Debbie please who is in a much better place to advice you correctly first time. It may be a good start if you could send her an exact plan of the location you are talking about if that's ok?

Best wishes

Joe

From: Ian Knight <ian.knight@mclife.co.uk>

Sent: 23 February 2021 15:41

To: Joe Hildred <Joe.Hildred@canalrivertrust.org.uk>; David J. George <David.George@canalrivertrust.org.uk>

Cc: Hutton, Helen <Helen.Hutton@macegroup.com>; Edwards, Amelia <Amelia.Edwards@macegroup.com>

Subject: RE: MCR Life Projects - C&RT drainage statement

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Joe, David,

Apologies for chasing, I'm aware I only sent the below email on Friday, have you had any opportunity to review it?

Thanks

Ian



Ian Knight

Programme Manager

Manchester Life Development Company Limited

Unit 5, Royal Mill, 17 Redhill Street, Manchester M4 5BA

M+44 (0)7798 500 438

ian.knight@mcrlife.co.uk
www.mcrlife.co.uk

From: Ian Knight
Sent: 19 February 2021 16:33
To: Joe Hildred <Joe.Hildred@canalrivertrust.org.uk>; David J. George <David.George@canalrivertrust.org.uk>
Cc: Hutton, Helen <Helen.Hutton@macegroup.com>; Edwards, Amelia <Amelia.Edwards@macegroup.com>
Subject: MCR Life Projects - C&RT drainage statement

Joe,

I hope your towpath enhancement project is progressing and you are both otherwise well. I'm hoping you can help us with something.

As we discussed a few weeks ago, we are progressing two projects in the vicinity of the Rochdale Canal, one of which backs directly onto the canal.

We are progressing our drainage design on the basis that we absolutely cannot discharge surface water into the Rochdale canal on the basis of advice received from Darren Spann in 2015. The note he provided (attached) was very helpful as it stopped us going around in circles with the local planning authority and UU in regards to their drainage hierarchy.

Would it be possible for you to provide an email or note which confirms this advice is still applicable and we are not permitted to discharge into the canal?

Thanks

Ian



Ian Knight

Programme Manager
Manchester Life Development Company Limited
Unit 5, Royal Mill, 17 Redhill Street, Manchester M4 5BA
M+44 (0)7798 500 438
ian.knight@mcrlife.co.uk
www.mcrlife.co.uk

-----Original Appointment-----

From: Joe Hildred <Joe.Hildred@canalrivertrust.org.uk>
Sent: 06 January 2021 15:23
To: Joe Hildred; David J. George; Cardwell, Ed; ian.knight@mcrlife.co.uk
Subject: Rochdale Canal TP - Canal & River Trust/MCR Life
When: 22 January 2021 14:00-15:30 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Hi everyone, thanks for providing your availability. This meeting is for Canal & River Trust to introduce Ian from Manchester Life to the towpath improvements (concept document) and Ian to talk through nearby developments he is involved in.

Microsoft Teams meeting

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Appendix H

Proposed Drainage Calculations

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Date 13/01/2021 15:02
File PROPOSED SW NETWORK- 18...
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Designed by Adam.Hogan
Checked by



Innovyze

Network 2018.1.1

Existing Network Details 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
1.000	4.499	0.050	90.0	0.019	5.00	0.0	0.600	o	150	Pipe/Conduit
1.001	7.854	0.080	98.2	0.014	5.00	0.0	0.600	o	150	Pipe/Conduit
1.002	6.843	0.500	13.7	0.009	5.00	0.0	0.600	o	150	Pipe/Conduit
1.003	20.772	0.670	31.0	0.018	5.00	0.0	0.600	o	150	Pipe/Conduit
1.004	4.947	0.050	98.9	0.004	5.00	0.0	0.600	o	150	Pipe/Conduit
1.005	9.225	0.090	102.5	0.002	0.00	0.0	0.600	o	150	Pipe/Conduit
2.000	9.854	0.570	17.3	0.030	5.00	0.0	0.600	o	150	Pipe/Conduit
1.006	3.118	0.040	78.0	0.012	0.00	0.0	0.600	o	225	Pipe/Conduit
3.000	2.091	0.090	23.2	0.026	5.00	0.0	0.600	o	150	Pipe/Conduit
3.001	18.171	0.180	101.0	0.041	0.00	0.0	0.600	o	150	Pipe/Conduit
3.002	10.480	0.590	17.8	0.030	0.00	0.0	0.600	o	225	Pipe/Conduit
3.003	4.354	0.040	108.9	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit
1.007	10.002	0.070	142.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
1.008	1.419	0.170	8.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
1.009	26.243	0.131	200.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	49.800	0.019	0.0	1.06	18.7
1.001	49.750	0.032	0.0	1.01	17.9
1.002	49.670	0.042	0.0	2.74	48.4
1.003	49.170	0.060	0.0	1.81	32.1
1.004	48.500	0.064	0.0	1.01	17.9
1.005	48.450	0.066	0.0	0.99	17.5
2.000	48.930	0.030	0.0	2.43	43.0
1.006	48.360	0.107	0.0	1.48	58.9
3.000	49.220	0.026	0.0	2.10	37.1
3.001	49.130	0.067	0.0	1.00	17.7
3.002	48.950	0.098	0.0	3.12	124.0
3.003	48.360	0.113	0.0	1.25	49.8
1.007	48.320	0.220	0.0	0.84	14.8
1.008	48.250	0.220	0.0	3.51	62.0
1.009	48.080	0.220	0.0	1.11	78.3

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Date 13/01/2021 15:02
File PROPOSED SW NETWORK- 18...
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Designed by Adam.Hogan
Checked by



Innovyze

Network 2018.1.1

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1	51.100	1.300	Open Manhole	600	1.000	49.800	150				
S2	51.100	1.350	Open Manhole	600	1.001	49.750	150	1.000	49.750	150	
S3	51.100	1.430	Open Manhole	600	1.002	49.670	150	1.001	49.670	150	
S4	51.100	1.930	Open Manhole	600	1.003	49.170	150	1.002	49.170	150	
S5	50.360	1.860	Open Manhole	600	1.004	48.500	150	1.003	48.500	150	
S6	50.500	2.050	Open Manhole	600	1.005	48.450	150	1.004	48.450	150	
S7	50.360	1.430	Open Manhole	600	2.000	48.930	150				
S8	50.480	2.120	Open Manhole	1200	1.006	48.360	225	1.005	48.360	150	
								2.000	48.360	150	
S9	50.380	1.160	Open Manhole	600	3.000	49.220	150				
S10	50.370	1.240	Open Manhole	600	3.001	49.130	150	3.000	49.130	150	
S11	50.360	1.410	Open Manhole	600	3.002	48.950	225	3.001	48.950	150	
S12	50.400	2.040	Open Manhole	1200	3.003	48.360	225	3.002	48.360	225	
TANK	50.450	2.130	Open Manhole	1200	1.007	48.320	150	1.006	48.320	225	
								3.003	48.320	225	
FCC	50.360	2.110	Open Manhole	1200	1.008	48.250	150	1.007	48.250	150	
C1	50.370	2.290	Open Manhole	1200	1.009	48.080	300	1.008	48.080	150	
	50.150	2.201	Open Manhole	0		OUTFALL		1.009	47.949	300	

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Area Summary for Storm <table><thead><tr><th>Pipe Number</th><th>PIMP Type</th><th>PIMP Name</th><th>PIMP (%)</th><th>Gross Area (ha)</th><th>Imp. 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Area (ha)	Pipe Total (ha)	1.000	User	-	100	0.019	0.019	0.019	1.001	User	-	100	0.014	0.014	0.014	1.002	User	-	100	0.009	0.009	0.009	1.003	User	-	100	0.018	0.018	0.018	1.004	User	-	100	0.004	0.004	0.004	1.005	User	-	100	0.002	0.002	0.002	2.000	User	-	100	0.030	0.030	0.030	1.006	User	-	100	0.012	0.012	0.012	3.000	User	-	100	0.026	0.026	0.026	3.001	User	-	100	0.041	0.041	0.041	3.002	User	-	100	0.023	0.023	0.023		User	-	100	0.007	0.007	0.030	3.003	User	-	100	0.005	0.005	0.005		User	-	100	0.010	0.010	0.015	1.007	-	-	100	0.000	0.000	0.000	1.008	-	-	100	0.000	0.000	0.000	1.009	-	-	100	0.000	0.000	0.000					Total	Total	Total					0.220	0.220	0.220	Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. 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Online Controls for Storm

Hydro-Brake® Optimum Manhole: FCC, DS/PN: 1.008, Volume (m³): 2.5

Unit Reference	MD-SHE-0096-5000-1630-5000
Design Head (m)	1.630
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	96
Invert Level (m)	48.250
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.630	5.0
Flush-Flo™	0.419	4.6
Kick-Flo®	0.858	3.7
Mean Flow over Head Range	-	4.2

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	3.1	1.200	4.3	3.000	6.6	7.000	9.9
0.200	4.2	1.400	4.7	3.500	7.1	7.500	10.2
0.300	4.6	1.600	4.9	4.000	7.6	8.000	10.6
0.400	4.6	1.800	5.2	4.500	8.0	8.500	10.9
0.500	4.6	2.000	5.5	5.000	8.4	9.000	11.2
0.600	4.5	2.200	5.7	5.500	8.8	9.500	11.5
0.800	4.0	2.400	6.0	6.000	9.2		
1.000	4.0	2.600	6.2	6.500	9.6		

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Simulation Criteria

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

Rainfall Model	FSR	Ratio R	0.355
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	Cv (Winter)	0.840

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

									Water
	US/MH		Return Climate	First (X)	First (Y)	First (Z)	Overflow	Level	
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act. (m)	
1.000	S1	15 Winter	1	+0%				49.840	
1.001	S2	15 Winter	1	+0%				49.801	
1.002	S3	15 Winter	1	+0%				49.705	
1.003	S4	15 Winter	1	+0%				49.220	
1.004	S5	15 Winter	1	+0%				48.579	
1.005	S6	15 Winter	1	+0%				48.526	
2.000	S7	15 Winter	1	+0%				48.961	
1.006	S8	15 Winter	1	+0%				48.461	
3.000	S9	15 Winter	1	+0%				49.261	
3.001	S10	15 Winter	1	+0%				49.200	
3.002	S11	15 Winter	1	+0%				48.998	
3.003	S12	15 Winter	1	+0%				48.459	
1.007	TANK	60 Winter	1	+0%				48.448	
1.008	FCC	120 Winter	1	+0%	1/15 Winter			48.447	
1.009	C1	120 Winter	1	+0%				48.127	

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PN	US/MH Name	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Pipe	Status	Level Exceeded
		Depth (m)	Volume (m³)			Flow (l/s)		
1.000	S1	-0.110	0.000	0.16		2.3		OK
1.001	S2	-0.099	0.000	0.25		3.8		OK
1.002	S3	-0.115	0.000	0.12		4.9		OK
1.003	S4	-0.100	0.000	0.23		7.0		OK
1.004	S5	-0.071	0.000	0.54		7.5		OK
1.005	S6	-0.074	0.000	0.50		7.8		OK
2.000	S7	-0.119	0.000	0.09		3.6		OK
1.006	S8	-0.124	0.000	0.42		12.5		OK
3.000	S9	-0.109	0.000	0.17		3.2		OK
3.001	S10	-0.080	0.000	0.44		7.3		OK
3.002	S11	-0.177	0.000	0.10		10.4		OK
3.003	S12	-0.126	0.000	0.40		12.0		OK
1.007	TANK	-0.022	0.000	0.33		4.4		OK
1.008	FCC	0.047	0.000	0.16		4.1	SURCHARGED	
1.009	C1	-0.253	0.000	0.06		4.1		OK

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Existing Network Details 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
1.000	4.499	0.050	90.0	0.019	5.00	0.0	0.600	o	150	Pipe/Conduit
1.001	7.854	0.080	98.2	0.014	5.00	0.0	0.600	o	150	Pipe/Conduit
1.002	6.843	0.500	13.7	0.009	5.00	0.0	0.600	o	150	Pipe/Conduit
1.003	20.772	0.670	31.0	0.018	5.00	0.0	0.600	o	150	Pipe/Conduit
1.004	4.947	0.050	98.9	0.004	5.00	0.0	0.600	o	150	Pipe/Conduit
1.005	9.225	0.090	102.5	0.002	0.00	0.0	0.600	o	150	Pipe/Conduit
2.000	9.854	0.570	17.3	0.030	5.00	0.0	0.600	o	150	Pipe/Conduit
1.006	3.118	0.040	78.0	0.012	0.00	0.0	0.600	o	225	Pipe/Conduit
3.000	2.091	0.090	23.2	0.026	5.00	0.0	0.600	o	150	Pipe/Conduit
3.001	18.171	0.180	101.0	0.041	0.00	0.0	0.600	o	150	Pipe/Conduit
3.002	10.480	0.590	17.8	0.030	0.00	0.0	0.600	o	225	Pipe/Conduit
3.003	4.354	0.040	108.9	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit
1.007	10.002	0.070	142.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
1.008	1.419	0.170	8.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
1.009	26.243	0.131	200.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	49.800	0.019	0.0	1.06	18.7
1.001	49.750	0.032	0.0	1.01	17.9
1.002	49.670	0.042	0.0	2.74	48.4
1.003	49.170	0.060	0.0	1.81	32.1
1.004	48.500	0.064	0.0	1.01	17.9
1.005	48.450	0.066	0.0	0.99	17.5
2.000	48.930	0.030	0.0	2.43	43.0
1.006	48.360	0.107	0.0	1.48	58.9
3.000	49.220	0.026	0.0	2.10	37.1
3.001	49.130	0.067	0.0	1.00	17.7
3.002	48.950	0.098	0.0	3.12	124.0
3.003	48.360	0.113	0.0	1.25	49.8
1.007	48.320	0.220	0.0	0.84	14.8
1.008	48.250	0.220	0.0	3.51	62.0
1.009	48.080	0.220	0.0	1.11	78.3

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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	0.019	0.019	0.019
1.001	User	-	100	0.014	0.014	0.014
1.002	User	-	100	0.009	0.009	0.009
1.003	User	-	100	0.018	0.018	0.018
1.004	User	-	100	0.004	0.004	0.004
1.005	User	-	100	0.002	0.002	0.002
2.000	User	-	100	0.030	0.030	0.030
1.006	User	-	100	0.012	0.012	0.012
3.000	User	-	100	0.026	0.026	0.026
3.001	User	-	100	0.041	0.041	0.041
3.002	User	-	100	0.023	0.023	0.023
	User	-	100	0.007	0.007	0.030
3.003	User	-	100	0.005	0.005	0.005
	User	-	100	0.010	0.010	0.015
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.220	0.220	0.220

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall C. Level Name (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
1.009	50.150	47.949	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 * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	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	0.354		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: FCC, DS/PN: 1.008, Volume (m³): 2.5

Unit Reference	MD-SHE-0096-5000-1630-5000
Design Head (m)	1.630
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	96
Invert Level (m)	48.250
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.630	5.0
Flush-Flo™	0.419	4.6
Kick-Flo®	0.858	3.7
Mean Flow over Head Range	-	4.2

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	3.1	1.200	4.3	3.000	6.6	7.000	9.9
0.200	4.2	1.400	4.7	3.500	7.1	7.500	10.2
0.300	4.6	1.600	4.9	4.000	7.6	8.000	10.6
0.400	4.6	1.800	5.2	4.500	8.0	8.500	10.9
0.500	4.6	2.000	5.5	5.000	8.4	9.000	11.2
0.600	4.5	2.200	5.7	5.500	8.8	9.500	11.5
0.800	4.0	2.400	6.0	6.000	9.2		
1.000	4.0	2.600	6.2	6.500	9.6		

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Innovyze	Network 2018.1.1																			
Storage Structures for Storm Cellular Storage Manhole: TANK, DS/PN: 1.007 Invert Level (m) 48.320 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><thead><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></thead><tbody><tr><td>0.000</td><td>100.0</td><td>0.0</td><td>0.801</td><td>0.0</td><td>0.0</td></tr><tr><td>0.800</td><td>100.0</td><td>0.0</td><td></td><td></td><td></td></tr></tbody></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	100.0	0.0	0.801	0.0	0.0	0.800	100.0	0.0			
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)															
0.000	100.0	0.0	0.801	0.0	0.0															
0.800	100.0	0.0																		
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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		

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m ³ /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	0.355
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	Cv (Winter)	0.840

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Margin for Flood Risk Warning (mm) 300.0      DVD Status OFF
      Analysis Timestep   Fine Inertia Status OFF
            DTS Status    ON
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Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	30
Climate Change (%)	0

									Water
	US/MH		Return Climate	First (X)	First (Y)	First (Z)	Overflow	Level	
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act. (m)	
1.000	S1	15 Winter	30	+0%				49.866	
1.001	S2	15 Winter	30	+0%				49.836	
1.002	S3	15 Winter	30	+0%				49.726	
1.003	S4	15 Winter	30	+0%				49.253	
1.004	S5	15 Winter	30	+0%	30/15 Summer			48.772	
1.005	S6	120 Winter	30	+0%	30/15 Summer			48.719	
2.000	S7	15 Winter	30	+0%				48.979	
1.006	S8	120 Winter	30	+0%	30/15 Winter			48.714	
3.000	S9	15 Winter	30	+0%				49.369	
3.001	S10	15 Winter	30	+0%	30/15 Summer			49.360	
3.002	S11	15 Winter	30	+0%				49.031	
3.003	S12	120 Winter	30	+0%	30/15 Summer			48.714	
1.007	TANK	120 Winter	30	+0%	30/15 Summer			48.713	
1.008	FCC	60 Winter	30	+0%	30/15 Summer			48.690	
1.009	C1	30 Winter	30	+0%				48.130	

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

PN	Surcharged		Flooded		Pipe	Status	Level Exceeded
	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)		
1.000	S1	-0.084	0.000	0.39		5.5	OK
1.001	S2	-0.064	0.000	0.61		9.4	OK
1.002	S3	-0.094	0.000	0.29		12.1	OK
1.003	S4	-0.067	0.000	0.57		17.2	OK
1.004	S5	0.122	0.000	1.30		18.2	SURCHARGED
1.005	S6	0.119	0.000	0.41		6.3	SURCHARGED
2.000	S7	-0.101	0.000	0.23		8.8	OK
1.006	S8	0.129	0.000	0.34		10.0	SURCHARGED
3.000	S9	-0.001	0.000	0.42		7.8	OK
3.001	S10	0.080	0.000	1.19		19.6	SURCHARGED
3.002	S11	-0.144	0.000	0.27		28.5	OK
3.003	S12	0.129	0.000	0.36		10.9	SURCHARGED
1.007	TANK	0.243	0.000	0.35		4.6	SURCHARGED
1.008	FCC	0.290	0.000	0.18		4.6	SURCHARGED
1.009	C1	-0.250	0.000	0.07		4.6	OK

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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
1.000	4.499	0.050	90.0	0.019	5.00	0.0	0.600	o	150	Pipe/Conduit
1.001	7.854	0.080	98.2	0.014	5.00	0.0	0.600	o	150	Pipe/Conduit
1.002	6.843	0.500	13.7	0.009	5.00	0.0	0.600	o	150	Pipe/Conduit
1.003	20.772	0.670	31.0	0.018	5.00	0.0	0.600	o	150	Pipe/Conduit
1.004	4.947	0.050	98.9	0.004	5.00	0.0	0.600	o	150	Pipe/Conduit
1.005	9.225	0.090	102.5	0.002	0.00	0.0	0.600	o	150	Pipe/Conduit
2.000	9.854	0.570	17.3	0.030	5.00	0.0	0.600	o	150	Pipe/Conduit
1.006	3.118	0.040	78.0	0.012	0.00	0.0	0.600	o	225	Pipe/Conduit
3.000	2.091	0.090	23.2	0.026	5.00	0.0	0.600	o	150	Pipe/Conduit
3.001	18.171	0.180	101.0	0.041	0.00	0.0	0.600	o	150	Pipe/Conduit
3.002	10.480	0.590	17.8	0.030	0.00	0.0	0.600	o	225	Pipe/Conduit
3.003	4.354	0.040	108.9	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit
1.007	10.002	0.070	142.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
1.008	1.419	0.170	8.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
1.009	26.243	0.131	200.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	49.800	0.019	0.0	1.06	18.7
1.001	49.750	0.032	0.0	1.01	17.9
1.002	49.670	0.042	0.0	2.74	48.4
1.003	49.170	0.060	0.0	1.81	32.1
1.004	48.500	0.064	0.0	1.01	17.9
1.005	48.450	0.066	0.0	0.99	17.5
2.000	48.930	0.030	0.0	2.43	43.0
1.006	48.360	0.107	0.0	1.48	58.9
3.000	49.220	0.026	0.0	2.10	37.1
3.001	49.130	0.067	0.0	1.00	17.7
3.002	48.950	0.098	0.0	3.12	124.0
3.003	48.360	0.113	0.0	1.25	49.8
1.007	48.320	0.220	0.0	0.84	14.8
1.008	48.250	0.220	0.0	3.51	62.0
1.009	48.080	0.220	0.0	1.11	78.3

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1	51.100	1.300	Open Manhole	600	1.000	49.800	150				
S2	51.100	1.350	Open Manhole	600	1.001	49.750	150	1.000	49.750	150	
S3	51.100	1.430	Open Manhole	600	1.002	49.670	150	1.001	49.670	150	
S4	51.100	1.930	Open Manhole	600	1.003	49.170	150	1.002	49.170	150	
S5	50.360	1.860	Open Manhole	600	1.004	48.500	150	1.003	48.500	150	
S6	50.500	2.050	Open Manhole	600	1.005	48.450	150	1.004	48.450	150	
S7	50.360	1.430	Open Manhole	600	2.000	48.930	150				
S8	50.480	2.120	Open Manhole	1200	1.006	48.360	225	1.005	48.360	150	
								2.000	48.360	150	
S9	50.380	1.160	Open Manhole	600	3.000	49.220	150				
S10	50.370	1.240	Open Manhole	600	3.001	49.130	150	3.000	49.130	150	
S11	50.360	1.410	Open Manhole	600	3.002	48.950	225	3.001	48.950	150	
S12	50.400	2.040	Open Manhole	1200	3.003	48.360	225	3.002	48.360	225	
TANK	50.450	2.130	Open Manhole	1200	1.007	48.320	150	1.006	48.320	225	
								3.003	48.320	225	
FCC	50.360	2.110	Open Manhole	1200	1.008	48.250	150	1.007	48.250	150	
C1	50.370	2.290	Open Manhole	1200	1.009	48.080	300	1.008	48.080	150	
	50.150	2.201	Open Manhole	0		OUTFALL		1.009	47.949	300	

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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	0.354		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: FCC, DS/PN: 1.008, Volume (m³): 2.5

Unit Reference	MD-SHE-0096-5000-1630-5000
Design Head (m)	1.630
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	96
Invert Level (m)	48.250
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.630	5.0
Flush-Flo™	0.419	4.6
Kick-Flo®	0.858	3.7
Mean Flow over Head Range	-	4.2

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	3.1	1.200	4.3	3.000	6.6	7.000	9.9
0.200	4.2	1.400	4.7	3.500	7.1	7.500	10.2
0.300	4.6	1.600	4.9	4.000	7.6	8.000	10.6
0.400	4.6	1.800	5.2	4.500	8.0	8.500	10.9
0.500	4.6	2.000	5.5	5.000	8.4	9.000	11.2
0.600	4.5	2.200	5.7	5.500	8.8	9.500	11.5
0.800	4.0	2.400	6.0	6.000	9.2		
1.000	4.0	2.600	6.2	6.500	9.6		

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Storage Structures for Storm Cellular Storage Manhole: TANK, DS/PN: 1.007 Invert Level (m) 48.320 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><thead><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></thead><tbody><tr><td>0.000</td><td>100.0</td><td>0.0</td><td>0.801</td><td>0.0</td><td>0.0</td></tr><tr><td>0.800</td><td>100.0</td><td>0.0</td><td></td><td></td><td></td></tr></tbody></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	100.0	0.0	0.801	0.0	0.0	0.800	100.0	0.0			
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)															
0.000	100.0	0.0	0.801	0.0	0.0															
0.800	100.0	0.0																		
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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		

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m ³ /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	0.355
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	Cv (Winter)	0.840

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Margin for Flood Risk Warning (mm) 300.0      DVD Status OFF
      Analysis Timestep   Fine Inertia Status OFF
            DTS Status      ON
```

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

									Water
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow
PN	Name	Storm	Period		Change	Surcharge	Flood	Overflow	Act.
1.000	S1	15 Winter	100		+40%	100/15 Summer			50.031
1.001	S2	15 Winter	100		+40%	100/15 Summer			50.014
1.002	S3	15 Winter	100		+40%	100/15 Summer			49.940
1.003	S4	120 Winter	100		+40%	100/15 Summer			49.901
1.004	S5	120 Winter	100		+40%	100/15 Summer			49.894
1.005	S6	120 Winter	100		+40%	100/15 Summer			49.891
2.000	S7	120 Winter	100		+40%	100/60 Winter			49.888
1.006	S8	120 Winter	100		+40%	100/15 Summer			49.885
3.000	S9	15 Winter	100		+40%	100/15 Summer			49.919
3.001	S10	120 Winter	100		+40%	100/15 Summer			49.896
3.002	S11	120 Winter	100		+40%	100/120 Winter			49.889
3.003	S12	120 Winter	100		+40%	100/15 Summer			49.886
1.007	TANK	120 Winter	100		+40%	100/15 Summer			49.884
1.008	FCC	120 Winter	100		+40%	100/15 Summer			49.867
1.009	C1	960 Winter	100		+40%				48.133

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

PN	Surcharged		Flooded		Pipe	Status	Level Exceeded
	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)		
1.000	S1	0.081	0.000	0.69		9.7	SURCHARGED
1.001	S2	0.114	0.000	1.05		16.3	SURCHARGED
1.002	S3	0.120	0.000	0.47		19.1	SURCHARGED
1.003	S4	0.581	0.000	0.36		10.9	SURCHARGED
1.004	S5	1.244	0.000	0.80		11.2	SURCHARGED
1.005	S6	1.291	0.000	0.74		11.5	SURCHARGED
2.000	S7	0.808	0.000	0.14		5.5	SURCHARGED
1.006	S8	1.300	0.000	0.62		18.6	SURCHARGED
3.000	S9	0.549	0.000	0.73		13.8	SURCHARGED
3.001	S10	0.616	0.000	0.74		12.3	SURCHARGED
3.002	S11	0.714	0.000	0.17		17.8	SURCHARGED
3.003	S12	1.301	0.000	0.67		19.9	SURCHARGED
1.007	TANK	1.414	0.000	0.39		5.1	SURCHARGED
1.008	FCC	1.467	0.000	0.19		5.0	SURCHARGED
1.009	C1	-0.247	0.000	0.06		4.5	OK

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Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall C. Level Name	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009		50.150	47.949	0.000	0

Datum (m) 46.546 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
60	1.000	300	1.000	540	1.000	780	1.000	1020	1.000	1260	1.000
120	1.000	360	1.000	600	1.000	840	1.000	1080	1.000	1320	1.000
180	1.000	420	1.000	660	1.000	900	1.000	1140	1.000	1380	1.000
240	1.000	480	1.000	720	1.000	960	1.000	1200	1.000	1440	1.000

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PN	US/MH	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Pipe	Status	Level Exceeded
	Name	Depth (m)	Volume (m³)			Flow (l/s)		
1.000	S1	0.081	0.000	0.69		9.7	SURCHARGED	
1.001	S2	0.114	0.000	1.05		16.3	SURCHARGED	
1.002	S3	0.120	0.000	0.47		19.1	SURCHARGED	
1.003	S4	0.581	0.000	0.36		10.9	SURCHARGED	
1.004	S5	1.244	0.000	0.80		11.2	SURCHARGED	
1.005	S6	1.291	0.000	0.74		11.5	SURCHARGED	
2.000	S7	0.808	0.000	0.14		5.5	SURCHARGED	
1.006	S8	1.300	0.000	0.62		18.6	SURCHARGED	
3.000	S9	0.549	0.000	0.73		13.8	SURCHARGED	
3.001	S10	0.616	0.000	0.74		12.3	SURCHARGED	
3.002	S11	0.714	0.000	0.17		17.8	SURCHARGED	
3.003	S12	1.301	0.000	0.67		19.9	SURCHARGED	
1.007	TANK	1.414	0.000	0.39		5.1	SURCHARGED	
1.008	FCC	1.467	0.000	0.19		5.0	SURCHARGED	
1.009	C1	-0.247	0.000	0.06		4.5	OK	

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