CONSULTING ENGINEERS

[CONSULTING CIVIL & STRUCTURAL ENGINEERS]

Chapel Street
Levenshulme
Manchester

Drainage Strategy

R - 00142 – 001 – DS – 0
March 2025

Report Originator(s)

Warren Allsopp, BEng (Hons)
Director for SEA Consulting Engineers Ltd.
warren@seace.co.uk
07976 310054

Revision Record

Revision	Date	Description	Written	Approved
0	20.03.24	First Issue	WRA	WRA
A	02.04.24	Updated to suit client comments	WRA	WRA
B	28.10.24	Updated to revised layout and amended storm design	WRA	WRA
C	17.03.25	Updated to suit comments, revisions	WRA	WRA

T: 07976 310054
E:warren@seace.co.uk

Contents

1.0 Introduction....4
1.1 Design Brief....4
1.2 Site Location....4
1.3 Current Land Use....4
1.4 Proposed Development....4
2.0 Surface Water Drainage....5
2.1 Existing Surface water drainage....5
2.2 Proposed Storm Drainage Discharge....5
2.3 Existing Surface Water Discharge rates....6
2.4 Proposed Surface Water Drainage Strategy....6
2.5 SUDS....7
2.6 Maintenance....8
3.0 Foul Water Drainage....9
3.1 Existing Foul water drainage....9
3.2 Proposed Foul Drainage Strategy....9
4.0 Conclusion....10

T: 07976 310054
E:warren@seace.co.uk

Appendices

Appendix A
Site Location Plan
Appendix B
Topographical Survey
Appendix C
Proposed Site Plan
Appendix D
UU Asset Plan
Appendix E
Borehole Log
Appendix F
Culvert Survey
Appendix G
SEA Sketches Sent to UU
Appendix H
UU Email confirming acceptance – 14.03.2025
Appendix I
Existing Drained Areas
SEA drawing 00142/E11
Appendix J
Drained Area Plan
SEA Drawing 00142/E01A
Appendix K
Greenfield Runoff Calculations
Appendix L
EA Climate Change Allowance Extract
Appendix M
Storm Calculations
Appendix N
Drainage Layouts
SEA Drawing 00142/E02F and E03B

1.0 Introduction

1.1 Design Brief

1.1.1 The client, Burke Developments Ltd. Requires a drainage design to assist in discharging planning conditions for a new development of 8 dwellings at Chapel Street, Levenshulme, Manchester.

1.1.2 This report provides design proposals to ensure stormwater is managed adequately along with a full maintenance plan.

1.1.3 This report has been prepared by SEA Consulting Engineers Ltd. With the benefit limited to our instructing Client, Burke Developments Ltd.

1.2 Site Location

1.2.1 The site is located to the southeast of Manchester within the Levenshulme area of the city, national grid reference E387490, E394215. The site location plan is presented in Appendix A.

1.3 Current Land Use

1.3.1 The site is currently an industrial development, a topographical survey for the development is presented in Appendix B. The site is therefore considered brownfield.

1.4 Proposed Development

1.4.1 The proposed development will comprise the construction of 8 new residential dwellings. Appendix C presents a copy of the site plan.

2.0 Surface Water Drainage

2.1 Existing Surface water drainage

2.1.1 The existing site is positively drained and outfalls via existing United Utilities combined sewers. A copy of the United Utilities (UU) asset plan is presented in Appendix D

2.2 Proposed Storm Drainage Discharge

2.2.1 Paragraph 80 of the Planning Practice Guidance for 'Flood Risk and Coastal Change' defines the hierarchy of drainage options. Where reasonably practicable the aim should be to discharge stormwater as high up the following hierarchy of storm drainage options;

- Into the Ground (infiltration);
- To a surface water body;
- To a surface water sewer, highway drain or another drainage system, and
- To combined sewer

2.2.2 Each of these is considered separately below;

Into the ground

2.2.3 Given the site's existing use and the fact that it is drained via existing combined sewers the use of soakaways is not considered feasible. Extracts of the ground investigation are presented in Appendix E and shows that the site is underlain by clay soils which are impermeable, therefore the use of soakaways is not viable.

To a surface water body

The UU asset plans show a 900mm private sewer with Chapel Street, further research has been carried and it has been determined that it is a culverted watercourse, Fallowfield Brook. A survey was carried out on this culverted watercourse to determine its depth so that a check could be undertaken on the viability of a gravity connection, a copy of the results is provided in the appendix F.

The survey shows that the 900mm culvert is 2.04m deep to invert which based on a shallow 45 degree saddle connection would mean a connection IL from the site of only 1.04m and working back into the site with minimum gradient would require the site to be lifted by 880mm at the lowest point to the north to ensure appropriate cover to any pipework and attenuation tanks. Appendix G shows sketches provided to UU to show that a gravity connection is not viable, which they accepted, see appendix H which presents an email from them confirming this.

To a surface water sewer, highway drain or another drainage system

2.2.4 The site is currently drained via the existing combined sewers located on the northern, eastern and southern boundary. Given a connection to the culverted watercourse is not viable and UU has accepted this in an email dated 14.03.2025 (appendix H) the site surface water will drain via the existing combined system.

2.3 Existing Surface Water Discharge rates

2.3.1 As the site is brownfield we have calculated runoff rates for this site using the modified rational method, (drained area x 0.014, from Building Regulations Part H) based on a rainfall intensity of 50mm/hr. Appendix I presents SEA drawing E11 which shows the site's existing drained areas, 835m^2. A brownfield runoff rate has therefore been calculated as 11.6l/s.

2.3.2 Local policy requires that new developments restrict storm water flows to as close to greenfield runoff as possible. We have used the HR Wallingford online tool to calculate greenfield runoff rates based on a total drained area of 1070m^2, SEA drawing E01 presented in appendix J shows the drained areas for the development.

The Qbar value has been calculated as 0.65l/s, calculations are presented in appendix K . Flows at this rate are considered too low for maintenance purposes, therefore flows will be restricted to 2.7l/s which will provide a HydroBrake with a minimum aperture of 75mm. This flow rate provides an 75% betterment on existing surface water flows.

2.4 Proposed Surface Water Drainage Strategy

2.4.1 The surface water drainage will comprise a piped network outfalling to the UU combined sewers within Chapel Street. All driveways will be provided with permeable block paving. Flows will be restricted to 2.7l/s with attenuation provided via online geo-modular attenuation tanks located within the access road.

2.4.2 The design will use FEH2 rainfall parameters and will be for all drained areas on the site to accommodate storms up to the 1 in 100-year event and allow for the increase in storm intensities up to 45%. This is based on the Environment Agency updates of May 2022 which bases peak rainfall climate change allowance on river management catchment areas. An extract from the EA website based on the site location is presented in Appendix L.

2.4.3 The system has been modelled using Causeway Flow for all storm durations up to 10,080mins. The calculations are presented in Appendix M and show that online tanks require a total volume of 31.35m^3. A drainage layout is presented in Appendix N which shows all components of the surface water drainage system.

2.5 SUDS

2.5.1 The use of SUDS and pollution control measures have been assessed using the Simple Index Approach set out within the CIRIA SUDS Manual 2015. Based on table 26.2 of the SUDS Manual, the pollution indices for the site are set out in table 3.2 below.

2.5.2

Pollution Hazard Indices for Different land use classifications				
Land use	**Pollution Hazard Level**	**Total Suspended Solids (TSS)**	**Metals**	**Hydrocarbons**
Residential Roofs	Very Low	0.2	0.2	0.05
Individual driveways, residential car parks, low traffic roads (Eg Cul De Sacs, homezones and general access roads) and non-residential car parking within infrequent changes (e.g. schools and offices) i.e. <300 movements per day.	Low	0.5	0.4	0.4

Table 3.2 – Extract of table 26.2 of the SUD manual.

2.5.3 The developments will provide permeable paving for all driveways

2.5.4 Table 26.3 of The SuDS Manual shows the mitigation indices for a range of Suds components for discharges to surface waters. An extract of this is provided in Table 3.3 below for the components relevant to the proposed development.

Indicative mitigation indices			
Type of SUDS Component	**Mitigation Indices**		
	Total Suspended Solids (TSS)	**Metals**	**Hydrocarbons**
Permeable Paving	0.7	0.6	0.7

Table 3.3 – Extract from table 26.3 of the SUDS Manual

2.5.5 Based on the above it can be seen that the permeable paving will provide adequate treatment for the site's surface water. In additional a bypass separator will be provided prior to outfall.

2.6 Maintenance

2.6.1 All new surface water will remain private and maintenance will be the responsibility of the landowner The following maintenance plan shall be implemented.

2.6.2 **Pipe systems, Inspection chambers and manholes.**

Maintenance Schedule		
Maintenance Category	**Required Action**	**Frequency**
Regular Maintenance	Inspect and identify area that are not operating correctly, if required, take remedial action	Monthly (for the first 3 months) then six monthly
	Debris removal from catchment surface (where may cause risks to performance)	Monthly
Remedial Actions	Remove Blockages	As required
	Cleaning/Jetting	As required
	Repair/rehabilitation of system	As required
Monitoring	Inspect/check all parts of the piped system and inspection chambers to ensure that they are in good condition and operating as required.	Annually and after large storm

Permeable Paving

Maintenance Schedule		
Maintenance Category	**Required Action**	**Frequency**
Regular Maintenance	Brushing (Standard cosmetic sweep over all areas)	Once a year, after the autumn leaf fall, or reduced frequency as required, based on site specific observations of clogging or manufacturers recommendations. Particular attention to be paid to areas where water into pervious areas from adjacent impermeable areas as this area is most likely to collect sediment
Occasional maintenance	Stabilise and mow adjacent contributing areas	As required
	Removal of weeds or management suing glyphosphate applied directly into the weeds by an applicator rather than spraying	As required
Remedial Actions	Remediate any landscaping which, through vegetation maintenance strip, has been raised to within 50mm of the finished surface	As required
	Remedial work to any depressions, rutting and cracked surfacing considered detrimental to the performance or hazard to users	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10-15 years, or as required (if infiltration performance is reduced due to significant clogging
Monitoring	Initial inspection	Monthly for 3 month after installation
	Inspect for areas of poor operation and/or weed growth – if required take remedial action	3-monthly, 48hrs after large storms for the first 6 months
	Establish slit accumulation rates and establish appropriate brushing frequencies.	Annually
	Monitor Inspection chambers	Annually

3.0 Foul Water Drainage

3.1 Existing Foul water drainage

3.1.1 Existing foul water from the development drains to the existing UU Combined Sewers.

3.2 Proposed Foul Drainage Strategy

3.2.1 Foul water from the proposed dwellings will drain to the existing UU Combined sewers. Given that the development is reducing the surface water flows by 75%, capacity for the 8 dwellings will be achievable.

4.0 Conclusion

4.1.1 Based on the above, and providing the above strategies are adopted, the developed site will not contribute further to flood risk and therefore satisfying the requirements of the National Planning Policies Framework.

4.1.2 **References**

- Department for Communities and Local Government (July 2021) - National Planning Policy Framework.
- The Building Regulations (2015) - Drainage and Waste Disposal - Approved Document H.
- BS 8533:2011 Assessing and managing flood risk in development – Code of Practice.
- CIRIA Report C635 Designing for exceedance in urban drainage – good practice.
- The SUDS Manual
- BS 8533:2011 Assessing and managing flood risk in development – Code of Practice.
- Design and Analysis of Urban Storm Drainage – The Wallingford procedure – Volume 1.

CONSULTING ENGINEERS
[CONSULTING CIVIL & STRUCTURAL ENGINEERS]
T: 07976 310054
E:warren@seace.co.uk

Client	Burke Developments
Project	Chapel Street, Levenshulme, Manchester
Title	Drainage Strategy – Rev C

Appendix A

Site Location Plan



LOCATION PLAN

notes

This drawing is subject to a detailed building and site survey, therefore no guarantee of its accuracy can be given.
This drawing has been draughted in accordance with the clients design requirements.
All areas are approximate and are subject to a detailed building and site survey and further design development.
All dimensions should be checked prior to commencement of construction on site. Measurements should not be taken off the drawing.

All dimensions shown are in millimetres (mm).

PL0 Planning Issue 03.04.23

revisions

PLANNING

NADA Architects Ltd
169 Kingsway
Burnage
Manchester
M19 2ND
Mob: 07974 735527
E: ahmed@nadaarchitects.com
W: www.nadaarchitects.com

D - design PL - planning PT - pre-tender
T - tender P - preliminary
C - construction R - record

BURKE CONSTRUCTION LTD

NEW BUILD RESIDENTIAL SITE @ 7 CHAPEL ST, MANCHESTER, M19 3QB

LOCATION PLAN

scale	date	drawn	checked
1:1250 @ A3	03.04.23		AC

job no	(category) dwg no	revision
23-1136	(01)001	PL0

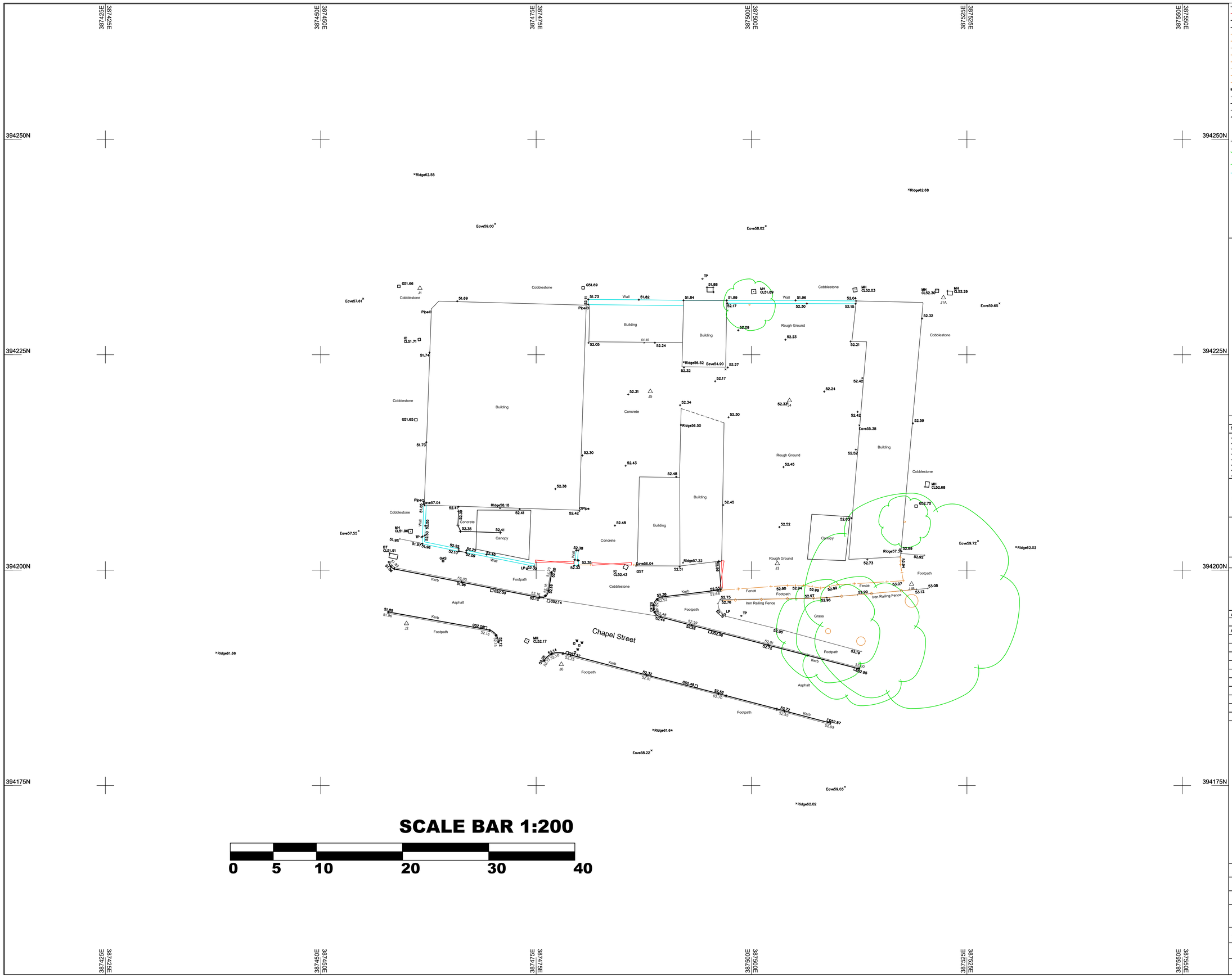
Drawing measurements shall not be obtained by scaling. Verify all dims prior to construction. Immediately report any discrepancies on this drawing to Architect. This drawing shall be read in conjunction with associated specifications and related consultant's documents.

CONSULTING ENGINEERS
[CONSULTING CIVIL & STRUCTURAL ENGINEERS]
T: 07976 310054
E:warren@seace.co.uk

Client	Burke Developments
Project	Chapel Street, Levenshulme, Manchester
Title	Drainage Strategy – Rev C

Appendix B

Topographical Survey



SCALE BAR 1:200

0 5 10 20 30 40

Top/Bottom of bank	
Building	
Channel	
Concrete slab	
Closeboard fence	
Chainlink fence	
Concrete post & panel fence	
Iron railing fence	
Palisade fence	
Post & Panel fence	
Post & rail fence	
Post and Wire Fence	
Hedge	
INV Invert	
Kerb line (bottom)	
Kerb line (top)	
Overhead Power lines	
SBX Switchbox	
Steel	
Tree spreed	
Verge	
Wall	
BH Borehole	
Bol Bollard	
CATV Cable tv	
Elec Electric cover	
EP Electricity pole	
Earth Earth rod	
FH Fire hydrant	
G Gulley	
GAS Gas cover	
IC Inspection cover	
LP Lamp post	
MH Manhole	
Marker Marker post	
OSBM OSBM	
RE Rodding eye	
RS Road sign	
SP Sign post	
Stump Stump	
SV Sluice Valve	
TP Telegraph Pole	
Trees	
TRL Traffic lights	
Trial Pit Trial pit	
Tree Trunk	
W Water cover	
Bus Stop Bus stop	
BT BT rectangle 3 pts	

SURVEY STATIONS

Name	Easting	Northing	Heig
J1	387461.517	394232.720	51.6
J2	387459.953	394193.801	52.0
J1A	387522.280	394231.618	52.2
J1B	387518.578	394198.380	53.0
J3	387502.993	394200.765	52.5
J4	387504.407	394219.681	52.3
J5	387488.254	394220.729	52.3
J6	387477.927	394189.063	52.3

DRAINAGE DISCLAIMER

ONLY DRAINAGE DISCOVERED WHILST ON SITE IS DISPLAYED ON THIS DRAWI
FURTHER INVESTIGATIONS MAY NEED TO BE CARRIED OUT TO ASCERTAIN
THE FULL EXTENT OF THE DRAINAGE FOR THE SITE

KEY DIMENSIONS SHOULD BE CHECKED ON SITE
BEFORE COMMENCEMENT OF ANY WORKS

NOTE

Grid and Level related to OS
using active GPS data network OSGB36
and transformations OSTN15/OSGM15

Amendments			
	Date	Surveyor	Description of work
A	04/04/23	JL	Added Scale Bar & Station Control to Drawi

powers
Integrated Survey Partner

Meridian House
58/60 Hillside Road, Frodsham, Cheshire WA6 6AG
Tel: 01928 734473 Fax: 01928 735573
Email: mail@powerstiltman.co.uk
www.powerstiltman.co.uk

Chapel Street
Levenshulme
Topographical Survey
Client :Burke Developments

Surveyed By : JW	Date : 22/03/23	Scale
Drawn By : JW	Drawing No : 6073/01	1:200
Checked By : JL	Amendment :	

CONSULTING ENGINEERS
[CONSULTING CIVIL & STRUCTURAL ENGINEERS]
T: 07976 310054
E:warren@seace.co.uk

Client	Burke Developments
Project	Chapel Street, Levenshulme, Manchester
Title	Drainage Strategy – Rev C

Appendix C

Proposed Site Plan



notes

This drawing is subject to a detailed building and site survey, therefore no guarantee of its accuracy can be given.
This drawing has been draughted in accordance with the clients design requirements.
All areas are approximate and are subject to a detailed building and site survey and further design development.
All dimensions should be checked prior to commencement of construction on site. Measurements should not be taken off the drawing.

All dimensions shown are in millimetres (mm).

N

SITE BOUNDARY LINE

DASHED LINE INDICATES 136792/FO/2023 SUBMISSION

PL6	Planning Updates	13.10.23
PL5	Planning Updates	05.10.23
PL4	Planning Updates	25.09.23
PL3	Planning Updates	10.08.23
PL2	Planning Updates	27.07.23
PL1	Bins area updated	25.05.23
PL0	Planning Issue	03.04.23

revisions

NADA Architects Ltd
169 Kingsway
Burnage
Manchester
M19 2ND
Mob: 07974 735527
E: ahmed@nadaarchitects.com
W: www.nadaarchitects.com

PLANNING

D - design PL - planning PT - pre-tender
T - tender P - preliminary
C - construction R - record

BURKE CONSTRUCTION LTD

NEW BUILD RESIDENTIAL SITE @ 7 CHAPEL ST, MANCHESTER, M19 3QB

PROPOSED GA SITE PLAN

scale	date	drawn	checked
1:500 @ A3	03.04.23		AC

job no	(category) dwg no	revision
23-1136	(03)001	PL6

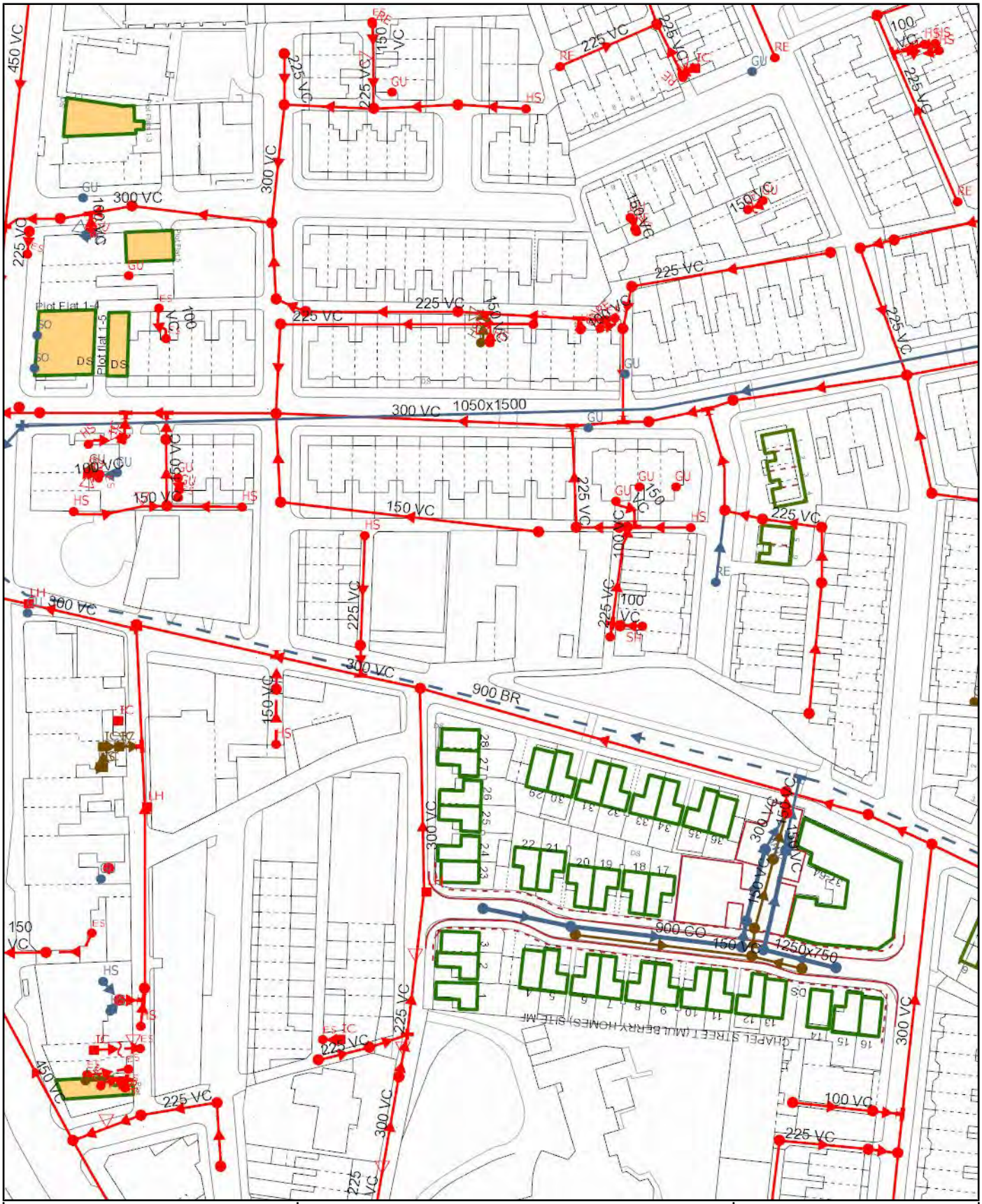
Drawing measurements shall not be obtained by scaling. Verify all dims prior to construction. Immediately report any discrepancies on this drawing to Architect. This drawing shall be read in conjunction with associated specifications and related consultant's documents.

CONSULTING ENGINEERS
[CONSULTING CIVIL & STRUCTURAL ENGINEERS]
T: 07976 310054
E:warren@seace.co.uk

Client	Burke Developments
Project	Chapel Street, Levenshulme, Manchester
Title	Drainage Strategy – Rev C

Appendix D

UU Asset Plan



Scale:	1:1250	**SEWER RECORDS**	United Utilities Water for the North West
Date:	24/05/2023		
Address or Site Reference:	BELPER TOOLS 7 CHAPEL STREET, LEVENSHULME, MANCHESTER, M19 3QB		
Printed by:	Property Searches		

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.

Crown copyright and database rights 2017 Ordnance Survey 100022432. Unauthorised reproduction will infringe these copyrights.

CONSULTING ENGINEERS
[CONSULTING CIVIL & STRUCTURAL ENGINEERS]
T: 07976 310054
E:warren@seace.co.uk

Client	Burke Developments
Project	Chapel Street, Levenshulme, Manchester
Title	Drainage Strategy – Rev C

Appendix E

Borehole Log

GeoAssist Limited	Exploratory Hole Record Sheet	Ref: WS1
Consultant: 0	Project: 7 Chapel Street Location: Manchester	Sheet: 1
Client: Burke Construction N.W. Ltd	Equipment: Archway Dart Rig	Ground Level: m.AOD Co-ordinates: Easting: (m) Northing: (m) Dates: 01/11/2024 to 01/11/2024

Drilling Foreman: M Walton
Engineer/Geologist: M Benson

STRATUM DESCRIPTION	Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests: Depth (m) from to	Sample Type/No	Blow Count N/(U)	Field Records
Dark brown sandy gravel with brick and pottery fragments - MADE GROUND	(0.50) 0.50						
Brown/grey sandy silty clay with brick fragments - MADE GROUND	(0.50) 1.00						
Soft grey silty CLAY with organic inclusions	(1.30) 2.30			1.00	CP1	1	
				2.00	CP2	6	Wet at 2.00m depth
Stiff to very stiff brown gravelly sandy silty CLAY	(5.10) 7.40			3.00	CP3	23	
				4.00	CP4	11	
				5.00	CP5	12	
				6.00	CP1	11	
				7.00	CP2	15	
Orange/brown silty fine to medium SAND	7.70						
Very stiff brown very gravelly very sandy silty CLAY with sand inclusions	(1.30) 9.00			8.00	CP3	56	
				8.90	CP4	60	01/11/2024: On completion of exploratory hole at 9.00m. Casing at 4.00m. Standing water nIL. On withdrawal of casing exploratory hole backfilled and reinstated
Exploratory Hole complete at 9.00m							

Remarks:

The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken.
Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.

Logged: M Benson
Date: 01/11/2024
Checked: M Richardson
Date: 01/11/2024
Site Ref: 6170/VEC
Scale 1:50

CONSULTING ENGINEERS
[CONSULTING CIVIL & STRUCTURAL ENGINEERS]
T: 07976 310054
E:warren@seace.co.uk

Client	Burke Developments
Project	Chapel Street, Levenshulme, Manchester
Title	Drainage Strategy – Rev C

Appendix F

Culvert Survey

387470 E

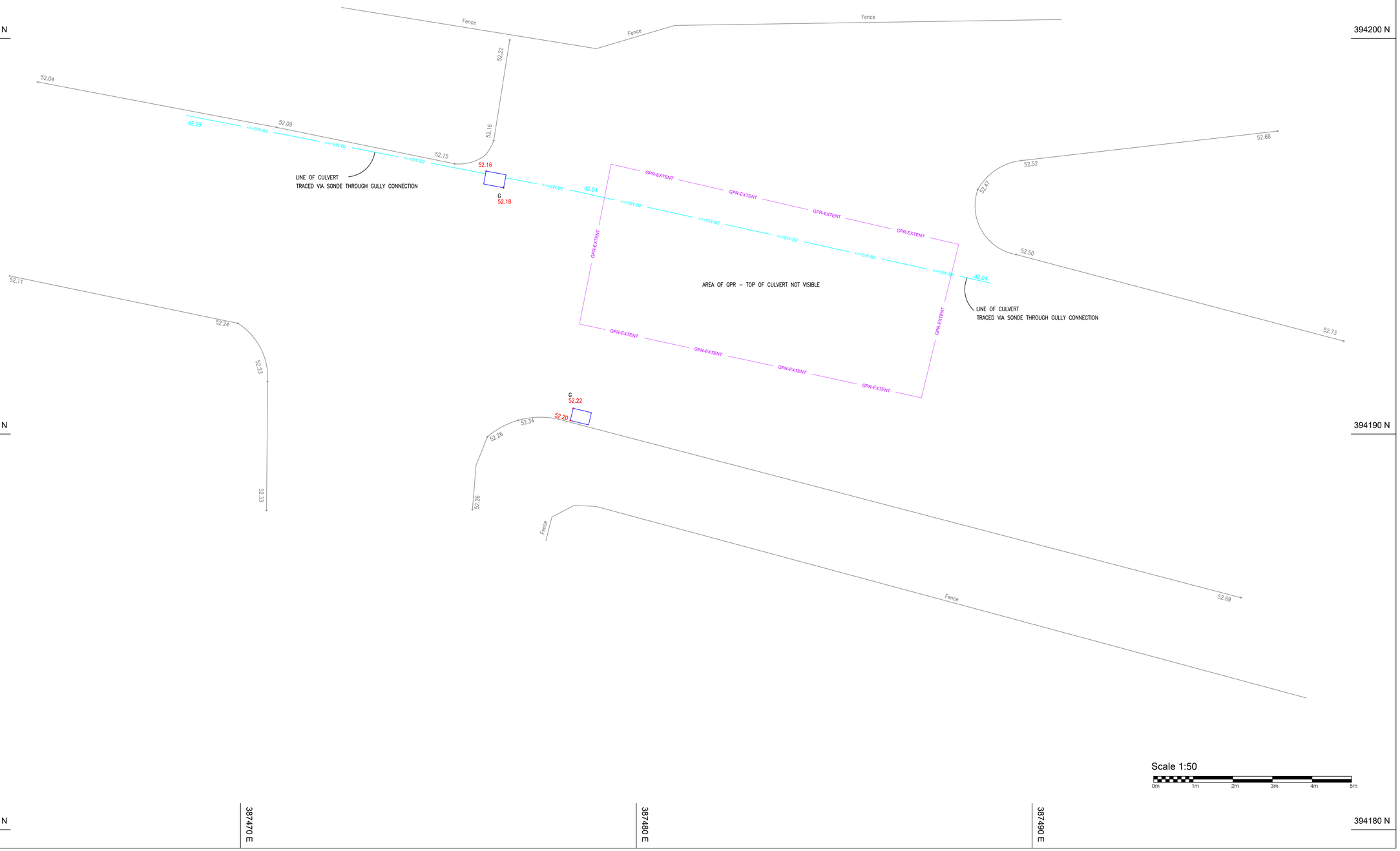
387480 E

387490 E

394200 N

394190 N

394180 N



ABBREVIATIONS

AB	Abandoned	LH	Lamp Hole
BLK	Blocked	LP	Lamp Post
B	Bollard	Mb	Multibole
CC	Control Cabinet	MH	Manhole
CCTV	Closed Circuit Television	Mkr	Marker
CL	Cover Level	NVO	No Visible Outlet
Col	Column	OSGM	Ordnance Survey
d	Depth of Service	P	Post
DP	Down Pipe	PGM	Permanent Ground Mark
DrC	Drainage Channel	RE	Rodding Eye
EOT	End of Trace	RI	Riser
EP	Electricity Pole	RS	Road Sign
ER	Earthing Rod	SL	Sump Level
EJB	Electrical Junction Box	TCP	Traffic Control Post
ESG	Electrical Switchgear	TL	Traffic Light
FB	Flower Bed	TP	Telephone Pole
FLD	Flooded	UNK	Unknown
FOS	Full of Silt	UTO	Unable to Open
FH	Fire Hydrant	UTS	Unable to Survey
G	Gully	VP	Vent Pipe
GM	Gas Meter	WM	Water Meter
GV	Gas Valve	WO	Wash Out
IC	Inspection Cover	WV	Water Valve
IL	Invert Level		

NOTES

The topographical survey is commensurate with band D accuracy, as specified in the RICS survey detail accuracy banding table. The survey was carried out by RL.

All levels are in meters.

No manholes or inspection chambers were opened during this survey. No information on underground invert levels or chamber depths have been recorded.

All due diligence has been taken to capture all site information. This plan only includes information on site that was accessible and visible at the time of survey. All features that were obstructed or were inaccessible have not been surveyed.

Every care has been taken to ensure the correct identification of the utility types, however these should be independently verified prior to use in any design/ building works. Please note that not all buried pipes, cables and ducts can be detected and mapped in consideration of their depth, location, material type and proximity to other utilities. Even an approximate and professionally executed survey may not be able to achieve a 100% detection rate. Where an area of utilities is likely to affect client project requirements, it is strongly recommended that A PAS128 QL A verification survey is carried out.

Copyright of all data produced by RL shall remain with RL unless otherwise agreed.

UTILITY CONFIDENCE LEVELS:

Survey Type		Quality Level	Post-processed	Location Accuracy		Supporting Data
				Horizontal	Vertical	
D	Desktop Utility Records Search	QL-D	---	Undefined	Undefined	---
C	Site Reconnaissance	QL-C	---	Undefined	Undefined	A minimum of one visible location as demonstrated by visual reference to street furniture, topographical Features or evidence of previous street works (reinstatement scar)
B	Detection	QL-B4P	No	Undefined	Undefined	A utility segment where is suspected to exist but has not been detected and is therefore plotted as an assumed route
		QL-B3	No	±500 mm	Undefined (No reliable depth measurement possible)	Horizontal location only of the utility detected by one of the geophysical techniques used.
		QL-B3V	Yes			
		QL-B2	No	±250 mm or ±40% of detected depth whichever is greater	±40% of detected depth	Horizontal and vertical location of the utility detected by one of the geophysical techniques used.
		QL-B2V	Yes			
		QL-B1	No	±100 mm or ±15% of detected depth whichever is greater	±15% of detected depth	Horizontal and vertical location of the utility detected by multiple geophysical techniques used.
		QL-B1V	Yes			
A	Verification	QL-A	---	±50 mm	±25 mm	Horizontal and vertical location of the top and/or bottom of the utility

CO-ORDINATE SYSTEM

GRID

- ☐ Arbitrary – related to building line
- ☐ Arbitrary – approx. related to North
- ☒ Ordnance Survey National Grid

LEVELS

- ☐ Arbitrary – related to a temporary bench mark
- ☐ Ordnance Survey Bench Mark
- ☒ Ordnance Survey Newlyn Datum

Rev	Date	By	Details

ASSET LEGEND

CATV-A	Cable TV	CWA	Combined Water
	Chamber	DA-A	Data Cable
	Duct	EHV-A	Extra High Voltage
EB-A	Electric Service	ED-A	Empty Duct
FU-A	Fuel	FWPMA	Foul Water
GAS-A	Gas	GPR-BH	GPR
HA	Heating and Cooling	HV-A	High Voltage
LV-A	Low Voltage	SL-A	Street Lighting
SURFA	Surface Water	TC	Telecom
TCBA-A	Traffic Control	TFL-A	TFL
UNK-A	Unknown	WA	Water
	Underground Disturbance		Trench
	Reinforcement		

RED LASER
www.redlaserscanning.co.uk
enquiry@redlaserscanning.co.uk
London Head Office
23 Sussex Street
SW1V 4RR
0207 477 2175

Project
Chapel St,
Manchester,
M19 3GJ 3

Description
Utility Survey

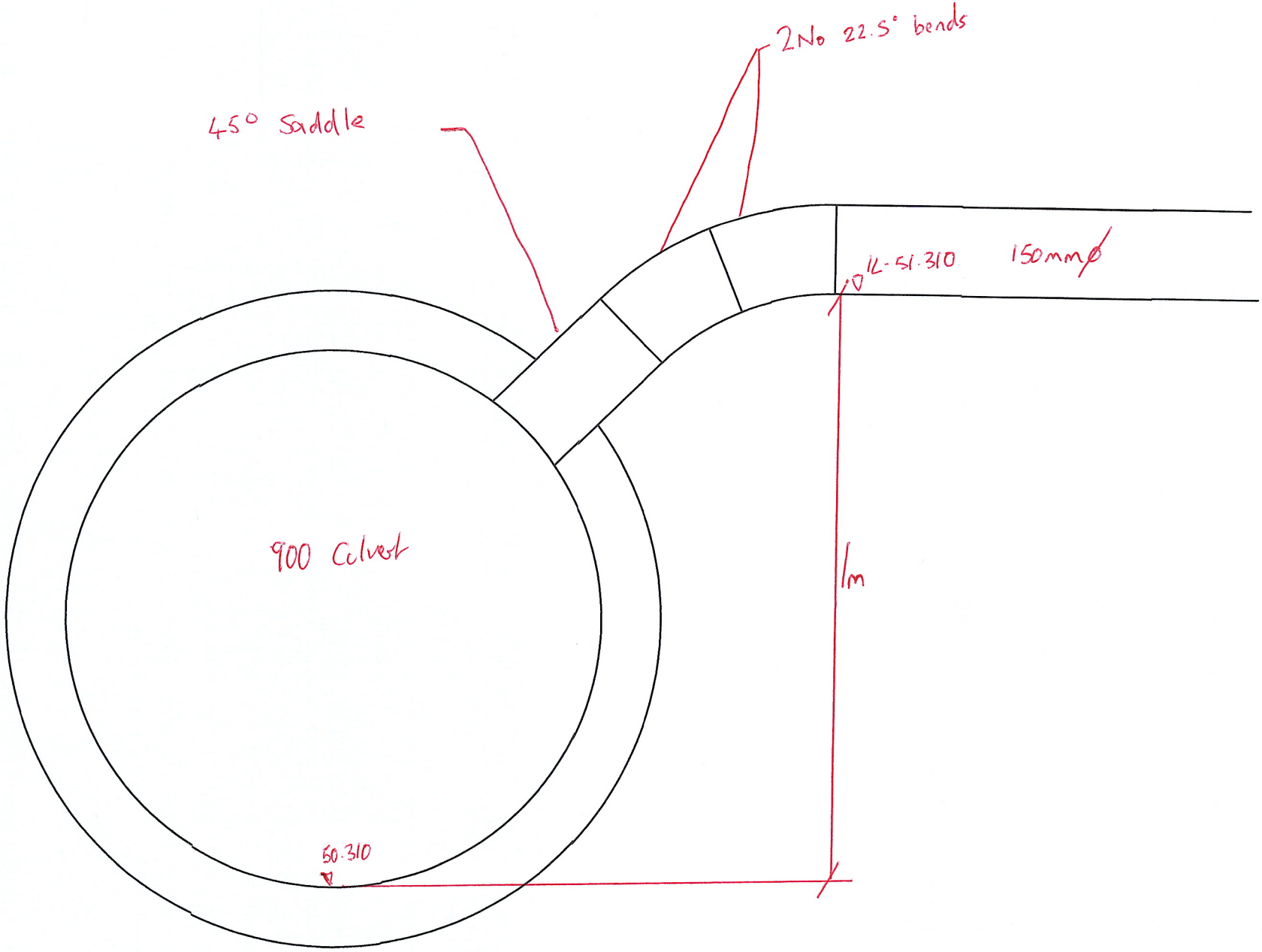
Survey Date	Drawing Date
05/12/2024	10/12/2024
Sheet: A1	Scale: 1:50
Drawing No.: 3324-UT-XX-M2-01	
Checked: RN	Revision: P01

CONSULTING ENGINEERS
[CONSULTING CIVIL & STRUCTURAL ENGINEERS]
T: 07976 310054
E:warren@seace.co.uk

Client	Burke Developments
Project	Chapel Street, Levenshulme, Manchester
Title	Drainage Strategy – Rev C

Appendix G

SEA Sketches Sent to UU



Saddle Connection

Minimum Gully level = 52.700 + 880mm floor Existing Levels

Existing UU Combined MH CL = 51.890 Depth as confirmed by client = 1.0m IL= 50.890

Existing UU Combined MH CL = 52.030 IL= 50.450 as confirmed by client

CL = 52.140 (Based on Current design)
IL = 51.565 (+ 680mm from Current design)

Tank IL= 51.530
Soffit - 52.030
min 750mm cover = 52.78
+ 660mm from Current design

CL 52.275 (Current design)
IL-51.520

tank IL = 51.485
Soffit = 51.985
min 750mm Cover = CL = 52.735
+500mm from Current design

CL = 52.425 (Based on Current design)
IL = 51.310 (+ 680mm from Current design

CL @ Connection = 52.350
IL = 50.310 (based on 2.04m depth from Survey)
Saddle Connection IL - 51.310

Proposed Proprietary Geo-Modular attenuation
Plan Area = 32m² (4m x 8m)
Depth = 0.5m
IL = 50.850
Providing 15.2m³ of attenuation
Built in strict accordance with manufacturers details

Proposed Proprietary Geo-Modular attenuation
Plan Area = 34m² (4m x 8.5m)
Depth = 0.5m
IL = 50.805
Providing 16.15m³ of attenuation
Built in strict accordance with manufacturers details

Class 1 bypass seperator
Kingspan NSBE010 or similar approved.
Inlet level = 50.600
Outlet Level - 50.700

300mmØ

S7
Propriatary Flow Control Chamber fitted with a Hydrobrake
Ref. SHE-0075-2700-1250-2700
Design Head 1.250
CL = 52.425
IL = 50.660
Restricting flow to 2.7l/s

Saddle connection to existing culverted watercourse.
Approx CL = 52.250
IL of 150mmØ connection 50.620
Soffit to soffit connection

Existing private foul chamber within site. IL = 51.150 as confirmed by client

Existing UU Combined MH CL = 52.030 IL= 49.245 as confirmed by client

New Foul PCC MH IL 51.350 (150) as confirmed by the client.

New Foul PCC MH IL 50.590 (150) as confirmed by the client.

Existing UU Combined MH

Existing back drop chamber. Once serving site CL = 52.430 IL = 42.430 as confirm by client

100 @ 1:19 (2.000) perforated within permeable paving

150 @ 1:21 (1.002)

100 @ 1:100 (1.001) Perforated with permeable paving extents

100 @ 1:49 (3.001) perforated within permeable paving

100 @ 1:55 (6.000) perforated

100 @ 1:16 (7.000) perforated within permeable paving

100 @ 1:10 (6.001)

100 @ 1:21 (6.000) perforated

150 @ 1:150

225mm

Cobblestone, Wall, Building, Concrete, Canopy, Rough Ground, Footpath, Kerb, Asphalt, Fence, Iron Railing Fence, Grass, Chapel Street, 900mm brick culverted watercourse

GENERAL

Do not scale from this drawing.

All dimensions are in millimetres unless noted otherwise.

All setting out to architects drawings.

Drawing to be read in conjunction with all other SEA drawings and architects drawings.

This scheme has been designed using the survey information provided by others. It shall be the responsibility of the contractor to verify levels, boundaries etc prior to commencing any works on site. SEA Structural Engineers Ltd. shall not accept any responsibility for errors resulting from the survey.

All setting to be in accordance with the Architect's drawings, the Contractor is to check all dimensions and levels prior to commencement of work and report any discrepancies to the Engineer, including any encountered during construction works.

All dimensions should be checked on site prior to construction. Please notify the Engineer of any discrepancies before commencing or continuing any work.

HEALTH, SAFETY & THE ENVIRONMENT

In accordance with the Health and Safety at Work etc Act 1973 and the Construction (Design and Management) Regulations 2015, designs and details on this drawing have been the subject of a Designers Risk Assessment, to identify risks in construction, use, or demolition of the scheme.

It is not considered necessary for Designers to highlight obvious and/or common risks (such as deep excavations, manual handling and working around heavy plant) which Contractors should be familiar with.

So as far as is reasonably practicable, risks inherent in the design have been eliminated. Where it has been considered that elimination of a risk (or part of a risk) is not reasonably practicable, it has been reduced.

Significant unusual residual risks are identified below, beside the measures which have been adopted to eliminate and/or reduce them:

- Existing services unknown must be confirmed prior to construction

DRAINAGE NOTES

All pipe lengths and gradients are based on centre of manhole to centre of manhole.

The exact position, level, size and use of existing sewers to be confirmed on site and reported to the Engineer prior to the commencement of works.

All pipes are to be laid with level soffits or as indicated.

All private drainage works to accord with the requirements of Building Regulations 2000, Part H (drainage and waste disposal).

The invert of each horizontal drain at the base of a stack shall be at least 450mm below the center line of the lowest branch pipe. Set the level to ensure at least 50mm clearance to footings.

All pipes to be bedded and backfilled in accordance with Part H, diagram 10. Shallow pipes shall be protected in accordance with Part H, diagram 11.

Unless otherwise stated, all private drainage to be 100mm diameter. Gradients have been shown where there are pipe capacity issues, however minimum gradients are as below:
- Surface water 100mm diameter pipes shall not be laid flatter than 1 in 100
- Surface water 150mm diameter pipes shall not be laid flatter than 1 in 150
- Foul water 100mm diameter pipes shall not be laid flatter than 1 in 40 unless there is a WC connected upstream at which it can be laid at 1 in 80
- Foul water 150mm diameter pipes shall not be laid flatter than 1 in 150 providing there are minimum of 5 WC's connected.

Pipes which run adjacent to buildings shall be installed in strict accordance with Part H, clauses 2.23 to 2.25 and diagram 8.

All private manholes and inspection chambers subject to vehicular loading must have class D400 covers and frames in accordance with BS EN 124:2015. All private manholes and inspection chambers not subject to vehicular loading must have class B125 covers and frames in accordance with BS EN 124:2015.

All drains near existing or proposed trees shall be constructed in accordance with the requirements of NHBC's practice note 3 'building near trees'.

Excavation of drain trenches must not be lower than the foundation of any nearby buildings. If the trench is within 1m of foundations, the trench needs to be filled with concrete up to the lowest level of the foundation. If the trench is further than 1m away from the foundations, the trench needs to be filled with concrete to a level below the lowest level for the building, equal to the distance from the building, less than 150mm.

An opening needs to be formed where a pipe passes through a wall, with a minimum 50mm clearance. A lintel must support the brickwork above and each side of the opening masked with rigid sheet material.

All pipework with less than 1.2m cover shall have a concrete slab to adopting water company's requirements unless in open space where 0.9m cover is acceptable. Where a pipe requires a concrete surround C20 concrete mix should be used with vertical joints formed at the face of each flexible joint using 18mm thick compressible board.

All UPVC pipes with less than 600mm cover need concrete protection. Where two pipes cross with less than 100mm separation, surround each with a C20 concrete mix. Where centered on the crossing point, extend the concrete surrounds as necessary to within 150mm of the next nearest flexible joint.

Adequate surface water drainage systems shall be provided to prevent unregulated discharge of water from a private drive onto the highway. These measures shall be implemented before the development in brought into use.

Perforated pipework to be used for distributor runs within permeable block paved areas.

Trapped road gullies to be used for all gullies designed within he access road

DRAWING KEY

- Existing UU combined drainage
- Existing 900mmØ brick culverted watercourse
- Proposed storm drainage
- Proposed storm road gully
- Proposed permeable block paving extent , ALL PIPE WORK WITHIN PERMEABLE SUBBASE TO BE PERFORATED
- Proposed storm attenuation tank
- Proposed foul drainage
- Existing Combined drainage Not UU

CELLULAR STORAGE NOTES

The structural design of the cellular storage tanks shall be in accordance with 'Structural design of buried pipelines under various conditions of loading' BSEN 1295, 'Highways Agency Specification for Highway Works', and Sewers for Adoption, 6th Edition. The design of the cellular storage shall be undertaken by the specialist supplier who will take design responsibility.

SEA Structural Engineers takes no responsibility for the design of the cellular storage, other than providing the required capacity. Full design responsibilities for all other aspects lies with the designer of the cellular storage. Prior to construction, SEA shall be provided with all construction drawings to allow the drawings to be co-ordinated. SEA will not approve the details.

The Cellular storage shall be designed to receive:
Distributed load = 10kN/m²
Concentrated load = 100kN
Dynamic factor = 2
Material factor = 1.5
unfactored
in addition to the dead load of the ground

The cellular storage shall be designed not to float. Groundwater levels are unknown.

The contractor shall provide to the designer of the cellular storage the type of construction plant likely to be used in the area of the cellular storage prior to construction.

For online storage it is essential that pipe work through the cellular storage is provided in order to allow the system to be maintained. Any proposals that do not show how the system can be rodded will not be adequate.

It is essential that construction sediments are not allowed to enter the cellular storage system and the contractor shall provide adequate protection to the drainage network to prevent this.

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, and then six monthly
	Debris removal from catchment surface (where may cause risks to performance).	Monthly
	Where rainfall infiltrates into blocks from above check surface of filter for blockages by silt, algae or other matte. Remove and replace surface infiltration medium as necessary.	Monthly (and after large storms)
	Remove sediment from pre-treatment structures.	Annually, or as required.
Remedial actions	Repair/rehabilitation of inlets, outlet, overflows and vents.	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are all in good condition and operating as designed.	Annually and after large storms

The designer of the cellular storage shall provide full details of how the cellular storage shall be maintained during the life time of the system.

Installation of the cellular storage shall be carried out by competent personnel only and strictly in accordance with manufactures requirements.

Reference shall be made to CIRIA C698, site hand book for the construction of SUDS, prior to construction.

The design of the cellular storage shall demonstrate compliance with Ciria C680, structural design of modular geocell and drainage tanks.

The main contractor and the supplier/installer of the cellular storage shall ensure that the design and installation are co-ordinated with other site works to include, but not limited to, understanding what construction plant may traffic close to or over the cellular storage.

Rev	Date	By	Description
E	20.03.24	WRA	Main outfall amended
D	28.11.24	WRA	Interceptor added
C	28.11.24	WRA	Storm outfall route amended
B	17.10.24	WRA	Text made smaller to avoid confusion
A	11.10.24	WRA	Foul outlet levels amended

SEA
CONSULTING ENGINEERS
[CONSULTING CIVIL & STRUCTURAL ENGINEERS]
E: warren@seace.co.uk
T: 07976310054

PROJECT
RESIDENTIAL DEVELOPMENT
CHAPEL LANE
LEVENHULME, MANCHESTER

DRAWING
PROPOSED DRAINAGE LAYOUT

SCALE: 1:100@A1	DATE: 20.03.2024
DRAWN BY: WRA	REV: E
STATUS: FOR APPROVAL	

DWG No: 00142/E02 | E

CONSULTING ENGINEERS
[CONSULTING CIVIL & STRUCTURAL ENGINEERS]
T: 07976 310054
E:warren@seace.co.uk

Client	Burke Developments
Project	Chapel Street, Levenshulme, Manchester
Title	Drainage Strategy – Rev C

Appendix H

UU Email confirming acceptance – 14.03.2025

From:	seweradoptions@uuplc.co.uk
To:	Warren Allsopp
Subject:	RE: 7 Chapel Street, Levenshulme - CDN/24/1196 - DC/25/59
Date:	14 March 2025 09:36:49
Attachments:	image005.png image003.png

Good Morning Warren

As discussed over the phone, thank you for providing the evidence. I can confirm that, if you are able to submit those documents to the LPA as evidence, UU should then be re-consulted at planning where we can look to remove our objection to the discharge of conditions.

If I can be of any further assistance please do get in touch.

Kind Regards

If you have received a great service today why not tell us?
Visit: unitedutilities.com/wow

Conor Donaghy
Developer Engineer
Developer Services & Metering
T: 01925 429097
unitedutilities.com

---------- Original Message ----------
From: seweradoptions@uuplc.co.uk [seweradoptions@uuplc.co.uk]
Sent: 11/03/2025 15:04
To: warren@seace.co.uk
Subject: RE: 7 Chapel Street, Levenshulme - CDN/24/1196 - DC/25/59

Good Afternoon,

Many thanks for your email.

I can confirm that I have now sent this across to Conor Donaghy who will respond on or before 18.03.2025.

Kind Regards

Jordan Houghton
Developer Engineer
Developer Services & Metering

Developer Engineer
Developer Services & Metering
Customer Services
T: 01925 429091
unitedutilities.com

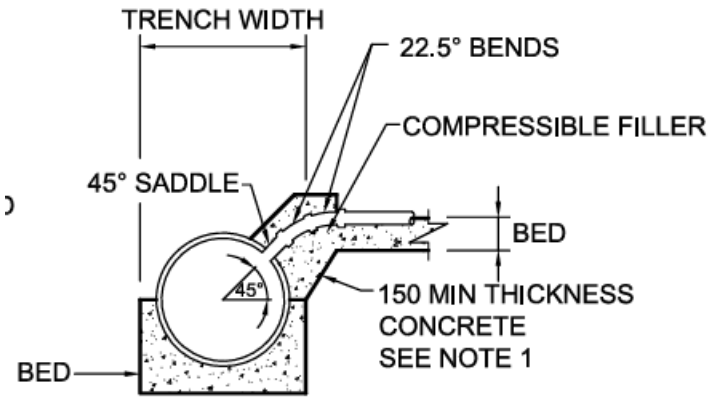
If you have received a great service today why not tell us?
Visit: unitedutilities.com/wow

---------- Original Message ----------
From: Warren Allsopp [warren@seace.co.uk]
Sent: 11/03/2025 11:41
To: seweradoptions@uuplc.co.uk
Subject: RE: 7 Chapel Street, Levenshulme - CDN/24/1196 - DC/25/59

Dear Connor

Thanks for your email.

I do not believe that the saddle connection can be slackened. Given the size of culvert and material a 45 degree connection is the only one viable. The sketch issued previously was based on the UU sadlle connection detail as below.



SHALLOW SADDLE CONNECTION

Please see attached email from MCC in which they refused our connection to the WC, please see bullet point 3 regarding flow rates

I would appreciate it if you can give me a call to discuss the above response as I am under increasing pressure to wrap things up, thanks

Regards

Warren Allsopp

M 07976310054

For and on behalf of SEA Consulting Engineers Ltd

[Image is no longer available]

This email (including any attachments) contains confidential information. If you are not the intended recipient please notify us immediately by replying to this email and delete this email from your system without reading, using, copying or disseminating it or placing any reliance upon its contents. Email is not a secure medium and we cannot accept liability for any breaches of confidence arising through use of email. Any opinions expressed in this email (including any attachments) are those of the author and do not necessarily reflect the views of SEA CE Limited. We will not accept responsibility for any commitments made by our employees outside the scope of our business. We do not warrant the accuracy or completeness of such information. Viruses: please note that we do not accept any liability for viruses and it is your responsibility to scan the attachments (if any) using suitable anti-virus software.

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>
Sent: 10 March 2025 11:39
To: Warren Allsopp <warren@seace.co.uk>
Subject: RE: 7 Chapel Street, Levenshulme - CDN/24/1196 - DC/25/59

Good Morning Warren

I hope you had a good weekend

After reviewing the provided evidence please can you confirm if the 45 degree saddle connection can be slackened to accommodate the connection to the WC.

Are you able to provide any correspondence from the LLFA stating that they would enforce a 1l/s discharge rate which would make the development unviable.

Kind Regards
If you have received a great service today why not tell us?
Visit: unitedutilities.com/wow

[Image is no longer available]

Conor Donaghy
Developer Engineer
Developer Services & Metering
T: 01925 429097
unitedutilities.com

---------- Original Message ----------
From: seweradoptions@uuplc.co.uk [seweradoptions@uuplc.co.uk]
Sent: 03/03/2025 13:26
To: warren@seace.co.uk
Subject: RE: 7 Chapel Street, Levenshulme - CDN/24/1196 - DC/25/59

Good Afternoon,

Many thanks for your email.

I can confirm that I have now sent this across to Conor Donaghy who will respond on or before 10.03.2025.

Kind Regards

Jordan Houghton
Developer Engineer
Developer Services & Metering
Customer Services
T: 01925 429091
unitedutilities.com

If you have received a great service today why not tell us?
Visit: unitedutilities.com/wow

---------- Original Message ----------
From: Warren Allsopp [warren@seace.co.uk]
Sent: 03/03/2025 13:16
To: seweradoptions@uuplc.co.uk
Subject: RE: 7 Chapel Street, Levenshulme - CDN/24/1196 - DC/25/59

Dear Connor

Further to our recent conversation we have below provided further evidence on why surface water flow is not achievable to the culverted watercourse as the original acceptance from UU via Marcus jones (see attached email)

The watercourse is a 900mm brick culvert which following our survey has been deemed to have a depth to IL of 2.04m as per the attached drawing by red laser. At a possible point of connection the ground is 52.350 which equates to an IL of 50.310. Given the size of the culvert and its material a 45-degree saddle connection would be the only appropriate type of connection. Given this the IL of the connection based on the attached sketch is 1.0m above the existing culvert IL, this provides an IL of 51.310 for the site connection.

The current design ILs are based on providing 750mm of cover to the attenuation tank and based on the above connection Il would require the proposed ground levels to be lifted by 680mm and the lowest point of the site (to the north) by 880mm (from existing ground levels) this is deemed to be excessive and makes an outfall via gravity not possible.

You have mentioned the use of alternative attenuation, however the only possible alternative is oversized pipework, there is no room for an offline tank. Based on the current design the total volume of storge required is 35.35m3. Assuming 600mm cover to any oversized pipe the largest pipe we could use is 525mm, which would require a total length of 525mm pipe work of 150m which we cannot fit on this site and would still require a significant lifting of the site to achieve a gravity connection.

Given the site does not currently connect to the watercourse means that the LLFA would also insist on a much lower flow rate than the current design, likely 1.0l/s, down from 2.7l./s. This will double to triple the required attenuation which again hinders viability.

The existing was a commercial site with roofs and hard surfaces. There were 4 connections from the site into the existing combined network. We've attached a drawing (E11) which presents the existing roof area and existing drainage within and surrounding the site. This drawing indicates the existing roofs had an area of 835m2 which based on a rainfall intensity of 50mm/hr equates to a flow rate of 11.6l/s. Proposals are to restrict flow to 2.7l/s therefore providing the reduction in surface water flows you have mentioned.

We ask based on the above you re-consider the site outfall into the combined system. Please give me a call to discuss once you have reviewed

Regards

Warren Allsopp

M 07976310054

For and on behalf of SEA Consulting Engineers Ltd

[Image is no longer available]

This email (including any attachments) contains confidential information. If you are not the intended recipient please notify us immediately by replying to this email and delete this email from your system without reading, using, copying or disseminating it or placing any reliance upon its contents. Email is not a secure medium and we cannot accept liability for any breaches of confidence arising through use of email. Any opinions expressed in this email (including any attachments) are those of the author and do not necessarily reflect the views of SEA CE Limited. We will not accept responsibility for any commitments made by our employees outside the scope of our business. We do not warrant the accuracy or completeness of such information. Viruses: please note that we do not accept any liability for viruses and it is your responsibility to scan the attachments (if any) using suitable anti-virus software.

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>
Sent: 19 February 2025 08:19
To: Warren Allsopp <warren@seace.co.uk>
Subject: RE: 7 Chapel Street, Levenshulme - CDN/24/1196 - DC/25/59

Good Morning Warren

I hope you're well

After reviewing the information provided and your plans, a depth of 2m for the culverted watercourse seems like an acceptable depth for a point of discharge, especially so close to the site. Therefore we'd expect the design of the drainage system to discharge to the watercourse by any means, that may include swapping the inline attenuation tanks for upsized sewers and an offline attenuation tank if that would resolve it?

Due to the funding and works UU have planned in order to reduce SW and storm overflows from operating, we cannot be seen allowing a discharge to a combined sewer based of your current design. Therefore please can you alter your design so that it is able to discharge to the culverted watercourse.

Kind Regards
If you have received a great service today why not tell us?
Visit: unitedutilities.com/wow

Conor Donaghy
Developer Engineer
Developer Services & Metering

[Image is no longer available]

T: 01925 429097
unitedutilities.com

---------- Original Message ----------
From: seweradoptions@uuplc.co.uk [seweradoptions@uuplc.co.uk]
Sent: 11/02/2025 11:48
To: warren@seace.co.uk
Subject: RE: 7 Chapel Street, Levenshulme - CDN/24/1196 - DC/25/59

Hi Warren,

This has been passed to one of our engineers who will respond within 5 working days.

Kind regards,

[Image is no longer available]

Eireann Thompson
Developer Engineer
Developer Services & Metering
01925 429086
unitedutilities.com

If you have received a great service today why not tell us?
Visit: unitedutilities.com/wow

---------- Original Message ----------
From: Warren Allsopp [warren@seace.co.uk]
Sent: 11/02/2025 11:38
To: seweradoptions@uuplc.co.uk
Subject: 7 Chapel Street, Levenshulme - CDN/24/1196 - DC/25/59

Good Morning

I have been asked to get in contact with you regarding the above planning condition application LPA reference CDN/24/1196, your Reference DC/25/59

We originally applied for S106 connection approval for the scheme but this was rejected as

we had not discharged the planning condition and we needed to investigate the surface water culvert within Chapel street. We carried out a survey of the culvert and have found that it is too shallow for a gravity connection, this information was submitted and discussed with the connections team and we had confirmation that based on this that a connection to the combined sewers would be acceptable. See the attached emails with the survey results and acceptance of a combined connection.

This information was submitted to the LPA as part of the planning condition and they have come back requesting confirmation that the flow rate is acceptable to UU.

Our proposals would indicate a surface water flow restriction of 2.7l/s, this is based on providing a minimum aperture of 75mm for the flow control device for maintenance purposes. The existing site is impermeable and drained via the existing combined sewers. The total existing area is 1795m2 which equates to a brownfield flow rate of approx. 25l/s, we are therefore providing an 80% betterment on the existing flows.

So we go back to the LPA can you please confirm acceptance of this flow rate. I have attached the current drainage layout for information which is what has been submitted to the LPA

Please call me should you wish to discuss

Regards

Warren Allsopp

M 07976310054

For and on behalf of SEA Consulting Engineers Ltd

[Image is no longer available]

This email (including any attachments) contains confidential information. If you are not the intended recipient please notify us immediately by replying to this email and delete this email from your system without reading, using, copying or disseminating it or placing any reliance upon its contents. Email is not a secure medium and we cannot accept liability for any breaches of confidence arising through use of email. Any opinions expressed in this email (including any attachments) are those of the author and do not necessarily reflect the views of SEA CE Limited. We will not accept responsibility for any commitments made by our employees outside the scope of our business. We do not warrant the accuracy or completeness of such information. Viruses: please note that we do not accept any liability for viruses and it is your responsibility to scan the attachments (if any) using suitable anti-virus software.

The information contained in this e-mail is intended only for the individual to whom it is addressed. It may contain legally privileged or confidential information or otherwise be exempt from disclosure. If you have received this Message in error or there are any problems, please notify the sender immediately and delete the message from your computer. You must not use, disclose, copy or alter this message for any unauthorised purpose. Neither United Utilities Group PLC nor any of its subsidiaries will be liable for any direct, special, indirect or consequential damages as a result of any virus being passed on, or arising from the alteration of the contents of this message by a third party.

United Utilities Group PLC, Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP
Registered in England and Wales. Registered No 6559020

www.unitedutilities.com
www.unitedutilities.com/subsidiaries

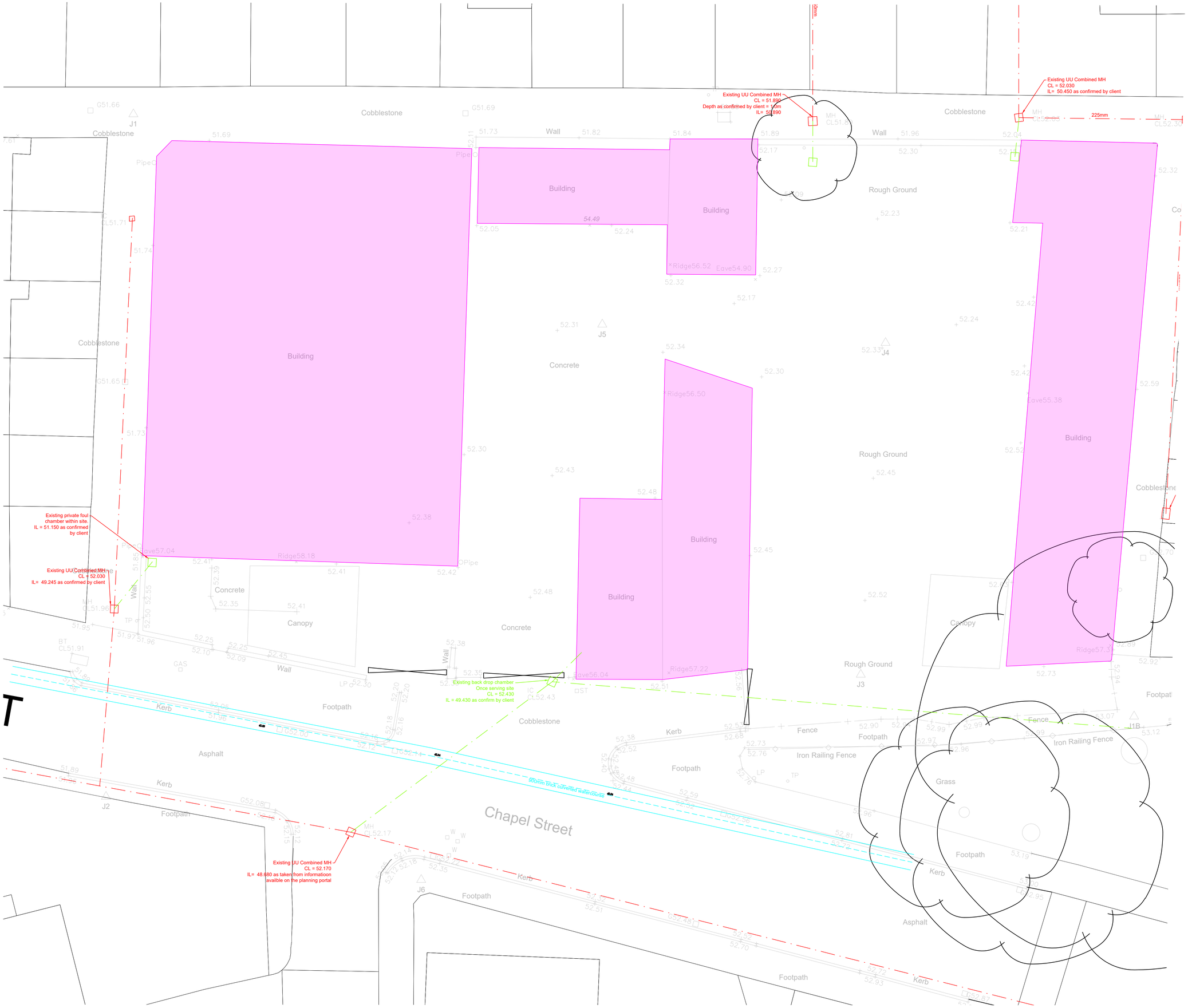


CONSULTING ENGINEERS
[CONSULTING CIVIL & STRUCTURAL ENGINEERS]
T: 07976 310054
E:warren@seace.co.uk

Client	Burke Developments
Project	Chapel Street, Levenshulme, Manchester
Title	Drainage Strategy – Rev C

Appendix I

Existing Drained Areas
SEA drawing 00142/E11



GENERAL

Do not scale from this drawing.

All dimensions are in millimetres unless noted otherwise.

All setting out to architects drawings.

Drawing to be read in conjunction with all other SEA drawings and architects drawings.

This scheme has been designed using the survey information provided by others. It shall be the responsibility of the contractor to verify levels, boundaries etc prior to commencing any works on site. SEA Structural Engineers Ltd. shall not accept any responsibility for errors resulting from the survey.

All setting to be in accordance with the Architect's drawings, the Contractor is to check all dimensions and levels prior to commencement of work and report any discrepancies to the Engineer, including any encountered during construction works.

All dimensions should be checked on site prior to construction. Please notify the Engineer of any discrepancies before commencing or continuing any work.

HEALTH, SAFETY & THE ENVIRONMENT

In accordance with the Health and Safety at Work etc Act 1973 and the Construction (Design and Management) Regulations 2015, designs and details on this drawing have been the subject of a Designers Risk Assessment, to identify risks in construction, use, or demolition of the scheme.

It is not considered necessary for Designers to highlight obvious and/or common risks (such as deep excavations, manual handling and working around heavy plant) which Contractors should be familiar with.

So as far as is reasonably practicable, risks inherent in the design have been eliminated. Where it has been considered that elimination of a risk (or part of a risk) is not reasonably practicable, it has been reduced.

Significant unusual residual risks are identified below, beside the measures which have been adopted to eliminate and/or reduce them:

- Existing services unknown must be confirmed prior to construction

DRAWING KEY:

Existing drained area = 835m²
Based on 50mm/hr equates to a flow rate of 11.6l/s

Existing UU combined drainage

Existing Combined drainage Not UU

Rev.	Date	By	Description

SEA
CONSULTING ENGINEERS
[CONSULTING CIVIL & STRUCTURAL ENGINEERS]

E: warren@seace.co.uk
T: 07976310054

PROJECT
RESIDENTIAL DEVELOPMENT
CHAPEL LANE
LEVENHULME, MANCHESTER

DRAWING
EXISTING DRAINED AREAS

SCALE: 1:100@A1	DATE: 28.02.25
DRAWN BY: WRA	REV: -

STATUS: FOR INFORMATION

DWG No: 00142/E11 -

CONSULTING ENGINEERS
[CONSULTING CIVIL & STRUCTURAL ENGINEERS]
T: 07976 310054
E:warren@seace.co.uk

Client	Burke Developments
Project	Chapel Street, Levenshulme, Manchester
Title	Drainage Strategy – Rev C

Appendix J

Drained Area Plan

SEA Drawing 00142/E01A

GENERAL

Do not scale from this drawing.

All dimensions are in millimetres unless noted otherwise.

All setting out to architects drawings.

Drawing to be read in conjunction with all other SEA drawings and architects drawings.

This scheme has been designed using the survey information provided by others. It shall be the responsibility of the contractor to verify levels, boundaries etc prior to commencing any works on site. SEA Structural Engineers Ltd. shall not accept any responsibility for errors resulting from the survey.

All setting to be in accordance with the Architect's drawings, the Contractor is to check all dimensions and levels prior to commencement of work and report any discrepancies to the Engineer, including any encountered during construction works.

All dimensions should be checked on site prior to construction. Please notify the Engineer of any discrepancies before commencing or continuing any work.

HEALTH, SAFETY & THE ENVIRONMENT

In accordance with the Health and Safety at Work etc Act 1973 and the Construction (Design and Management) Regulations 2015, designs and details on this drawing have been the subject of a Designers Risk Assessment, to identify risks in construction, use, or demolition of the scheme.

It is not considered necessary for Designers to highlight obvious and/or common risks (such as deep excavations, manual handling and working around heavy plant) which Contractors should be familiar with.

So as far as is reasonably practicable, risks inherent in the design have been eliminated. Where it has been considered that elimination of a risk (or part of a risk) is not reasonably practicable, it has been reduced.

Significant unusual residual risks are identified below, beside the measures which have been adopted to eliminate and/or reduce them:

- Existing services unknown must be confirmed prior to construction

DRAWING KEY:

Proposed Impermeable Area
Roof areas = 435m² + 10% for urban creep = 480m²
Private drive = 190m²
Access Road = 400m²
Total = 1070m²

Rev.	Date	By	Description
A	28.10.24	WRA	Site Plan Amended

SEA
CONSULTING ENGINEERS
[CONSULTING CIVIL & STRUCTURAL ENGINEERS]
E: warren@seace.co.uk
T: 07976310054

PROJECT
RESIDENTIAL DEVELOPMENT
CHAPEL LANE
LEVENHULME, MANCHESTER

DRAWING
PROPOSED DRAINED AREAS

SCALE: 1:200@A1	DATE: 20.03.2024
DRAWN BY: WRA	REV: A

STATUS: PRELIMINARY

DWG No: 00142/E01 | A

CONSULTING ENGINEERS
[CONSULTING CIVIL & STRUCTURAL ENGINEERS]
T: 07976 310054
E:warren@seace.co.uk

Client	Burke Developments
Project	Chapel Street, Levenshulme, Manchester
Title	Drainage Strategy – Rev C

Appendix K

Greenfield Runoff Calculations

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Warren Allsopp
Site name:	Chapel St, Levenshulme
Site location:	Manchester

Site Details

Latitude:	53.44458° N
Longitude:	2.18983° W
Reference:	1060808593
Date:	Mar 06 2024 13:08

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 0.103

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	878	878
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	0.65	0.65
1 in 1 year (l/s):	0.56	0.56
1 in 30 years (l/s):	1.1	1.1
1 in 100 year (l/s):	1.35	1.35
1 in 200 years (l/s):	1.54	1.54

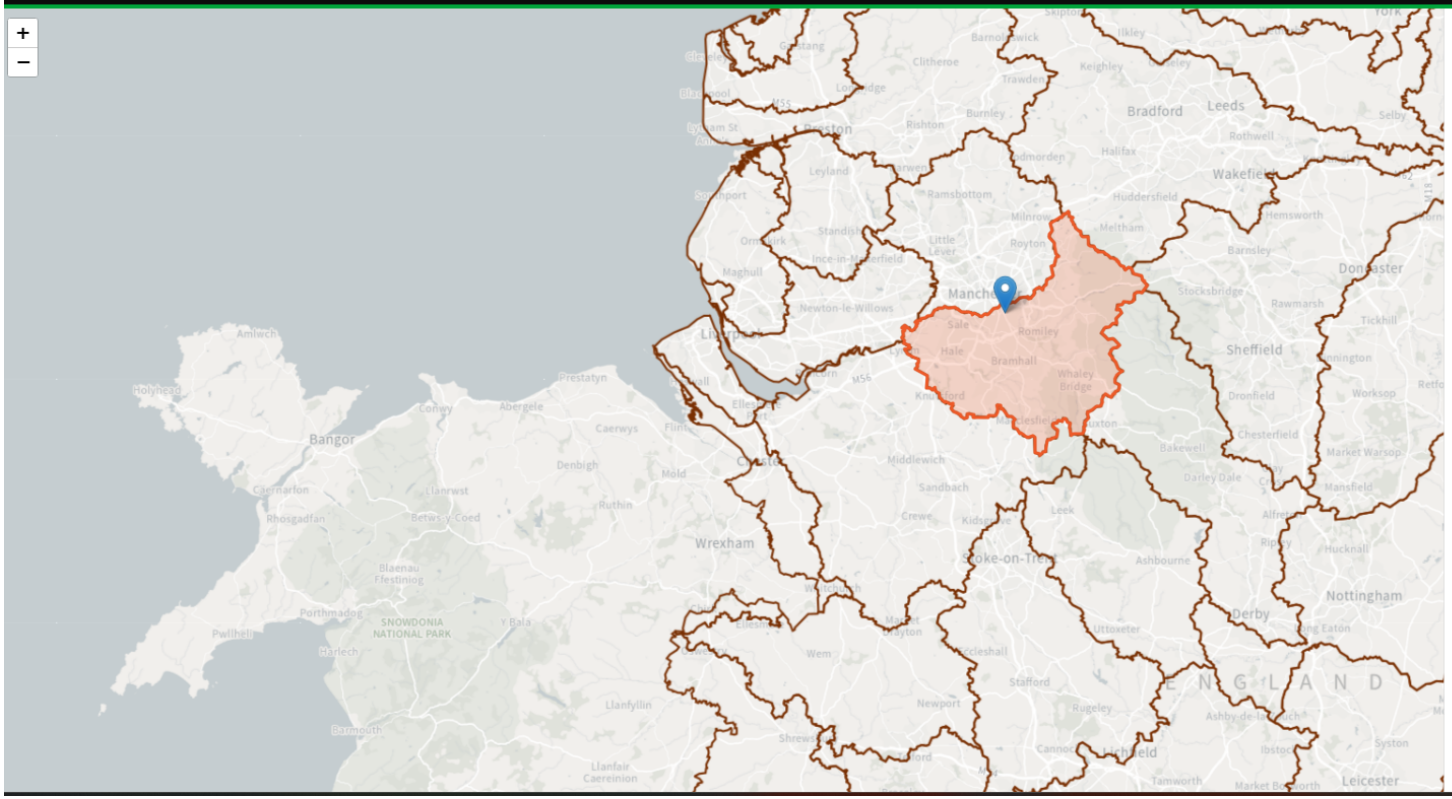
This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the

CONSULTING ENGINEERS
[CONSULTING CIVIL & STRUCTURAL ENGINEERS]
T: 07976 310054
E:warren@seace.co.uk

Client	Burke Developments
Project	Chapel Street, Levenshulme, Manchester
Title	Drainage Strategy – Rev C

Appendix L

EA Climate Change Allowance Extract



Upper Mersey Management Catchment peak rainfall allowances

3.3% annual exceedance rainfall event

Epoch

	Central allowance	Upper end allowance
2050s	20%	35%
2070s	30%	40%

1% annual exceedance rainfall event

Epoch

	Central allowance	Upper end allowance
2050s	25%	40%
2070s	30%	45%

*Use '2050s' for development with a lifetime up 2060 and use the 2070s epoch for development with a lifetime between 2061 and 2125.

CONSULTING ENGINEERS
[CONSULTING CIVIL & STRUCTURAL ENGINEERS]
T: 07976 310054
E:warren@seace.co.uk

Client	Burke Developments
Project	Chapel Street, Levenshulme, Manchester
Title	Drainage Strategy – Rev C

Appendix M

Storm Calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.000
CV	0.750	Preferred Cover Depth (m)	0.450
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	550.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.007	5.00	52.300	100	387473.048	394223.159	0.550
2	0.006	5.00	52.300	100	387473.048	394208.730	0.550
3	0.009	5.00	52.300	450	387473.048	394215.839	0.940
4	0.003	5.00	52.600	450	387501.327	394201.963	0.750
5	0.004	5.00	52.630	450	387493.989	394201.963	1.125
6	0.005	5.00	52.300	450	387479.088	394201.252	0.700
7	0.013	5.00	52.425	1500	387488.831	394201.527	1.735
8	0.006	5.00	52.450	450	387501.367	394215.085	0.850
9	0.005	5.00	52.520	450	387493.954	394215.087	1.033
10	0.013	5.00	52.275	1200	387488.831	394215.834	1.435
11	0.005	5.00	52.300	450	387479.307	394230.216	0.700
12	0.013	5.00	52.140	1200	387488.831	394229.246	1.255
13	0.006	5.00	52.335	450	387497.658	394229.906	0.878
14	0.012	5.00	52.450	100	387507.985	394200.930	0.550
15			52.450	450	387507.985	394229.906	0.840
C1			52.150	450	387486.822	394193.330	1.520

Links (Input)

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
3.000	1	3	7.320	0.600	51.750	51.360	0.390	18.8	100	5.07	51.7
4.000	2	3	7.109	0.600	51.750	51.360	0.390	18.2	100	5.07	51.7
3.001	3	10	15.783	0.600	51.360	51.040	0.320	49.3	100	5.31	50.8
6.000	4	5	7.338	0.600	51.850	51.505	0.345	21.3	100	5.07	51.7
6.001	5	7	5.176	0.600	51.505	50.990	0.515	10.1	100	5.11	51.6
7.000	6	7	9.747	0.600	51.600	50.990	0.610	16.0	100	5.08	51.7
1.005	7	C1	8.440	0.600	50.690	50.630	0.060	140.7	300	6.53	46.3
5.000	8	9	7.413	0.600	51.600	51.487	0.113	65.6	100	5.13	51.5
5.001	9	10	5.177	0.600	51.487	51.040	0.447	11.6	100	5.17	51.3
1.004	10	7	14.307	0.600	50.840	50.790	0.050	286.1	300	6.42	46.7
2.000	11	12	9.573	0.600	51.600	51.085	0.515	18.6	100	5.09	51.6
1.003	12	10	13.412	0.600	50.885	50.840	0.045	300.0	300	6.17	47.6
1.002	13	12	8.852	0.600	51.457	51.035	0.422	21.0	150	5.92	48.4
1.000	14	15	28.976	0.600	51.900	51.610	0.290	99.9	100	5.63	49.6
1.001	15	13	10.327	0.600	51.610	51.507	0.103	100.0	100	5.85	48.7

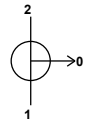
Flow+ v12.0 Copyright © 1988-2024 Causeway Technologies Ltd

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
3.000	7.320	18.8	100	Circular	52.300	51.750	0.450	52.300	51.360	0.840
4.000	7.109	18.2	100	Circular	52.300	51.750	0.450	52.300	51.360	0.840
3.001	15.783	49.3	100	Circular	52.300	51.360	0.840	52.275	51.040	1.135
6.000	7.338	21.3	100	Circular	52.600	51.850	0.650	52.630	51.505	1.025
6.001	5.176	10.1	100	Circular	52.630	51.505	1.025	52.425	50.990	1.335
7.000	9.747	16.0	100	Circular	52.300	51.600	0.600	52.425	50.990	1.335
1.005	8.440	140.7	300	Circular	52.425	50.690	1.435	52.150	50.630	1.220
5.000	7.413	65.6	100	Circular	52.450	51.600	0.750	52.520	51.487	0.933
5.001	5.177	11.6	100	Circular	52.520	51.487	0.933	52.275	51.040	1.135
1.004	14.307	286.1	300	Circular	52.275	50.840	1.135	52.425	50.790	1.335
2.000	9.573	18.6	100	Circular	52.300	51.600	0.600	52.140	51.085	0.955
1.003	13.412	300.0	300	Circular	52.140	50.885	0.955	52.275	50.840	1.135
1.002	8.852	21.0	150	Circular	52.335	51.457	0.728	52.140	51.035	0.955
1.000	28.976	99.9	100	Circular	52.450	51.900	0.450	52.450	51.610	0.740
1.001	10.327	100.0	100	Circular	52.450	51.610	0.740	52.335	51.507	0.728

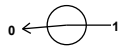
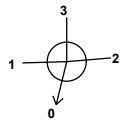
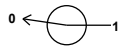
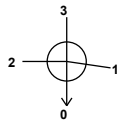
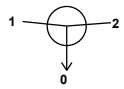
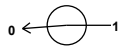
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
3.000	1	100	Manhole	Adoptable	3	450	Manhole	Adoptable
4.000	2	100	Manhole	Adoptable	3	450	Manhole	Adoptable
3.001	3	450	Manhole	Adoptable	10	1200	Manhole	Adoptable
6.000	4	450	Manhole	Adoptable	5	450	Manhole	Adoptable
6.001	5	450	Manhole	Adoptable	7	1500	Manhole	Adoptable
7.000	6	450	Manhole	Adoptable	7	1500	Manhole	Adoptable
1.005	7	1500	Manhole	Adoptable	C1	450	Manhole	Adoptable
5.000	8	450	Manhole	Adoptable	9	450	Manhole	Adoptable
5.001	9	450	Manhole	Adoptable	10	1200	Manhole	Adoptable
1.004	10	1200	Manhole	Adoptable	7	1500	Manhole	Adoptable
2.000	11	450	Manhole	Adoptable	12	1200	Manhole	Adoptable
1.003	12	1200	Manhole	Adoptable	10	1200	Manhole	Adoptable
1.002	13	450	Manhole	Adoptable	12	1200	Manhole	Adoptable
1.000	14	100	Manhole	Adoptable	15	450	Manhole	Adoptable
1.001	15	450	Manhole	Adoptable	13	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	387473.048	394223.159	52.300	0.550	100	 0	3.000	51.750	100
2	387473.048	394208.730	52.300	0.550	100	 0	4.000	51.750	100
3	387473.048	394215.839	52.300	0.940	450	 1	4.000	51.360	100
						2	3.000	51.360	100
						0	3.001	51.360	100

Flow+ v12.0 Copyright © 1988-2024 Causeway Technologies Ltd

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
4	387501.327	394201.963	52.600	0.750	450				
						0	6.000	51.850	100
5	387493.989	394201.963	52.630	1.125	450		1	6.000	51.505	100
							0	6.001	51.505	100
6	387479.088	394201.252	52.300	0.700	450				
						0	7.000	51.600	100
7	387488.831	394201.527	52.425	1.735	1500		1	7.000	50.990	100
							2	6.001	50.990	100
							3	1.004	50.790	300
							0	1.005	50.690	300
8	387501.367	394215.085	52.450	0.850	450				
						0	5.000	51.600	100
9	387493.954	394215.087	52.520	1.033	450		1	5.000	51.487	100
							0	5.001	51.487	100
10	387488.831	394215.834	52.275	1.435	1200		1	5.001	51.040	100
							2	3.001	51.040	100
							3	1.003	50.840	300
							0	1.004	50.840	300
11	387479.307	394230.216	52.300	0.700	450				
						0	2.000	51.600	100
12	387488.831	394229.246	52.140	1.255	1200		1	2.000	51.085	100
							2	1.002	51.035	150
							0	1.003	50.885	300
13	387497.658	394229.906	52.335	0.878	450		1	1.001	51.507	100
							0	1.002	51.457	150
14	387507.985	394200.930	52.450	0.550	100				
						0	1.000	51.900	100
15	387507.985	394229.906	52.450	0.840	450		1	1.000	51.610	100
							0	1.001	51.610	100
C1	387486.822	394193.330	52.150	1.520	450		1	1.005	50.630	300

Flow+ v12.0 Copyright © 1988-2024 Causeway Technologies Ltd

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	0.750	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	0.840	Additional Storage (m³/ha)	20.0		

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	45	0	0

Node 7 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	50.690	Product Number	CTL-SHE-0075-2700-1250-2700
Design Depth (m)	1.250	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.7	Min Node Diameter (mm)	1200

Node 10 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	50.850
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	206

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	32.0	0.0	0.500	32.0	0.0	0.501	0.0	0.0

Node 7 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	50.805
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	232

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	34.0	0.0	0.500	34.0	0.0	0.501	0.0	0.0

Flow+ v12.0 Copyright © 1988-2024 Causeway Technologies Ltd

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	11	51.767	0.017	0.9	0.0045	0.0000	OK
15 minute summer	2	10	51.766	0.016	0.8	0.0036	0.0000	OK
15 minute winter	3	10	51.400	0.040	2.9	0.0141	0.0000	OK
15 minute winter	4	11	51.862	0.012	0.4	0.0029	0.0000	OK
15 minute winter	5	11	51.520	0.015	0.9	0.0035	0.0000	OK
15 minute winter	6	10	51.615	0.015	0.7	0.0044	0.0000	OK
30 minute winter	7	26	50.899	0.209	8.7	3.4372	0.0000	OK
15 minute summer	8	10	51.623	0.023	0.8	0.0068	0.0000	OK
15 minute winter	9	10	51.507	0.020	1.5	0.0051	0.0000	OK
15 minute winter	10	13	50.909	0.069	10.3	1.9088	0.0000	OK
15 minute winter	11	10	51.615	0.015	0.7	0.0046	0.0000	OK
15 minute winter	12	11	50.940	0.055	4.5	0.0736	0.0000	OK
15 minute winter	13	11	51.482	0.025	2.2	0.0074	0.0000	OK
15 minute winter	14	10	51.935	0.035	1.6	0.0156	0.0000	OK
15 minute winter	15	11	51.645	0.035	1.6	0.0056	0.0000	OK
15 minute summer	C1	1	50.630	0.000	2.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	3.000	3	0.9	0.504	0.064	0.0140	
15 minute summer	2	4.000	3	0.8	0.445	0.055	0.0129	
15 minute winter	3	3.001	10	2.8	0.968	0.323	0.0454	
15 minute winter	4	6.000	5	0.4	0.630	0.030	0.0047	
15 minute winter	5	6.001	7	0.9	1.231	0.047	0.0038	
15 minute winter	6	7.000	7	0.7	0.964	0.044	0.0068	
30 minute winter	7	Hydro-Brake®	C1	2.4				8.4
15 minute summer	8	5.000	9	0.8	0.646	0.102	0.0088	
15 minute winter	9	5.001	10	1.4	1.333	0.080	0.0055	
15 minute winter	10	1.004	7	7.2	0.621	0.110	0.1981	
15 minute winter	11	2.000	12	0.7	0.913	0.047	0.0070	
15 minute winter	12	1.003	10	4.6	0.547	0.072	0.1321	
15 minute winter	13	1.002	12	2.2	1.180	0.057	0.0168	
15 minute winter	14	1.000	15	1.6	0.650	0.257	0.0708	
15 minute winter	15	1.001	13	1.5	0.632	0.254	0.0251	

Flow+ v12.0 Copyright © 1988-2024 Causeway Technologies Ltd

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	51.778	0.028	2.4	0.0073	0.0000	OK
15 minute winter	2	10	51.775	0.025	2.0	0.0057	0.0000	OK
15 minute winter	3	10	51.434	0.073	7.4	0.0258	0.0000	OK
15 minute winter	4	11	51.869	0.019	1.0	0.0045	0.0000	OK
15 minute winter	5	11	51.529	0.024	2.3	0.0056	0.0000	OK
15 minute winter	6	10	51.623	0.023	1.7	0.0069	0.0000	OK
60 minute winter	7	60	51.091	0.401	13.3	10.0310	0.0000	SURCHARGED
15 minute winter	8	10	51.637	0.037	2.0	0.0111	0.0000	OK
15 minute winter	9	10	51.520	0.033	3.7	0.0083	0.0000	OK
60 minute winter	10	60	51.091	0.251	14.1	7.6786	0.0000	OK
15 minute winter	11	10	51.624	0.024	1.7	0.0072	0.0000	OK
60 minute winter	12	60	51.091	0.206	6.4	0.2760	0.0000	OK
15 minute winter	13	11	51.498	0.041	5.8	0.0121	0.0000	OK
15 minute winter	14	10	51.960	0.060	4.0	0.0266	0.0000	OK
15 minute winter	15	11	51.672	0.062	3.9	0.0098	0.0000	OK
15 minute summer	C1	1	50.630	0.000	2.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	3.000	3	2.4	0.596	0.169	0.0291	
15 minute winter	2	4.000	3	2.0	0.527	0.139	0.0274	
15 minute winter	3	3.001	10	7.2	1.199	0.831	0.0945	
15 minute winter	4	6.000	5	1.0	0.808	0.076	0.0091	
15 minute winter	5	6.001	7	2.3	1.603	0.119	0.0074	
15 minute winter	6	7.000	7	1.7	1.257	0.110	0.0130	
60 minute winter	7	Hydro-Brake®	C1	2.5				27.5
15 minute winter	8	5.000	9	2.0	0.818	0.264	0.0179	
15 minute winter	9	5.001	10	3.6	1.720	0.203	0.0110	
60 minute winter	10	1.004	7	9.4	0.566	0.144	0.9543	
15 minute winter	11	2.000	12	1.7	1.190	0.119	0.0135	
60 minute winter	12	1.003	10	5.9	0.427	0.092	0.7689	
15 minute winter	13	1.002	12	5.8	1.541	0.149	0.0334	
15 minute winter	14	1.000	15	3.9	0.804	0.650	0.1427	
15 minute winter	15	1.001	13	3.9	0.796	0.646	0.0507	

Flow+ v12.0 Copyright © 1988-2024 Causeway Technologies Ltd

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	1	116	51.924	0.174	1.4	0.0456	0.0000	SURCHARGED
120 minute winter	2	116	51.924	0.174	1.2	0.0393	0.0000	SURCHARGED
120 minute winter	3	116	51.924	0.564	4.3	0.1979	0.0000	SURCHARGED
120 minute winter	4	118	51.922	0.072	0.6	0.0173	0.0000	OK
120 minute winter	5	118	51.922	0.417	1.4	0.0960	0.0000	SURCHARGED
120 minute winter	6	118	51.922	0.322	1.0	0.0973	0.0000	SURCHARGED
120 minute winter	7	118	51.922	1.232	11.3	18.5442	0.0000	SURCHARGED
120 minute winter	8	118	51.922	0.322	1.2	0.0966	0.0000	SURCHARGED
120 minute winter	9	118	51.922	0.435	2.2	0.1114	0.0000	SURCHARGED
120 minute winter	10	118	51.922	1.082	14.9	16.6501	0.0000	SURCHARGED
120 minute winter	11	118	51.922	0.322	1.0	0.0973	0.0000	SURCHARGED
120 minute winter	12	118	51.922	1.037	7.0	1.3877	0.0000	FLOOD RISK
120 minute winter	13	118	51.922	0.465	3.5	0.1377	0.0000	SURCHARGED
15 minute winter	14	11	52.085	0.185	7.4	0.0820	0.0000	SURCHARGED
120 minute winter	15	118	51.923	0.313	2.3	0.0497	0.0000	SURCHARGED
15 minute summer	C1	1	50.630	0.000	2.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute winter	1	3.000	3	1.4	0.559	0.100	0.0573	
120 minute winter	2	4.000	3	1.2	0.496	0.084	0.0556	
120 minute winter	3	3.001	10	4.3	1.065	0.498	0.1235	
120 minute winter	4	6.000	5	0.6	0.714	0.045	0.0509	
120 minute winter	5	6.001	7	1.4	1.294	0.073	0.0405	
120 minute winter	6	7.000	7	1.0	1.011	0.066	0.0763	
120 minute winter	7	Hydro-Brake®	C1	2.7				50.6
120 minute winter	8	5.000	9	1.2	0.739	0.161	0.0580	
120 minute winter	9	5.001	10	2.2	1.460	0.123	0.0405	
120 minute winter	10	1.004	7	6.6	0.481	0.100	1.0075	
120 minute winter	11	2.000	12	1.0	0.996	0.071	0.0749	
120 minute winter	12	1.003	10	6.2	0.380	0.098	0.9445	
120 minute winter	13	1.002	12	3.5	1.310	0.090	0.1558	
15 minute winter	14	1.000	15	6.5	0.867	1.077	0.2267	
120 minute winter	15	1.001	13	2.3	0.702	0.381	0.0808	

Flow+ v12.0 Copyright © 1988-2024 Causeway Technologies Ltd

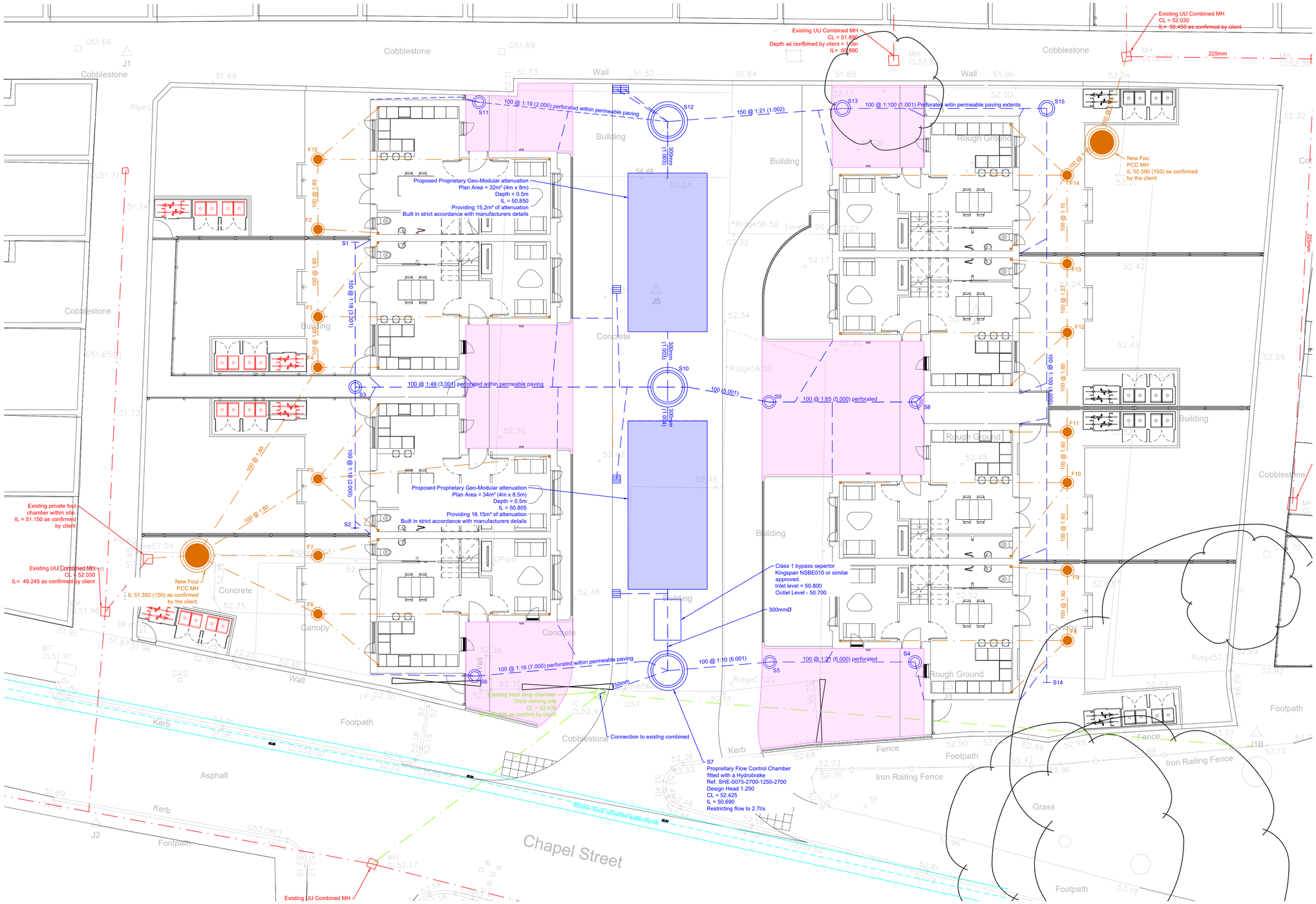
CONSULTING ENGINEERS
[CONSULTING CIVIL & STRUCTURAL ENGINEERS]
T: 07976 310054
E:warren@seace.co.uk

Client	Burke Developments
Project	Chapel Street, Levenshulme, Manchester
Title	Drainage Strategy – Rev C

Appendix N

Drainage Layouts

SEA Drawing 00142/E02F and E03B



GENERAL

Do not scale from this drawing.

All dimensions are in millimetres unless noted otherwise.

All setting out to architects drawings.

Drawing to be read in conjunction with all other SEA drawings and architects drawings.

This scheme has been designed using the survey information provided by others. It shall be the responsibility of the contractor to verify levels, boundaries etc prior to commencing any works on site. SEA Structural Engineers Ltd. shall not accept any responsibility for errors resulting from the survey.

All setting to be in accordance with the Architect's drawings, the Contractor is to check all dimensions and levels prior to commencement of work and report any discrepancies to the Engineer, including any encountered during construction works.

All dimensions should be checked on site prior to construction. Please notify the Engineer of any discrepancies before commencing or continuing any work.

HEALTH, SAFETY & THE ENVIRONMENT

In accordance with the Health and Safety at Work etc Act 1973 and the Construction (Design and Management) Regulations 2015, designs and details on this drawing have been the subject of a Designers Risk Assessment, to identify risks in construction, use, or demolition of the scheme.

It is not considered necessary for Designers to highlight obvious and/or common risks (such as deep excavations, manual handling and working around heavy plant) which Contractors should be familiar with.

So as far as is reasonably practicable, risks inherent in the design have been eliminated. Where it has been considered that elimination of a risk (or part of a risk) is not reasonably practicable, it has been reduced.

Significant unusual residual risks are identified below, beside the measures which have been adopted to eliminate and/or reduce them:

- Existing services unknown must be confirmed prior to construction

DRAINAGE NOTES

All pipe lengths and gradients are based on centre of manhole to centre of manhole.

The exact position, level, size and use of existing sewers to be confirmed on site and reported to the Engineer prior to the commencement of works.

All pipes are to be laid with level soffit's or as indicated.

All private drainage works to accord with the requirements of Building Regulations 2000, Part H (drainage and waste disposal).

The invert of each horizontal drain at the base of a stack shall be at least 450mm below the center line of the lowest branch pipe. Set the level to ensure at least 50mm clearance to footings.

All pipes to be bedded and backfilled in accordance with Part H, diagram 10. Shallow pipes shall be protected in accordance with Part H, diagram 11.

Unless otherwise stated, all private drainage to be 100mm diameter. Gradients have been shown where there are pipe capacity issues, however minimum gradients are as below:

- Surface water 100mm diameter pipes shall not be laid flatter than 1 in 100
- Surface water 150mm diameter pipes shall not be laid flatter than 1 in 150
- Foul water 100mm diameter pipes shall not be laid flatter than 1 in 40 unless there is a WC connected upstream at which it can be laid at 1 in 80
- Foul water 150mm diameter pipes shall not be laid flatter than 1 in 150 providing there are minimum of 5 WC's connected.

Pipes which run adjacent to buildings shall be installed in strict accordance with Part h, clauses 2.23 to 2.25 and diagram 8.

All private manholes and inspection chambers subject to vehicular loading must have class D400 covers and frames in accordance with BS EN 124:2015. All private manholes and inspection chambers not subject to vehicular loading must have class B125 covers and frames in accordance with BS EN 124:2015.

All drains near existing or proposed trees shall be constructed in accordance with the requirements of NHBC's practice note 3 'building near trees'.

Excavation of drain trenches must not be lower than the foundation of any nearby buildings. If the trench is within 1m of foundations, the trench needs to be filled with concrete up to the lowest level of the foundation. If the trench is further than 1m away from the foundations, the trench needs to be filled with concrete to a level below the lowest level for the building, equal to the distance from the building, less than 150mm.

An opening needs to be formed where a pipe passes through a wall, with a minimum 50mm clearance. A lintel must support the brickwork above and each side of the opening masked with rigid sheet material.

All pipework with less than 1.2m cover shall have a concrete slab to adopting water company's requirements unless in open space where 0.9m cover is acceptable. Where a pipe requires a concrete surround C20 concrete mix should be used with vertical joints formed at the face of each flexible joint using 18mm thick compressible board.

All UPVC pipes with less than 600mm cover need concrete protection. Where two pipes cross with less than 300mm separation, surround each with a C20 concrete mix. Where centered on the crossing point, extend the concrete surrounds as necessary to within 150mm of the next nearest flexible joint.

Adequate surface water drainage systems shall be provided to prevent unregulated discharge of water from a private drive onto the highway. These measures shall be implemented before the development in brought into use.

Perforated pipework to be used for distributor runs within permeable block paved areas.

Trapped road gullies to be used for all gullies designed within he access road

DRAWING KEY:

- Existing UU combined drainage
- Existing 900mmØ brick culverted watercourse
- Proposed storm drainage
- Proposed storm road gully
- Proposed permeable block paving extent . ALL PIPE WORK WITHIN PERMEABLE SUBBASE TO BE PERFORATED
- Proposed storm attenuation tank
- Proposed foul drainage
- Existing Combined drainage Not UU

CELLULAR STORAGE NOTES

The structural design of the cellular storage tanks shall be in accordance with 'Structural design of buried pipelines under various conditions of loading' BSEN 1295, 'Highways Agency Specification for Highway Works', and Sewers for Adoption, 6th Edition. The design of the cellular storage shall be undertaken by the specialist supplier who will take design responsibility.

SEA Structural Engineers takes no responsibility for the design of the cellular storage, other than providing the required capacity. Full design responsibilities for all other aspects lies with the designer of the cellular storage. Prior to construction, SEA shall be provided with all construction drawings to allow the drawings to be co-ordinated. SEA will not approve the details.

The Cellular storage shall be designed to receive:
Distributed load = 10kN/m²
Concentrated load = 100kN
Dynamic factor = 2
Material factor = 1.5
unfactored
in addition to the dead load of the ground

The cellular storage shall be designed not to float. Groundwater levels are unknown.

The contractor shall provide to the designer of the cellular storage the type of construction plant likely to be used in the area of the cellular storage prior to construction.

For online storage it is essential that pipe work through the cellular storage is provided in order to allow the system to be maintained. Any proposals that do not show how the system can be rodded will not be adequate.

It is essential that construction sediments are not allowed to enter the cellular storage system and the contractor shall provide adequate protection to the drainage network to prevent this.

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, and then six monthly
	Debris removal from catchment surface (where may cause risks to performance).	Monthly
	Where rainfall infiltrates into blocks from above, check surface of filter for blockages by silt, algae or other matte. Remove and replace surface infiltration medium as necessary.	Monthly (and after large storms)
	Remove sediment from pre-treatment structures.	Annually, or as required.
Remedial actions	Repair/ rehabilitation of inlets, outlet, overflows and vents.	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are all in good condition and operating as designed.	Annually and after large storms

The designer of the cellular storage shall provide full details of how the cellular storage shall be maintained during the life time of the system.

Installation of the cellular storage shall be carried out by competent personnel only and strictly in accordance with manufactures requirements.

Reference shall be made to CIRIA C698, site hand book for the construction of SUDS, prior to construction.

The design of the cellular storage shall demonstrate compliance with Ciria C680, structural design of modular geocell and drainage tanks

The main contractor and the supplier/installer of the cellular storage shall ensure that the design and installation are co-ordinated with other site works to include, but not limited to, understanding what construction plant may traffic close to or over the cellular storage.

Rev.	Date	By	Description
F	13.01.25	WRA	Storm outfall amended
E	25.11.24	WRA	Storm outfall amended
D	24.11.24	WRA	Interceptor added
C	28.10.24	WRA	Storm outfall route amended
B	17.10.24	WRA	Text made clearer to avoid confusion
A	11.10.24	WRA	Foul outfall routes amended

SEA
CONSULTING ENGINEERS
[CONSULTING CIVIL & STRUCTURAL ENGINEERS]
E: warren@seace.co.uk
T: 07976310054

PROJECT
RESIDENTIAL DEVELOPMENT
CHAPEL LANE
LEVENHULME, MANCHESTER

DRAWING
PROPOSED DRAINAGE LAYOUT

SCALE: 1:100@A1	DATE: 20.03.2024
DRAWN BY: WRA	REV: F

STATUS: FOR APPROVAL

DWG No: 00142/E02 F

FOUL MANHOLE SCHEDULE

Node	CL (m)	Depth (m)	Dia (mm)	MH Type	Connections	IL (m)	Dia (mm)
F1	52.300	0.625	450	PPIC	0	51.675	100
F2	52.300	0.670	450	PPIC	1	51.630	
					0	51.630	100
F3	52.300	0.726	450	PPIC	1		
					0	51.574	100
F4	52.300	0.758	450	PPIC	1	51.542	100
					0	51.542	100
F5	52.300	0.809	450	PPIC	0	51.491	100
F6	52.300	0.815	450	PPIC	0	51.485	100
F7	52.300	0.823	450	PPIC	0	51.477	100
F8	52.450	0.800	450	PPIC	0	51.650	100
F9	52.450	0.844	450	PPIC	1	51.606	100
					0	51.606	100
F10	52.450	0.899	450	PPIC	1	51.551	100
					0	51.551	100
F11	52.450	0.931	450	PPIC	1	51.519	100
					0	51.519	100
F12	52.450	0.994	450	PPIC	1	51.456	100
					0	51.456	100
F13	52.450	1.119	450	PPIC	1	51.331	100
					0	51.331	100
F14	52.450	1.565	450	PPIC	1	50.885	100
					0	50.885	100

STORM MANHOLE SCHEDULE

Node	CL (m)	Depth (m)	Dia (mm)	MH Type	Connections	Link	IL (m)	Dia (mm)
S1	52.300	0.550		Rodding Eye	0	3.000	51.750	100
S2	52.300	0.550		Rodding Eye	0	4.000	51.750	100
S3	52.300	0.940	450	PPIC	1	4.000	51.360	100
					2	3.000	51.360	100
					0	3.001	51.360	100
S4	52.600	0.750	450	PPIC	0	6.000	51.850	100
S5	52.630	1.125	450	PPIC	1	6.000	51.505	100
					0	6.001	51.505	100
S6	52.300	0.700	450	PPIC	0	4.000	51.600	100
S7	52.425	1.635	1500	PCC FLOW CONTROL CHAMBER	1	7.000	50.990	100
					2	6.001	50.990	100
					3	1.004	50.790	300
					0	1.005	50.790	150
S8	52.450	0.850	450	PPIC	0	5.000	51.600	100
S9	52.520	1.033	450	PPIC	1	5.000	51.487	100
					0	5.001	51.487	100
S10	52.275	1.435	1200	PCC MH Catchpit	1	5.001	51.040	100
					2	3.001	51.040	100
					3	1.003	50.840	300
					0	1.004	50.840	300
S11	52.300	0.700	450	PPIC	0	2.000	51.600	100
S12	52.140	1.255	1200	PCC MH Catchpit	1	2.000	51.085	100
					2	1.002	51.035	150
					0	1.003	50.885	300
S13	52.335	0.878	450	PPIC	1	1.001	51.507	100
					0	1.002	51.457	150
S14	52.450	0.550		Rodding Eye	0	1.000	51.900	100
S15	52.450	0.840	450	PPIC	1	1.000	51.610	100
					0	1.005	50.610	100

NB: FOR CLARITY CONNECTIONS FROM INTENRAL FOUL CONNETIONS, RWPS AND GULLIES ARE NOT SHOWN ON THE CONNETION MAPS ON THE ADJACENT SCHEDULE. REFERENCE SHOULD BE MADE TO THE DRAINAGE LAYOUT TO CONFIRM ALL CONNECTIONS

GENERAL

Do not scale from this drawing.

All dimensions are in millimetres unless noted otherwise.

All setting out to architects drawings.

Drawing to be read in conjunction with all other SEA drawings and architects drawings.

This scheme has been designed using the survey information provided by others. It shall be the responsibility of the contractor to verify levels, boundaries etc prior to commencing any works on site. SEA Structural Engineers Ltd. shall not accept any responsibility for errors resulting from the survey.

All setting to be in accordance with the Architect's drawings, the Contractor is to check all dimensions and levels prior to commencement of work and report any discrepancies to the Engineer, including any encountered during construction works.

All dimensions should be checked on site prior to construction. Please notify the Engineer of any discrepancies before commencing or continuing any work.

HEALTH, SAFETY & THE ENVIRONMENT

In accordance with the Health and Safety at Work etc Act 1973 and the Construction (Design and Management) Regulations 2015, designs and details on this drawing have been the subject of a Designers Risk Assessment, to identify risks in construction, use, or demolition of the scheme.

It is not considered necessary for Designers to highlight obvious and/or common risks (such as deep excavations, manual handling and working around heavy plant) which Contractors should be familiar with.

So as far as is reasonably practicable, risks inherent in the design have been eliminated. Where it has been considered that elimination of a risk (or part of a risk) is not reasonably practicable, it has been reduced.

Significant unusual residual risks are identified below, beside the measures which have been adopted to eliminate and/or reduce them:

- Existing services unknown must be confirmed prior to construction

Rev.	Date	By	Description
B	27.10.24	WRA	Storm water details amended to suit revised outfall direction
A	11.10.24	WRA	Updated to suit foul outfall changes

SEA
CONSULTING ENGINEERS
[CONSULTING CIVIL & STRUCTURAL ENGINEERS]
E: warren@seace.co.uk
T: 07976310054

PROJECT

RESIDENTIAL DEVELOPMENT
CHAPEL LANE
LEVENHULME, MANCHESTER

DRAWING

PROPOSED MANHOLE SCHEDULE

SCALE: NTS	DATE: 20.03.2024
DRAWN BY: WRA	REV: B

STATUS: FOR APPROVAL

DWG No: 00142/E03 B