

24 August 2025

Our Ref: 2998 - St Gabriels

Your Ref: 135278/FO/2022

Dear Sir/Madam,

RE: St Gabriels – Discharge of Drainage Condition 13

We have been commissioned by our client (McLaren) to discharge **Planning Condition 13** associated with the Planning Permission reference 135278/FO/2022.

This specific pre-commencement condition states:

Notwithstanding details submitted, prior to commencement of development (excluding demolition) a scheme for surface water drainage works in accordance with Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015) or any subsequent replacements national standards and details shall be submitted to and approved in writing by the City Council as Local Planning Authority. The approved drainage system shall be implemented in accordance with the approved detailed design, prior to the use of the building commencing.

The below comment remains outstanding; the purpose of this report is to provide the outstanding information in order to satisfy the planning condition.

1) A feasibility assessment and engineering details of the Green / Blue Roof. – Please note that green roofs are no longer part of the scheme. Therefore, the requirement for a site-specific feasibility assessment to demonstrate structural suitability is no longer applicable. This element of the planning condition is considered satisfied.

Meinhardt response to comments dated 01.05.24:

As noted above, green roofs are no longer included in the scheme. The structural assessment previously provided for green roof loading is therefore superseded and no longer relevant to the current proposal.

Additional Note on Attenuation Capacity:

The attenuation volume originally provided by the green roof SuDS features has been fully accommodated within the revised drainage strategy. This has been achieved through the provision of additional attenuation tank volume at ground level, ensuring continued compliance with the Non-Statutory Technical Standards for Sustainable Drainage Systems (2015).

Drainage Layout Overview

The proposed surface and foul water drainage systems are shown in the latest drawings:

- Surface Water Layout: 2998-MHT-Z0-00-DR-C-00110 Rev C13
- Foul Water Layout: 2998-MHT-Z0-00-DR-C-00120 Rev C11

These layouts reflect the updated drainage design including revised attenuation tank locations and sizes. All SuDS components, flow control chambers, and pipework have been coordinated with architectural and structural layouts. Easements from proposed attenuation tanks to nearby buildings and site boundaries have been maintained as per United Utilities guidelines. An easement overlay has been added to the drainage drawing to confirm that attenuation tanks are located outside the sewer easement extents. Refer to Drawing 00110 Rev C13 for confirmation.

A minimum easement of 1.7 metres has been provided from Attenuation Tank 1, and a minimum easement of 3.5 metres to buildings from Attenuation Tank 1A. In relation to Tank 1, the adjacent

building foundation has a base of foundation (BOF) level of +38.140m AOD. With a conservative 45° load dispersion allowance, the zone of influence extends laterally and vertically below the foundation. The invert level of Tank 1 is set at +37.400m AOD, which lies outside of and below this zone of influence.

On this basis, the reduced easement (1.7m from Tank 1 to building) does not compromise building stability or the performance of the attenuation tank. The foundation and tank therefore operate independently without conflict, satisfying the structural protection principles of the SuDS Manual (C753).

All SuDS features are suitably positioned away from building footprints and boundaries. Based on these clearances, no changes to flow rate limits at the flow control devices are proposed. Although a concrete slab bike store is located above the public sewer, a written confirmation of 'no objection' from United Utilities has been provided. This confirmation (Ref: 4200047420) acknowledges the structure as exempt, provided relevant building regulations guidance is followed.

Hydraulic Calculations

Hydraulic calculations have been updated in line with the finalised layout and confirm that the system:

- Prevents flooding in a 1 in 100 year storm with 45% climate change allowance
- Aligns all pipe sizes, gradients, and manhole levels with Drawing 00110
- Includes capacity for full attenuation volume as per designed Drainage Strategy.

Overland Flows

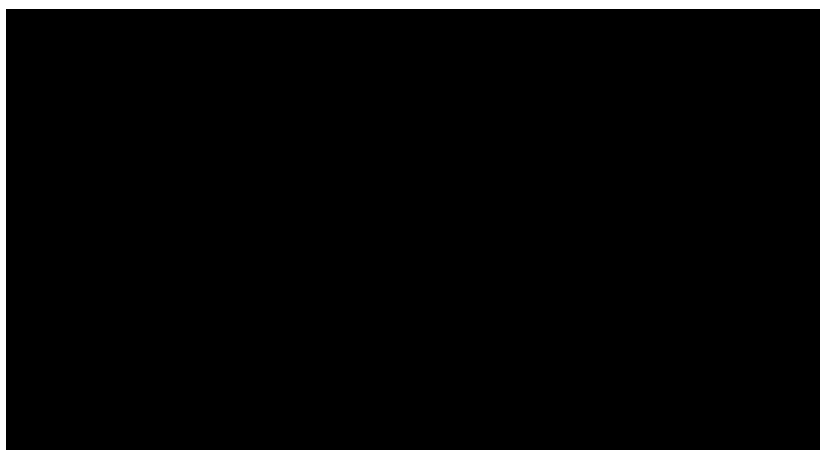
An overland flow routing assessment has been undertaken. In the event of blockage or exceedance:

- Flow paths are directed away from buildings
- Ground levels and thresholds ensure protection of internal areas
- No basement areas are impacted
- A drawing showing overland flow routes is included within the appendices

Construction and Maintenance

Construction details for the flow control devices and attenuation tanks, are available in the appended drawings. Tanks will be constructed in phases where required. Access and maintenance requirements have been considered in the design.

Yours sincerely,

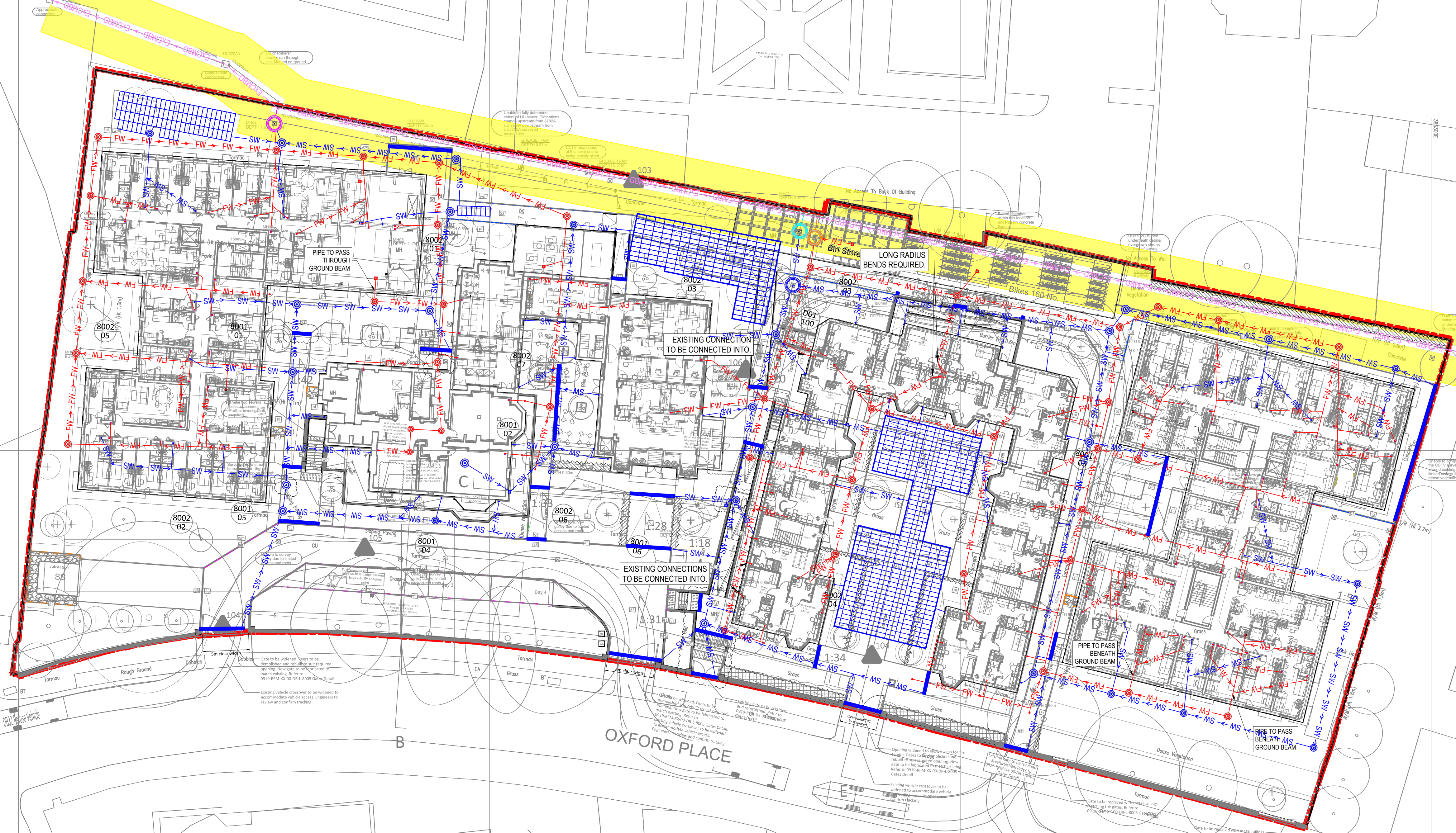


Appendix A – Meinhardt Construction Issue
Drainage Drawings and Overland
Flow Sketch

ISO A1 841mm x 594mm
DATE: 06/08/2025
FILE LOCATION: H:\PROJECTS\998- ST GABRIEL'S1.MHT\CIVILDRAWINGS\DRAWINGS\2998-MHT-Z0-00-DR-C-00100.DWG
© MEINHARDT (UK). ALL RIGHTS RESERVED



- OUTSTANDING RISKS:**
1. FINAL DESIGN SUBJECT TO RECEIPT OF FROZEN ARCHITECTURAL LAYOUTS
 2. FINAL DESIGN SUBJECT TO RECEIPT OF FROZEN MEP LAYOUTS
 3. EXISTING DRAINAGE FROM BUILDINGS TO BE RETAINED TO BE RE-USED WHERE POSSIBLE. SUBJECT TO CONDITION AND PROPOSED EXTERNAL LEVELS.
 4. ALL DRAINAGE CAST INTO OR PASSING THROUGH STRUCTURE TO BE CAST IRON.
 5. FINAL DRAINAGE DESIGN SUBJECT TO RECEIPT OF FINALISED MEP FLOW RATES. PIPE DIAMETERS AND GRADIENTS WHERE NOT SHOWN ARE TO BE 1000 LAID AT 1:40
 6. AREAS CLOUDED IN ABEYANCE PENDING FINAL ABOVE GROUND DRAINAGE POSITIONS.
 7. EXISTING BUILDING DRAINAGE POINTS BASED ON ARCHITECTURAL/ SURVEY INFORMATION. ANY DISCREPANCIES FOUND ON SITE TO BE REPORTED TO ENGINEER.
 8. ALL DOWNPOINTS TO BE RODDABLE FROM ABOVE GROUND
 9. NO SETTING OUT OF DOWNPOINTS IS TO BE DONE FROM THIS DRAWING



CONSTRUCTION ISSUE

REV	DESCRIPTION	BY	DATE
C01	CONSTRUCTION ISSUE	JD	14.02.24
C02	REVISED WHERE CLOUDED	JD	20.02.24
C03	REVISED WHERE CLOUDED	JD	26.02.24
C04	REVISED WHERE CLOUDED	JD	12.03.24
C05	REVISED WHERE CLOUDED	JD	26.03.24
C06	REVISED WHERE CLOUDED	JD	21.05.24
C07	REVISED WHERE CLOUDED	JD	21.06.24
C08	REVISED WHERE CLOUDED	MM	10.07.24
C09	REVISED WHERE CLOUDED	MM	07.08.24
C10	REVISED WHERE CLOUDED	MM	05.10.24
C11	REVISED WHERE CLOUDED	MM	28.11.24
C12	REVISED WHERE CLOUDED	MM	02.12.24
C13	REVISED WHERE CLOUDED	MM	30.01.25
C14	REVISED WHERE CLOUDED	MM	25.05.02

- NOTES:**
1. DO NOT SCALE FROM THIS DRAWING
 2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
 3. THIS DRAWING IS FOR CONSTRUCTION PURPOSES.
 4. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND CONSULTANTS DRAWINGS AND SPECIFICATIONS.
 5. THIS DRAWING IS BASED ON:
 - SIMPSON HAUGH ARCHITECTURAL DRAWING - 10349-SHP-Z0-A-G100-PL-00-001 P08 PROPOSED GROUND FLOOR PLAN - RECEIVED 29.06.23
 - SIMPSON HAUGH ARCHITECTURAL DRAWING - 10349-SHP-Z2-A-G200-PL-00-001 P14 PROPOSED GROUND FLOOR PLAN - RECEIVED 26.06.24
 - SIMPSON HAUGH SETTING OUT DRAWINGS 10349-SHP-Z34-A-G260-PL-00-001 RECEIVED 03.11.23
 - RE-FORM LANDSCAPING PLAN - 0919-RFM-XX-00-DR-L-0006-P01-LANDSCAPE WORKING DRAWING RECEIVED 14.06.23
 - LANDSCAPE LEVELS PLAN - 0919-RFM-XX-00-M2-L-0001-P01-LANDSCAPE WORKING DRAWING RECEIVED 23.05.21
 - CHORD ABOVE GROUND DRAINAGE DRAWINGS RECEIVED 29.06.23
 - UNITED UTILITIES SEWER RECORDS DATED SEPTEMBER 2021
 - LASER SURVEYS LTD CCTV SURVEY DRAWING - LAYERSERV0001116 REV A RECEIVED 22.02.22

- KEY:**
- SITE BOUNDARY
 - SW → SW → PROPOSED SURFACE WATER SEWER
 - ExSW → ExSW → EXISTING SURFACE WATER SEWER
 - FW → FW → PROPOSED FOUL WATER SEWER
 - ExFW → ExFW → EXISTING FOUL WATER SEWER
 - ExCMBD → EXISTING COMBINED DRAINAGE
 - PROPOSED SURFACE WATER MANHOLE
 - PROPOSED FOUL WATER MANHOLE
 - + SUB STACK / SOIL VENT PIPE
 - + RAINWATER PIPE
 - CD CHANNEL DRAIN
 - PROPOSED BELOW GROUND SURFACE WATER ATTENUATION TANK
 - G PROPOSED FOUL GULLY
 - RE PROPOSED RODDING EYE
 - EXISTING FOUL WATER MANHOLE
 - EXISTING SURFACE WATER MANHOLE
 - SEWER EASEMENT

CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISKS

MEINHARDT
10 Aldersgate Street, London EC1A 4JU
Telephone: +44 (0)20 7831 7969
www.meinhardt.co.uk

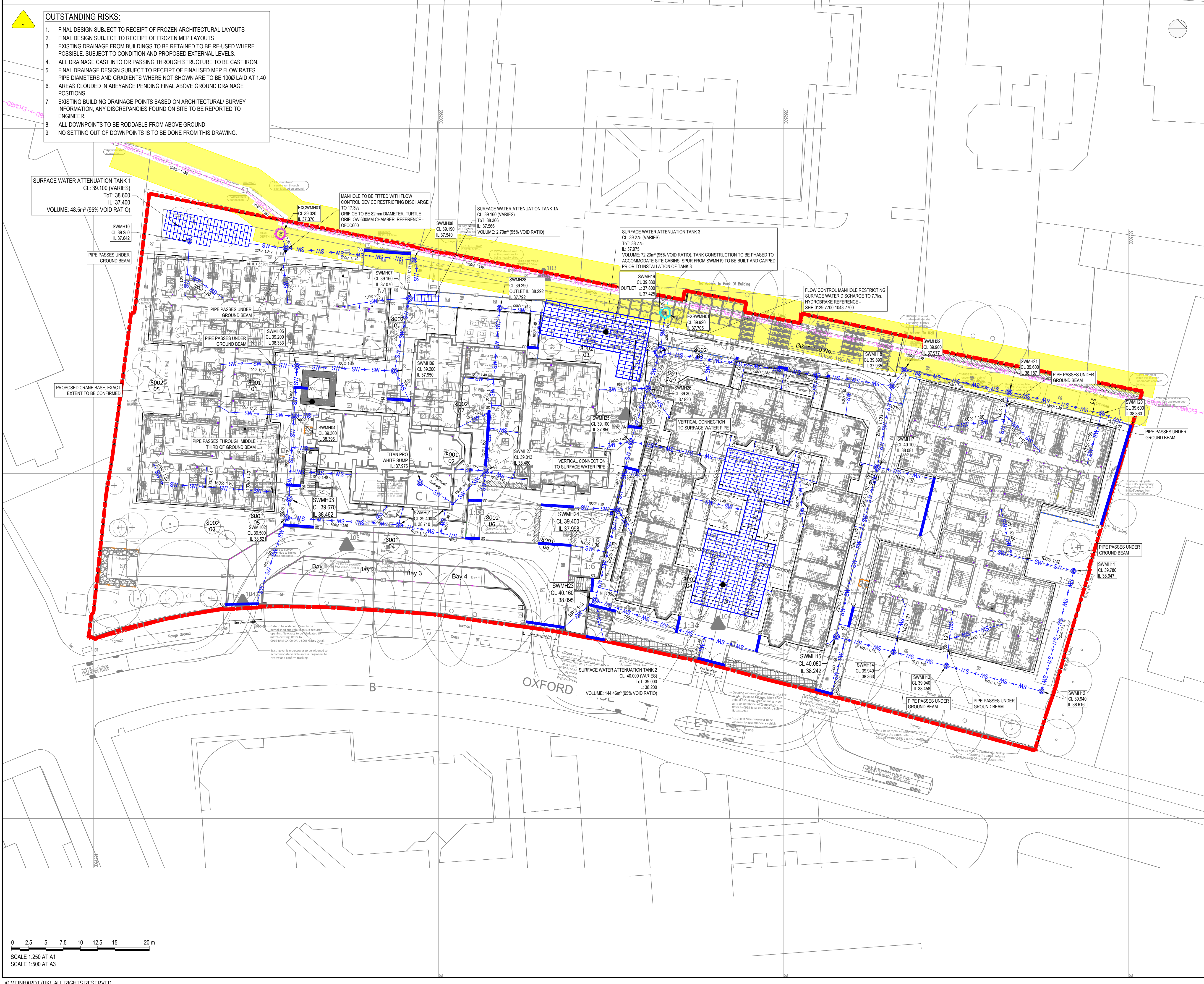
PROJECT
**ST GABRIEL'S
1 OXFORD PLACE
MANCHESTER
M14 5RP**

CLIENT
MCLAREN

TITLE
**PROPOSED BELOW GROUND DRAINAGE
COMBINED LAYOUT**

DISCIPLINE			SCALE
CIVIL			1:250
DRAWN	DESIGNED	CHECKED	APPROVED
JD	JD	GB	GB
DRAWING No 2998-MHT-Z0-00-DR-C-00100			ISSUE C14

ISO A1 841mm x 594mm
DATE: 06/08/2025
FILE LOCATION: H:\PROJECTS\998 - ST GABRIEL'S\1. MHT\CIVIL\DRAWINGS\DRAWINGS\2998-MHT-Z0-00-DR-C-00110.DWG
25/08/2025



- OUTSTANDING RISKS:**
1. FINAL DESIGN SUBJECT TO RECEIPT OF FROZEN ARCHITECTURAL LAYOUTS
 2. FINAL DESIGN SUBJECT TO RECEIPT OF FROZEN MEP LAYOUTS
 3. EXISTING DRAINAGE FROM BUILDINGS TO BE RETAINED TO BE RE-USED WHERE POSSIBLE. SUBJECT TO CONDITION AND PROPOSED EXTERNAL LEVELS.
 4. ALL DRAINAGE CAST INTO OR PASSING THROUGH STRUCTURE TO BE CAST IRON.
 5. FINAL DRAINAGE DESIGN SUBJECT TO RECEIPT OF FINALISED MEP FLOW RATES.
 6. PIPE DIAMETERS AND GRADIENTS WHERE NOT SHOWN ARE TO BE 1000 LAID AT 1:40
 7. AREAS CLOUDED IN ABEYANCE PENDING FINAL ABOVE GROUND DRAINAGE POSITIONS.
 8. EXISTING BUILDING DRAINAGE POINTS BASED ON ARCHITECTURAL/ SURVEY INFORMATION, ANY DISCREPANCIES FOUND ON SITE TO BE REPORTED TO ENGINEER.
 9. ALL DOWNPOINTS TO BE RODDABLE FROM ABOVE GROUND
 10. NO SETTING OUT OF DOWNPOINTS IS TO BE DONE FROM THIS DRAWING.

CONSTRUCTION ISSUE

REV	DESCRIPTION	BY	DATE
C01	CONSTRUCTION ISSUE	JD	14.02.24
C02	REVISED WHERE CLOUDED	JD	20.02.24
C03	REVISED WHERE CLOUDED	JD	26.02.24
C04	REVISED WHERE CLOUDED	JD	12.03.24
C05	REVISED WHERE CLOUDED	JD	26.03.24
C06	REVISED WHERE CLOUDED	JD	21.05.24
C07	REVISED WHERE CLOUDED	JD	21.06.24
C08	REVISED WHERE CLOUDED	MM	05.10.24
C09	REVISED WHERE CLOUDED	MM	28.11.24
C10	REVISED WHERE CLOUDED	MM	02.12.24
C11	REVISED WHERE CLOUDED	MM	30.01.25
C12	REVISED WHERE CLOUDED	MM	02.05.25
C13	SLOT AND CHANNEL DRAINS SPECIFIED	MM	15.05.25

- NOTES:**
1. DO NOT SCALE FROM THIS DRAWING
 2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
 3. THIS DRAWING IS FOR CONSTRUCTION PURPOSES.
 4. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND CONSULTANTS DRAWINGS AND SPECIFICATIONS.
 5. THIS DRAWING IS BASED ON:
 - SIMPSON HAUGH ARCHITECTURAL DRAWING - 10349-SHP-Z0-A-G100-PL-00-001 P08 PROPOSED GROUND FLOOR PLAN - RECEIVED 29.06.23
 - SIMPSON HAUGH SETTING OUT DRAWINGS - 10349-SHP-Z34-A-G260-PL-00-001 RECEIVED 03.11.23
 - RE-FORM LANDSCAPING PLAN - 0919-RFM-XX-00-DR-L-0006-P01-LANDSCAPE WORKING DRAWING RECEIVED 14.06.23
 - LANDSCAPE LEVELS PLAN - 0919-RFM-XX-00-M2-L-0001-P04-2-LANDSCAPE WORKING DRAWING RECEIVED 250314
 - CHORD ABOVE GROUND DRAINAGE DRAWINGS RECEIVED 29.06.23
 - UNITED UTILITIES SEWER RECORDS DATED SEPTEMBER 2021
 - LASER SURVEYS LTD CCTV SURVEY DRAWING - LAYERSERVER0001116 REV A RECEIVED 22.02.22

- KEY:**
- SW — SW — PROPOSED SURFACE WATER SEWER
 - CMBD — CMBD — PROPOSED COMBINED DRAINAGE
 - EXCMBD — EXCMBD — EXISTING COMBINED DRAINAGE
 - EXSW — EXSW — EXISTING SURFACE WATER DRAINAGE
 - PROPOSED SURFACE WATER MANHOLE
 - RAINWATER PIPE
 - CD — CHANNEL DRAIN
 - SD — SLOT DRAIN
 - PROPOSED BELOW GROUND SURFACE WATER ATTENUATION TANK
 - EXISTING SURFACE WATER WATER MANHOLE
 - SEWER EASEMENT

CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISKS



PROJECT
**ST GABRIEL'S
1 OXFORD PLACE
MANCHESTER
M14 5RP**

CLIENT
MCLAREN

TITLE
**PROPOSED BELOW GROUND DRAINAGE
SURFACE WATER LAYOUT**

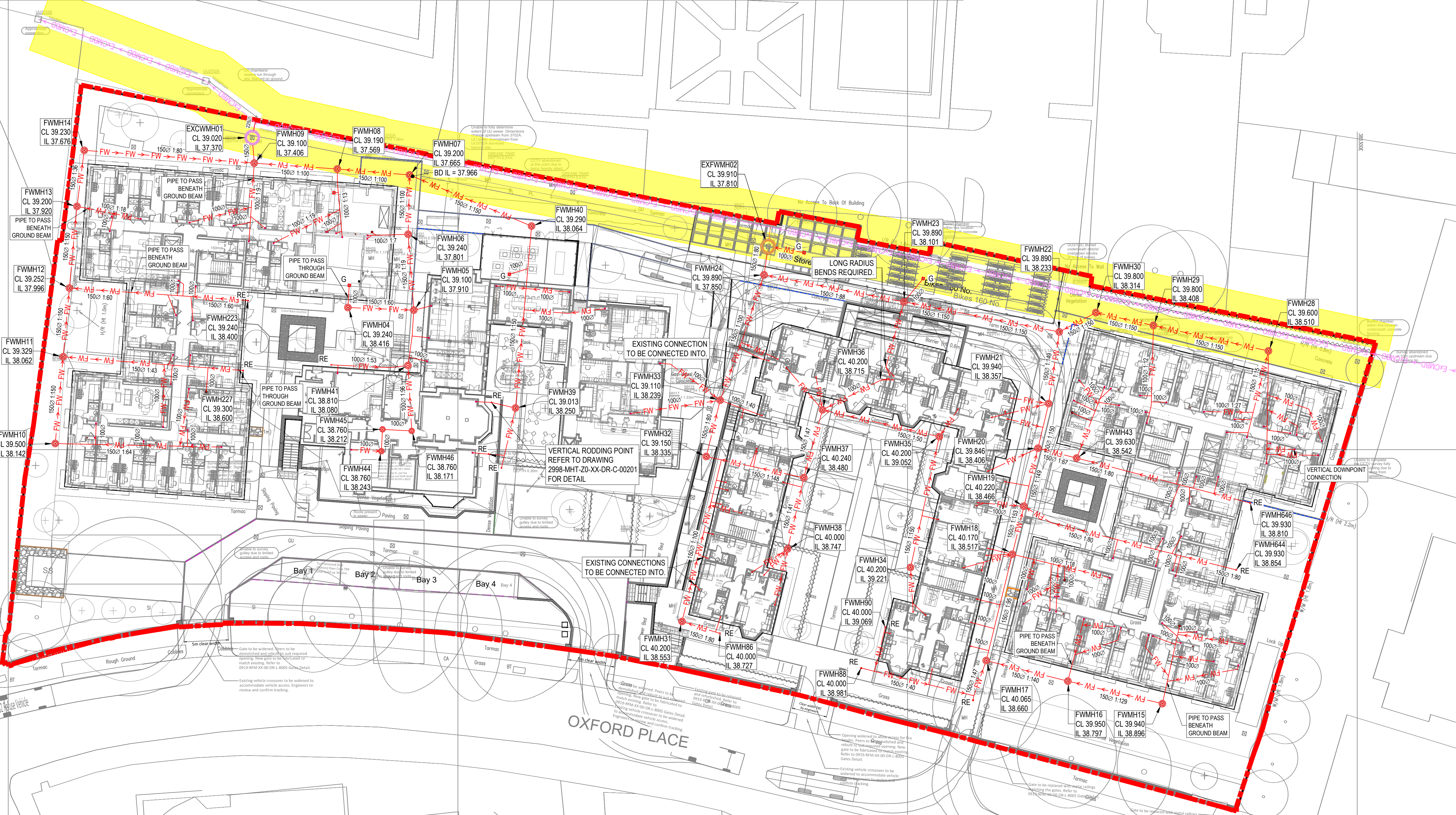
DISCIPLINE			SCALE
CIVIL			1:250
DRAWN	DESIGNED	CHECKED	APPROVED
JD	JD	GB	GB
DRAWING No			ISSUE
2998-MHT-Z0-XX-DR-C-00110			C13

ISO A1 841mm x 594mm
DATE: 06/08/2025
FILE LOCATION: H:\PROJECTS\2998 - ST GABRIEL'S\1. MHT\CIVIL\DRAWINGS\DRAWINGS\2998-MHT-Z0-00-DR-C-00120.DWG
© MEINHARDT (UK). ALL RIGHTS RESERVED



OUTSTANDING RISKS:

1. FINAL DESIGN SUBJECT TO RECEIPT OF FROZEN ARCHITECTURAL LAYOUTS
2. FINAL DESIGN SUBJECT TO RECEIPT OF FROZEN MEP LAYOUTS
3. ALL DRAINAGE CAST INTO OR PASSING THROUGH STRUCTURE TO BE CAST IRON.
4. FINAL DRAINAGE DESIGN SUBJECT TO RECEIPT OF FINALISED MEP FLOW RATES.
5. PIPE DIAMETERS AND GRADIENTS WHERE NOT SHOWN ARE TO BE 1000 LAID AT 1:40
6. WOODTHORPE BUILDING DRAINAGE IN ABEYANCE PENDING FROZEN ARCHITECTURAL/ MEP LAYOUTS.
7. EXISTING BUILDING DRAINAGE POINTS BASED ON ARCHITECTURAL/ SURVEY INFORMATION, ANY DISCREPANCIES FOUND ON SITE TO BE REPORTED TO ENGINEER.
8. ALL DOWNPOINTS TO BE RODDABLE FROM ABOVE GROUND
9. NO SETTING OUT OF DOWNPOINTS IS TO BE DONE FROM THIS DRAWING.



CONSTRUCTION ISSUE

REV	DESCRIPTION	BY	DATE
C01	CONSTRUCTION ISSUE	JD	14.02.24
C02	REVISED WHERE CLOUDED	JD	20.02.24
C03	REVISED WHERE CLOUDED	JD	26.02.24
C04	REVISED WHERE CLOUDED	JD	12.03.24
C05	REVISED WHERE CLOUDED	JD	26.03.24
C06	REVISED WHERE CLOUDED	JD	10.05.24
C07	REVISED WHERE CLOUDED	JD	21.05.24
C08	REVISED WHERE CLOUDED	JD	21.06.24
C09	REVISED WHERE CLOUDED	MM	10.07.24
C10	REVISED WHERE CLOUDED	MM	07.08.24
C11	REVISED WHERE CLOUDED	MM	02.05.25

NOTES:

1. DO NOT SCALE FROM THIS DRAWING
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
3. THIS DRAWING IS FOR CONSTRUCTION PURPOSES.
4. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND CONSULTANTS DRAWINGS AND SPECIFICATIONS.
5. THIS DRAWING IS BASED ON:
 - SIMPSON HAUGH ARCHITECTURAL DRAWING - 10349-SHP-Z0-A-G100-PL-00-001 P06 PROPOSED GROUND FLOOR PLAN - RECEIVED 29.06.23
 - SIMPSON HAUGH ARCHITECTURAL DRAWING - 10349-SHP-Z2-A-G200-PL-00-001 P14 PROPOSED GROUND FLOOR PLAN - RECEIVED 26.06.24
 - SIMPSON HAUGH SETTING OUT DRAWINGS 10349-SHP-Z34-A-G260-PL-00-001 RECEIVED 03.11.23
 - RE-FORM LANDSCAPING PLAN - 0919-RFM-XX-00-DR-L-0006-P01-LANDSCAPE WORKING DRAWING RECEIVED 14.06.23
 - LANDSCAPE LEVELS PLAN - LANDSCAPE LEVELS PLAN - 0919-RFM-XX-00-M2-L-0001-P04-LANDSCAPE WORKING DRAWING RECEIVED 25.03.24
 - CHORD ABOVE GROUND DRAINAGE DRAWINGS RECEIVED 29.06.23
 - UNITED UTILITIES SEWER RECORDS DATED SEPTEMBER 2021
 - LASER SURVEYS LTD CCTV SURVEY DRAWING - LAYERSERV001116 REV A RECEIVED 22.02.22

KEY:

- SITE BOUNDARY
- FW → FW → PROPOSED FOUL WATER SEWER
- EX-CMBD → EXISTING COMBINED DRAINAGE
- PROPOSED FOUL WATER MANHOLE
- SUB STACK / SOIL VENT PIPE
- EXFW → EXISTING FOUL WATER DRAINAGE
- G PROPOSED GULLY
- RE PROPOSED RODDING EYE
- EXISTING FOUL WATER MANHOLE
- SEWER EASEMENT

CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISKS



PROJECT ST GABRIEL'S 1 OXFORD PLACE MANCHESTER M14 5RP			
CLIENT MCLAREN			
TITLE PROPOSED BELOW GROUND DRAINAGE FOUL WATER LAYOUT			
DISCIPLINE CIVIL	SCALE 1:250		
DRAWN JD	DESIGNED JD	CHECKED GB	APPROVED GB
DRAWING No 2998-MHT-Z0-00-DR-C-00120			ISSUE C11

ISO A1 841mm x 594mm
DATE: 21/07/2025
FILE LOCATION: H:\PROJECTS\998 - ST GABRIEL'S1.MHT\CIVILDRAWINGS\DRAWINGS\2998-MHT-Z0-00-DR-C-00110.DWG



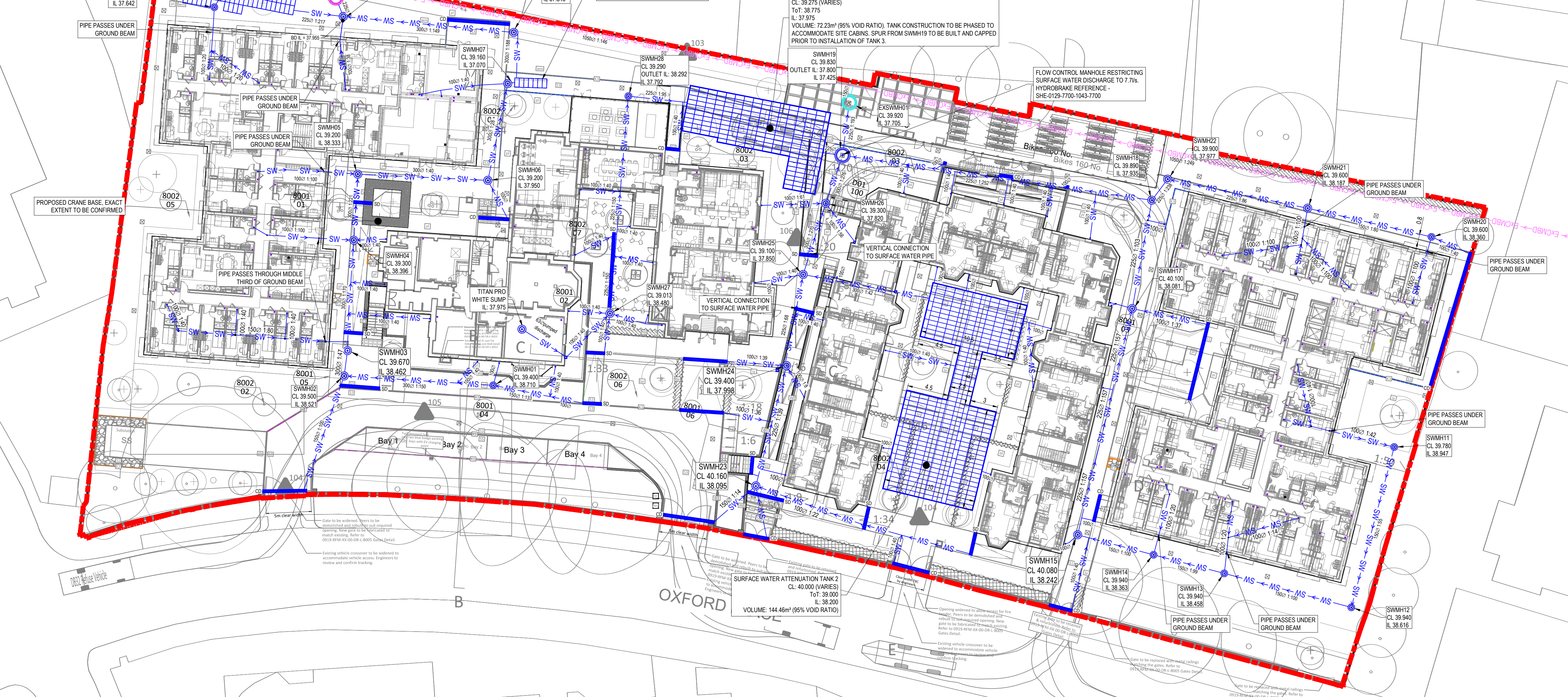
- OUTSTANDING RISKS:**
1. FINAL DESIGN SUBJECT TO RECEIPT OF FROZEN ARCHITECTURAL LAYOUTS
 2. FINAL DESIGN SUBJECT TO RECEIPT OF FROZEN MEP LAYOUTS
 3. EXISTING DRAINAGE FROM BUILDINGS TO BE RETAINED TO BE RE-USED WHERE POSSIBLE. SUBJECT TO CONDITION AND PROPOSED EXTERNAL LEVELS.
 4. ALL DRAINAGE CAST INTO OR PASSING THROUGH STRUCTURE TO BE CAST IRON.
 5. FINAL DRAINAGE DESIGN SUBJECT TO RECEIPT OF FINALISED MEP FLOW RATES.
 6. PIPE DIAMETERS AND GRADIENTS WHERE NOT SHOWN ARE TO BE 1000 LAID AT 1:40
 7. AREAS CLOUDED IN ABEYANCE PENDING FINAL ABOVE GROUND DRAINAGE POSITIONS.
 8. EXISTING BUILDING DRAINAGE POINTS BASED ON ARCHITECTURAL / SURVEY INFORMATION. ANY DISCREPANCIES FOUND ON SITE TO BE REPORTED TO ENGINEER.
 9. ALL DOWNPOINTS TO BE RODDABLE FROM ABOVE GROUND
 10. NO SETTING OUT OF DOWNPOINTS IS TO BE DONE FROM THIS DRAWING.

SURFACE WATER ATTENUATION TANK 1
CL: 39.100 (VARIES)
Tot: 38.600
IL: 37.400
VOLUME: 48.5m³ (95% VOID RATIO)

SURFACE WATER ATTENUATION TANK 1A
CL: 39.160 (VARIES)
Tot: 38.566
IL: 37.566
VOLUME: 2.70m³ (95% VOID RATIO)

SURFACE WATER ATTENUATION TANK 3
CL: 39.275 (VARIES)
Tot: 38.775
IL: 37.975
VOLUME: 72.23m³ (95% VOID RATIO). TANK CONSTRUCTION TO BE PHASED TO ACCOMMODATE SITE CABINS. SPIR FROM SWMH19 TO BE BUILT AND CAPPED PRIOR TO INSTALLATION OF TANK 3.

SURFACE WATER ATTENUATION TANK 2
CL: 40.000 (VARIES)
Tot: 39.000
IL: 38.200
VOLUME: 144.46m³ (95% VOID RATIO)



CONSTRUCTION ISSUE

REV	DESCRIPTION	BY	DATE
C01	CONSTRUCTION ISSUE	JD	14.02.24
C02	REVISED WHERE CLOUDED	JD	20.02.24
C03	REVISED WHERE CLOUDED	JD	26.02.24
C04	REVISED WHERE CLOUDED	JD	12.03.24
C05	REVISED WHERE CLOUDED	JD	26.03.24
C06	REVISED WHERE CLOUDED	JD	21.05.24
C07	REVISED WHERE CLOUDED	JD	21.06.24
C08	REVISED WHERE CLOUDED	MM	05.10.24
C09	REVISED WHERE CLOUDED	MM	28.11.24
C10	REVISED WHERE CLOUDED	MM	02.12.24
C11	REVISED WHERE CLOUDED	MM	30.01.25
C12	REVISED WHERE CLOUDED	MM	02.05.25
C13	SLOT AND CHANNEL DRAINS SPECIFIED	MM	15.05.25

- NOTES:**
1. DO NOT SCALE FROM THIS DRAWING
 2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
 3. THIS DRAWING IS FOR CONSTRUCTION PURPOSES.
 4. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND CONSULTANTS DRAWINGS AND SPECIFICATIONS.
 5. THIS DRAWING IS BASED ON:
 - SIMPSON HAUGH ARCHITECTURAL DRAWING - 10349-SHP-Z0-A-G100-PL-00-001 P06 PROPOSED GROUND FLOOR PLAN - RECEIVED 29.06.23
 - SIMPSON HAUGH SETTING OUT DRAWINGS - 10349-SHP-Z3/4-A-G260-PL-00-001 RECEIVED 03.11.23
 - RE-FORM LANDSCAPING PLAN - 0919-RFM-XX-00-DR-L-0006-P01-LANDSCAPE WORKING DRAWING RECEIVED 14.06.23
 - LANDSCAPE LEVELS PLAN - 0919-RFM-XX-00-M2-L-0001-P04.2-LANDSCAPE WORKING DRAWING RECEIVED 250314
 - CHORD ABOVE GROUND DRAINAGE DRAWINGS RECEIVED 29.06.23
 - UNITED UTILITIES SEWER RECORDS DATED SEPTEMBER 2021
 - LASER SURVEYS LTD CCTV SURVEY DRAWING - LAYERSERV0001116 REV A RECEIVED 22.02.22

- KEY:**
- SW — SW — PROPOSED SURFACE WATER SEWER
 - CMBD — CMBD — PROPOSED COMBINED DRAINAGE
 - EXCMBD — EXCMBD — EXISTING COMBINED DRAINAGE
 - EXSW — EXSW — EXISTING SURFACE WATER DRAINAGE
 - ⊙ ⊙ — PROPOSED SURFACE WATER MANHOLE
 - + — RAINWATER PIPE
 - CD — CHANNEL DRAIN
 - SD — SLOT DRAIN
 - ▢ — PROPOSED BELOW GROUND SURFACE WATER ATTENUATION TANK
 - ⊙ — EXISTING SURFACE WATER WATER MANHOLE

CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISKS

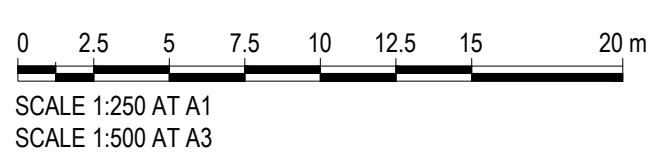


PROJECT
**ST GABRIEL'S
1 OXFORD PLACE
MANCHESTER
M14 5RP**

CLIENT
MCLAREN

TITLE
**PROPOSED BELOW GROUND DRAINAGE
SURFACE WATER LAYOUT**

DISCIPLINE			SCALE
CIVIL			1:250
DRAWN	DESIGNED	CHECKED	APPROVED
JD	JD	GB	GB
DRAWING No 2998-MHT-Z0-XX-DR-C-00110			ISSUE C13



Appendix B – Hydraulic Calculations

Meinhardt (UK) Ltd		Page 1
10 Aldersgate Street London EC1A 4HJ	ST GABRIELS 2998 PROPOSED DRAINAGE MODEL	
Date 02/09/2022	Designed by GB	
File 250822 - Revised SW Dra...	Checked by GB	
Innovyze	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model	
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 385241 395742 SJ 85241 95742
Data Type	Point
Maximum Rainfall (mm/hr)	0
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm at outfall SOUTFALL 2 (pipe S1.008)

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.240	4-8	0.066

Total Area Contributing (ha) = 0.306

Total Pipe Volume (m³) = 11.487

Time Area Diagram at outfall SOUTFALL 1 (pipe S6.010)

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.107	4-8	0.022

Total Area Contributing (ha) = 0.129

Total Pipe Volume (m³) = 3.921

Network Design Table for Storm

PN Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
------------------	-------------	----------------	----------------	----------------	--------------------	-----------	-------------	-------------	--------------	----------------

Meinhardt (UK) Ltd										Page 3	
10 Aldersgate Street London EC1A 4HJ					ST GABRIELS 2998 PROPOSED DRAINAGE MODEL						
Date 02/09/2022 File 250822 - Revised SW Dra...					Designed by GB Checked by GB						
Innovyze					Network 2020.1.3						
Network Design Table for Storm											
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	19.737	0.180	109.6	0.000	5.00	0.0	0.600	o	100	Pipe/Conduit	
S1.001	12.908	0.142	90.9	0.005	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	10.193	0.095	107.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	8.485	0.091	93.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.004	8.603	0.056	153.6	0.008	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.005	16.729	0.112	149.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.006	11.883	0.080	148.5	0.024	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	12.534	0.138	90.8	0.018	5.00	0.0	0.600	o	150	Pipe/Conduit	
S2.001	14.794	0.102	145.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.002	3.940	0.023	171.3	0.027	0.00	3.0	0.600	o	225	Pipe/Conduit	
S1.007	34.240	0.171	200.0	0.016	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.000	11.409	0.454	25.1	0.021	5.00	0.0	0.600	o	225	Pipe/Conduit	
S3.001	11.382	0.071	160.3	0.012	0.00	0.0	0.600	o	225	Pipe/Conduit	
S4.000	19.575	0.320	61.2	0.055	5.00	0.0	0.600	o	300	Pipe/Conduit	
S3.002	5.231	0.022	237.8	0.022	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.003	10.722	0.041	261.5	0.008	0.00	0.0	0.600	o	300	Pipe/Conduit	
Network Results Table											
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	
S1.000	0.00	5.45	38.947	0.000	0.0	0.0	0.0	0.73	5.8	0.0	
S1.001	0.00	5.65	38.600	0.005	0.0	0.0	0.0	1.05	18.6	0.0	
S1.002	0.00	5.83	38.458	0.005	0.0	0.0	0.0	0.97	17.1	0.0	
S1.003	0.00	5.96	38.363	0.005	0.0	0.0	0.0	1.04	18.4	0.0	
S1.004	0.00	6.10	38.242	0.013	0.0	0.0	0.0	1.05	41.8	0.0	
S1.005	0.00	6.36	38.189	0.013	0.0	0.0	0.0	1.07	42.4	0.0	
S1.006	0.00	6.55	38.081	0.037	0.0	0.0	0.0	1.07	42.6	0.0	
S2.000	0.00	5.20	38.360	0.018	0.0	0.0	0.0	1.05	18.6	0.0	
S2.001	0.00	5.43	38.187	0.018	0.0	0.0	0.0	1.08	43.1	0.0	
S2.002	0.00	5.49	37.965	0.045	3.0	0.0	0.0	1.00	39.6	3.0	
S1.007	0.00	7.06	37.902	0.099	3.0	0.0	0.0	1.11	78.3	3.0	
S3.000	0.00	5.07	38.363	0.021	0.0	0.0	0.0	2.62	104.2	0.0	
S3.001	0.00	5.26	37.998	0.034	0.0	0.0	0.0	1.03	41.0	0.0	
S4.000	0.00	5.16	38.200	0.055	0.0	0.0	0.0	2.01	142.3	0.0	
S3.002	0.00	5.34	37.714	0.110	0.0	0.0	0.0	1.02	71.8	0.0	
S3.003	0.00	5.53	37.680	0.118	0.0	0.0	0.0	0.97	68.4	0.0	
©1982-2020 Innovyze											

Meinhardt (UK) Ltd		Page 4
10 Aldersgate Street London EC1A 4HJ	ST GABRIELS 2998 PROPOSED DRAINAGE MODEL	
Date 02/09/2022 File 250822 - Revised SW Dra...	Designed by GB Checked by GB	
Innovyze	Network 2020.1.3	

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S5.000	23.426	0.160	146.4	0.036	5.00	0.0	0.600	o	225	Pipe/Conduit	
S5.001	7.259	0.060	120.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.002	14.933	0.105	142.2	0.018	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.008	5.400	0.036	150.0	0.034	0.00	0.0	0.600	o	225	Pipe/Conduit	
S6.000	16.227	0.159	102.1	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	
S6.001	3.583	0.059	60.7	0.031	0.00	0.0	0.600	o	225	Pipe/Conduit	
S6.002	11.208	0.066	169.8	0.004	0.00	0.0	0.600	o	225	Pipe/Conduit	
S6.003	7.191	0.033	221.0	0.005	0.00	0.0	0.600	o	225	Pipe/Conduit	
S6.004	14.141	0.353	40.1	0.037	0.00	0.0	0.600	o	225	Pipe/Conduit	
S6.005	10.738	0.380	28.3	0.005	0.00	0.0	0.600	o	225	Pipe/Conduit	
S6.006	2.553	0.004	638.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S6.007	3.289	0.026	126.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S6.008	19.039	0.125	152.3	0.030	0.00	0.0	0.600	o	225	Pipe/Conduit	
S7.000	6.806	0.240	28.4	0.006	5.00	0.0	0.600	o	150	Pipe/Conduit	
S7.001	6.806	0.025	271.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S6.009	2.073	0.025	82.9	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
S6.010	2.517	0.013	193.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S5.000	0.00	5.36	38.480	0.036	0.0	0.0	0.0	1.08	42.9	0.0
S5.001	0.00	5.46	38.292	0.036	0.0	0.0	0.0	1.19	47.4	0.0
S5.002	0.00	5.65	37.975	0.054	0.0	0.0	0.0	1.32	93.0	0.0
S1.008	0.00	7.15	37.732	0.306	3.0	0.0	0.0	1.07	42.4	3.0
S6.000	0.00	5.21	38.710	0.000	0.0	0.0	0.0	1.29	51.5	0.0
S6.001	0.00	5.24	38.521	0.031	0.0	0.0	0.0	1.68	66.8	0.0
S6.002	0.00	5.43	38.462	0.035	0.0	0.0	0.0	1.00	39.8	0.0
S6.003	0.00	5.57	38.396	0.040	0.0	0.0	0.0	0.88	34.8	0.0
S6.004	0.00	5.68	38.333	0.078	0.0	0.0	0.0	2.07	82.4	0.0
S6.005	0.00	5.75	37.950	0.083	0.0	0.0	0.0	2.47	98.2	0.0
S6.006	0.00	5.84	37.570	0.083	0.0	0.0	0.0	0.51	20.3	0.0
S6.007	0.00	5.88	37.566	0.083	0.0	0.0	0.0	1.16	46.2	0.0
S6.008	0.00	6.19	37.540	0.113	0.0	0.0	0.0	1.06	42.0	0.0
S7.000	0.00	5.06	37.944	0.006	0.0	0.0	0.0	1.90	33.5	0.0
S7.001	0.00	5.25	37.440	0.006	0.0	0.0	0.0	0.61	10.7	0.0
S6.009	0.00	6.21	37.395	0.129	0.0	0.0	0.0	1.44	57.1	0.0
S6.010	0.00	6.25	37.370	0.129	0.0	0.0	0.0	0.94	37.2	0.0

Meinhardt (UK) Ltd		Page 5
10 Aldersgate Street London EC1A 4HJ	ST GABRIELS 2998 PROPOSED DRAINAGE MODEL	
Date 02/09/2022 File 250822 - Revised SW Dra...	Designed by GB Checked by GB	
Innovyze	Network 2020.1.3	

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.000	0.000	0.000
1.001	User	-	100	0.003	0.003	0.003
	User	-	100	0.002	0.002	0.005
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
1.004	User	-	100	0.002	0.002	0.002
	User	-	100	0.004	0.004	0.006
	User	-	100	0.003	0.003	0.008
1.005	-	-	100	0.000	0.000	0.000
1.006	User	-	100	0.006	0.006	0.006
	User	-	100	0.001	0.001	0.008
	User	-	100	0.007	0.007	0.015
	User	-	100	0.001	0.001	0.016
	User	-	100	0.008	0.008	0.024
2.000	User	-	100	0.005	0.005	0.005
	User	-	100	0.013	0.013	0.018
2.001	-	-	100	0.000	0.000	0.000
2.002	User	-	100	0.025	0.025	0.025
	User	-	100	0.002	0.002	0.027
1.007	User	-	100	0.009	0.009	0.009
	User	-	100	0.002	0.002	0.011
	User	-	100	0.002	0.002	0.012
	User	-	100	0.004	0.004	0.016
3.000	User	-	100	0.010	0.010	0.010
	User	-	100	0.002	0.002	0.012
	User	-	100	0.009	0.009	0.021
3.001	User	-	100	0.012	0.012	0.012
4.000	User	-	100	0.008	0.008	0.008
	User	-	100	0.007	0.007	0.015
	User	-	100	0.010	0.010	0.025
	User	-	100	0.017	0.017	0.042
	User	-	100	0.001	0.001	0.044
	User	-	100	0.002	0.002	0.045
	User	-	100	0.002	0.002	0.047
	User	-	100	0.002	0.002	0.049
	User	-	100	0.003	0.003	0.052
	User	-	100	0.003	0.003	0.055
3.002	User	-	100	0.006	0.006	0.006
	User	-	100	0.001	0.001	0.007
	User	-	100	0.001	0.001	0.008
	User	-	100	0.006	0.006	0.013
	User	-	100	0.001	0.001	0.014
	User	-	100	0.008	0.008	0.022
3.003	User	-	100	0.005	0.005	0.005
	User	-	100	0.002	0.002	0.006
	User	-	100	0.002	0.002	0.008
5.000	User	-	100	0.010	0.010	0.010
	User	-	100	0.004	0.004	0.014
	User	-	100	0.004	0.004	0.019
	User	-	100	0.004	0.004	0.023
	User	-	100	0.002	0.002	0.025

Meinhardt (UK) Ltd		Page 6
10 Aldersgate Street London EC1A 4HJ	ST GABRIELS 2998 PROPOSED DRAINAGE MODEL	
Date 02/09/2022 File 250822 - Revised SW Dra...	Designed by GB Checked by GB	
Innovyze	Network 2020.1.3	

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	User	-	100	0.011	0.011	0.036
5.001	-	-	100	0.000	0.000	0.000
5.002	User	-	100	0.004	0.004	0.004
	User	-	100	0.006	0.006	0.010
	User	-	100	0.004	0.004	0.014
	User	-	100	0.004	0.004	0.018
1.008	User	-	100	0.022	0.022	0.022
	User	-	100	0.005	0.005	0.027
	User	-	100	0.002	0.002	0.029
	User	-	100	0.004	0.004	0.033
	User	-	100	0.001	0.001	0.034
6.000	-	-	100	0.000	0.000	0.000
6.001	User	-	100	0.020	0.020	0.020
	User	-	100	0.005	0.005	0.025
	User	-	100	0.005	0.005	0.029
	User	-	100	0.002	0.002	0.031
6.002	User	-	100	0.004	0.004	0.004
6.003	User	-	100	0.003	0.003	0.003
	User	-	100	0.002	0.002	0.005
6.004	User	-	100	0.006	0.006	0.006
	User	-	100	0.017	0.017	0.023
	User	-	100	0.000	0.000	0.023
	User	-	100	0.000	0.000	0.023
	User	-	100	0.003	0.003	0.026
	User	-	100	0.002	0.002	0.028
	User	-	100	0.009	0.009	0.037
6.005	User	-	100	0.005	0.005	0.005
6.006	-	-	100	0.000	0.000	0.000
6.007	-	-	100	0.000	0.000	0.000
6.008	User	-	100	0.018	0.018	0.018
	User	-	100	0.012	0.012	0.030
7.000	User	-	100	0.006	0.006	0.006
7.001	-	-	100	0.000	0.000	0.000
6.009	User	-	100	0.006	0.006	0.006
	User	-	100	0.003	0.003	0.009
6.010	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.434	0.434	0.434

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.008	SOUTFALL 2	39.910	37.696	37.770	0	0

Meinhardt (UK) Ltd		Page 7
10 Aldersgate Street London EC1A 4HJ	ST GABRIELS 2998 PROPOSED DRAINAGE MODEL	
Date 02/09/2022 File 250822 - Revised SW Dra...	Designed by GB Checked by GB	
Innovyze Network 2020.1.3		

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S6.010	SOUTFALL 1	39.920	37.357	37.760	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	4
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 385241 395742 SJ 85241 95742
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

©1982-2020 Innovyze

Meinhardt (UK) Ltd		Page 8
10 Aldersgate Street London EC1A 4HJ	ST GABRIELS 2998 PROPOSED DRAINAGE MODEL	
Date 02/09/2022	Designed by GB	
File 250822 - Revised SW Dra...	Checked by GB	
Innovyze	Network 2020.1.3	

Online Controls for Storm

Hydro-Brake® Optimum Manhole: SSWMH19, DS/PN: S1.008, Volume (m³): 6.4

Unit Reference	MD-SHE-0129-7700-1043-7700
Design Head (m)	1.043
Design Flow (l/s)	7.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	129
Invert Level (m)	37.732
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.043	7.7
Flush-Flo™	0.309	7.7
Kick-Flo®	0.681	6.3
Mean Flow over Head Range	-	6.7

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	4.6	1.200	8.2	3.000	12.7	7.000	19.0
0.200	7.5	1.400	8.8	3.500	13.6	7.500	19.6
0.300	7.7	1.600	9.4	4.000	14.5	8.000	20.3
0.400	7.6	1.800	10.0	4.500	15.4	8.500	20.9
0.500	7.4	2.000	10.5	5.000	16.2	9.000	21.4
0.600	7.0	2.200	10.9	5.500	16.9	9.500	22.0
0.800	6.8	2.400	11.4	6.000	17.6		
1.000	7.5	2.600	11.8	6.500	18.3		

Orifice Manhole: SSWMH09, DS/PN: S6.009, Volume (m³): 1.3

Diameter (m) 0.082 Discharge Coefficient 0.600 Invert Level (m) 37.395

Meinhardt (UK) Ltd		Page 9
10 Aldersgate Street London EC1A 4HJ	ST GABRIELS 2998 PROPOSED DRAINAGE MODEL	
Date 02/09/2022	Designed by GB	
File 250822 - Revised SW Dra...	Checked by GB	
Innovyze	Network 2020.1.3	

Storage Structures for Storm

Cellular Storage Manhole: STank 2, DS/PN: S4.000

Invert Level (m) 38.200 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	188.0	0.0	0.801	0.0	0.0
0.800	188.0	0.0			

Cellular Storage Manhole: STANK 3, DS/PN: S5.002

Invert Level (m) 37.975 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	95.0	0.0	0.801	0.0	0.0
0.800	95.0	0.0			

Cellular Storage Manhole: S29, DS/PN: S6.007

Invert Level (m) 37.614 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	3.5	0.0	0.801	0.0	0.0
0.800	3.5	0.0			

Cellular Storage Manhole: S31, DS/PN: S7.001

Invert Level (m) 37.440 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	42.5	0.0	1.201	0.0	0.0
1.200	42.5	0.0			

Meinhardt (UK) Ltd

10 Aldersgate Street
London
EC1A 4HJ

Date 02/09/2022
File 250822 - Revised SW Dra...

Innovyze

ST GABRIELS
2998
PROPOSED DRAINAGE MODEL

Designed by GB
Checked by GB

Network 2020.1.3

Page 10



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

for Storm

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 2.000

Hot Start Level (mm) 0

Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Storage Structures 4

Number of Online Controls 2

Number of Time/Area Diagrams 0

Number of Offline Controls 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model

FEH

FEH Rainfall Version

2013

Site Location GB 385241 395742

SJ 85241 95742

Data Type

Point

Cv (Summer)

0.950

Cv (Winter)

0.950

Margin for Flood Risk Warning (mm)

300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status

OFF

DVD Status

ON

Inertia Status

ON

Profile(s)

Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440

Return Period(s) (years)

2, 30, 100

Climate Change (%)

0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SSWMH11	15 Summer	2	+0%					38.947
S1.001	SSWMH12	15 Summer	2	+0%	100/15 Summer				38.620
S1.002	SSWMH13	15 Summer	2	+0%	100/15 Summer				38.480
S1.003	SSWMH14	15 Summer	2	+0%	30/15 Summer				38.384
S1.004	SSWMH15	30 Summer	2	+0%	30/15 Summer				38.298
S1.005	SSWMH16	30 Summer	2	+0%	30/15 Summer				38.296
S1.006	SSWMH17	30 Summer	2	+0%	30/15 Summer				38.292
S2.000	SSWMH20	15 Summer	2	+0%	30/15 Summer				38.406
S2.001	SSWMH21	30 Summer	2	+0%	30/15 Summer				38.295
S2.002	SSWMH22	30 Summer	2	+0%	2/15 Summer				38.290
S1.007	SSWMH18	30 Summer	2	+0%	2/15 Summer				38.288
S3.000	SSWMH23	15 Summer	2	+0%	100/15 Summer				38.393
S3.001	SSWMH24	30 Summer	2	+0%	2/15 Summer				38.282
S4.000	STank 2	60 Summer	2	+0%	100/30 Summer				38.230
S3.002	SSWMH25	30 Summer	2	+0%	2/15 Summer				38.276
S3.003	SSWMH26	30 Summer	2	+0%	2/15 Summer				38.276

©1982-2020 Innovyze

Meinhardt (UK) Ltd		Page 11
10 Aldersgate Street London EC1A 4HJ	ST GABRIELS 2998 PROPOSED DRAINAGE MODEL	
Date 02/09/2022 File 250822 - Revised SW Dra...	Designed by GB Checked by GB	
Innovyze	Network 2020.1.3	

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

PN	US/MH Name	Surcharged Flooded		Half Drain		Pipe		Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)		
S1.000	SSWMH11	-0.100	0.000	0.00			0.0	OK	
S1.001	SSWMH12	-0.130	0.000	0.05			0.8	OK	
S1.002	SSWMH13	-0.128	0.000	0.05			0.8	OK	
S1.003	SSWMH14	-0.129	0.000	0.05			0.8	OK	
S1.004	SSWMH15	-0.169	0.000	0.06			1.9	OK	
S1.005	SSWMH16	-0.118	0.000	0.05			1.8	OK	
S1.006	SSWMH17	-0.014	0.000	0.13			4.6	OK	
S2.000	SSWMH20	-0.104	0.000	0.20			3.4	OK	
S2.001	SSWMH21	-0.117	0.000	0.08			3.0	OK	
S2.002	SSWMH22	0.100	0.000	0.32			8.6	SURCHARGED	
S1.007	SSWMH18	0.086	0.000	0.18			12.7	SURCHARGED	
S3.000	SSWMH23	-0.195	0.000	0.04			3.9	OK	
S3.001	SSWMH24	0.059	0.000	0.12			4.1	SURCHARGED	
S4.000	STank 2	-0.270	0.000	0.02		34	2.4	OK	
S3.002	SSWMH25	0.262	0.000	0.10			4.7	SURCHARGED	
S3.003	SSWMH26	0.296	0.000	0.09			4.9	SURCHARGED	

[illegible]

Meinhardt (UK) Ltd		Page 13
10 Aldersgate Street London EC1A 4HJ	ST GABRIELS 2998 PROPOSED DRAINAGE MODEL	
Date 02/09/2022	Designed by GB	
File 250822 - Revised SW Dra...	Checked by GB	
Innovyze	Network 2020.1.3	

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

PN	US/MH Name	Level Exceeded
S5.002	STANK 3	
S1.008	SSWMH19	
S6.000	SSWMH01	3
S6.001	SSWMH02	
S6.002	SSWMH03	
S6.003	SSWMH04	
S6.004	SSWMH05	2
S6.005	SSWMH06	
S6.006	SSWMH07	
S6.007	S29	
S6.008	SSWMH08	
S7.000	SSWMH10	
S7.001	S31	
S6.009	SSWMH09	
S6.010	SEXCWMH01	

Meinhardt (UK) Ltd							Page 14	
10 Aldersgate Street London EC1A 4HJ				ST GABRIELS 2998 PROPOSED DRAINAGE MODEL				
Date 02/09/2022 File 250822 - Revised SW Dra...				Designed by GB Checked by GB				
Innovyze				Network 2020.1.3				
30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) <u>for Storm</u>								
Simulation Criteria								
Areal Reduction Factor 1.000						Additional Flow - % of Total Flow 0.000		
Hot Start (mins) 0						MADD Factor * 10m³/ha Storage 2.000		
Hot Start Level (mm) 0						Inlet Coefficient 0.800		
Manhole Headloss Coeff (Global) 0.500						Flow per Person per Day (l/per/day) 0.000		
Foul Sewage per hectare (l/s) 0.000								
Number of Input Hydrographs 0 Number of Storage Structures 4								
Number of Online Controls 2 Number of Time/Area Diagrams 0								
Number of Offline Controls 0 Number of Real Time Controls 0								
Synthetic Rainfall Details								
Rainfall Model						FEH		
FEH Rainfall Version						2013		
Site Location GB 385241 395742 SJ 85241 95742								
Data Type						Point		
Cv (Summer)						0.950		
Cv (Winter)						0.950		
Margin for Flood Risk Warning (mm)						300.0		
Analysis Timestep 2.5 Second Increment (Extended)								
DTS Status						OFF		
DVD Status						ON		
Inertia Status						ON		
Profile(s)						Summer and Winter		
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440								
Return Period(s) (years)						2, 30, 100		
Climate Change (%)						0, 0, 45		
PN US/MH Return Climate First (X) First (Y) First (Z) Overflow								
Name Storm Period Change Surcharge Flood Overflow Act.								
S1.000	SSWMH11	15 Summer	30	+0%				
S1.001	SSWMH12	15 Summer	30	+0%	100/15 Summer			
S1.002	SSWMH13	15 Summer	30	+0%	100/15 Summer			
S1.003	SSWMH14	15 Summer	30	+0%	30/15 Summer			
S1.004	SSWMH15	15 Summer	30	+0%	30/15 Summer			
S1.005	SSWMH16	15 Summer	30	+0%	30/15 Summer			
S1.006	SSWMH17	15 Summer	30	+0%	30/15 Summer			
S2.000	SSWMH20	15 Summer	30	+0%	30/15 Summer			
S2.001	SSWMH21	15 Summer	30	+0%	30/15 Summer			
S2.002	SSWMH22	15 Summer	30	+0%	2/15 Summer			
S1.007	SSWMH18	15 Summer	30	+0%	2/15 Summer			
S3.000	SSWMH23	15 Summer	30	+0%	100/15 Summer			
S3.001	SSWMH24	15 Summer	30	+0%	2/15 Summer			
S4.000	STank 2	120 Winter	30	+0%	100/30 Summer			
S3.002	SSWMH25	120 Winter	30	+0%	2/15 Summer			
S3.003	SSWMH26	120 Winter	30	+0%	2/15 Summer			
©1982-2020 Innovyze								

Meinhardt (UK) Ltd		Page 15
10 Aldersgate Street London EC1A 4HJ	ST GABRIELS 2998 PROPOSED DRAINAGE MODEL	
Date 02/09/2022 File 250822 - Revised SW Dra...	Designed by GB Checked by GB	
Innovyze	Network 2020.1.3	

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

PN	US/MH Name	Water		Surcharged		Flooded		Half Drain Time (mins)	Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)				
S1.000	SSWMH11	38.947	-0.100	0.000	0.00			0.0		OK
S1.001	SSWMH12	38.636	-0.114	0.000	0.13			2.3		OK
S1.002	SSWMH13	38.549	-0.059	0.000	0.15			2.3		OK
S1.003	SSWMH14	38.536	0.023	0.000	0.17			2.8		SURCHARGED
S1.004	SSWMH15	38.517	0.050	0.000	0.18			6.0		SURCHARGED
S1.005	SSWMH16	38.507	0.093	0.000	0.17			6.4		SURCHARGED
S1.006	SSWMH17	38.496	0.190	0.000	0.41			15.0		SURCHARGED
S2.000	SSWMH20	38.582	0.072	0.000	0.47			7.9		SURCHARGED
S2.001	SSWMH21	38.531	0.119	0.000	0.21			8.1		SURCHARGED
S2.002	SSWMH22	38.514	0.324	0.000	0.82			22.2		SURCHARGED
S1.007	SSWMH18	38.468	0.266	0.000	0.59			42.6		SURCHARGED
S3.000	SSWMH23	38.433	-0.155	0.000	0.10			8.7		OK
S3.001	SSWMH24	38.419	0.196	0.000	0.41			14.3		SURCHARGED
S4.000	STank 2	38.398	-0.102	0.000	0.02			2.9		OK
S3.002	SSWMH25	38.412	0.398	0.000	0.13			6.3		SURCHARGED
S3.003	SSWMH26	38.417	0.437	0.000	0.11			6.2		SURCHARGED

PN	US/MH Name	Level Exceeded
S1.000	SSWMH11	
S1.001	SSWMH12	
S1.002	SSWMH13	
S1.003	SSWMH14	
S1.004	SSWMH15	
S1.005	SSWMH16	
S1.006	SSWMH17	
S2.000	SSWMH20	
S2.001	SSWMH21	
S2.002	SSWMH22	
S1.007	SSWMH18	
S3.000	SSWMH23	
S3.001	SSWMH24	
S4.000	STank 2	
S3.002	SSWMH25	
S3.003	SSWMH26	

[illegible]

Meinhardt (UK) Ltd		Page 17
10 Aldersgate Street London EC1A 4HJ	ST GABRIELS 2998 PROPOSED DRAINAGE MODEL	
Date 02/09/2022 File 250822 - Revised SW Dra...	Designed by GB Checked by GB	
Innovyze	Network 2020.1.3	

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

PN	US/MH Name	Level Exceeded
S5.002	STANK 3	
S1.008	SSWMH19	
S6.000	SSWMH01	3
S6.001	SSWMH02	
S6.002	SSWMH03	
S6.003	SSWMH04	
S6.004	SSWMH05	2
S6.005	SSWMH06	
S6.006	SSWMH07	
S6.007	S29	
S6.008	SSWMH08	
S7.000	SSWMH10	
S7.001	S31	
S6.009	SSWMH09	
S6.010	SEXCWMH01	

Meinhardt (UK) Ltd		Page 18	
10 Aldersgate Street London EC1A 4HJ		ST GABRIELS 2998 PROPOSED DRAINAGE MODEL	
Date 02/09/2022 File 250822 - Revised SW Dra...		Designed by GB Checked by GB	
Innovyze		Network 2020.1.3	

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	4
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 385241 395742 SJ 85241 95742
Data Type	Point
Cv (Summer)	0.950
Cv (Winter)	0.950

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	SSWMH11	15 Summer	100	+45%				
S1.001	SSWMH12	15 Summer	100	+45%	100/15	Summer		
S1.002	SSWMH13	15 Summer	100	+45%	100/15	Summer		
S1.003	SSWMH14	15 Summer	100	+45%	30/15	Summer		
S1.004	SSWMH15	15 Summer	100	+45%	30/15	Summer		
S1.005	SSWMH16	30 Summer	100	+45%	30/15	Summer		
S1.006	SSWMH17	30 Summer	100	+45%	30/15	Summer		
S2.000	SSWMH20	15 Summer	100	+45%	30/15	Summer		
S2.001	SSWMH21	15 Summer	100	+45%	30/15	Summer		
S2.002	SSWMH22	15 Summer	100	+45%	2/15	Summer		
S1.007	SSWMH18	240 Winter	100	+45%	2/15	Summer		
S3.000	SSWMH23	240 Winter	100	+45%	100/15	Summer		
S3.001	SSWMH24	240 Winter	100	+45%	2/15	Summer		
S4.000	STank 2	240 Winter	100	+45%	100/30	Summer		
S3.002	SSWMH25	240 Winter	100	+45%	2/15	Summer		
S3.003	SSWMH26	240 Winter	100	+45%	2/15	Summer		

©1982-2020 Innovyze

Meinhardt (UK) Ltd		Page 21
10 Aldersgate Street London EC1A 4HJ	ST GABRIELS 2998 PROPOSED DRAINAGE MODEL	
Date 02/09/2022 File 250822 - Revised SW Dra...	Designed by GB Checked by GB	
Innovyze	Network 2020.1.3	

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

PN	US/MH Name	Level Exceeded
S5.002	STANK 3	
S1.008	SSWMH19	
S6.000	SSWMH01	3
S6.001	SSWMH02	
S6.002	SSWMH03	
S6.003	SSWMH04	
S6.004	SSWMH05	2
S6.005	SSWMH06	
S6.006	SSWMH07	
S6.007	S29	
S6.008	SSWMH08	
S7.000	SSWMH10	
S7.001	S31	
S6.009	SSWMH09	
S6.010	SEXCWMH01	

Appendix C – Flow Control and Tank Details

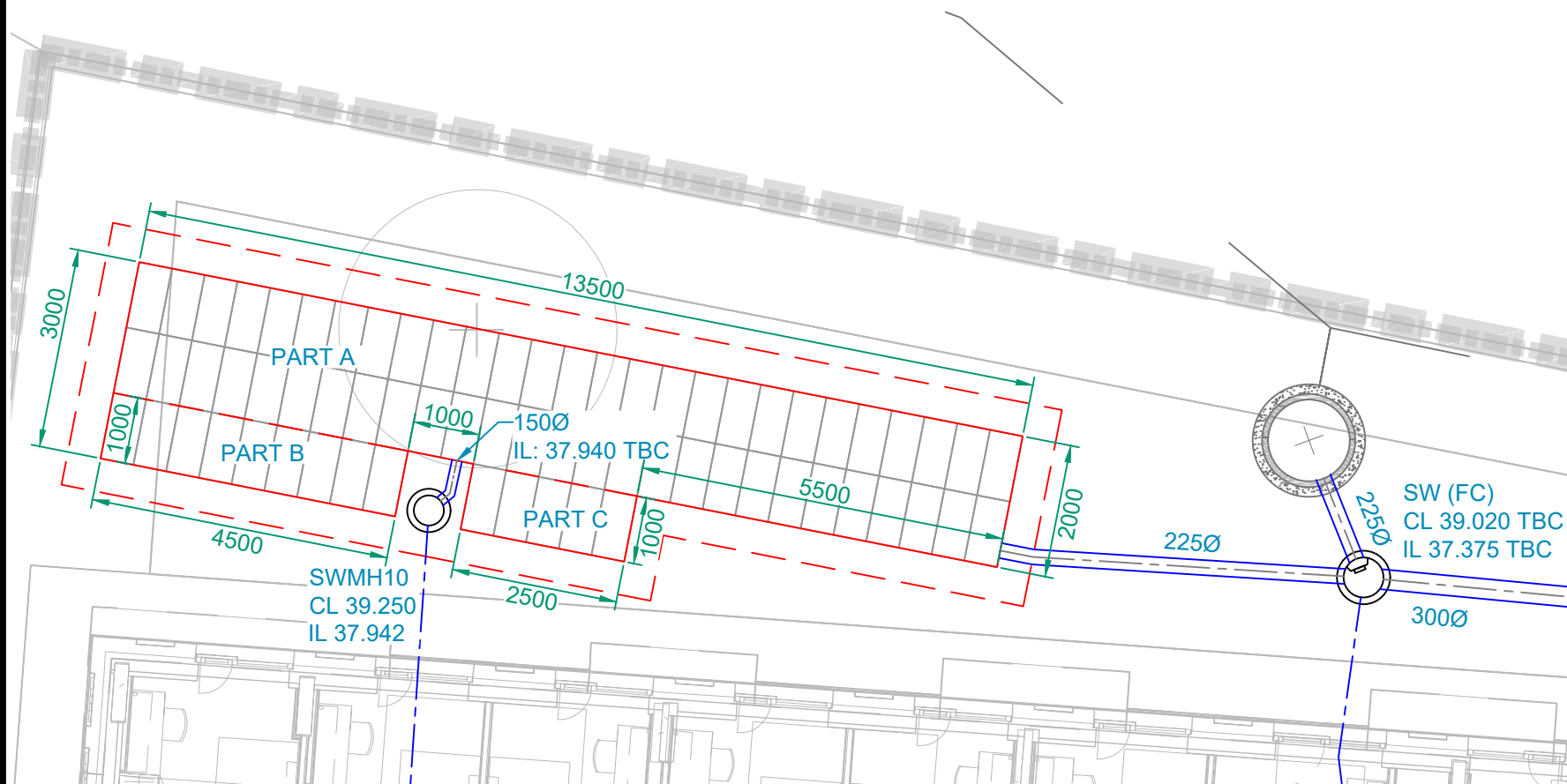
NOTES

Part A:
13.5 x 2.0 x 1.6m deep
Part B:
4.5 x 1.0 x 1.6m deep
Part C:
2.5 x 1.0 x 1.6m deep

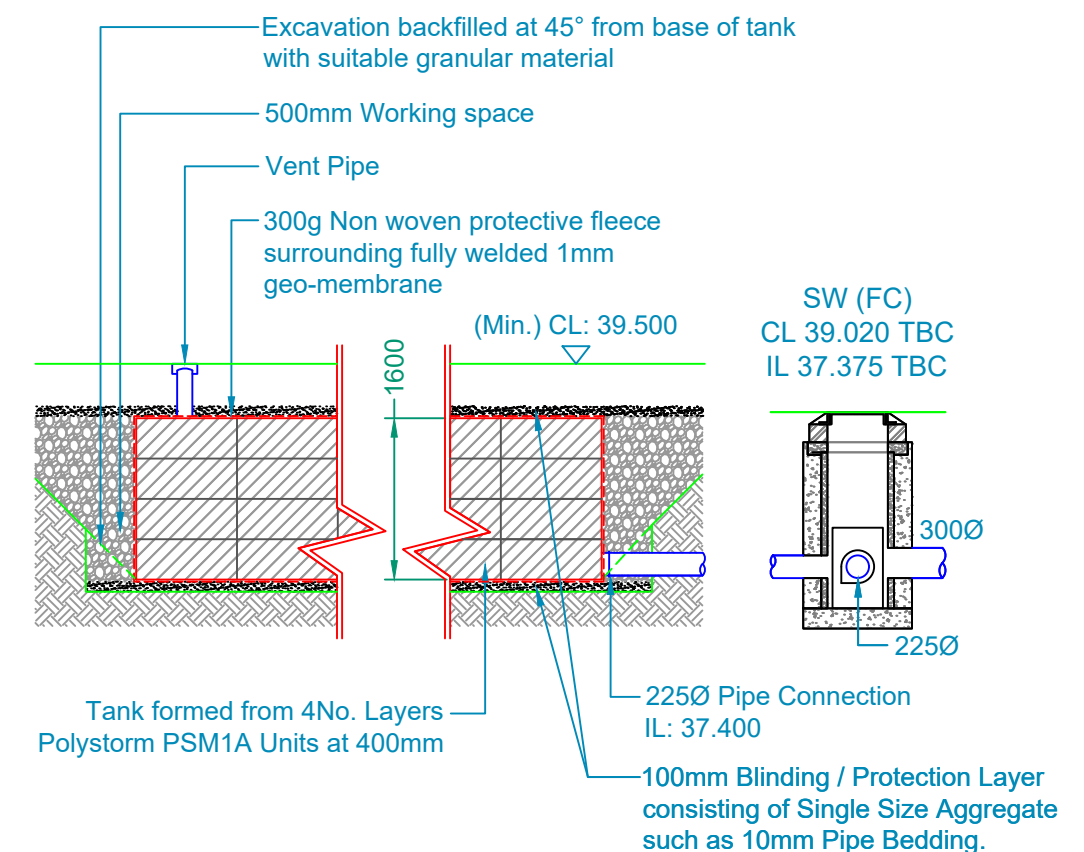
Total Vol = 54.40m³
Net Vol ≈ 51.68m³
At 95% min Void Ratio
272 PSM1A units

*Extents of excavation to be an additional
500mm around the perimeter of the tank*

1. Proposed Hydro WMS layout.
2. All dimensions are in millimetres, all elevations in metres unless otherwise stated.
3. All temporary and enabling works by others.
4. All dimensions of fabricated items are nominal and may vary within manufacturing tolerances.



Proposed Plan
(Scale 1:100)



Proposed Section
(Scale 1:75)

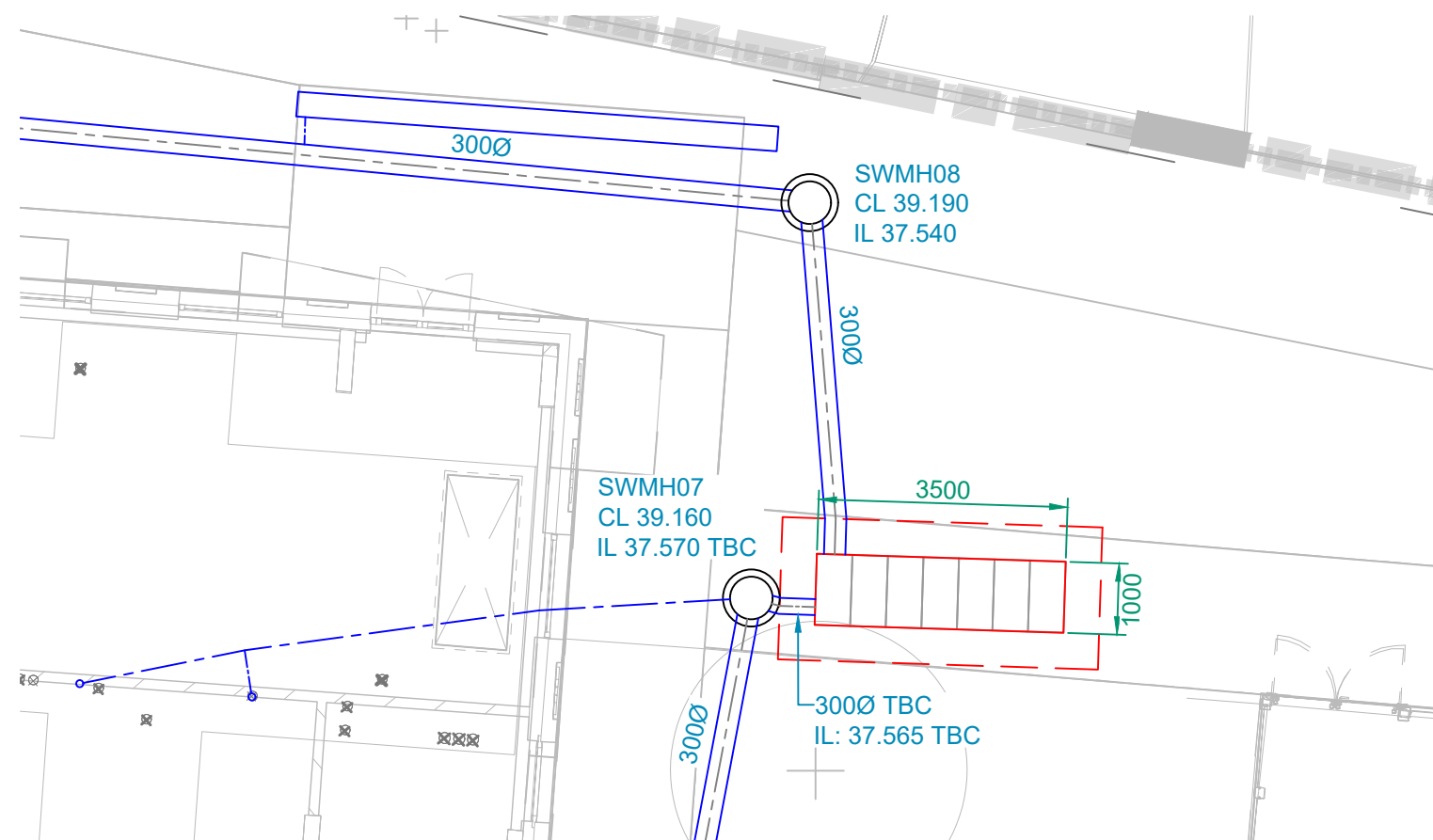
A	UPDATE TANK DIMENSIONS & DRAINAGE LAYOUT	04/06/2025
REV	AMENDMENT	DATE

NOTES

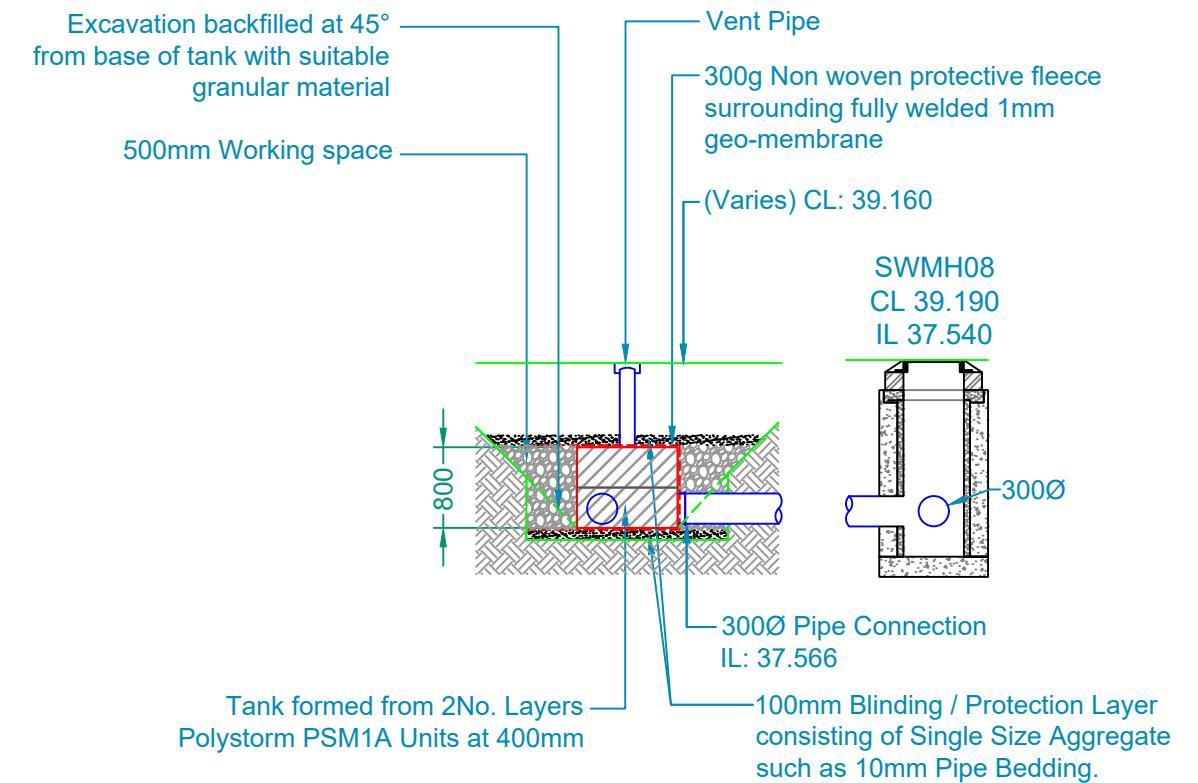
3.5 x 1.0 x 0.8m deep
 Total Vol = 2.80m³
 Net Vol ≈ 2.66m³
 At 95% min Void Ratio
 14 PSM1A units

*Extents of excavation to be an additional
 500mm around the perimeter of the tank*

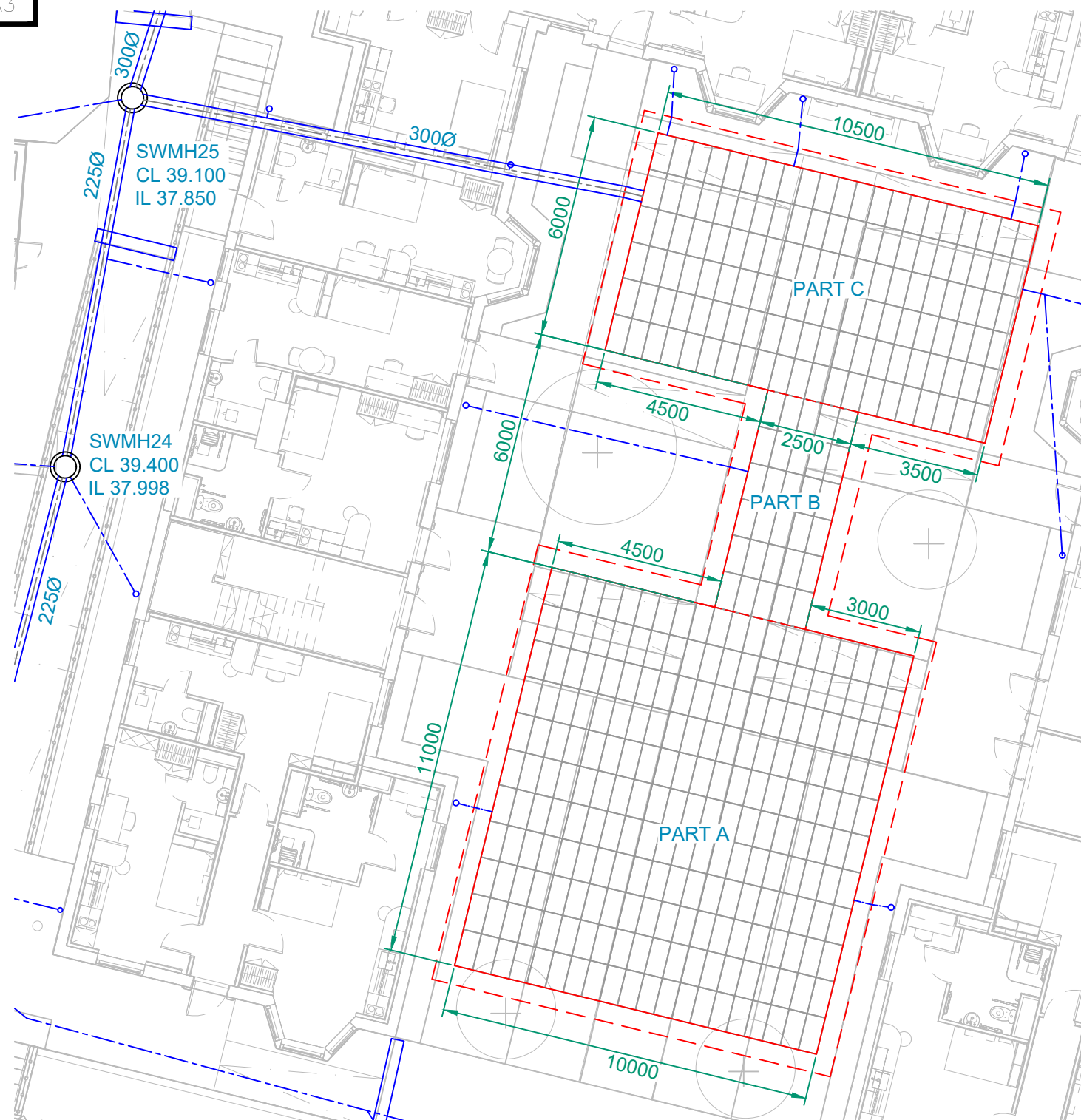
1. Proposed Hydro WMS layout.
2. All dimensions are in millimetres, all elevations in metres unless otherwise stated.
3. All temporary and enabling works by others.
4. All dimensions of fabricated items are nominal and may vary within manufacturing tolerances.



Proposed Plan
 (Scale 1:100)



Proposed Section
 (Scale 1:75)



Proposed Plan
(Scale 1:150)

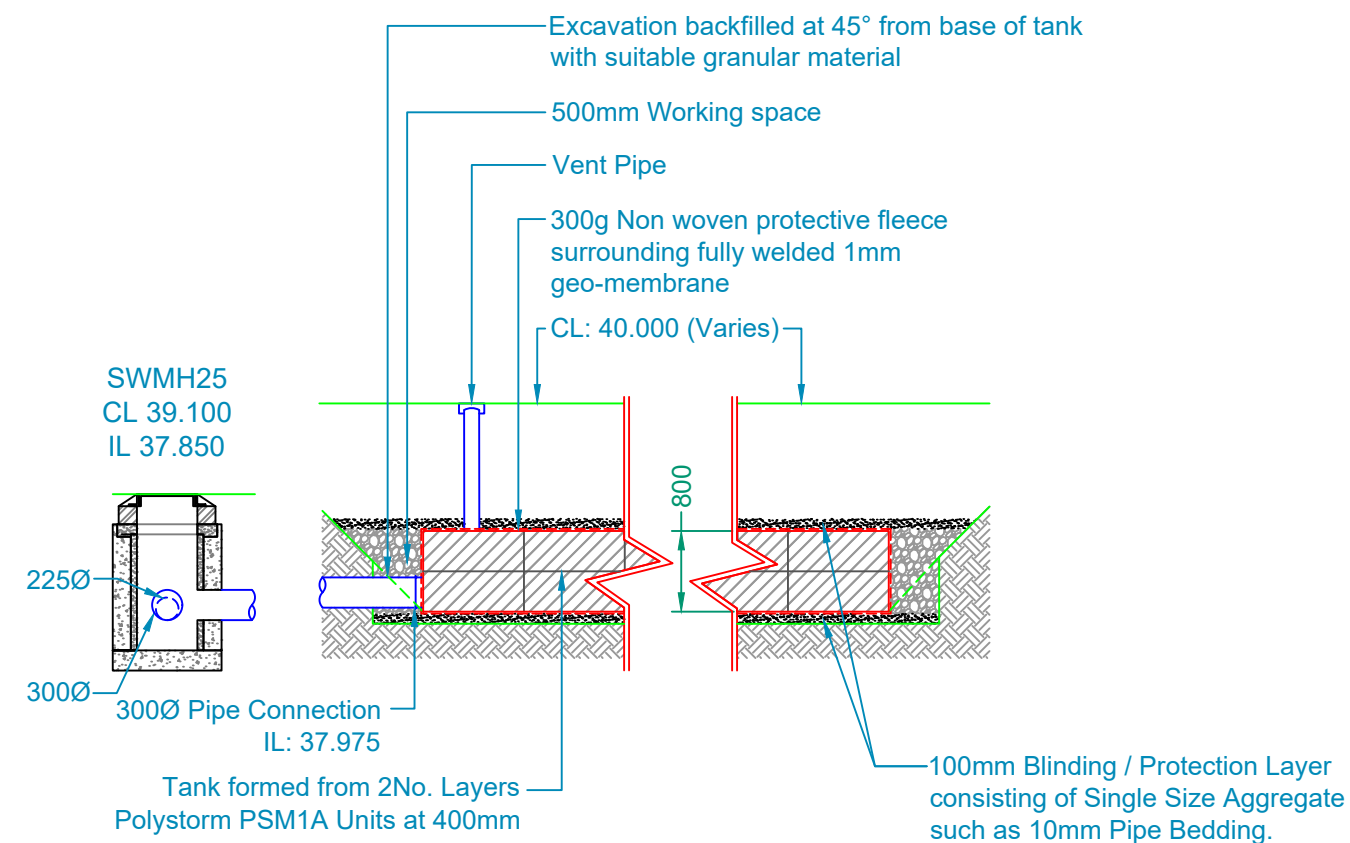
Part A:
11.0 x 10.0 x 0.8m deep
Part B:
6.0 x 2.5 x 0.8m deep
Part C:
10.5 x 6.0 x 0.8m deep

Total Vol = 150.40m³
Net Vol ≈ 142.88m³
At 95% min Void Ratio
752 PSM1A units

*Extents of excavation to be an additional
500mm around the perimeter of the tank*

NOTES

1. Proposed Hydro WMS layout.
2. All dimensions are in millimetres, all elevations in metres unless otherwise stated.
3. All temporary and enabling works by others.
4. All dimensions of fabricated items are nominal and may vary within manufacturing tolerances.



Proposed Section
(Scale 1:75)

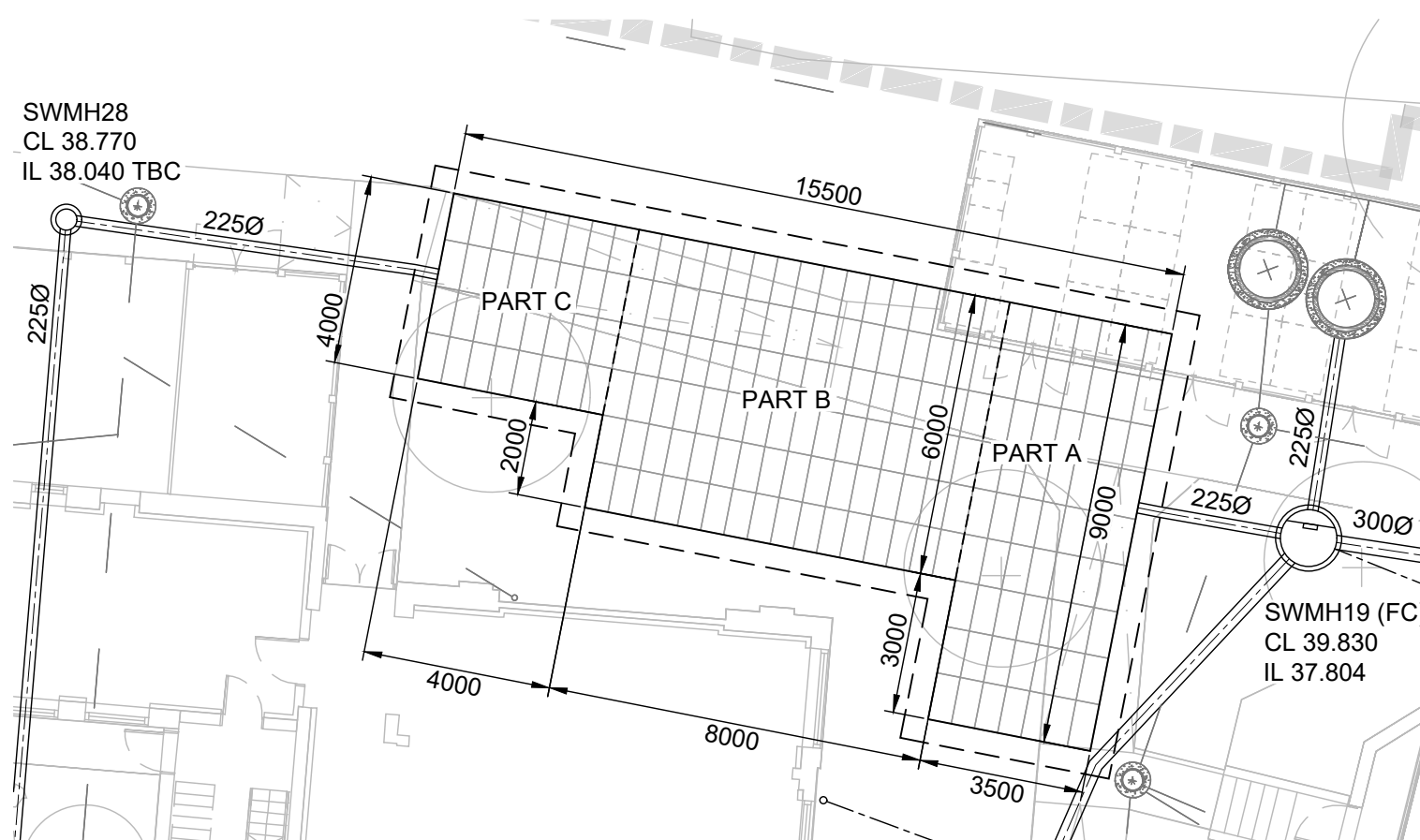
NOTES

1. Proposed Hydro WMS layout.
2. All dimensions are in millimetres, all elevations in metres unless otherwise stated.
3. All temporary and enabling works by others.
4. All dimensions of fabricated items are nominal and may vary within manufacturing tolerances.

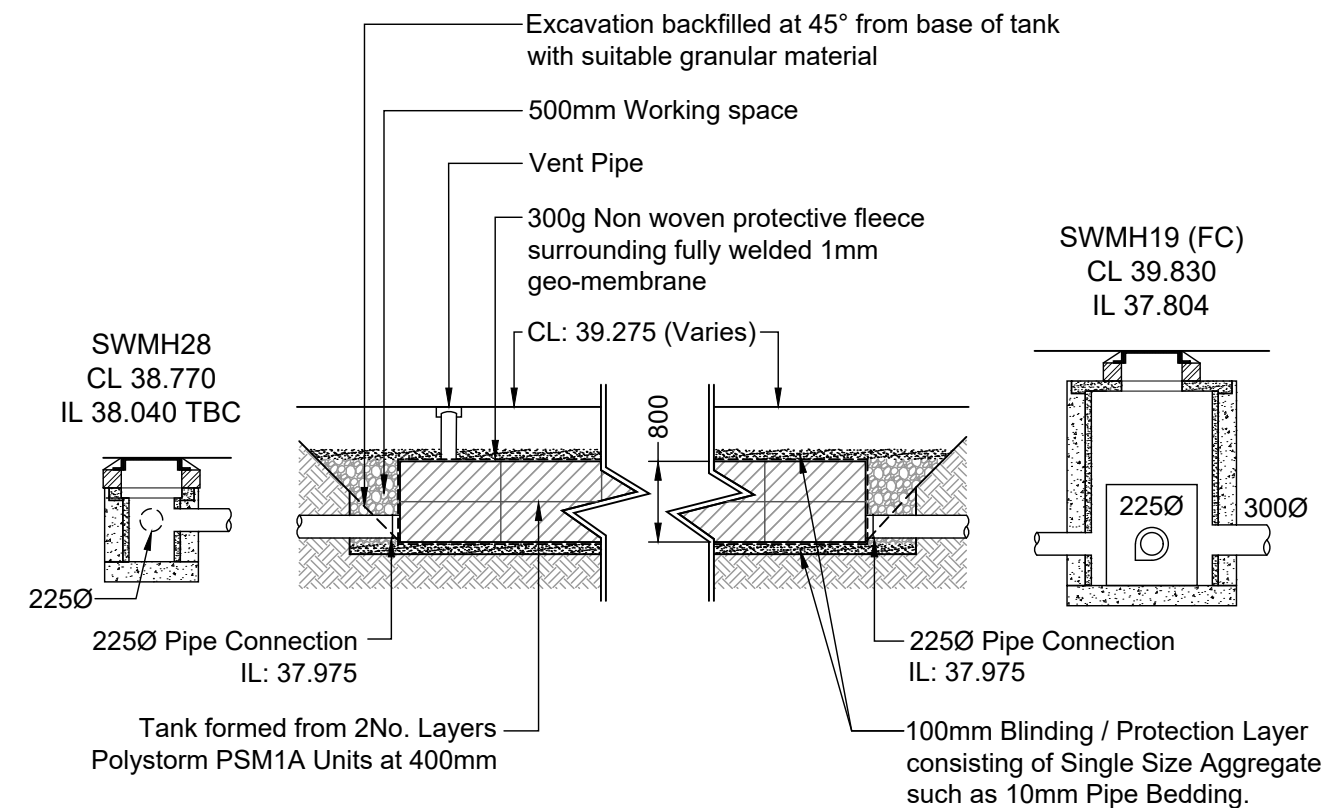
Part A:
9.0 x 3.5 x 0.8m deep
Part B:
8.0 x 6.0 x 0.8m deep
Part C:
4.0 x 4.0 x 0.8m deep

Total Vol = 76.4m³
Net Vol ≈ 72.58m³
At 95% min Void Ratio
382 PSM1A units

*Extents of excavation to be an additional
500mm around the perimeter of the tank*



Proposed Plan
(Scale 1:150)



Proposed Section
(Scale 1:75)



Flow Control Systems

Orifice Flow Control Chamber



Product Type: Orifice Flow Control Model: OFCC600

600mm diameter, pre-assembled protected flow control chamber, delivered ready to install. This model uses 225mm or 300mm main channel socket connections including two further 150mm side inlets at 90°, 270° off centre from the outlet at 0°. Side inlets are supplied as blanked ends that can be used as required.

Application

- Above ground access for inspection and maintenance of surface water pipe systems.
- Suitable for Adoptable and Non-Adoptable applications.
- Maximum installation depth to soffit of pipe – Adoptable 3000mm and Non-Adoptable 3000mm.
- Designed for large housing or commercial developments.

Built to the following standards

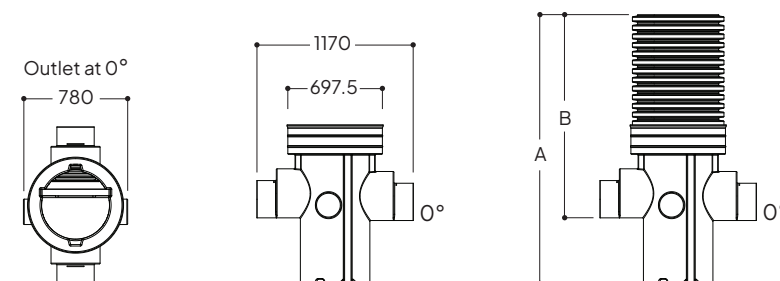
- Design & Construction Guidance (DCG) – Type D & E Chambers
- Buildings Regulations part H
- BS EN 13598-1 & 2
- BS EN 681-1

Features

- Single piece, pre-assembled chambers.
- Durable rotational moulded LLDPE base – chemical and impact resistant.
- 515mm sump depth.
- Compatible with all UK Twinwall pipe systems.
- Profiled base which improves overall strength.
- Four standard depths available.
- Access shafts are easily cut onsite to the required depth.
- Chambers can be installed in granular backfill.

Quality Assurance

Before leaving our factory, chambers are tested in accordance to required standards.



Model ref.	Main Pipework Connections Ø (mm)	Optional Side Inlets Ø (mm)	Overall Depth A (mm)	Inlet Invert B (mm)	Approx. Weight (kg)
OFCC600B/1.5	225, 300	150	1490	980	37
OFCC600B/2	225, 300	150	2010	1500	47
OFCC600B/2.4	225, 300	150	2400	1890	54
OFCC600B/3	225, 300	150	2985	2475	65

- Chambers over 1000mm soffit depth require our reduction/restriction caps to meet DCG.
- Inlet Invert measurements accurate to main channel socket. This measurement will vary depending on pipework used.
- We provide a range of adaptors to connect to various pipework dimensions and pipework types including Marley Quantum, Polysewer and UltraRib.

Our BLOK Filter Technology Within The Oriflo Range

This model is within our protected Oriflo range. This range includes a filter to prevent total suspended solids (TSS) including silt from reaching the flow control unit and migrating into the waterway, improving the design life and effectiveness of the product.



What information do we need to design your ORIFLO chamber?

We have a large range of flow control chambers allowing us to help tailor your choice to what would be best for your implementation. For this we will require:

- Orifice size
- Pipework sizes and configurations
- Invert depths

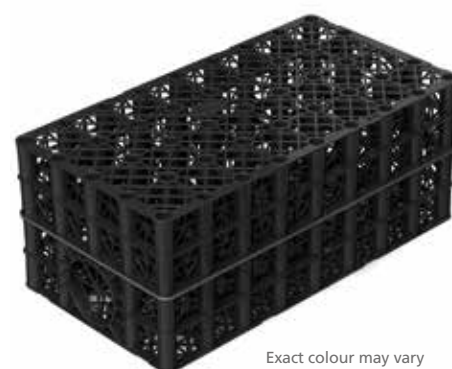
If you are unsure on the orifice size, you can use our Oriflo Orifice Size Calculator on our website to calculate what orifice size you would need for your chamber.

www.turtleenviro.co.uk/oriflo-OFCC600/#oriflo-calculator

Product code: PSM1A

The Polystorm-R modular cell is ideally suited for loaded applications at greater depths, such as housing, commercial and infrastructure projects and has a compressive strength of up to 61 tonnes/m². It offers all the proven performance of the Polystorm cell, with the added benefits of being manufactured from over 90% recycled material content.

Wherever performance criteria and standards allow, we will always maximise the sustainability of our products by using post consumer plastics in their manufacture. By sourcing and carefully controlling the quality of the recycled material we use our precision injection moulding. Therefore we are able to guarantee consistent quality in our recycled plastic, giving you the confidence and the performance levels you expect from the market leader.



Exact colour may vary due to recycled materials.

Key Benefits

- Made from specially selected and controlled recycled materials
- Environmentally friendly, sustainable solution
- Has undergone stringent testing to ensure product performance
- Compressive strength of 61 tonnes/m²
- Ideal for retention, attenuation and infiltration applications with a suitable geomembrane or geotextile
- BBA approved
- Allow flexibility of shape - ideal for shallow excavation systems, narrow strips or use in restricted areas
- Can be used as part of a value engineered hybrid system with Polystorm, Polystorm Lite and Polystorm Xtra
- Integrated inlet and outlet
- 3D flow throughout the structure
- 95% void ratio
- Light weight yet robust - excellent Health and Safety and installation benefits
- 60 years creep limited life expectancy

Technical Support

Detailed guidance and assistance is available.

For further information, please contact our Technical Team on **+44 (0) 1509 615100** or email civils@polypipe.com



ELEMENT	VALUE
PHYSICAL PROPERTIES	
Length	1m
Width	0.5m
Depth	0.4m
Total volume	0.2m ³
Unit weight	9kg (approx)
Unit storage volume	0.19m ³ (190 litres)
Void ratio	95%
SHORT TERM COMPRESSIVE STRENGTH	
Vertical	610 kN/m ² **
Lateral	63 kN/m ² **
SHORT TERM DEFLECTION	
Short-term vertical deflection	60 kN/m ² per mm
LONG TERM DEFLECTION	
Estimated long term vertical deflection (creep)	0.2798 Ln (design life in hrs) +0.485 [Based on an applied test load = 162 kN/m ²] Creep data limit 60 years
Estimated long term lateral deflection (creep)	1.0192 Ln (design life in hrs) -3.864 [Based on an applied test load = 30.8 kN/m ²] Creep data limit 60 years

Note: Polystorm-R is ideal for use in trafficked and pedestrian applications subject to a structural design check and suitable installation conditions

* Each unit includes 4 Clips and 2 Shear Connectors.

** Compressive strength at yield, maximum recommended value for design purposes.

RECOMMENDED MAXIMUM DEPTH OF INSTALLATION (to cell invert) [m]

TYPICAL SOIL TYPE	TYPICAL ANGLE OF SHEAR RESISTANCE	SOIL WEIGHT kN/m ³	WITHOUT GROUNDWATER (below base of cells) NORMAL CASE		WITH GROUNDWATER AT 1M BELOW GROUND LEVEL AND UNITS WRAPPED IN GEOMEMBRANE	
			Pedestrian	Trafficked (cars) <3000kg GVW	Pedestrian	Trafficked (cars) <3000kg GVW
Stiff over consolidated clay e.g. London clay	24	20.0	2.2	1.9	1.8	1.6
Normally consolidated silty sandy clay e.g. alluvium, made ground	26	19.0	2.4	2.2	1.9	1.7
Loose sand and gravel	30	18.0	3.0	2.7	2.0	1.9
Medium dense sand and gravel	33	19.0	3.2	2.9	2.0	1.9
Dense sand and gravel	38	20.0	3.7	3.5	2.1	2.0

Note:

1) Stated depths based on the calculation methodology detailed within CIRIA C680 (2008)

2) Assuming water density = 10.0kN/m³

3) Assumed ultimate limit state (ULS) partial factor of safety applied to: Material = 2.75 Lateral pressure = 1.35

Durability

The polymer material used in the manufacture of the Polystorm-R unit has an adequate resistance to attack from the type and quantities of chemicals that may be expected to naturally occur in uncontaminated soils and rainwater runoff. When installed in accordance with our recommendations, it is expected that the Polystorm-R unit will have a design life in excess of 60 years*. The installer of a proposed geocellular structure should ensure that an appropriate design check has been undertaken, in accordance with the recommended methodology and factors of safety given in CIRIA C680 (2008), Structural Design of Modular Geocellular Drainage Tanks, prior to the commencement of construction activities.

* Derived from long term extrapolated creep testing

Notes

1. Unless stated, all values are nominal and may vary within normal production tolerances.
2. The characteristic unit parameters stated have been based on Polypipe BBA certificate N° 06/4297, sheet 3.
3. Polypipe reserve the right to change product specifications without prior notice.
4. This document is uncontrolled and updates will not be issued automatically.

RECOMMENDED MINIMUM COVER LEVELS [m]

LIVE LOAD CONDITIONS	PEDESTRIAN	LIGHT TRAFFICKED	
		Car park with vehicle mass <GVW	
Minimum cover depth required (m)	0.50	<3000kg 0.50	<9000kg 0.65

Note

1) Stated depths based on the calculation methodology detailed within CIRIA C680 (2008)

2) Assumed serviceability limit state (SLS) partial factor of safety applied to: Material = 1.5 Live load = 1.0 Dead load = 1.0

3) Shallower minimum burial depths may be applicable subject to an assessment of the specific site conditions. For further details please consult our Technical Team on 01509 615100.

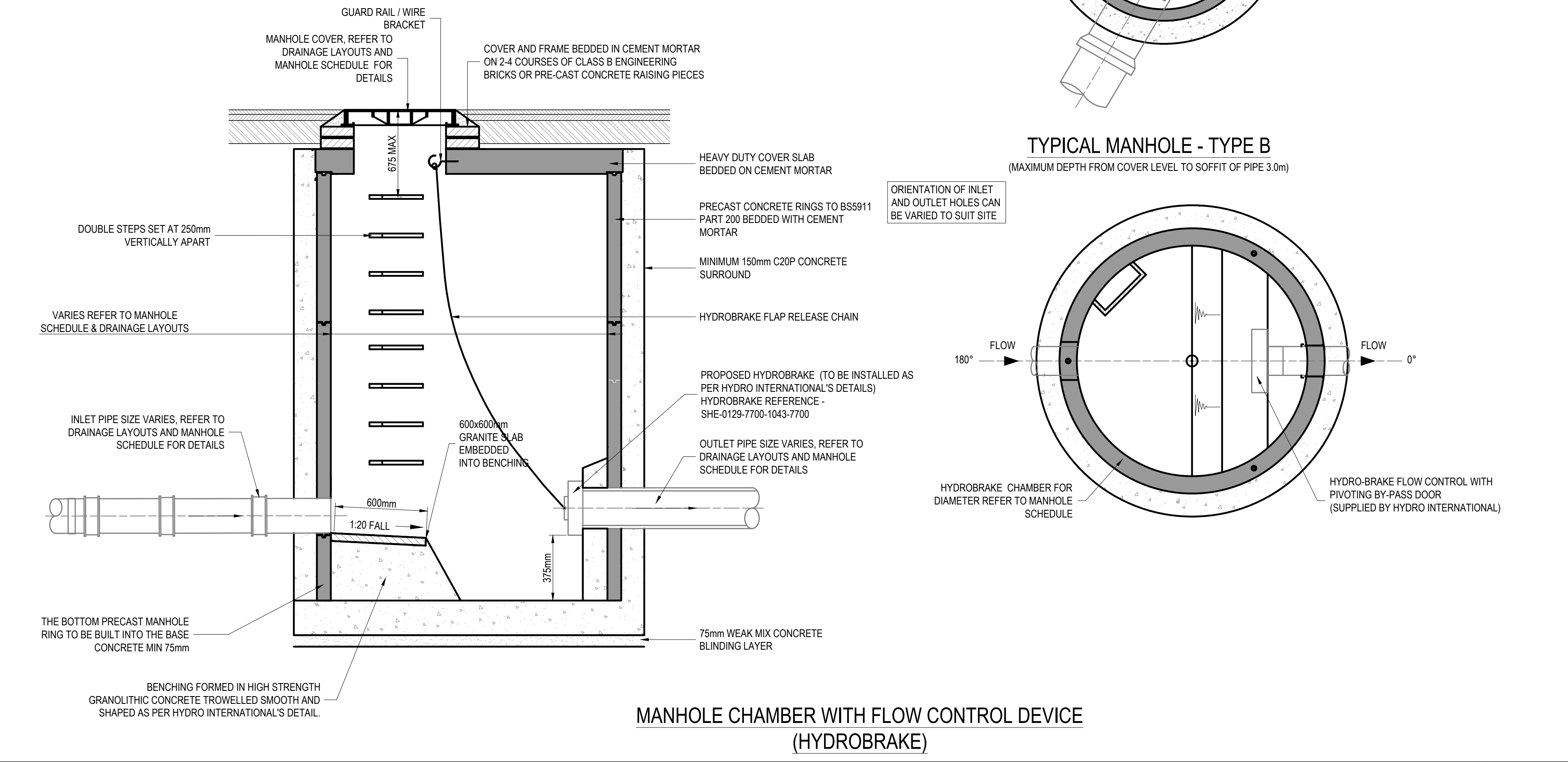
All descriptions and illustrations in this publication are intended for guidance only and shall not constitute a 'sale by description'. All dimensions given are nominal and Polypipe may modify and change the information, products and specifications from time to time for a variety of reasons, without prior notice. The information in this publication is provided 'as is' on September 2017. Updates will not be issued automatically. This information is not intended to have any legal effect, whether by way of advice, representation or warranty (express or implied). We accept no liability whatsoever (to the extent permitted by law) if you place any reliance on this publication you must do so at your own risk. All rights reserved. Copyright in this publication belongs to Polypipe and all such copyright may not be used, sold, copied or reproduced in whole or part in any manner in any media to any person without prior consent. Polypipe is a registered trademark of Polypipe. All Polypipe products are protected by Design Right under CDPA 1988. Copyright © 2016 Polypipe. All rights reserved.

Polypipe Civils

Charnwood Business Park, Loughborough, Leicestershire LE11 1LE

Tel: +44 (0) 1509 615100 Fax: +44 (0) 1509 610215 Email: civils@polypipe.com

www.polypipe.com/wms

[illegible]

- | | | | |
|--|----------------|---------------|----------------|
| CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISKS | | | |
| 
10 Aldersgate Street, London EC1A 4JU
Telephone: +44 (0)20 7831 7969
www.meinhardt.co.uk | | | |
| PROJECT
ST GABRIEL'S
1 OXFORD PLACE
MANCHESTER
M14 5RP | | | |
| CLIENT
MCLAREN | | | |
| TITLE
PROPOSED BELOW GROUND DRAINAGE
STANDARD DETAILS
SHEET 1 | | | |
| DISCIPLINE
CIVIL | | | SCALE
1:20 |
| DRAWN
JD | DESIGNED
JD | CHECKED
GB | APPROVED
GB |
| DRAWING No
2998-MHT-XX-XX-DR-C-00200 | | | ISSUE
C01 |

Appendix D – United Utilities Build Over No Objection



**United Utilities Water Ltd
Developer Services & Planning**
2nd floor Grasmere house
Lingley Mere Business Park
Lingley Green Avenue
Great Sankey
Warrington WA5 3LP

Wastewaterdeveloperservices@uuplc.co.uk

Gurdeep Bansal
Meinhardt (UK) Ltd, 10 Aldersgate Street,
London, EC1A 4HJ

Your Reference	
Our Reference	4200047420
Date	13 th November 2023

Dear Sir

Thank you for your build over consultation of 8th November 2023 regarding the;

**1000 mm diameter [combined] public sewer at an unconfirmed depth of 3.6m at 1 Oxford Road M14
SRP**

In consideration of the affected public sewer, **United Utilities have no objection to the Bin & Bike storage** but would request that all works satisfy the Approved Document's Guidance that supports the requirement of Part H4 of the Building Regulations.

The following guidance should be passed to the applicant/property owner;

What does this mean?

- Permission to build over or near the public sewer is not required from us based on the information you have submitted. However, we would still ask that you take the appropriate steps to protect the public sewer from your development and also protect your development from the public sewer should it ever fail.
- Please note you will be responsible for any damage to the public sewer caused by your development, even were our permission to build is not required.
- These protective measures can be found in the Building Regulations Guidance; electronic copies of the guidance can be found here:

<http://www.planningportal.gov.uk/buildingregulations/approveddocuments/downloads>

- Although your development may be exempt from these regulations, United Utilities would recommend that the guidance is followed as 'good practice' to ensure protection to the sewer and your development.

What do I need to do next?

- The most important thing is to establish the exact location and condition of the sewer as you should not build near to or over a sewer that is in poor condition. Furthermore this will help you be sure that your work will not lead to damage to the public sewer. Defects such as deformation (change in Shape) hair-line cracks, open/displaced joints are unlikely to cause the sewer to fail and will not normally require attention if the sewer remains the same. Once construction starts close to or over the sewer these defects could possibly cause the sewer to collapse. Work to rectify such issues post development can be both intrusive and expensive, the cost of which may be repayable to United Utilities by the applicant.
- You will need to appoint your own contractor, it is usually good practice to contact a number of contractors and get three individual quotes. Currently, United Utilities do not offer this service for customers and are not able to recommend any contractors.
- when carrying out any investigation or CCTV survey work on the public sewer system please fully complete the Request for permission to work on a public sewer (CCTV investigation) form and return to Wastewaterdeveloperservices@uuplc.co.uk and the relevant Network Drainage Engineer for your area will assess the request and issue an approval, if appropriate.

<https://www.unitedutilities.com/builders-developers/your-development/planning/building-over-or-working-near-our-assets/>

- You may need to procure the services of a structural or civil engineer who can make sure that your proposals meet the other requirements of the Building Regulations including how to protect the sewer (Part H4) and how to protect your building from the sewer (Part A2 & A3). They will be familiar with these regulations and what needs to be done to satisfy them.

Other useful information.

- United Utilities provides the approximate location of its sewers according to its records. These records are not necessarily accurate or complete nor do they normally show the positions of every sewer, culvert or drain, private connections to the public sewers or the particulars of any private system. No person or company shall be relieved from liability for any damage caused by reason of the actual position and/or depths being different from those indicated.
- The applicant should carry out a site survey to determine the exact position of any underground assets prior to construction. Should the site survey identify any discrepancies the applicant should contact United Utilities Developer Services for further assistance as soon as possible.

Yours faithfully,

Developer Services & Planning