# JOB NAMEMILLOM LEISURE CENTREJOB No.L2762DATEAUG '23

# DRAINAGE STRATEGY



London Bradford 20 Britton Street, London, EC1M 5TX The Paper Hall, Anne Gate, Bradford BD1 4EQ

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This report has been prepared for the sole benefit, use and information of Cumberland Council, for the purposes described and the liability of Furness Partnership Ltd. in respect of the information contained within the report will not extend to any third party.

REVISION	DATE	ISSUE STATUS	PREPARED BY	CHECKED BY
P1	11.08.23	FOR REVIEW	M.H	C.J.H

### **1** INTRODUCTION

- 1.1 This document has been prepared by Furness Partnership and sets out the proposed drainage strategy for the Millom Leisure Centre development. This strategy should be read in conjunction with the following appended documentation:
  - Roberts Limbrick Existing Site Plan: 10930-RL-XX-ZZ-DR-A-P0002
  - Discovery Surveys Ltd Utilities Scan: 5442CTS 230522 213FD
  - Roberts Limbrick Proposed Site Plan: 10930-RL-XX-ZZ-DR-A-P2001
  - Roberts Limbrick Change of Use Plan: 10930-RL-XX-ZZ-DR-A-P2002
  - Furness Partnership Existing / Proposed Impermeable Areas:
    - o L2762-FUR-XX-XX-DR-D-0901 (P1)
    - L2762-FUR-XX-XX-DR-D-0902 (P1)
    - Furness Partnership Drainage Drawings:
      - L2762-FUR-XX-XX-DR-D-0911 (P2)
      - L2762-FUR-XX-XX-DR-D-0921 (P2)
      - L2762-FUR-XX-XX-DR-D-0922 (P2)
      - o L2762-FUR-XX-XX-DR-D-0923 (P1)
      - L2762-FUR-XX-XX-DR-D-0931 (P2)
      - L2762-FUR-XX-XX-DR-D-0932 (P2)
    - United Utilities Pre-Planning Enquiry Response & Sewer Map Records
  - GEOL Ground Investigation / Soakaway Test Results Extract
  - Furness Partnership MicroDrainage Surface Water Hydraulic Calculations
  - Furness Partnership SuDS Maintenance Schedule

### 2 EXISTING SITE DETAILS & PROPOSED DEVELOPMENT

- 2.1 The existing site extends over an area of commercial land adjacent to Salthouse Rd, Millom, LA18 5AB. The site currently comprises Millom School, associated outbuildings, playgrounds, an all-weather pitch, and car parking facilities.
- 2.2 The total area within the site boundary is approx. 3.77 ha.



Fig 2.1 – Site map showing approximate development boundary

2.3 Levels within the site are generally flat with a slight fall from west to east. Levels to the west are circa 8.30m, falling to circa 6.50m to the east of the site.

2.4 The proposed development is split into 3No development zones. The main development zone involves demolishing the existing pavilion building to the east of the site and constructing a new leisure centre and car parking facilities in its place. The second development zone involves demolishing an existing outbuilding to the west of the site known as 'The Bungalow' and constructing a new extended car park in its place. The third development zone is located to the south of the site and involves constructing an extended playground area over an area of existing landscaping.

### **3 FLOOD RISK STATEMENT**

3.1 A Flood Risk Assessment has been carried out by GEOL Consultants, dated April 2023, and the reader is referred to this report for further details regarding the risk of flooding to the site. Conclusions from the report state that the site is not considered to be at significant risk from fluvial flooding as it lies wholly within a Zone 1 flood risk area. The site is also not considered to be at risk from tidal flooding, flooding from artificial sources of water (reservoirs, canals, etc.), or flooding from public sewers, and there are no records of any historical flooding. In general, the site is not shown to be affected by significant pluvial (surface water) flooding however the northeastern portion of the site lies within an area which is at risk from groundwater flooding occurring at surface so any below ground structures should be designed to be waterproof. Provided a suitable drainage strategy is implemented to accommodate the increase in post-development impermeable area, the development will not have an adverse impact on any nearby watercourses, floodplains, and areas of flood storage capacity, nor will the development result in flooding of adjacent sites.

### 4 SURFACE WATER DRAINAGE

### **EXISTING**

- 4.1 The existing site comprises brownfield (buildings / car parking / hardstanding) land.
- 4.2 The nearest watercourse is Salthouse Pool, located 30 m to the east of the site boundary.
- 4.3 United Utilities asset plans show that there are 4No combined sewers running through the site (see Fig 4.1). There are 300mm & 525mm diameter combined sewers running through the east of the site and 225mm & 900mm diameter combined sewers running through the south of the site.

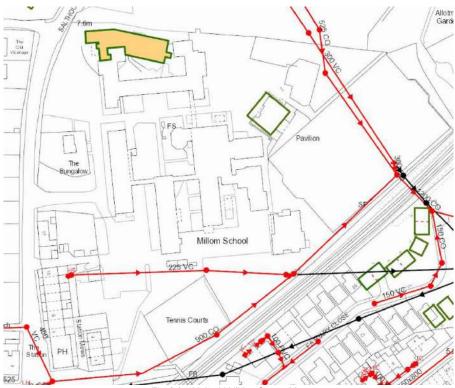


Fig 4.1 – United Utilities Sewer Map

- 4.4 A drainage survey has been carried out which shows that most of the site surface water discharges into the combined sewers to the south of the site at various locations through an existing private network. The all-weather pitch has a separate outfall into the nearby watercourse to the east. The Pavilion building to the east of the site could discharge into the 300/525mm United Utilities combined sewer or into the watercourse, however the drainage route was not able to be fully surveyed.
- 4.5 The existing impermeable area within each of the development zones is shown in Table 4.1:

Table 4.1 Existing Impermeable Areas					
Development Zone Existing Impermeable Area					
Leisure Centre	2710 m <sup>2</sup>				
Car Park Extension	300 m²				
Playground Extension	0 m²				

#### PROPOSED

- 4.6 The surface water discharge from the proposed development will be made up from the following elements:
  - Building Roof Area
  - Access Roads
  - Playground Area
- Paved Areas around new development
- Car Parking Bays

4.7 The total proposed impermeable area within each of the development zones is shown in Table 4.2:

Development Zone	Proposed Impermeable Area
Leisure Centre	3415 m²
Car Park Extension	1240 m²
Playground Extension	2345 m²

### Table 4.2 Proposed Impermeable Areas

### Surface Water Discharge Hierarchy

- 4.8 The recommended surface water discharge hierarchy set out in the CIRIA SuDS Manual is to utilise soakaways, or infiltration as the preferred option, followed by discharging to an appropriate watercourse. If these options are not feasible then the final option is to discharge to an existing surface water sewer, followed by discharge into a combined public sewer.
- 4.9 In accordance with the surface water discharge hierarchy, soakaways were initially considered for the discharge of surface water from the new development zones. Falling head tests carried out on site have shown mixed infiltration results ranging from water soaking away too quickly to record, to a rate of 1.47x10<sup>-7</sup> m/s (which would not be suitable for soakaways). BRE 365 soakaway tests are proposed for the next stage to confirm whether the site is suitable for infiltration. If infiltration is suitable then soakaways will be used for the discharge of surface water from site however, due to the mixed preliminary infiltration results, a backup discharge location for each development zone will be explored in case soakaways are not suitable.
- 4.10 If soakaways are not suitable the next step in the discharge hierarchy is to consider discharge into a watercourse. The closest watercourse is Salthouse Pool located 30 m to the east of the site boundary. As Salthouse Pool runs adjacent to the eastern site boundary a connection into this watercourse is proposed for the leisure centre site if soakaways are not suitable. It is understood that the existing all-weather pitch has a connection into this watercourse that will be utilised if possible. If the existing connection is already at capacity, then a new connection & outfall will be made into Salthouse Pool for the surface water discharge from the leisure centre development.
- 4.11 For the car park and playground development zones, it would not be feasible to connect into the Salthouse Pool as this would require crossing over 200m of built-up land within the site. Discharge of surface water into a watercourse is not therefore proposed for these development zones.
- 4.12 The next step in the discharge hierarchy is to discharge into a public surface water sewer, followed by discharge to a public combined sewer. A pre-development enquiry has been submitted to United Utilities and their response and asset maps are appended to this report. United Utilities have confirmed that the 525mm combined sewer running through the site is suitable to connect into provided the rate of discharge is restricted to match the greenfield runoff rate for each development area. The preferred connection point for the car park and playground developments is the 225mm combined sewer to the south of the site so a request has been made to United Utilities to discharge into this sewer instead. This report will be updated once a response is received and formal approval to connect into the public drainage network will be agreed with United Utilities through the submission of a sewer connection application where necessary.

### **SuDS Considerations**

- 4.13 SuDS have been considered when producing this drainage strategy to provide effective surface water treatment and slow down the rate of surface water runoff in accordance with National Planning Policy recommendations. The following sustainable drainage systems are proposed:
  - Cellular Infiltration Tanks: [subject to infiltration testing] Due to the limited green space & topography on site and low allowable discharge rate an underground tank has been selected as the most efficient method of storing surface water.
    - OR
  - Cellular Storage Tanks: Due to the limited green space & topography on site and low allowable discharge rate an
    underground tank has been selected as the most efficient method of storing surface water.

### Simple Index Approach & Maintenance Schedule

4.14 In accordance with the CIRIA SuDS Manual, to deliver adequate treatment using SuDS, the selected SuDS components should have a total pollution mitigation index (for each contaminant type) that equals or exceeds the pollution hazard index (for each contaminant type).

4.15 The land usage and pollution hazard levels for the site are shown in Table 4.3.

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Leisure Centre Roof	Low	0.3	0.2	0.05
Hardstanding & Car Parking surrounding Leisure Centre	Low	0.5	0.4	0.4
Playground Extension Development	Low	0.3	0.2	0.05
Car Park Extension Development	Medium	0.7	0.6	0.7

### Table 4.3 Pollution bazard indices for different land use classifications (CIRIA SuDS Manual)

4.16 The SuDS components used for treatment on the site and their mitigation indices are shown in Table 4.4.

#### Table 4.4 Indicative SuDS mitigation indices for discharges to surface waters (CIRIA SuDS Manual)

	Mitigation indices					
Land use to be treated	Type of SuDS treatment component	TSS	Metals	Hydrocarbons		
Car Park Extension Development	Proprietary Oil Separator - Designed & t contaminant types to acceptable levels f return period, for inflow concentrations n	or frequent e	vents up to th	ne 1 in 1 year		

- 4.17 Discharge of surface water from commercial roofs & areas without vehicular access (i.e., playground extension) is deemed to have a low pollution risk and does not therefore require any additional treatment when discharging into a surface water body according to the CIRIA SuDS Manual, however catchpit manholes have been provided within the drainage network to increase network resiliency. The access road and car parking bays around the leisure centre development are classed as low risk due to the infrequent vehicle use and relatively small area (<800m<sup>2</sup> & < 50 spaces). It is proposed to treat this area using trapped gullies/channels in accordance with best practice guidelines.
- 4.18 Surface water runoff from the car park development area, which is classed as medium risk, will be collected in trapped gullies/channels and pass through a class 1 bypass separator to remove oils and silts in accordance with guidance set out in the CIRIA SuDS Manual.
- 4.19 As the total SuDS mitigation index  $\geq$  pollution hazard index for each proposed land use within the site, the proposed treatment is sufficient.
- 4.20 A suitable maintenance plan for all SuDS features can be found in the Appendix and should be developed and implemented by the operator once the drainage proposals have been installed to ensure sufficient operation and treatment is maintained throughout the design life of the development.

Design Criteria & Summary

- 4.21 If additional soakaway testing is not successful, then the surface water from the proposed leisure centre development will discharge into Salthouse Pool to the east of the site and the car park and playground extension areas will discharge into the United Utilities 225mm combined sewer ruing through the south of the site.
- 4.22 It is proposed that the leisure centre development surface water discharge rate is limited to greenfield runoff rate (Qbar) for all rainfall events up to and including the 1 in 100-year return period in accordance with guidance in the North West England SuDS Pro-forma. Refer to Table 4.5 & Appendix E for details of greenfield runoff rate calculations.

#### **Development Zone** Proposed Impermeable Area Greenfield Runoff Rate (Qbar) Leisure Centre 3415 m<sup>2</sup> 2.7 l/s Playground Extension 2345 m<sup>2</sup> 1.9 l/s

- Table 4.5 Proposed Greenfield Runoff Rates
- 4.23 It is also proposed that the playground extension development surface water discharge rate is limited to greenfield runoff rate (Qbar) for all rainfall events up to and including the 1 in 100-year return period in accordance with the agreement with United Utilities and guidance in the North West England SuDS Pro-forma. Refer to Table 4.5 & Appendix E for details of greenfield runoff rate calculations.

4.24 As the car park development is located on a brownfield site it is proposed to limit the surface water discharge rate from this area to provide a 50% betterment on the existing site 1 in 1-year discharge rate for all rainfall events up to and including the 1 in 100-year return period. This is because the calculated greenfield runoff rate for this area is < 1I/s and would therefore require a flow control device with an orifice diameter less than 50mm which would introduce the risk of blockages. A request has been made to United Utilities to allow a 50% betterment for this area of site and this report will be updated once a response is received.</p>

Table 4.6 Care Park Extension Discharge Summary								
Development Zone	Existing Impermeable Area	Existing Discharge Rate	Proposed Discharge Rate					
Car Park Extension	300 m²	2.9 I/s (Modified Rational Method)	1.4 l/s (>50% betterment)					

- 4.25 Cellular infiltration/attenuation tanks (subject to additional infiltration testing) are proposed to accommodate all surface water discharge from the site and will have sufficient capacity to attenuate flows up to and including the 1 in 100-year return period plus a 40% allowance for climate change.
- 4.26 All private surface water drains will be designed and constructed in accordance with BS EN 752:2017 and Building Regulations Approved Document H.

### 5 FOUL WATER DRAINAGE

### **EXISTING**

- 5.1 The existing site foul drainage infrastructure comprises sewage from the existing school buildings.
- 5.2 United Utilities asset plans show that there are 4No combined sewers running through the site (see Fig 4.1). There are 300mm & 525mm diameter combined sewers running through the east of the site and 225mm & 900mm diameter combined sewers running through the south of the site.
- 5.3 A drainage survey has been carried out which shows that the site foul water discharges into the combined sewers to the east & south of the site at various locations through an existing private network.

### PROPOSED

#### Discharge Method

5.4 A pre-development enquiry has been submitted to United Utilities and their response and asset maps are appended to this report. United Utilities have confirmed that the 525mm public combined sewer to the east of the site is suitable to connect into and has sufficient capacity for the proposed leisure centre development.

### Design Criteria & Summary

- 5.5 The foul water from the proposed development will discharge into the 525mm United Utilities combined sewer to the east of the site.
- 5.6 New foul drains will be provided to serve all foul producing appliances within the proposed development. All drains will be designed in accordance with BS EN 752:2017 and Building Regulations Approved Document H.

### Trade Effluent

- 5.7 Foul waste classified as 'trade effluent' will be discharged during backwashing of the swimming pool filters and must be connected into the foul network. Formal approval is required to discharge trade effluent and a trade effluent agreement will need to be arranged between the site operator and the operator's chosen water retailer. The trade effluent agreement will stipulate the frequency, volume, and maximum rate at which the operator will be able to discharge trade effluent from their site.
- 5.8 In addition, as part of the pre-development enquiry United Utilities have confirmed that they have capacity within their foul network to accommodate the trade effluent provided the discharge rate is limited to 5l/s.
- 5.9 Trade effluent from the swimming pool filters will therefore discharge into an isolated trade effluent drainage network and make a separate connection into the main foul drainage network, downstream of a dedicated sampling chamber. The trade effluent network will have a suitably sized backwash storage facility and a mechanism to restrict the flow rate into the main foul drainage network in accordance with the approved trade effluent agreement.

# **APPENDIX A – ARCHITECTURAL INFORMATION**



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P01 01.06.23 JWM CK Draft Planning Issue									
C01 30.06.23 JWM LE Planning Issue									



### **Roberts Limbrick**

03333 405 500 mail@robertslimbrick.com robertslimbrick.com Registered Office: England No. 06658029

**Project Name** Millom Leisure Centre

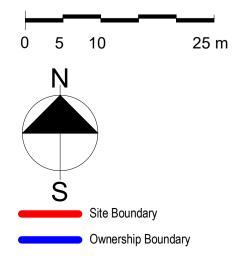
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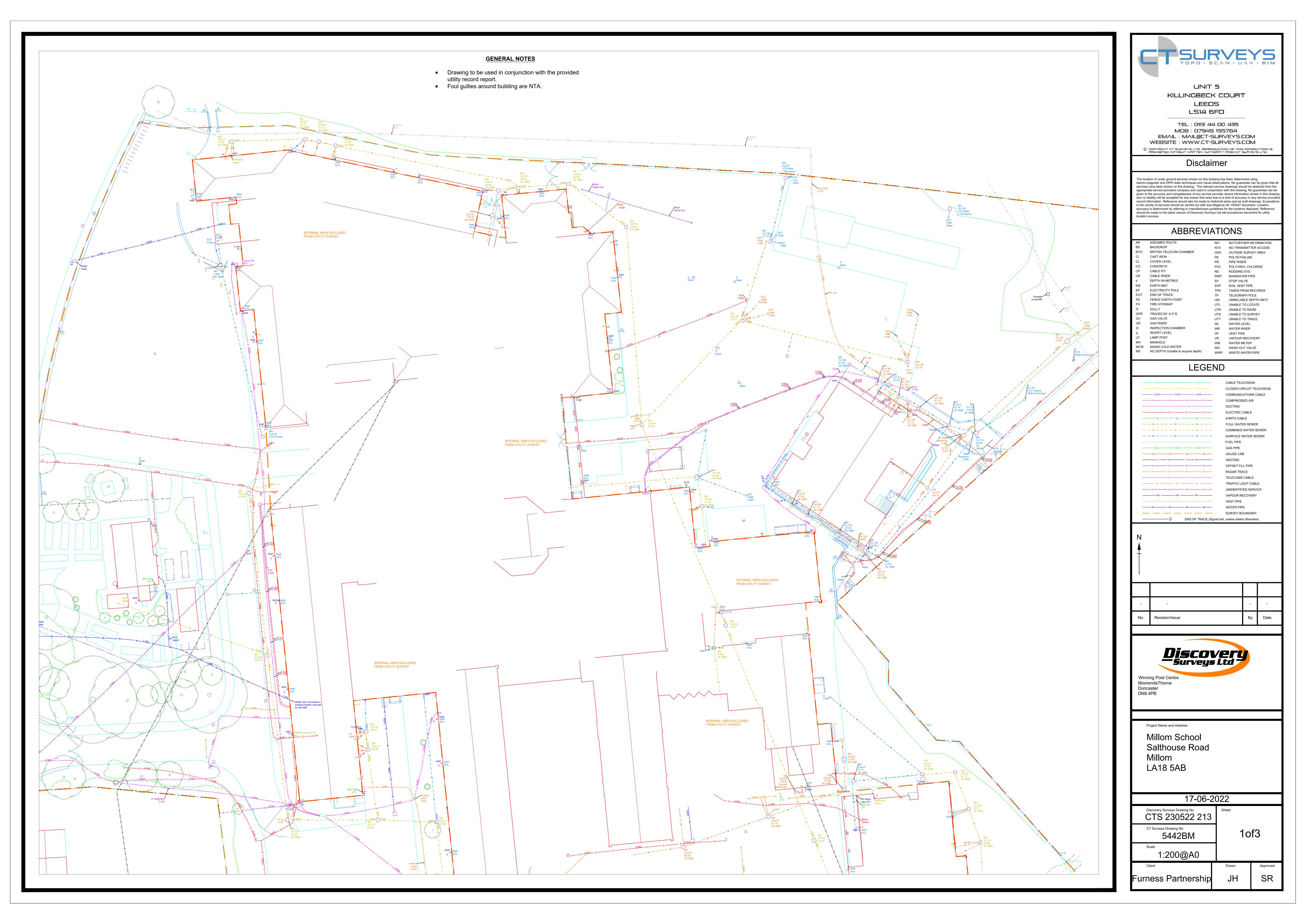
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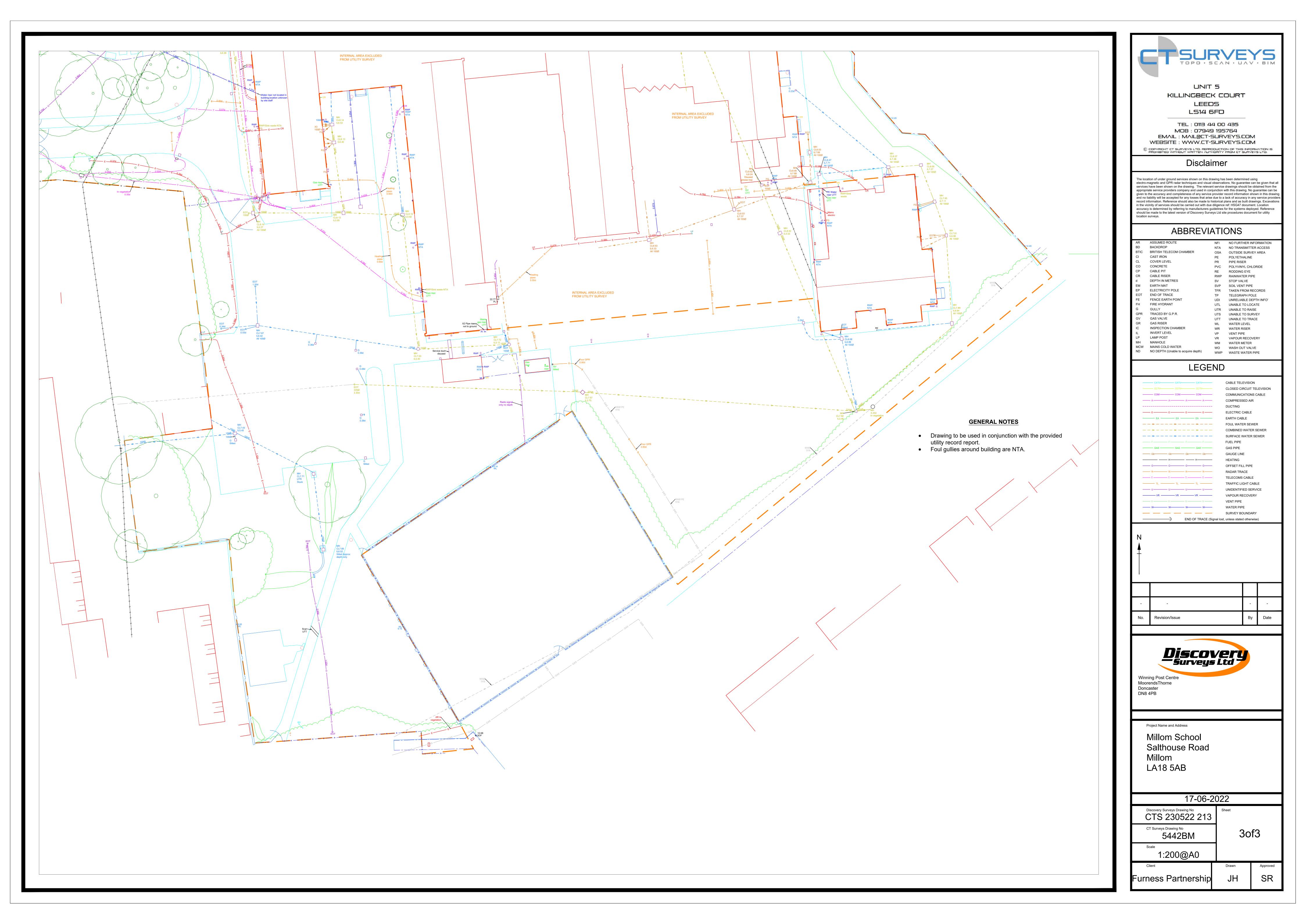
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### Roberts Limbrick 03333 405 500 mail@robertslimbrick.com

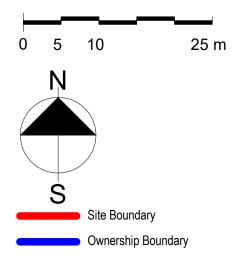
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**Project Name** Millom Leisure Centre

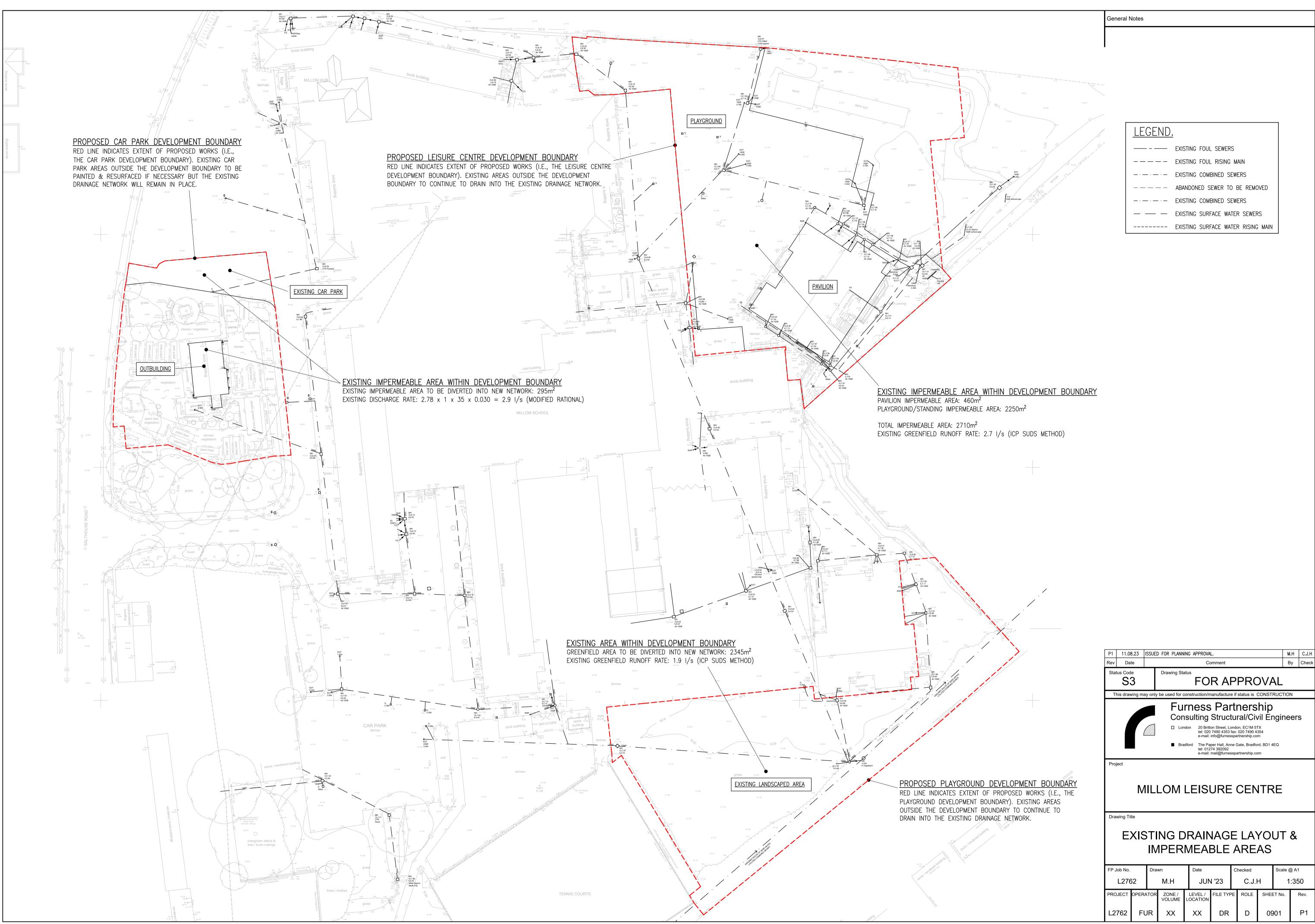
**Client Name** Cumberland Council

**Drawing Title** Proposed Site Plan

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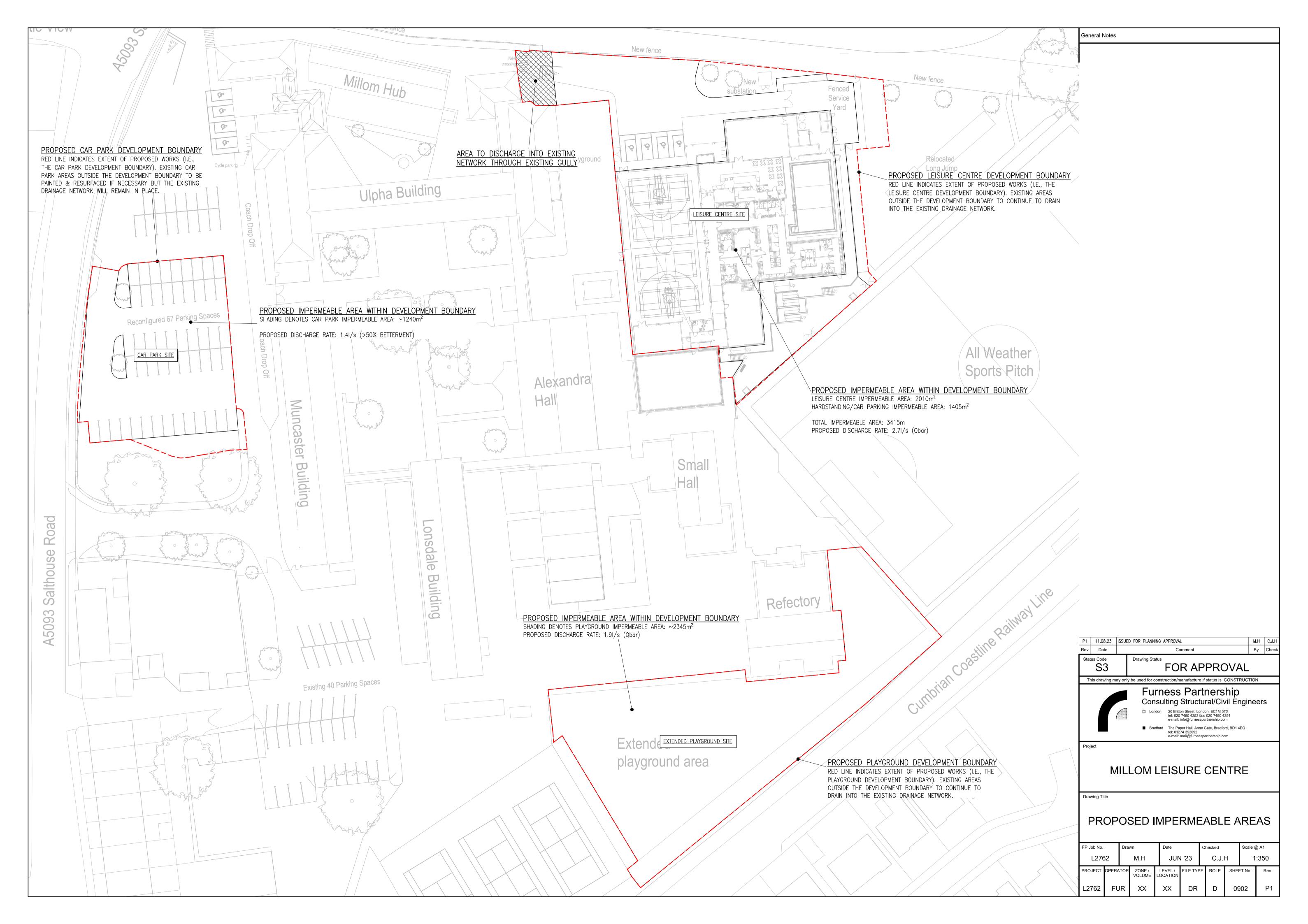


## **APPENDIX B – DRAINAGE DRAWINGS**



LEGEND	<u>.</u>
	EXISTING FOUL SEWERS
	EXISTING FOUL RISING MAIN
_ · _ · _ · _	EXISTING COMBINED SEWERS
	ABANDONED SEWER TO BE REMOVED
_ · _ · _ · _	EXISTING COMBINED SEWERS
	EXISTING SURFACE WATER SEWERS
	EXISTING SURFACE WATER RISING MAIN

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ADDITIONAL FOUL WATER DRAINAGE NOTES:

- LOCATION OF ALL EXISTING DRAINAGE TO BE CONFIRMED ON SITE PRIOR TO COMMENCEMENT OF WORKS AS IT IS APPROXIMATELY
- TRANSLATED FROM SURVEY DRAWING. ALL DRAINAGE AT MANHOLES/ACCESS CHAMBERS TO CONNECT WITH SOFFITS LEVEL UNLESS OTHERWISE NOTED. MANHOLE INVERT LEVELS SHOWN ON PLAN ARE THAT OF LOWEST OUTGOING PIPE.
- ALL FOUL DRAINAGE TO BE 100mm DIA. UNLESS OTHERWISE
- NOTED. ALL INTERNAL 100mm DIA. SOIL VENT PIPE CONNECTIONS TO BE LAID AT FALLS NOT LESS THAN 1:40 TO SUIT CONNECTION INTO MAIN NETWORK OR 1:80 IF AT LEAST 1 WC IS CONNECTED. ALL TOILET/SVP FOUL BRANCH CONNECTIONS TO BE MADE USING OBLIQUE 45° CONNECTION IN THE DIRECTION OF FLOW OF THE
- MAIN LINE. FOR INTERNAL FOUL CONNECTIONS WITHOUT A TOILET/SVP WHERE OBLIQUE CONNECTIONS ARE NOT POSSIBLE 87.5° CURVED SQUARE BRANCH CONNECTIONS TO BE USED IN DIRECTION OF FLOW OF
- MAIN LINE.
- FOUL RODDING POINTS SHOULD BE PROVIDED, ABOVE SPILLOVER LEVEL OF CONNECTED APPLIANCES, IN DISCHARGE STACKS TO GIVE ACCESS TO ANY LENGTH OF PIPE WHICH CANNOT BE REACHED FROM ANY OTHER PART OF THE NETWORK.
- ALL DRAINAGE WITHIN 300mm OF UNDERSIDE OF STRUCTURAL SLAB TO HAVE FULL GEN 3 CONCRETE BED AND SURROUND. ALL INTERNAL MANHOLE & INSPECTION CHAMBERS TO HAVE SCREW
- DOWN DOUBLE SEAL ACCESS COVERS. ALL INTERNAL & EXTERNAL FOUL WATER INSPECTION CHAMBERS SITUATED IN AREAS WITHOUT VEHICULAR ACCESS TO BE TYPE 3 CHAMBERS WITH 150mm DOT TYPE 1 SURROUND UNLESS NOTED
- OTHERWISE.
- ALL EXTERNAL FOUL WATER INSPECTION CHAMBERS SITUATED IN AREAS WITH VEHICULAR ACCESS TO BE TYPE 3 CHAMBERS WITH GEN 3 CONCRETE SURROUND UNLESS NOTED OTHERWISE. ALL TYPE 3 INSPECTION CHAMBERS WHERE DEPTH TO INVERT OF CHAMBER IS > 1m SHALL HAVE COVER FRAME WITH ACCESS
- RESTRICTED TO 350mm DIA. OR 300x300mm SQUARE. ALL EXTERNAL FOUL WATER MANHOLES TO BE MIN. 1200mm DIA. WIDE WALL (125mm THICK) TYPE 2 PRECAST CONCRETE CHAMBERS UNLESS NOTED OTHERWISE.
- MANHOLE COVER LEVELS ARE SUBJECT TO CONFIRMATION OF FINAL EXTERNAL & INTERNAL LEVELS. THE LOAD CLASS OF ALL COVERS, GRATINGS, GULLIES, CHANNELS
- & FRAMES TO CHAMBERS TO SUIT THEIR LOCATION AS FOLLOWS (REFER TO MANHOLE SCHEDULE FOR CONFIRMATION):
  - A15 INTERNAL LOCATIONS B125 - EXTERNAL WITH PEDESTRIAN ACCESS ONLY C250 – EXTERNAL LIGHTLY TRAFFICKED AREAS

  - D400 MAIN ROADS/HIGHWAYS E600 – HGV/LOADING BAY AREAS
- GRATINGS IN PEDESTRIAN AREAS TO HAVE HEEL SAFE ANTI-SLIP COVERS.
- REFERENCE SHOULD BE MADE TO ARCHITECT & M&E ENGINEERS DRAWINGS FOR ABOVE GROUND DRAINAGE DETAILS & SET-OUT. ALL EXISTING DRAINAGE THAT IS MADE REDUNDANT AS A RESULT OF THE WORKS TO BE GRUBBED UP AND REMOVED.
- THE LAYOUT OF PIPELINES, MANHOLES ETC. IS DESIGNED TO SUIT THE PERMANENT CASE. ADDITIONAL LOADS OVER & ABOVE THOSE DESIGNED FOR MAY ARISE DURING THE CONSTRUCTION PROCESS. THE CONTRACTOR SHALL PROVIDE ANY NECESSARY TEMPORARY
- PROTECTION TO ENSURE THAT PIPELINES, MANHOLES ETC. ARE NOT DAMAGED DURING THE CONSTRUCTION PHASE.

## LEGEND.

	EXISTING FOUL SE
	NEW BRANCH FOU
	NEW MAIN FOUL S
~~~	CONCRETE ENCASE
<u> </u>	NEW FOUL MANHO
·	EXISTING FOUL RIS
	FOUL RISING MAIN
	NEW TRADE EFFLU
<u>XX</u>	NEW TRADE EFFLU
<u> </u>	EXISTING COMBINE
<u> </u>	NEW COMBINED SI
<u>(X</u>	NEW COMBINED M
P	SOIL VENT PIPE (
	INTERNAL GULLY (
	STUB STACK
	VERTICAL BACK DI
	INTERNAL CHANNE
	RODDING EYE
	ABANDONED SEWE

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.

General Notes

- ALL DRAINAGE TO BE TO THE SATISFACTION OF THE LOCAL AUTHORITY 2. BUILDING CONTROL AND MAIN DRAINAGE SECTIONS ON MATTERS INVOLVING PUBLIC SEWERS.
- ALL PIPEWORK, BENDS AND JUNCTIONS TO BE EXTRA STRENGTH 3. VITRIFIED CLAY TO BS 65:1991, BS EN 295 OR PVCu TO BS EN 1401 TO BE AGREED WITH RELEVANT AUTHORITY.
- INVERT LEVELS ON EXISTING DRAINS & OUTFALLS TO BE CHECKED PRIOR TO COMMENCEMENT OF WORKS.
- TRENCH WIDTHS GENERALLY:- AS SMALL AS PRACTICABLE BUT NOT LESS THAN PIPE DIAMETER +300mm OR LARGER IF SPECIFIED. TRENCH SIDES MUST BE VERTICAL FROM BOTTOM UP TO 300mm ABOVE CROWN OF PIPE.
- WHERE DRAINAGE PIPES HAVE LESS THAN 1.2m COVER IN TRAFFICKED 6. AREAS AND LESS THAN 600mm UNDER LANDSCAPED AREAS PIPES SHALI HAVE A FULL CLASS Z CONCRETE SURROUND. CONCRETE PROTECTION TO BE DISCONTINUED AT EACH PIPE JOINT WITH COMPRESSIBLE MATERIAL. ALL OTHER FLEXIBLE PIPES TO HAVE CLASS S GRANULAR BEDDING DETAIL UNLESS OTHERWISE NOTED. ALL OTHER RIGID PIPES TO HAVE CLASS B GRANULAR BEDDING DETAIL UNLESS OTHERWISE NOTED.
- 7. GRANULAR BEDDING: 10mm SINGLE SIZED COARSE AGGREGATE SHALL BE USED ON PIPES
- NOT EXCEEDING 140mm DIAMETER. • 2-14mm WELL GRADED COARSE AGGREGATE MAY BE USED ON PIPES
- EXCEEDING 140mm BUT NOT EXCEEDING 400mm DIAMETER. • 4-20mm WELL GRADED COARSE AGGREGATE MAY BE USED ON PIPES EXCEEDING 400mm DIAMETER.
- THE DEPTH OF GRANULAR BEDDING UNDER THE PIPES SHALL BE X/6 OR 150mm, WHICHEVER IS GREATER, WHERE X=EXTERNAL DIAMETER OF THE PIPE.
- ADOPTABLE PUBLIC SEWERS TO BE CONSTRUCTED IN ACCORDANCE WITH 8 SEWERS FOR ADOPTION, 7th EDITION, SEPTEMBER 2012.
- 9. ALL PRIVATE DRAINAGE WORKS SHALL BE IN ACCORDANCE WITH "THE BUILDING REGULATIONS APPROVED DOCUMENT H" AND BRITISH STANDARD BS EN 752.
- 10. ALL NEW DRAINAGE TO BE TESTED PRIOR TO BACKFILL OF THE TRENCHES & PRIOR TO HANDOVER TO THE SATISFACTION OF THE BUILDING CONTROL INSPECTOR.
- 11. THE CONTRACTOR MUST LIAISE WITH THE LOCAL AUTHORITY MAIN DRAINAGE SECTION PRIOR TO COMMENCEMENT OF WORK ON PUBLIC DRAINAGE.
- 12. TRENCH BACKFILL SHALL BE COMPACTED IN LAYERS NOT EXCEEDING 250mm ONCE 300mm COVER HAS BEEN PROVIDED TO THE TOP OF PIPE.
- 13. THE CONTRACTOR SHALL ALLOW IN HIS RATES FOR MAINTAINING FLOW IN PUBLIC SEWERS AT ALL TIMES DURING DIVERSION WORKS INCLUDING TEMPORARY PUMPING AND ALSO KEEPING EXCAVATIONS FREE FROM GROUNDWATER INCLUDING PUMPING AND FORMATION OF TEMPORARY SUMPS.
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P2	11.08.23	ISSUED FO	R PLANNING A	PPROVAL.	M.H	C.J.H			
P1	06/07/23	PRELIMINA	ry issue		OJ				
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Proj	Project MILLOM LEISURE CENTRE								
Drawing Title									
	PROPOSED FOUL WATER								

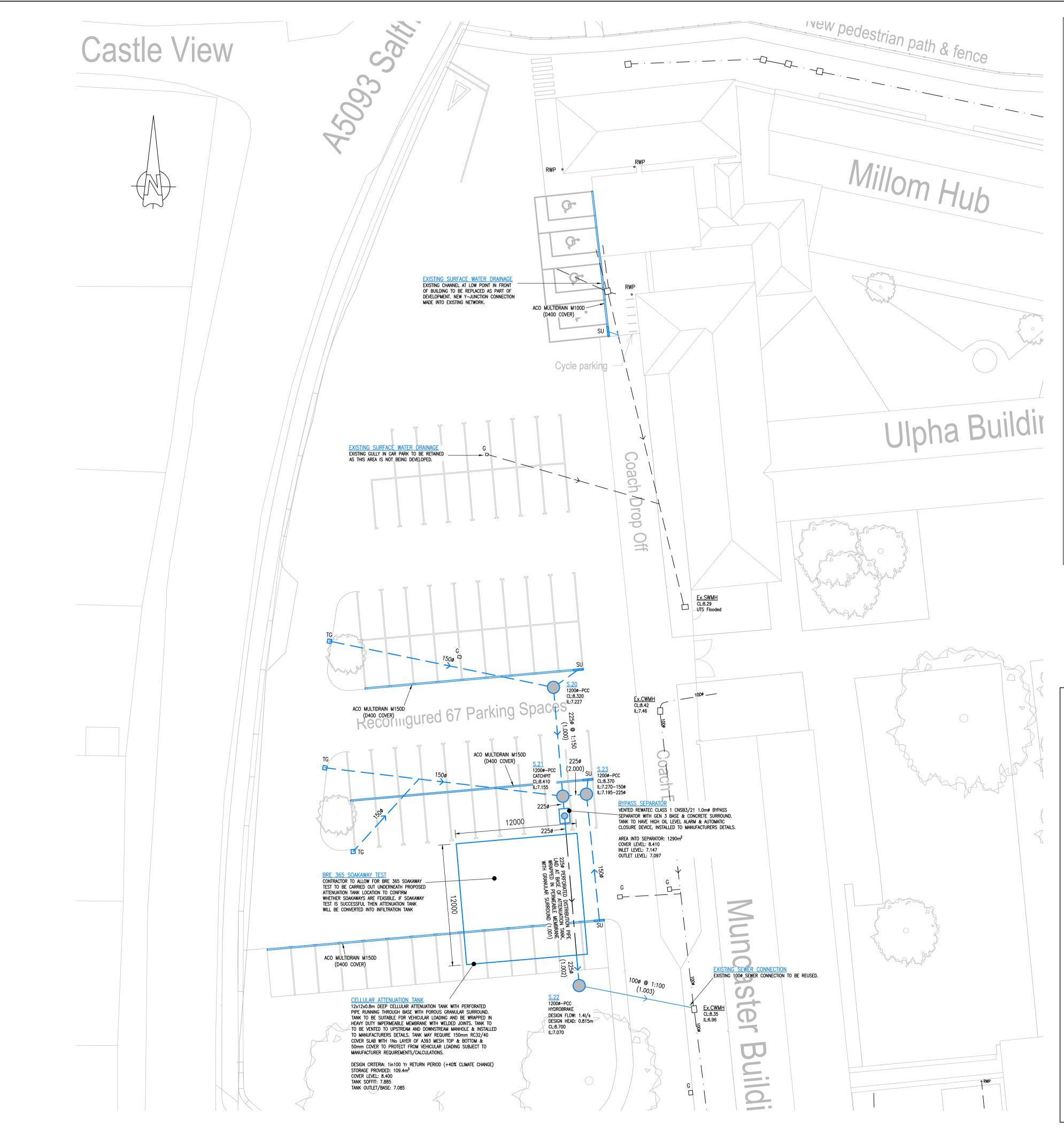
# DRAINAGE LAYOUT

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SEWERS

- UL SEWERS
- SEWERS
- SED FW SEWER
- OLE
- RISING MAIN
- Ν
- UENT SEWERS
- UENT MANHOLE
- ED SEWERS
- SEWERS
- MANHOLE
- (RODDABLE ACCESS)
- (TRAPPED & RODDABLE)
- DROP
- EL DRAIN POINT

---- ABANDONED SEWER TO BE REMOVED



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# <u>LEGEND.</u>

	ABANDONED SEWER TO
_ · _ · _ · _ · _ · _	EXISTING COMBINED SI
	NEW COMBINED SEWER
<b>FXX</b>	NEW COMBINED MANH
	EXISTING SURFACE WA
	NEW SURFACE WATER
	CONCRETE ENCASED S
SXX	NEW SURFACE WATER
	EXISTING SURFACE WA
	SURFACE WATER RISIN
	NEW LAND DRAINS
O BD	VERTICAL BACK DROP
	PETROL INTERCEPTOR
	DRAINAGE CHANNEL
🗖 G	ROAD GULLY
<b>G</b> TG	TRAPPED ROAD GULLY
SU	TRAPPED SUMP UNIT
• RWP	RAIN WATER PIPE
• RE	RODDING EYE
DT	PERMAVOID 150 DISTR

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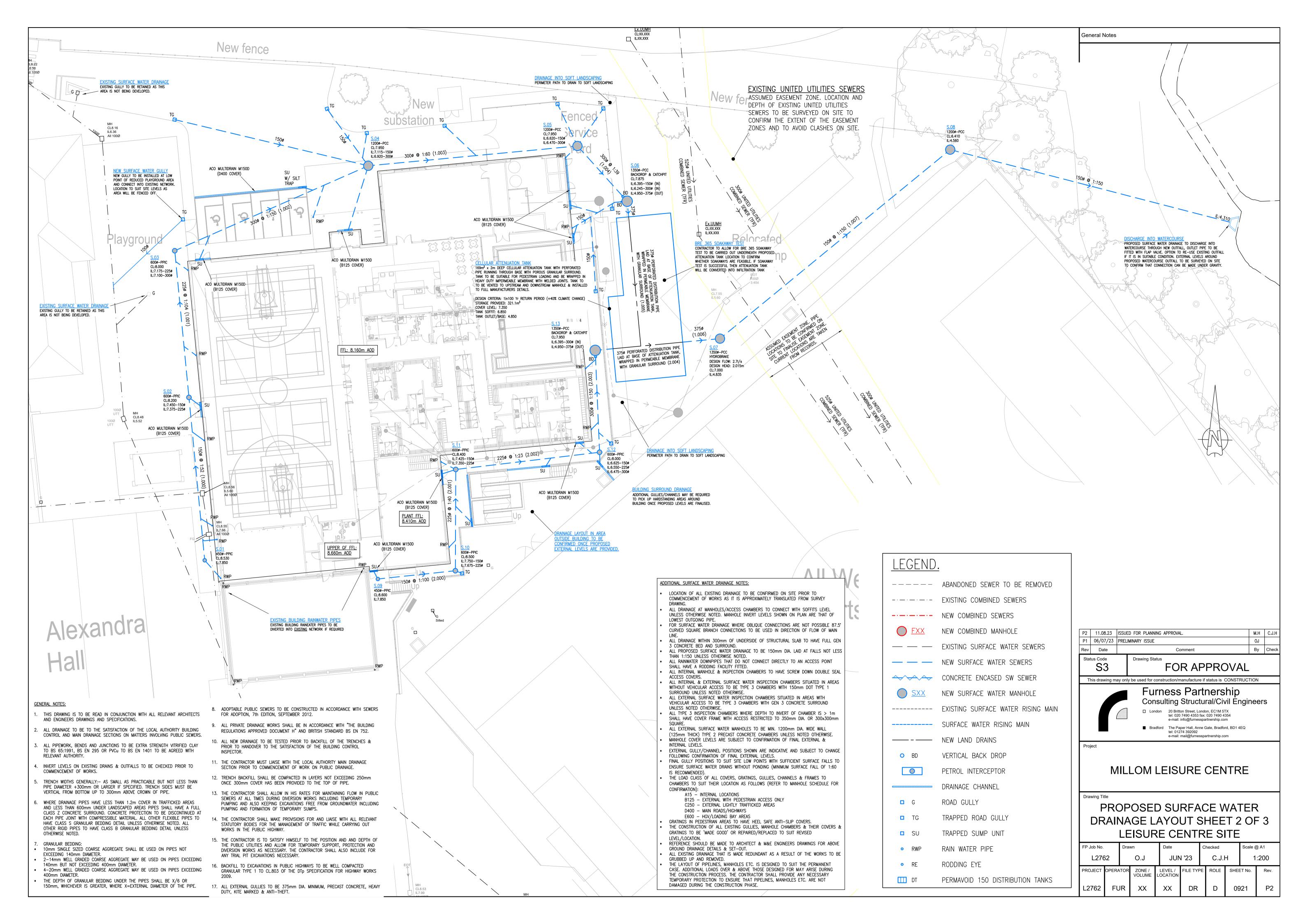
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Proj	Project MILLOM LEISURE CENTRE								
	Drawing Title PROPOSED SURFACE WATER								
	DRAINAGE LAYOUT SHEET 1 OF 3 CAR PARK SITE								

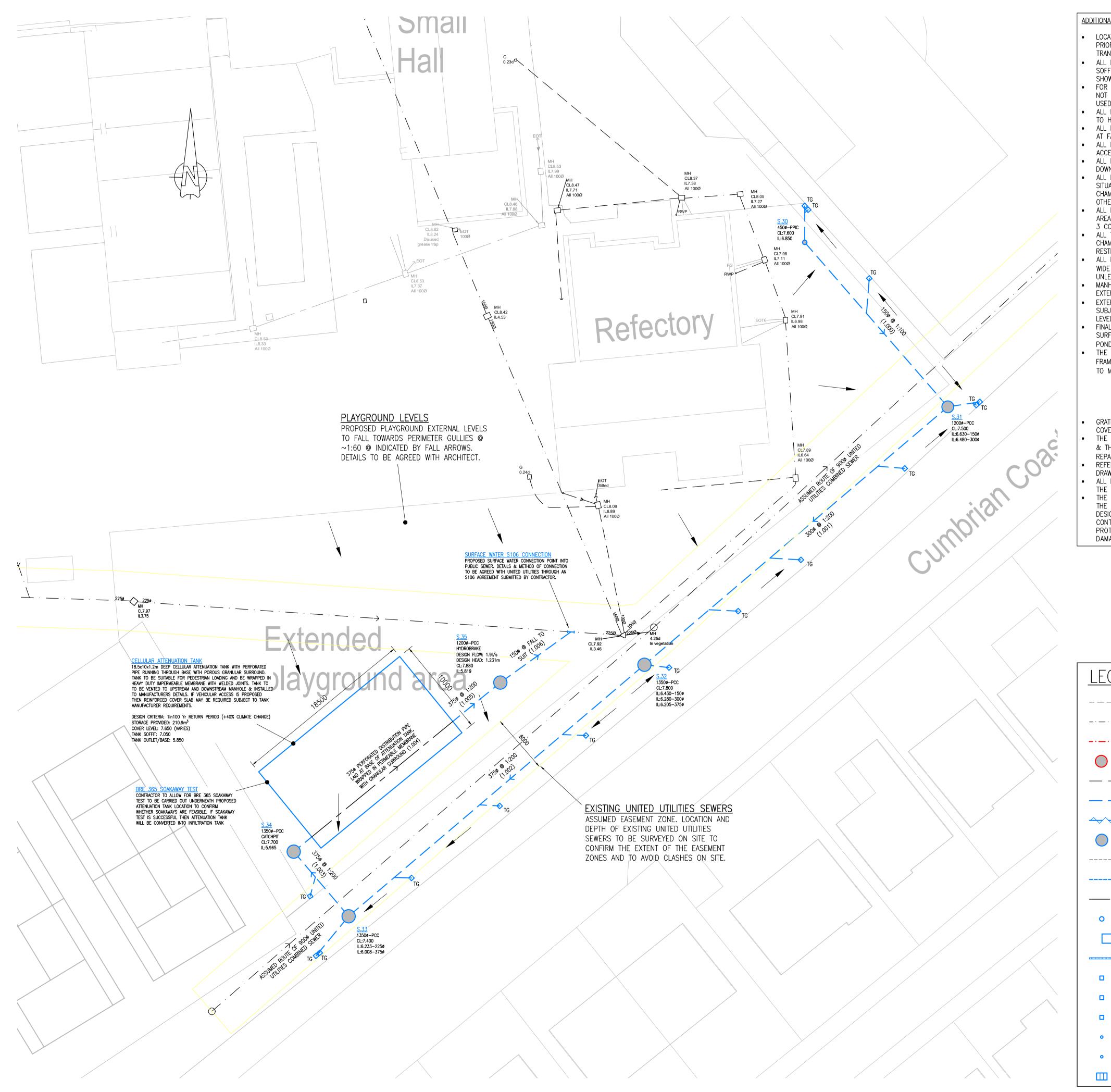
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WER TO BE REMOVED

- NED SEWERS
- SEWERS
- MANHOLE
- ACE WATER SEWERS
- WATER SEWERS
- ASED SW SEWER
- NATER MANHOLE
- ACE WATER RISING MAIN
- RISING MAIN
- NS
- DROP
- INEL
- GULLY
- UNIT

DISTRIBUTION TANKS





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· ·	EXISTING COMBI
<u> </u>	NEW COMBINED
<u>FXX</u>	NEW COMBINED
	EXISTING SURFA
	NEW SURFACE
	CONCRETE ENC.
<u>SXX</u>	NEW SURFACE
	EXISTING SURFA
	SURFACE WATER
	NEW LAND DRA
BD	VERTICAL BACK
	PETROL INTERC
	DRAINAGE CHAN
G	ROAD GULLY
TG	TRAPPED ROAD
SU	TRAPPED SUMP
RWP	RAIN WATER PIF
RE	RODDING EYE
DT	PERMAVOID 150

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Proj	Project MILLOM LEISURE CENTRE								
Drawing Title PROPOSED SURFACE WATER DRAINAGE LAYOUT SHEET 3 OF 3 PLAYOROLIND SITE									

	FLATGROUND SITE										
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EWER TO BE REMOVED

SINED SEWERS

SEWERS

MANHOLE

ACE WATER SEWERS

WATER SEWERS

CASED SW SEWER

WATER MANHOLE

ACE WATER RISING MAIN

R RISING MAIN

AINS

DROP

CEPTOR

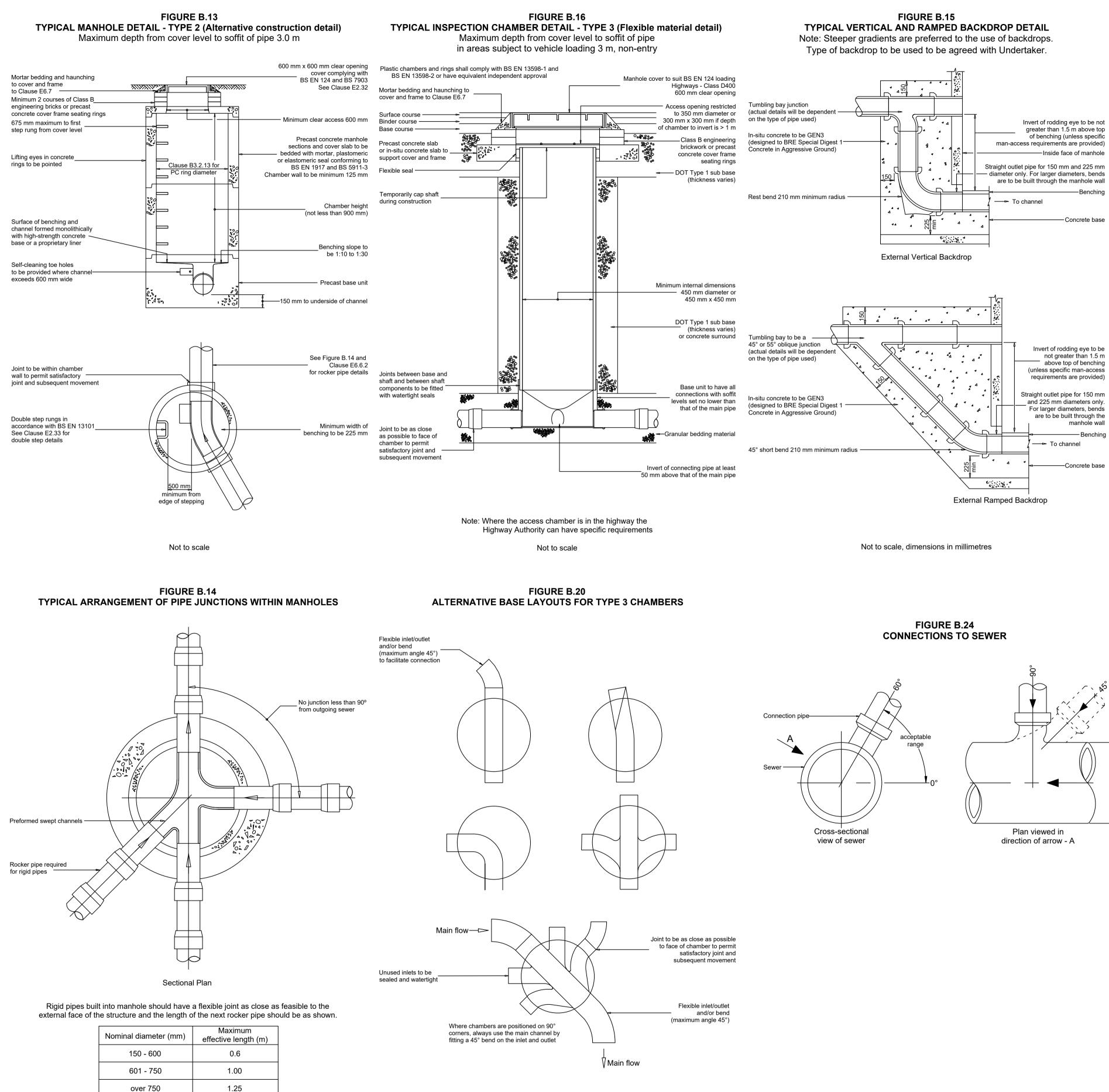
NNEL

GULLY

UNIT

PF

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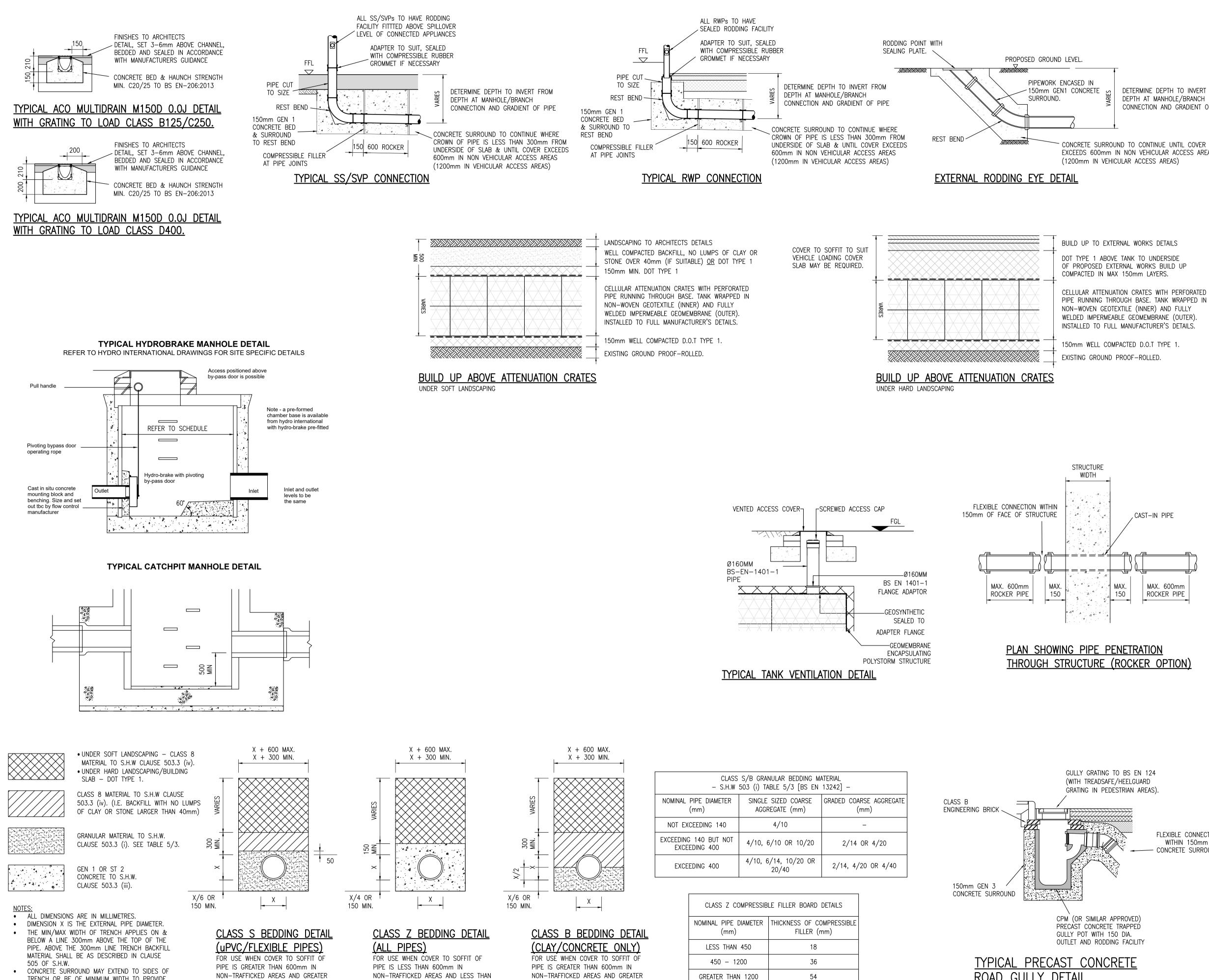


All pipes entering the bottom of the manhole to have soffits level.

Note: Where a bend is used immediately outside the manhole, this may be used as the rocker pipe Not to scale

General	Notes
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P2	11.08	3.23	ISSUE	ED FOR PLANNING APPROVAL. M.H C.J.H								
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CONCRETE SURROUND MAY EXTEND TO SIDES OF TRENCH OR BE OF MINIMUM WIDTH TO PROVIDE 150mm COVER AT EACH SIDE OF THE PIPE.

• UNTIL THERE IS 300mm COVER OVER CROWN OF PIPE, COMPACT GRANULAR & BACKFILL MATERIAL BY HAND IN 100mm THICK LAYERS.

NON-TRAFFICKED AREAS AND GREATER THAN 1200mm IN AREAS WITH VEHICULAR ACCESS.

NON-TRAFFICKED AREAS AND LESS THAN 1200mm IN AREAS WITH VEHICULAR ACCESS. MIN. 18mm COMPRESSIBLE BOARD AT ALL PIPE JOINTS

NON-TRAFFICKED AREAS AND GREATER THAN 1200mm IN AREAS WITH VEHICULAR ACCESS.

CLASS S/B GRANULAR BEDDING MATERIAL – S.H.W 503 (i) TABLE 5/3 [BS EN 13242] –						
NOMINAL PIPE DIAMETER (mm)	SINGLE SIZED COARSE AGGREGATE (mm)	GRADED COARSE AGGREGATE (mm)				
NOT EXCEEDING 140	4/10	-				
EXCEEDING 140 BUT NOT EXCEEDING 400	4/10, 6/10 OR 10/20	2/14 OR 4/20				
EXCEEDING 400	4/10, 6/14, 10/20 OR 20/40	2/14, 4/20 OR 4/40				

ROAD GULLY DETAIL

General Notes

DETERMINE DEPTH TO INVERT FROM DEPTH AT MANHOLE/BRANCH CONNECTION AND GRADIENT OF PIPE

EXCEEDS 600mm IN NON VEHICULAR ACCESS AREAS

, CAST-IN PIPE

	<u>р</u>	2
λ		17
لحر	L	עק
	MAX. 600mm	
	ROCKER PIPE	
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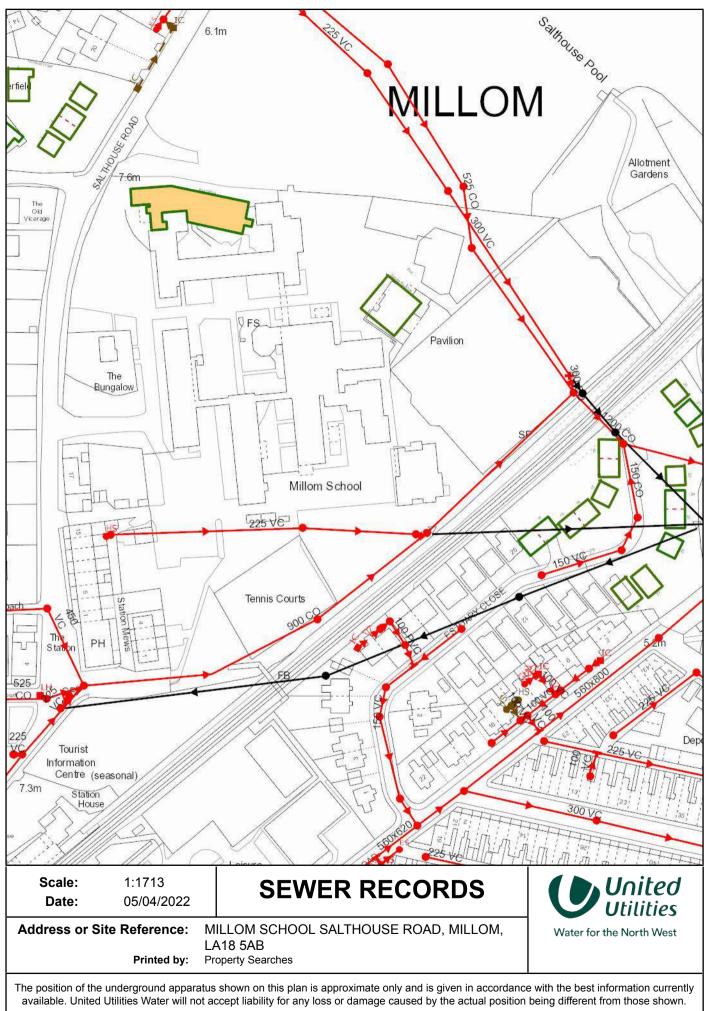
## APPENDIX C – LOCAL WATER AUTHORITY CONSULTATION & DOCUMENTS



### Wastewater Symbology

Abandoned	Foul	Surface Water	Combined	Public Sewer Private Sewer
·····			·····	Section 104 Rising Main Sludge Main
<u> </u>				Overflow Water Course
				Highway Drain

All point assets follow the standard colour conv	red – combined blue – surface water	brown - foul purple - overflow	
<ul> <li>Manhole</li> </ul>		Side Entry Manhole	
Head of System	C	Outfall	
Extent of Survey		Screen Chamber	
Rodding Eye	IC.	Inspection Chamber	
🚽 Inlet	$\oplus$	<b>Bifurcation Chamber</b>	r
Discharge Point	LH	Lamp Hole	
ど Vortex	-	T Junction / Saddle	
Penstock	$\odot$	Catchpit	
💞 Washout Chamber	$\odot$	Valve Chamber	
🍑 Valve	-	Vent Column	
🎳 Air Valve	C	Vortex Chamber	
Non Return Valve	0	Penstock Chamber	
Soakaway		Network Storage Tar	hk
Sully	Ď	Sewer Overflow	
Cascade	Ē	Ww Treatment Work:	\$
Flow Meter		Ww Pumping Station	i.
Hatch Box		Septic Tank	
Oil Interceptor	100	Control Kiosk	
Summit			
<sup>05</sup> Drop Shaft	$\bigtriangledown$	Change of Characte	ristic
Orifice Plate			



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### **Michael Herbert**

From:	seweradoptions@uuplc.co.uk
Sent:	15 June 2023 15:33
To:	Michael Herbert
Subject:	RE: Pre Development Enquiry - Millom Leisure Centre [Filed 07 Aug 2023 17:33]
Follow Up Flag:	Follow up
Flag Status:	Flagged

### Good Afternoon Michael,

### <u>Pre Development Enquiry – Millom Leisure Centre, Millom School, Salthouse Road, Millom, Cumberland LA18 5AB –</u> UU ref 04140748

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

If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 6723 723 or refer to the link below: <a href="https://www.unitedutilities.com/builders-developers/working-near-our-assets/">https://www.unitedutilities.com/builders-developers/working-near-our-assets/</a>

### Foul Water

Foul flow from this site will be allowed to drain into the public foul water/combined sewer system. We would have no objections to the proposed connection point (525mm public combined sewer to the north east).

Please confirm if the proposals are to include a swimming pool? If you are able to identify an alternative, more suitable point of discharge, we request that you contact us at your

earliest convenience so that we can assess suitability.

In accordance with our infrastructure plans we may ask you to change your point of connection. Therefore please contact us when you are ready to formalise your drainage proposals, we would suggest before you submit for Full Planning.

### Surface Water

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

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

This is outlined as follows, in order of priority:

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

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

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

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

### Infiltration

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

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

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

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

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

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

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

### Waterbody

If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you contact the Lead Local Flood Authority and/or Environment Agency to discuss a point of discharge to the watercourse running through the site boundary, north east of the proposed building. You may need to consider the use of a non-return valve on the outfall.

### Public Sewer

We would not consider allowing a connection to the combined sewer network unless both infiltration and discharge to watercourse are evidence as not being possible. In the event that sufficient evidence discounting these options is provided, we would consider allowing surface water to connect at the proposed connection point (525mm combined public sewer) however we would ask that discharge rates are set to greenfield runoff rates.

### **Levels**

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

### Land drainage / Overland flows / track drainage

United Utilities have no obligation, and furthermore we do not accept land drainage, overland flows or track drainage into the pubic sewerage network <u>under any circumstances</u>

### **Existing Wastewater Assets Crossing the Site**

According to our public sewer records there are public sewers located within your site boundary. We will require unrestricted access to the sewer for maintenance purposes, we would ask that you maintain a minimum clearance of 6m which is measured 3m from the centre line of the pipe unless there happens to be a formal easement agreement in place, in which case the specified easement width would apply. If you cannot achieve this then you may wish to

consider diverting and or abandoning the public sewer. The public sewers must be accurately located on site at the earliest convenience to understand actual clearance requirements/standoff zones, as our sewer records are indicative only.

Please be aware that any proposed diversion may require modelling. This process may take up to 6 months in order to reach an acceptable design.

Please refer to the link below to obtain full details of the processes involved with sewer diversions: https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sewer-diversions/

### Existing Water Assets Crossing the Site

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

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

### **Connection Application**

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

https://www.unitedutilities.com/builders-developers/wastewater-services/sewer-connections/sewer-connection/ We recommend that the detailed design should confirm the locations of all utilities in the area and ensure that any proposed drainage solution considers routing and clash checks where required. If we can be of any further assistance please don't hesitate to contact us further.

Many thanks and kind regards,

Tom



Thomas Bethell Developer Engineer Developer Services & Metering Customer Services M: 07880 339 195 unitedutilities.com

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

------ Original Message -----From: Michael Herbert [m.herbert@furnesspartnership.com]
Sent: 05/06/2023 18:07
To: seweradoptions@uuplc.co.uk
Subject: RE: Pre Development Enquiry - Millom Leisure Centre

Hi,

Please find attached pre-development enquiry for a redevelopment of Millom School, Salthouse Rd, Millom LA18 5AB which includes the construction of a new leisure centre. There is a site investigation report that has been carried out for the site that I can forward if required however the file size is too large for your inbox.

Existing Impermeable Area for new Leisure Centre site: ~2670 m<sup>2</sup>

Estimated Brownfield Discharge Rate: 37.3 I/s (based on 50mm/hr rainfall intensity)

Point of proposed connection into public sewer for foul and surface water highlighted in yellow below (assuming soakaways are not feasible):

[Image is no longer available]

Regards

Michael Herbert | Civil Engineer

t: +44 (0)1274 392 092 | w: <u>www.furnesspartnership.com</u>

The Paper Hall, Anne Gate, Bradford, BD1 4EQ

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[Image is no longer available] [Image is no longer available]

<sup>\*\*\*\*\*\*\*\*</sup> 

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### **Michael Herbert**

From:	seweradoptions@uuplc.co.uk
Sent:	01 August 2023 09:39
То:	Michael Herbert
Subject:	RE: Pre Development Enquiry - Millom Leisure Centre [Filed 07 Aug 2023 17:33]

Hi Michael,

Yes we would accept the backwash at a rate restricted to 5 l/s as suggested.

### Please note the following, which is taken from our Trade Effluent FAQ page of our website (found <u>here</u>):

United Utilities considers the backwash water from swimming pools to be in a low risk category and that issuing formal trade effluent consent is not appropriate control for the level of risk. As such we will not normally pursue an application for a 'Consent to Discharge'.

The position statement above applies to the routine discharge of filter backwash water. If you need to empty the content of a swimming pool the following process should be followed. Swimming pool emptying position:

- You must obtain formal approval from United Utilities prior to emptying the swimming pool contents
- The discharge point and rate for emptying into the public foul sewer will be determined and agreed
- This requirement shall relate to each and every pool emptying event

*Please contact your retailer if you need to make an enquiry to discharge the pool content. The following information should be included in your enquiry to enable us to assess the request:* 

- Name of Company
- Contact name and details including email
- Site address This is the site address where the swimming pool contents are being discharged from
- Maximum volume to be discharged m3/day
- Discharge flow rate l/sec
- Street name where discharge will be made into the public foul sewer
- Start date
- Completion date

### Many thanks and kind regards,

### Tom



Thomas Bethell Developer Engineer Developer Services & Metering Customer Services M: 07880 339 195 unitedutilities.com

If you have received a great service today why not tell us? Visit: <u>unitedutilities.com/wow</u> ------ Original Message -----From: Michael Herbert [m.herbert@furnesspartnership.com]
Sent: 21/07/2023 12:50
To: seweradoptions@uuplc.co.uk
Subject: RE: Pre Development Enquiry - Millom Leisure Centre

Hi,

Thanks for the response. I can confirm that the proposal will include a swimming pool with an associated trade effluent discharge. The current proposal will be to attenuate the backwash in an underground tank and release the trade effluent into the foul network at a restricted flow rate (currently 51/s). We don't have figures on volume of discharge per day at this stage, but it is usually somewhere in the region of 20-30m<sup>3</sup>.

Can you confirm if this is feasible, or next steps to take?

Regards

Michael Herbert | Civil Engineer

t: +44 (0)1274 392 092 | w: <u>www.furnesspartnership.com</u>

The Paper Hall, Anne Gate, Bradford, BD1 4EQ

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### APPENDIX D – GROUND INVESTIGATION EXTRACT / SOAKAWAY TEST RESULTS

### PHASE II GROUND INVESTIGATION REPORT



### MILLOM SCHOOL, SALTHOUSE ROAD, MILLOM, CUMBRIA, LA18 5AB PREPARED FOR ALLIANCE LEISURE SERVICES LIMITED



### 4.0 Ground Conditions (Cont'd)

### 4.1 Soil Profile (Cont'd)

Strata	Depths Recorded	Description & Comments
TOPSOIL	From 0.00m to 0.30m up to 0.50m	At BH06, BH07, BH08 and BH10 the initial surfacing comprised grass over dark grey slightly clayey gravelly soily sand
SUPERFICIAL GEOLOGY Devensian Till	From 0.30m to 2.00m up to 5.45m	The superficial deposits beneath the site initally comprised stiff dark grey slightly sandy slightly gravelly CLAY, transitioning into grey and brown slightly gravelly SAND

There was no obvious visual or olfactory evidence of any fuel / oil type contamination or potential asbestos containing materials (ACM's) or bundles of fibres noted at the borehole locations. Similarly, there was also no evidence of any biodegradable or putrescible deposits at the borehole locations, or ashy deposits.

### 4.2 Groundwater

The borehole locations were noted to remain dry during the investigation period. However, post fieldwork monitoring encountered water levels in BH10 to the range between 1.05m and 2.95m. Therefore, water ingresses may occur within construction related excavations. and it would be prudent to allow for the introduction of temporary groundwater control techniques (i.e. sump pumping), to take care of any localised ingresses of groundwater, during the construction period, especially during the wetter periods of the year. It should also be noted that instability within such excavations is also likely to occur because of water inflow.

Adequate lateral trench support may also be required for excavations, to prevent trench wall collapse or over excavation, as well as to create a safe working environment, and any excavations on this site should remain open for as short a period as possible, since the initial topsoil and superficial deposits will be susceptible to deterioration, if left open to the natural elements for any significant period of time.

Tectonic House, Unit 11, Queens Court North Third Avenue, Team Valley Trading Estate Gateshead, Tyne and Wear NE11 OBU



### 5.0 Insitu Geotechnical Testing (Cont'd)

### 5.4 Insitu Variable (Falling) Head Permeability Tests

Insitu variable (falling) head permeability tests were completed at the locations of BH07, BH08 and BH10, to assess the permeability characteristics of the underlying natural deposits for determining the suitability of using conventional soakaways / SuDS as part of the drainage design scheme for the site. The permeability test results and calculations can be seen on the record sheets attached in Appendix II.

The test section at BH07 extended from 0.12m to 2.85m, however a permeability value could not be calculated due to the water draining within 1 minute, suggesting good drainage characteristics.

The test section at borehole BH08 extended from 0.22m to 4.70m bgl. The result of the test has identified a coefficient of permeability value (k) of 1.17E<sup>-06</sup> ms<sup>-1</sup> indicating the deposits tested to have a low permeability classification with poor drainage characteristics.

The test section at borehole BH10 extended from 0.05m to 3.00m bgl. The result of the test has identified a coefficient of permeability value (k) of 1.47E<sup>-07</sup> ms<sup>-1</sup> indicating the deposits tested to have a very low permeability classification with poor drainage characteristics.

### 6.0 Laboratory Testing

### 6.1 Determination of Chemical Attack on Buried Concrete

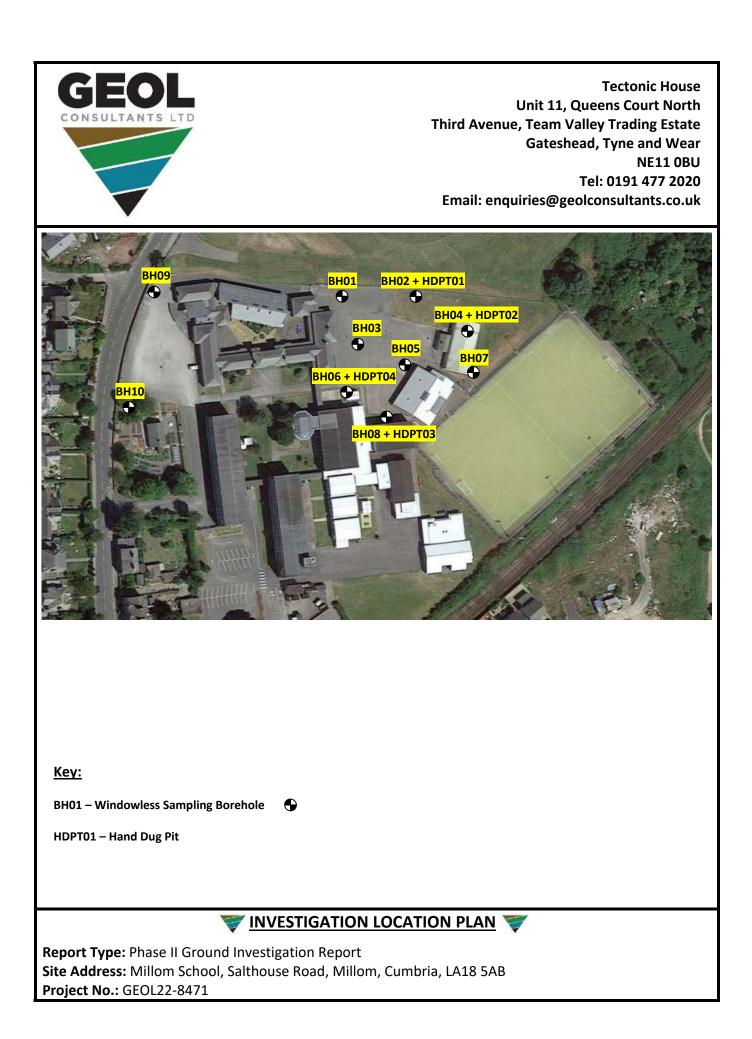
Nineteen representative samples of the soil deposits encountered at the windowless sampling borehole locations were tested by Derwentside Environmental Testing Services Limited (DETS) to determine their pH value and soluble sulphate levels, so these materials can be classified in accordance with the guidance BRE Special Digest 1:2005, Concrete in Aggressive Ground. The results of the tests are contained in the DETS Certificate of Analysis Report (references 22-16769 and 22-22649), copies of which can be seen in Appendix III.



# **APPENDIX II**

**Investigation Location Plans Borehole Record Sheets DCP Record Sheets & Falling Head Test Record Sheets** 







Geol Consultants Limited Tectonic House, Unit 11 Queens Court North, Third Avenue Team Valley Trading Estate Gateshead Tyne and Wear, NE11 0BU 0191 477 2020 enquiries@geolconsultants.co.uk

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Geol Consultants Limited Tectonic House, Unit 11 Queens Court North, Third Avenue Team Valley Trading Estate Gateshead Tyne and Wear, NE11 0BU 0191 477 2020 enquiries@geolconsultants.co.uk

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### **Geol Consultants Limited**

VARIABLE HEAD (FALLING) PERMEABILITY TEST



▼							
SITE DETAILS: Millom School, Salthous	se Road, N	lillom		BOREHOLE	: BH08		
Cumbria, LA18 5AB							
Bottom of Borehole4.70Base of casing1.00Diameter of casing100.00	mBGL mBGL mm	-	Operator Date Time		IH 27/10/2022 11:30:00		
Height of casing0.00Elevation of Borehole0.00Groundwater Level4.70	mAGL mAOD mBGL	_	Weather Input volun Test Zone	ne of water	Sunny ~ 4.48	litres m	
TEST CALCULATION	MDOL	Elapsed (minutes)	Elapsed (seconds)	Total seconds	Water Depth (m)	Head (metres)	H/H
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(From BS 5930:2015 for standpipes) L=length of test zone D=diameter of standpipe		10 15 20 25 30 45	0 0 0 0 0 0	600 900 1200 1500 1800 2700	2.880 3.220 3.400 3.530 3.640 3.880	1.820 1.480 1.300 1.170 1.060 0.820	0.40 0.33 0.29 0.26 0.23 0.18
$\frac{\text{Permeability (k)}}{\text{K}= \underbrace{A}_{F(t_2 - t_1)} \text{ x Log}_e(H_1/H_2)}$ or	(ii)	60	0	3600	4.050	0.650	0.14
k= <u>A</u> FT	(iii)						
Where T is the Basic Time Lag Factor corresponding to an H/Ho value of 0.37							
L= 4.48 m D= 0.100 m L/D= 44.80							
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$							
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$							
Remarks		-					
Prainage Characteristics: POOR Permeability Classification: LOW		1					



### **Geol Consultants Limited**

VARIABLE HEAD (FALLING) PERMEABILITY TEST



•							
SITE DETAILS: Millom School, Salthous	se Road, M	lillom		BOREHOLE	:BH10		
Cumbria, LA18 5AB							
Bottom of Borehole 3.00	mBGL		Operator		IH		
Base of casing 1.00	mBGL	_	Date		27/10/2022		
Diameter of casing 100.00	mm		Time		13:00:00		
Height of casing 0.00	mAGL		Weather		Sunny		
Elevation of Borehole 0.00	mAOD		Input volun	ne of water	~	litres	
Groundwater Level 2.35	mBGL		Test Zone		2.95	m	
TEST CALCULATION		Elapsed (minutes)	Elapsed (seconds)	Total seconds	Water Depth (m)	Head (metres)	H/H
listelie Eester (E)		0	0	0	0.050	2.300	1.00
Intake Factor (F)		1	0 0	60 120	0.170 0.230	2.180 2.120	0.94 0.92
F= 2 πL	(i)	2 3	0	120	0.230	2.120	0.92
$F = \frac{2 \text{ IIL}}{\text{Log}_{e} [(L/D) + \sqrt{(1+(L/D)^{2})]}}$	(1)	4	0	240	0.320	2.070	0.88
		5	0	300	0.350	2.000	0.87
(From BS 5930:2015 for standpipes)		10	0	300 600	0.350	2.000	0.87
		15	0	900	0.530	1.820	0.79
L=length of test zone		20	0	1200	0.560	1.790	0.77
D=diameter of standpipe		25	0	1500	0.580	1.770	0.77
		30	0	1800	0.600	1.750	0.76
<u>Permeability (k)</u>		45 60	0 0	2700 3600	0.630 0.660	1.720 1.690	0.74 0.73
	(ii)	60	0	3000	0.000	1.090	0.73
$k= \underline{A} \qquad x \text{ Log}_{e} (H_{1}/H_{2})$ $\vdash (t_{2} - t_{1})$	(ii)						
or							
k= <u>A</u> FT	(iii)						
Where T is the Basic Time Lag Factor corresponding to an H/Ho value of 0.37							
L= 2.95 m							
D= 0.100 m /D= 29.50							
t <sub>1</sub> = 0 s							
t <sub>2</sub> = 3600 s							
− H <sub>1</sub> = 2.30 m							
$H_2 = 1.69$ m							
A= 0.00785 m <sup>2</sup>							
F = 4.5454 From (i)							
T = 4.3434 FIGH (I) T = 750 s							
· · · ·1 - ····							
k= 1.47917E-07 ms From (ii) k= From (iii)							
e k=							
emarks		-					
ainage Characteristics: POOR							
meability Classification: VERY LOW							

## **Ground Gas Monitoring Record Sheet**



					Site		Borehole	Gas			Methane	Methane (% v/v) Methane (% LEL)		EL) Carbon Dioxide (% v/v)		Oxygen (% v/v)		(GFM 435 only)					Depth to	Depth to	
Visit	Date	Time	Equipment	Weather	Engineer	Comments	Position	Flow (l/hr)	Pressure (mbar)	Pressure Trend	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Hex %	PID Cf	PID (Isobutylene)	H₂S	со	Water (m bgl)	Base (m bgl)
							7	<0.1	1009			0.0		0.0		1.6		18.5	0.000	1.0		0	0	DRY	3.00
1	14/09/2022	07:30	GFM436	Sunny spells, wet	IH		8	<0.1	1009	Falling 1017 - 1012		0.0		0.0		1.4		19.1	0.000	1.0		0	0	DRY	4.80
							10	<0.1	1009			0.0		0.0		2.6		17.8	0.000	1.0		0	0	DAMP 2.95	3.00
							7	<0.1	996			0.0		0.0		1.5		18.5	0.001	1.0		0	0	DRY	3.00
2	28/09/2022	16:55	GFM436	Overcast	IH		8	<0.1	996	Falling 1019 - 1000		0.0		0.0		1.7		18.8	0.001	1.0		0	0	DRY	4.80
							10	<0.1	996			0.0		0.0		2.6		17.6	0.001	1.0		0	0	2.82	3.00
				Overcast, wet with			7	<0.1	1007			0.0		0.0		2.0		18.0	0.005	1.0		0	0	DRY	3.00
3	27/10/2022	09:00	GFM436	occassional light showers	IH		8	<0.1	1007	Rising 995 -1009		0.0		0.0		1.8		18.8	0.000	1.0		0	0	DRY	4.80
				Showers			10	<0.1	1007			0.0		0.0		1.4		17.8	0.002	1.0		0	0	2.35	3.00
							7	<0.1	1001			0.0		0.0		2.2		17.5	0.004	1.0		0	0	DRY	3.00
4	10/11/2022	15:20	GFM436	Overcast, wet and windy	IH		8	<0.1	1001	Rising 988 - 1010		0.0		0.0		1.9		18.6	0.001	1.0		0	0	DRY	4.80
							10	<0.1	1001			0.0		0.0		2.4		14.5	0.005	1.0		0	0	1.05	3.00
							7	<0.1	1007			0.0		0.0		1.4		17.7	0.028	1.0		0	0	DRY	3.00
5	15/12/2022	15:30	GFM436	Sunny, cold (Ice)	IH		8	<0.1	1008	Rising 1009 - 1012		0.0		0.0		1.3		18.6	0.023	1.0		0	0	DRY	4.80
							10	<0.1	1009			0.0		0.0		0.9		17.6	0.027	1.0		0	0	2.76	3.00
							7	<0.1	988			0.0		0.0		1.9		17.2	0.020	1.0		0	0	DRY	3.00
6	22/12/2022	15:00	GFM436	Overcast, wet	IH		8	<0.1	988	Rising 995 - 1001		0.0		0.0		1.7		18.4	0.020	1.0		0	0	DRY	4.80
							10	<0.1	987			0.0		0.0		1.4		16.5	0.021	1.0		0	0	2.72	3.00

## APPENDIX E – HYDRAULIC SURFACE WATER CALCULATIONS

## LEISURE CENTRE GREENFIELD RUNOFF RATE CALCUATION (Qbar)

Furness Partnership		Page 1
20 Britton Street	GREENFIELD RUNOFF RATE	
London	LEISURE CENTRE	
EC1M 5TX	MILLOM	Micro
Date 11/08/2023	Designed by MH	Drainage
File FITNESS CENTRE 1IN100 +	Checked by CJH	Diamage
Micro Drainage	Source Control 2020.1.3	·

#### ICP SUDS Mean Annual Flood

Input

Return Period (years) 1 Soil 0.470 Area (ha) 0.341 Urban 0.000 SAAR (mm) 1070 Region Number Region 10

#### Results 1/s

QBAR Rural 2.7 QBAR Urban 2.7 Q1 year 2.4 Q1 year 2.4 Q30 years 4.6

Q100 years 5.6

## PLAYGROUND EXTENSION GREENFIELD RUNOFF RATE CALCUATION (Qbar)

Furness Partnership		Page 1
20 Britton Street	GREENFIELD RUNOFF RATE	
London	PLAYGROUND SITE	
EC1M 5TX	MILLOM LC	Mirro
Date 31/07/2023	Designed by M.H	Drainage
File PLAYGROUND 1IN100 + 40%	Checked by	Diamaye
Micro Drainage	Source Control 2020.1.3	

#### ICP SUDS Mean Annual Flood

Input

Return Period (years) 1 Soil 0.470 Area (ha) 0.235 Urban 0.000 SAAR (mm) 1070 Region Number Region 10

#### Results 1/s

QBAR Rural 1.9 QBAR Urban 1.9 Q1 year 1.6 Q1 year 1.6 Q30 years 3.2

Q100 years 3.9

## LEISURE CENTRE DEVELOPMENT HYDRAULIC CALCULATIONS

Furness Partnership		Page 1
20 Britton Street	LEISURE CENTRE NETWORK	
London	MILLOM SCHOOL	
EC1M 5TX	MILLOM	Micco
Date 11/08/2023	Designed by MH	Desinado
File LEISURE CENTRE NETWORK.MDX	Checked by CJH	Diamage
Micro Drainage	Network 2020.1.3	
STORM SEWER DESIGN	by the Modified Rational Method	
Design	Criteria for Storm	
Pipe Sizes STA	NDARD Manhole Sizes STANDARD	
FSR Rainfall	Model - England and Wales	
Return Period (years)		(%) 100
	18.000Add Flow / Climate Change0.267Minimum Backdrop Height	
Maximum Bainfall (mm/hr)	50 Maximum Backdrop Height	(m) 1.500
	30 Min Design Depth for Optimisation	(m) 1.200
Foul Sewage (l/s/ha)		
Volumetric Runoff Coeff.	1.000 Min Slope for Optimisation (	1:X) 500
Design	ed with Level Soffits	
Time Are	ea Diagram for Storm	
	Area Time Area (ha) (mins) (ha)	
0-4	4 0.200 4-8 0.141	
Total Area	Contributing (ha) = 0.341	
Total Pi	pe Volume (m³) = 12.498	
Network D	esign Table for Storm	
« - Indica	tes pipe capacity < flow	
	E. Base k HYD DIA Section T .ns) Flow (l/s) (mm) SECT (mm)	'ype Auto Design
		-
	0.00         0.0         0.600         o         150         Pipe/Cond           0.00         0.0         0.600         o         225         Pipe/Cond	
	0.00 0.0 0.600 o 225 Pipe/Cond 0.00 0.0 0.600 o 300 Pipe/Cond	
	-	-
	ork Results Table	
PN Rain T.C. US/IL E I.A (mm/hr) (mins) (m) (ha	-	<pre>&gt; Flow (1/s)</pre>
s1.000 39.50 5.25 7.850 0.	047 0.0 0.0 0.0 1.39 24.	6 6.7
	078 0.0 0.0 0.0 1.35 53.	
s1.002 37.90 5.84 7.100 0.	126 0.0 0.0 0.0 1.28 90.	4 17.2
©19	32-2020 Innovyze	

Furness Partnership		Page 2
20 Britton Street	LEISURE CENTRE NETWORK	
London	MILLOM SCHOOL	
EC1M 5TX	MILLOM	Mirco
Date 11/08/2023	Designed by MH	Dcainago
File LEISURE CENTRE NETWORK.MDX	Checked by CJH	Diamage
Micro Drainage	Network 2020.1.3	

#### Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	ise (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.003	27.000	0.450	60.0	0.051	0.00	0.0	0.600	0	300	Pipe/Conduit	<b>A</b>
S1.004	9.500	0.225	42.2	0.004	0.00	0.0	0.600	0	300	Pipe/Conduit	ě
S1.005	18.700	0.100	187.0	0.044	0.00	0.0	0.600	0	375	Pipe/Conduit	ě
S2.000	10.000	0.100	100.0	0.000	5.00	0.0	0.600	0	150	Pipe/Conduit	<b>A</b>
S2.001	13.000	0.325	40.0	0.013	0.00	0.0	0.600	0	225	Pipe/Conduit	ě
S2.002	18.600	0.800	23.3	0.012	0.00	0.0	0.600	0	225	Pipe/Conduit	- ă
S2.003	13.100	0.080	163.8	0.091	0.00	0.0	0.600	0	300	Pipe/Conduit	ă
S2.004	5.900	0.100	59.0	0.000	0.00	0.0	0.600	0	375	Pipe/Conduit	ě
S1.006	10.200	0.015	680.0	0.000	0.00	0.0	0.600	0	375	Pipe/Conduit	<u>0</u>
S1.007	38.300	0.275	139.3	0.000	0.00	0.0	0.600	0	150	Pipe/Conduit	ě

#### Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (1/s)	Add Flow (l/s)	Vel (m/s)	Cap (1/s)	Flow (l/s)
S1.003	37.33	6.06	6.920	0.177	0.0	0.0	0.0	2.03	143.7	23.9
S1.004	37.17	6.13	6.470	0.181	0.0	0.0	0.0	2.43	171.5	24.3
S1.005	36.60	6.36	4.950	0.225	0.0	0.0	0.0	1.32	146.0	29.7
S2.000 S2.001 S2.002 S2.003	39.75 39.45 39.12 38.63	5.27 5.38 5.56	7.850 7.675 7.350 6.475	0.000 0.013 0.025 0.116	0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	1.23	17.8 82.5 108.4 86.7	0.0 1.9 3.5 16.2
S2.004	38.52	5.60	4.950	0.116	0.0	0.0	0.0	2.36	261.0	16.2
S1.006 S1.007	36.02 34.39		4.850 4.835	0.341 0.341	0.0	0.0	0.0	0.69 0.85	75.9 15.0«	44.4 44.4

#### Free Flowing Outfall Details for Storm

		Outfall		I.					W	
ртре	Number	Name		(m)		(m)	т.	Level	(mm)	(mm)
								(m)		
	S1.007	S		6.410		4.560		4.560	0	0

Furness Partnership		Page 3
20 Britton Street	LEISURE CENTRE NETWORK	
London	MILLOM SCHOOL	
EC1M 5TX	MILLOM	Micro
Date 11/08/2023	Designed by MH	Drainage
File LEISURE CENTRE NETWORK.MDX	Checked by CJH	Diamage
Micro Drainage	Network 2020.1.3	

#### Simulation Criteria for Storm

Volumetric Runoff Coeff 1.000Additional Flow - % of Total Flow 0.000Areal Reduction Factor 1.000MADD Factor \* 10m³/ha Storage 1.000Hot Start (mins)0Inlet Coefficient 0.800Hot Start Level (mm)0 Flow per Person per Day (1/per/day)Manhole Headloss Coeff (Global)0.500Foul Sewage per hectare (1/s)0.000Output Interval (mins)1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSF	Pro:	file Type	Summer
Return Period (years)	1	Cv	(Summer)	1.000
Region	England and Wales	Cv	(Winter)	0.840
M5-60 (mm)	18.000	Storm Duratio	on (mins)	30
Ratio R	0.267			

	hip										Pa	ge 4
20 Britton Street LEISURE CENTRE								WORK				
ondon			1	MILLOM SCHOOL							2	
C1M 5TX			1	MILLO	M						M	licro
ate 11/08/2023				Desig	ned by	y MH					and the second se	rainag
ile LEISURE CEN	TRE N	ETWORK.M	IDX	Check	ed by	СЈН						iairiay
licro Drainage				Netwo	rk 202	20.1	.3				-	
					ols fo							
<u>Hydro-Brake</u>	® Opt	imum Mar	nhole:	STAN	ik, ds	/ PN :	SI.	006,	Volume	∋ (n	n³):	6.0
						-SHE	-0067	-2700-	2000-27			
		De	Design esign F						2.0	.7		
		20	2	lush-F				С	alculat			
				-		linim	ise u	pstrea	m stora	-		
			-	plicat Availa					Surfa v	ice Tes		
			-	neter (						es 67		
			Invert		· · /				4.8	50		
		Dutlet Pip								00		
2	Suggesi	ed Manhol	le Diam	leter (	mm)				12	00		
Control Point	s	Head (m)	) Flow	(1/s)		Cont	rol P	oints	He	ead	(m) I	Flow (1/s
Design Point (Calcu		) 2.000 ™ 0.285		2.7					-Flo®		594 _	1. 2.
F LU:	511-110	0.20	9	1.9	Mean 1	C TOW	OVEL	neau r	lange			۷.
The hydrological Hydro-Brake® Opti								-			-	
Hydro-Brake Optim			then t	these :		e rou	ting					
	um® be	utilised			storage			calcul	ations	will	L be :	invalidat
Hydro-Brake Optim	um® be	utilised	) Flow		storage			calcul	ations Depth	will	L be :	invalidat
Hydro-Brake Optim Depth (m) Flow 0.100 0.200	um® be ( <b>1/s)</b> 1.6 1.9	utilised Depth (m) 1.20 1.40	<b>) Flow</b>	(1/s) 2.1 2.3	Depth 3 3	(m) .000 .500		calcul (1/s) 3.3 3.5	ations Depth 7. 7.	will (m) 000 500	L be :	invalidat ( <b>1/s)</b> 4.8 5.0
Hydro-Brake Optim <b>Depth (m) Flow</b> 0.100 0.200 0.300	uum® be ( <b>1/s)</b> 1.6 1.9 1.9	utilised Depth (m) 1.200 1.400 1.600	<b>) Flow</b>	(1/s) 2.1 2.3 2.4	Depth 3 3 4	(m) .000 .500 .000		calcul (1/s) 3.3 3.5 3.7	ations Depth 7. 7. 8.	will (m) 000 500 000	L be :	invalidat ( <b>1/s)</b> 4.8 5.0 5.2
Hydro-Brake Optim <b>Depth (m) Flow</b> 0.100 0.200 0.300 0.400	uum® be ( <b>1/s)</b> 1.6 1.9 1.9 1.9	utilised Depth (m) 1.200 1.400 1.600 1.800	<b>) Flow</b>	(1/s) 2.1 2.3 2.4 2.6	Depth 3 3 4 4	(m) .000 .500 .000 .500		calcul (1/s) 3.3 3.5 3.7 3.9	ations Depth 7. 7. 8. 8.	will (m) 000 500 000 500	L be :	invalidat ( <b>1/s)</b> 4.8 5.0 5.2 5.3
Hydro-Brake Optim <b>Depth (m) Flow</b> 0.100 0.200 0.300	uum® be ( <b>1/s)</b> 1.6 1.9 1.9	utilised Depth (m) 1.200 1.400 1.600	) Flow	(1/s) 2.1 2.3 2.4 2.6 2.7 2.8	<b>Depth</b> 3 3 4 4 5 5	(m) .000 .500 .000		calcul (1/s) 3.3 3.5 3.7	ations Depth 7. 7. 8. 8. 9.	will (m) 000 500 000	L be :	invalidat ( <b>1/s)</b> 4.8 5.0 5.2
Hydro-Brake Optim <b>Depth (m) Flow</b> 0.100 0.200 0.300 0.400 0.500 0.600 0.800	(1/s) (1/s) 1.6 1.9 1.9 1.9 1.8 1.6 1.8	utilised Depth (m) 1.20 1.40 1.60 1.80 2.00 2.20 2.40	) Flow	(1/s) 2.1 2.3 2.4 2.6 2.7 2.8 2.9	<b>Depth</b> 3 3 4 4 5 5 6	(m) .000 .500 .500 .500 .500 .500		calcul (1/s) 3.3 3.5 3.7 3.9 4.1 4.3 4.5	ations Depth 7. 7. 8. 8. 9. 9.	will (m) 000 500 000 500 000	L be :	invalidat (1/s) 4.8 5.0 5.2 5.3 5.4
Hydro-Brake Optim <b>Depth (m) Flow</b> 0.100 0.200 0.300 0.400 0.500 0.600	(1/s) (1/s) 1.6 1.9 1.9 1.9 1.8 1.6	utilised Depth (m) 1.20 1.40 1.60 1.80 2.00 2.20	) Flow	(1/s) 2.1 2.3 2.4 2.6 2.7 2.8	<b>Depth</b> 3 3 4 4 5 5 6	(m) .000 .500 .000 .500 .000 .500		<pre>calcul (l/s) 3.3 3.5 3.7 3.9 4.1 4.3</pre>	ations Depth 7. 7. 8. 8. 9. 9.	will (m) 000 500 000 500 000	L be :	invalidat (1/s) 4.8 5.0 5.2 5.3 5.4
Hydro-Brake Optim <b>Depth (m) Flow</b> 0.100 0.200 0.300 0.400 0.500 0.600 0.800	(1/s) (1/s) 1.6 1.9 1.9 1.9 1.8 1.6 1.8	utilised Depth (m) 1.20 1.40 1.60 1.80 2.00 2.20 2.40	) Flow	(1/s) 2.1 2.3 2.4 2.6 2.7 2.8 2.9	<b>Depth</b> 3 3 4 4 5 5 6	(m) .000 .500 .500 .500 .500 .500		calcul (1/s) 3.3 3.5 3.7 3.9 4.1 4.3 4.5	ations Depth 7. 7. 8. 8. 9. 9.	will (m) 000 500 000 500 000	L be :	invalidat (1/s) 4.8 5.0 5.2 5.3 5.4
Hydro-Brake Optim <b>Depth (m) Flow</b> 0.100 0.200 0.300 0.400 0.500 0.600 0.800	(1/s) (1/s) 1.6 1.9 1.9 1.9 1.8 1.6 1.8	utilised Depth (m) 1.20 1.40 1.60 1.80 2.00 2.20 2.40	) Flow	(1/s) 2.1 2.3 2.4 2.6 2.7 2.8 2.9	<b>Depth</b> 3 3 4 4 5 5 6	(m) .000 .500 .500 .500 .500 .500		calcul (1/s) 3.3 3.5 3.7 3.9 4.1 4.3 4.5	ations Depth 7. 7. 8. 8. 9. 9.	will (m) 000 500 000 500 000	L be :	invalidat (1/s) 4.8 5.0 5.2 5.3 5.4
Hydro-Brake Optim <b>Depth (m) Flow</b> 0.100 0.200 0.300 0.400 0.500 0.600 0.800	(1/s) (1/s) 1.6 1.9 1.9 1.9 1.8 1.6 1.8	utilised Depth (m) 1.20 1.40 1.60 1.80 2.00 2.20 2.40	) Flow	(1/s) 2.1 2.3 2.4 2.6 2.7 2.8 2.9	<b>Depth</b> 3 3 4 4 5 5 6	(m) .000 .500 .500 .500 .500 .500		calcul (1/s) 3.3 3.5 3.7 3.9 4.1 4.3 4.5	ations Depth 7. 7. 8. 8. 9. 9.	will (m) 000 500 000 500 000	L be :	invalidat (1/s) 4.8 5.0 5.2 5.3 5.4
Hydro-Brake Optim <b>Depth (m) Flow</b> 0.100 0.200 0.300 0.400 0.500 0.600 0.800	(1/s) (1/s) 1.6 1.9 1.9 1.9 1.8 1.6 1.8	utilised Depth (m) 1.20 1.40 1.60 1.80 2.00 2.20 2.40	) Flow	(1/s) 2.1 2.3 2.4 2.6 2.7 2.8 2.9	<b>Depth</b> 3 3 4 4 5 5 6	(m) .000 .500 .500 .500 .500 .500		calcul (1/s) 3.3 3.5 3.7 3.9 4.1 4.3 4.5	ations Depth 7. 7. 8. 8. 9. 9.	will (m) 000 500 000 500 000	L be :	invalidat (1/s) 4.8 5.0 5.2 5.3 5.4
Hydro-Brake Optim <b>Depth (m) Flow</b> 0.100 0.200 0.300 0.400 0.500 0.600 0.800	(1/s) (1/s) 1.6 1.9 1.9 1.9 1.8 1.6 1.8	utilised Depth (m) 1.20 1.40 1.60 1.80 2.00 2.20 2.40	) Flow	(1/s) 2.1 2.3 2.4 2.6 2.7 2.8 2.9	<b>Depth</b> 3 3 4 4 5 5 6	(m) .000 .500 .500 .500 .500 .500		calcul (1/s) 3.3 3.5 3.7 3.9 4.1 4.3 4.5	ations Depth 7. 7. 8. 8. 9. 9.	will (m) 000 500 000 500 000	L be :	invalidat (1/s) 4.8 5.0 5.2 5.3 5.4

Furness Partnership	Page 5	
20 Britton Street	LEISURE CENTRE NETWORK	
London	MILLOM SCHOOL	
EC1M 5TX	MILLOM	Mirco
Date 11/08/2023	Designed by MH	Drainage
File LEISURE CENTRE NETWORK.MDX	Checked by CJH	Diamage
Micro Drainage	Network 2020.1.3	•

#### Storage Structures for Storm

#### Cellular Storage Manhole: STANK, DS/PN: S1.006

Invert Level (m) 4.850 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

#### Depth (m) Area (m<sup>2</sup>) Inf. Area (m<sup>2</sup>) Depth (m) Area (m<sup>2</sup>) Inf. Area (m<sup>2</sup>)

0.000	169.0	0.0	2.001	0.0	0.0
2.000	169.0	0.0			

20 Brit		nership						Page	6
	ton S	treet		L	EISURE CENTR	E NETWORK	<		
London				M	ILLOM SCHOOL				
С1М 5Т	'X			M	ILLOM			Mie	
ate 11	/08/2	023		<u></u>	esigned by M	Н		Mic	
		CENTRE NE	יי אסראזיי					Dra	inag
-			I WORK .I	-	hecked by CJ etwork 2020.				2
licro D	laina	ge		IN	etwork 2020.	1.3			
l year	Retur	n Period S	ummary	of Cri	tical Result Storm	s by Max	imum Leve	el (Rank	1) fo
Number (	Foul of Inp	Hot Hot Star Headloss Co Sewage per h it Hydrograph	Start (m t Level eff (Glc ectare ( ns 0 M	actor 1.0 nins) (mm) obal) 0.1 (1/s) 0.0 Number of	500 Flow per Pe 000 f Offline Contr	al Flow - % Factor * 1 Inle erson per I	lOm³/ha Sto et Coeffie Day (l/per, Der of Time	orage 1.00 cient 0.80 /day) 0.00 e/Area Dia	0 0 0
Numbe	r of O	nline Control	ls 1 Nun	nber of :	Storage Structu	ires 1 Numb	per of Rea	l Time Con	trols
				Syntheti	.c Rainfall Det	ails			
		Rainf	all Mod			Ratio R			
					ind and Wales C				
		ŀ	15-60 (mi	m)	18.000 C	v (Winter)	1.000		
	1	Margin for Fl	lood Ris	k Warnin	ıq (mm)		3	300.0	
		-	Ana	lysis Ti	mestep 2.5 Sec	ond Increm	ent (Exten	ided)	
				DTS	Status			OFF	
				DVD	Status			OFF	
				Inertia	Status			OFF	
				Inertia	Status			OFF	
		P	rofile(s		Status	:	Summer and		
			rofile(s	5)	Status 0, 60, 120, 18			Winter	
		Duration(	rofile(s s) (mins	s) s) 15, 3			0, 480, 60 960, 144	Winter 0, 720, 0, 2160	
	Ret	Duration(	rofile(s s) (mins ) (years	s) s) 15, 3			0,480,60 960,144 1,	Winter 0, 720, 0, 2160 30, 100	
	Ret	Duration(	rofile(s s) (mins ) (years	s) s) 15, 3			0,480,60 960,144 1,	Winter 0, 720, 0, 2160	
	Ret	Duration(	rofile(s s) (mins ) (years	s) s) 15, 3			0,480,60 960,144 1,	Winter 0, 720, 0, 2160 30, 100	
		Duration(	rofile(s s) (mins ) (years hange (१	s) s) 15, 3 s) s)	0, 60, 120, 18	0, 240, 360	0,480,60 960,144 1, 40,	Winter 0, 720, 0, 2160 30, 100 40, 40	
PN	Ret US/MH Name	Duration(	rofile(s s) (mins ) (years hange (% <b>Return</b>	s) s) 15, 3	0, 60, 120, 18	0, 240, 360	0,480,60 960,144 1,	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	
	US/MH Name	Duration( urn Period(s Climate C Storm	rofile(s s) (mins ) (years hange (% Return Period	<pre>;) ;) 15, 3 ;) ;) Climate Change</pre>	0, 60, 120, 18 First (X) Surcharge	0, 240, 360 First (Y)	0, 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	
S1.000	US/MH Name SS.01	Duration( urn Period(s Climate C <b>Storm</b> 15 Summer	rofile(s s) (mins ) (years hange (% Return Period 1	<pre>;) ;) 15, 3 ;) ;) Climate Change +40%</pre>	0, 60, 120, 18 First (X)	0, 240, 360 First (Y)	0, 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Leve] (m) 7.916
S1.000 S1.001	US/MH Name SS.01 SS.02	Duration( urn Period(s Climate C <b>Storm</b> 15 Summer 15 Summer	rofile(s s) (mins ) (years hange (% Return Period 1 1	<pre>;) ;) 15, 3 ;) Climate Change +40% +40%</pre>	0, 60, 120, 18 First (X) Surcharge	0, 240, 360 First (Y)	0, 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Level (m) 7.916 7.459
S1.000 S1.001 S1.002	<b>US/MH</b> Name SS.01 SS.02 SS.03	Duration( urn Period(s Climate C Storm 15 Summer 15 Summer 15 Summer	rofile(s s) (mins ) (years hange (% Return Period 1 1 1	<pre>s) 15, 3 s) 15, 3 s) Climate Change +40% +40% +40% +40%</pre>	0, 60, 120, 18 First (X) Surcharge	0, 240, 360 First (Y)	0, 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Leve: (m) 7.910 7.459 7.200
S1.000 S1.001 S1.002 S1.003	<b>US/MH</b> Name SS.01 SS.02 SS.03 SS.04	Duration( urn Period(s Climate C Storm 15 Summer 15 Summer 15 Summer 15 Summer	rofile(s s) (mins ) (years hange (% Return Period 1 1 1 1	<pre>s) 15, 3 s) 15, 3 s) Climate Change +40% +40% +40% +40% +40%</pre>	0, 60, 120, 18 First (X) Surcharge	0, 240, 360 First (Y)	0, 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Leve: (m) 7.910 7.459 7.200 7.018
S1.000 S1.001 S1.002 S1.003 S1.004	US/MH Name SS.01 SS.02 SS.03 SS.04 SS.05	Duration ( urn Period(s Climate C Storm 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer	rofile(s s) (mins ) (years hange (% Return Period 1 1 1 1 1	<pre>s) 15, 3 s) 15, 3 s) Climate Change +40% +40% +40% +40% +40% +40%</pre>	0, 60, 120, 18 First (X) Surcharge 100/15 Summer	0, 240, 360 First (Y)	0, 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Leve: (m) 7.916 7.459 7.206 7.018 6.574
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005	US/MH Name SS.01 SS.02 SS.03 SS.04 SS.05 SS.06	Duration ( urn Period(s Climate C Storm 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 1440 Summer	rofile(s s) (mins hange (% Return Period 1 1 1 1 1 1 1	<pre>s) 15, 3 s) 15, 3 s) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%</pre>	0, 60, 120, 18 First (X) Surcharge	0, 240, 360 First (Y)	0, 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Leve: (m) 7.916 7.459 7.206 7.018 6.574 5.459
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S2.000	US/MH Name SS.01 SS.02 SS.03 SS.04 SS.05 SS.06 SS.09	Duration ( urn Period (s Climate C Storm 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 1440 Summer	rofile(s s) (mins hange (% Return Period 1 1 1 1 1 1 1 1	<pre>s) 15, 3 s) 15, 3 s) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%</pre>	0, 60, 120, 18 First (X) Surcharge 100/15 Summer	0, 240, 360 First (Y)	0, 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Leve: (m) 7.916 7.459 7.206 7.018 6.574 5.459 7.850
\$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005 \$2.000 \$2.001	US/MH Name SS.01 SS.02 SS.03 SS.04 SS.05 SS.06 SS.09 SS.10	Duration ( urn Period (s Climate C Storm 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 1440 Summer 15 Summer 15 Summer 15 Summer	rofile(s s) (mins hange (% Return Period 1 1 1 1 1 1 1 1 1 1	<pre>s) 15, 3 s) 15, 3 s) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%</pre>	0, 60, 120, 18 First (X) Surcharge 100/15 Summer	0, 240, 360 First (Y)	0, 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Level (m) 7.916 7.459 7.206 7.206 7.018 6.574 5.459 7.850 7.850 7.702
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S2.000 S2.001 S2.002	US/MH Name SS.01 SS.02 SS.03 SS.04 SS.05 SS.06 SS.09 SS.10 SS.11	Duration ( urn Period (s Climate C Storm 15 Summer 15 Summer	rofile(s s) (mins hange (% Return Period 1 1 1 1 1 1 1 1 1 1 1	<pre>s) 15, 3 s) 15, 3 s) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%</pre>	0, 60, 120, 18 <b>First (X)</b> <b>Surcharge</b> 100/15 Summer 1/360 Summer	0, 240, 360 First (Y)	0, 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Level (m) 7.916 7.459 7.206 7.018 6.574 5.459 7.850 7.701 7.380
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S2.000 S2.001 S2.002 S2.003	US/MH Name SS.01 SS.02 SS.03 SS.04 SS.05 SS.06 SS.09 SS.10 SS.11 SS.12	Duration ( urn Period (s Climate C Storm 15 Summer 15 Summer	rofile(s s) (mins hange (% Return Period 1 1 1 1 1 1 1 1 1 1 1 1 1 1	<pre>s) 15, 3 s) 15, 3 s) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%</pre>	0, 60, 120, 18 <b>First (X)</b> <b>Surcharge</b> 100/15 Summer 1/360 Summer 100/15 Summer	0, 240, 360 First (Y)	0, 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Level (m) 7.910 7.455 7.200 7.014 6.57 5.455 7.850 7.700 7.386 6.58
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S2.000 S2.001 S2.002 S2.003 S2.004	US/MH Name SS.01 SS.02 SS.03 SS.04 SS.05 SS.06 SS.09 SS.10 SS.11 SS.12 SS.13	Duration ( urn Period (s Climate C Storm 15 Summer 15 Summer	rofile(s s) (mins hange (% Return Period 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	<pre>s) 15, 3 s) 15, 3 s) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%</pre>	0, 60, 120, 18 <b>First (X)</b> <b>Surcharge</b> 100/15 Summer 1/360 Summer 1/360 Summer	0, 240, 360 First (Y)	0, 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Level (m) 7.916 7.459 7.206 7.018 6.574 5.459 7.856 7.702 7.386 6.582 5.458
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S2.000 S2.001 S2.002 S2.003 S2.004 S1.006	US/MH Name SS.01 SS.02 SS.03 SS.04 SS.05 SS.06 SS.09 SS.10 SS.10 SS.11 SS.12 SS.13 STANK	Duration ( urn Period (s Climate C Storm 15 Summer 15 Summer 1440 Summer	rofile(s s) (mins hange (% Return Period 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	<pre>s) 15, 3 s) 15, 3 s) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%</pre>	0, 60, 120, 18 <b>First (X)</b> <b>Surcharge</b> 100/15 Summer 1/360 Summer 1/360 Summer	0, 240, 360 First (Y)	0, 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Level (m) 7.916 7.459 7.200 7.018 6.574 5.459 7.850 7.700 7.380 6.582 5.458 5.458
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S2.000 S2.001 S2.002 S2.003 S2.004	US/MH Name SS.01 SS.02 SS.03 SS.04 SS.05 SS.06 SS.09 SS.10 SS.10 SS.11 SS.12 SS.13 STANK	Duration ( urn Period (s Climate C Storm 15 Summer 15 Summer	rofile(s s) (mins hange (% Return Period 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	<pre>s) 15, 3 s) 15, 3 s) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%</pre>	0, 60, 120, 18 <b>First (X)</b> <b>Surcharge</b> 100/15 Summer 1/360 Summer 1/360 Summer	0, 240, 360 First (Y)	0, 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Level (m) 7.914 7.452 7.200 7.014 6.574 5.452 7.856 7.702 7.386 6.582 5.456

Furness Partnership	Page 7	
20 Britton Street	LEISURE CENTRE NETWORK	
London	MILLOM SCHOOL	
EC1M 5TX	MILLOM	Mirco
Date 11/08/2023	Designed by MH	Dcainago
File LEISURE CENTRE NETWORK.MDX	Checked by CJH	Diamaye
Micro Drainage	Network 2020.1.3	1

 $\frac{1 \ {\rm year} \ {\rm Return} \ {\rm Period} \ {\rm Summary} \ {\rm of} \ {\rm Critical} \ {\rm Results} \ {\rm by} \ {\rm Maximum} \ {\rm Level} \ ({\rm Rank} \ 1) \ {\rm for} \ {\rm Storm}$ 

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)		Overflow (1/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SS.01	-0.084	0.000	0.39			9.1	OK	
S1.001	SS.02	-0.141	0.000	0.29			14.0	OK	
S1.002	SS.03	-0.194	0.000	0.27			21.8	OK	
S1.003	SS.04	-0.202	0.000	0.23			30.0	OK	
S1.004	SS.05	-0.196	0.000	0.26			30.7	OK	
S1.005	SS.06	0.134	0.000	0.05			5.8	SURCHARGED	
S2.000	SS.09	-0.150	0.000	0.00			0.0	OK	
S2.001	SS.10	-0.199	0.000	0.03			2.1	OK	
S2.002	SS.11	-0.195	0.000	0.04			4.1	OK	
S2.003	SS.12	-0.194	0.000	0.27			19.1	OK	
S2.004	SS.13	0.133	0.000	0.02			3.0	SURCHARGED	
S1.006	STANK	0.233	0.000	0.04		719	1.9	SURCHARGED	
S1.007	SS.07	-0.114	0.000	0.13			1.9	OK	

		nership						Page	8
20 Brit	ton S	treet		L	EISURE CENTR	E NETWORF	ζ		
London				M	ILLOM SCHOOL				
С1М 5Т	X			М	ILLOM			Mic	
)ate 11	/08/2	023		D	esigned by M	н		— Mic	
		CENTRE NE	ישמסטעו					Dra	inag
-			I WORK .	-	hecked by CJ			Contraction of the second s	
licro D	raina	ge		N	etwork 2020.	1.3			
<u>30 ye</u>	ar Re	turn Perio	d Summa		Critical Res	ults by M	laximum I	Jevel (Ra	ink 1)
					for Storm				
				Simu	lation Criteria	ì			
		Areal Redu	iction Fa		000 Additiona	-	of Total	Flow 0.00	0
		Hot	Start (r	nins)	0 MADD	Factor * 1	.0m³/ha St	orage 1.00	0
		Hot Star						cient 0.80	
М					500 Flow per Pe	erson per I	ay (l/per	/day) 0.00	0
	Foul	Sewage per h	lectare	(1/s) 0.0	000				
Number	of Inn	ut Hydrogram	hs 0 1	Number o	f Offline Cont:	ols () Numb	er of Tim	e/Area Dia	arams
	-				Storage Structu				-
	0.								. = •
				Syntheti	lc Rainfall Det	ails			
		Rain	fall Mod	el	FSR	Ratio R	0.267		
			Regi	on Engla	and and Wales C				
		1	M5-60 (m	m)	18.000 C	v (Winter)	1.000		
					<i>.</i> .				
	1	Margin for F			-	and Themen		00.0	
			Ana	-	mestep 2.5 Sec Status	ona increm	ent (Exter	OFF	
					Status Status			OFF	
				DVD				OFF	
				Thortin	Ctatura			OFF	
				Inertia	Status			OFF	
				Inertia	Status			OFF	
			rofile(s	5)			Summer and	Winter	
				5)	Status 0, 60, 120, 18		), 480, 60	Winter 0, 720,	
		Duration(	s) (mins	s) s) 15, 3			), 480, 60 960, 144	Winter 0, 720, 0, 2160	
	Ret	Duration( urn Period(s	s) (mins	s) s) 15, 3			0, 480, 60 960, 144 1,	Winter 0, 720, 0, 2160 30, 100	
	Ret	Duration(	s) (mins	s) s) 15, 3			0, 480, 60 960, 144 1,	Winter 0, 720, 0, 2160	
	Ret	Duration( urn Period(s	s) (mins	s) s) 15, 3			0, 480, 60 960, 144 1,	Winter 0, 720, 0, 2160 30, 100	Water
	Ret US/MH	Duration( urn Period(s Climate C	s) (mins ) (years Change (9	s) s) 15, 3	0, 60, 120, 18		0,480,60 960,144 1, 40,	Winter 0, 720, 0, 2160 30, 100 40, 40	
PN		Duration( urn Period(s	s) (mins ) (years Thange (% Return	5) 5) 15, 3 5) 5)	0, 60, 120, 18	0, 240, 360	0,480,60 960,144 1, 40,	Winter 0, 720, 0, 2160 30, 100 40, 40	Water Level (m)
	US/MH Name	Duration( urn Period(s Climate C <b>Storm</b>	s) (mins ) (years hange (% Return Period	s) s) 15, 3 s) climate Change	0, 60, 120, 18 First (X) Surcharge	0, 240, 360 First (Y)	), 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Level (m)
S1.000	US/MH Name SS.01	Duration( urn Period(s Climate C <b>Storm</b> 15 Summer	s) (mins ) (years hange (% Return Period 30	<pre>\$) \$) 15, 3 3) b) Climate Change +40%</pre>	0, 60, 120, 18 <b>First (X)</b>	0, 240, 360 First (Y)	), 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Leve] (m) 7.967
S1.000 S1.001	US/MH Name SS.01 SS.02	Duration( urn Period(s Climate C <b>Storm</b> 15 Summer 15 Summer	s) (mins ) (years hange (% Return Period 30 30	<pre>S) S) 15, 3 S) Climate Change +40% +40%</pre>	0, 60, 120, 18 First (X) Surcharge	0, 240, 360 First (Y)	), 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Level (m) 7.967 7.529
S1.000 S1.001 S1.002	<b>US/MH</b> <b>Name</b> SS.01 SS.02 SS.03	Duration( urn Period(s Climate C <b>Storm</b> 15 Summer 15 Summer 15 Summer	s) (mins ) (years hange (% Return Period 30 30 30	<pre>s) s) 15, 3 s) Climate Change +40% +40% +40% +40%</pre>	0, 60, 120, 18 First (X) Surcharge	0, 240, 360 First (Y)	), 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Leve: (m) 7.96 7.529 7.302
S1.000 S1.001 S1.002 S1.003	<b>US/MH</b> Name SS.01 SS.02 SS.03 SS.04	Duration( urn Period(s Climate C <b>Storm</b> 15 Summer 15 Summer 15 Summer 15 Summer	s) (mins ) (years hange (% Return Period 30 30 30 30	<pre>S) S) 15, 3 S) Climate Change +40% +40% +40% +40% +40%</pre>	0, 60, 120, 18 First (X) Surcharge	0, 240, 360 First (Y)	), 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Leve] (m) 7.96 7.529 7.302 7.106
S1.000 S1.001 S1.002 S1.003 S1.004	US/MH Name SS.01 SS.02 SS.03 SS.04 SS.05	Duration( urn Period(s Climate C Storm 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer	s) (mins c) (years change (s <b>Return</b> <b>Period</b> 30 30 30 30 30 30	<pre>S) S) 15, 3 S) Climate Change +40% +40% +40% +40% +40% +40%</pre>	<pre>80, 60, 120, 18 First (X) Surcharge 100/15 Summer</pre>	0, 240, 360 First (Y)	), 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Leve: (m) 7.96 <sup>7</sup> 7.529 7.302 7.100 6.670
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005	<b>US/MH</b> Name SS.01 SS.02 SS.03 SS.04 SS.05 SS.06	Duration( urn Period(s Climate C Storm 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 1440 Winter	s) (mins change ( Return Period 30 30 30 30 30 30 30 30 30	<pre>s) s) 15, 3 s) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%</pre>	0, 60, 120, 18 First (X) Surcharge	0, 240, 360 First (Y)	), 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Leve: (m) 7.96 7.529 7.302 7.100 6.670 6.298
S1.000 S1.001 S1.002 S1.003 S1.004 S1.005 S2.000	<b>US/MH</b> Name SS.01 SS.02 SS.03 SS.04 SS.05 SS.06 SS.09	Duration( urn Period(s Climate C Storm 15 Summer 15 Summer 15 Summer 15 Summer 1440 Winter 15 Summer	s) (mins change (% Return Period 30 30 30 30 30 30 30 30 30 30 30	<pre>s) s) 15, 3 s) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%</pre>	<pre>80, 60, 120, 18 First (X) Surcharge 100/15 Summer</pre>	0, 240, 360 First (Y)	), 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Leve: (m) 7.96 7.529 7.302 7.100 6.670 6.298 7.850
\$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005 \$2.000 \$2.001	<b>US/MH</b> Name SS.01 SS.02 SS.03 SS.04 SS.05 SS.06 SS.09 SS.10	Duration( urn Period(s Climate C Storm 15 Summer 15 Summer 15 Summer 15 Summer 1440 Winter 15 Summer 15 Summer	s) (mins ) (years hange (% <b>Return</b> <b>Period</b> 30 30 30 30 30 30 30 30 30 30	<pre>s) s) 15, 3 s) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%</pre>	<pre>80, 60, 120, 18 First (X) Surcharge 100/15 Summer</pre>	0, 240, 360 First (Y)	), 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Level (m) 7.967 7.529 7.302 7.106 6.670 6.298 7.850 7.722
\$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005 \$2.000 \$2.001 \$2.002	<b>US/MH</b> <b>Name</b> SS.01 SS.02 SS.03 SS.04 SS.05 SS.06 SS.09 SS.10 SS.11	Duration( urn Period(s Climate C Storm 15 Summer 15 Summer 15 Summer 15 Summer 1440 Winter 15 Summer 15 Summer 15 Summer 15 Summer	s) (mins change (% Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	<pre>s) s) 15, 3 s) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%</pre>	<pre>50, 60, 120, 18 First (X) Surcharge 100/15 Summer 1/360 Summer</pre>	0, 240, 360 First (Y)	), 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Level (m) 7.96 <sup>°</sup> 7.529 7.302 7.106 6.670 6.670 6.298 7.850 7.722 7.405
\$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005 \$2.000 \$2.001 \$2.002 \$2.003	US/MH Name SS.01 SS.02 SS.03 SS.04 SS.05 SS.06 SS.09 SS.10 SS.11 SS.12	Duration( urn Period(s Climate C Storm 15 Summer 15 Summer 15 Summer 15 Summer 1440 Winter 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer	s) (mins ) (years hange (% <b>Return</b> <b>Period</b> 30 30 30 30 30 30 30 30 30 30 30 30 30	<pre>s) s) 15, 3 s) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%</pre>	<pre>50, 60, 120, 18 First (X) Surcharge 100/15 Summer 1/360 Summer 100/15 Summer</pre>	0, 240, 360 First (Y)	), 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Level (m) 7.96 7.529 7.302 7.100 6.670 6.670 6.692 7.850 7.722 7.409 6.692
\$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005 \$2.000 \$2.001 \$2.002 \$2.003 \$2.004	US/MH Name SS.01 SS.02 SS.03 SS.04 SS.05 SS.06 SS.09 SS.10 SS.11 SS.12 SS.13	Duration( urn Period(s Climate C Storm 15 Summer 15 Summer 15 Summer 15 Summer 1440 Winter 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 1440 Winter	s) (mins ) (years hange (% <b>Return</b> <b>Period</b> 30 30 30 30 30 30 30 30 30 30 30 30 30	<pre>s) s) 15, 3 s) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%</pre>	<pre>First (X) Surcharge 100/15 Summer 1/360 Summer 1/360 Summer</pre>	0, 240, 360 First (Y)	), 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Level (m) 7.96° 7.529 7.302 7.106 6.670 6.670 6.692 7.850 7.722 7.405 6.692 6.29°
\$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005 \$2.000 \$2.001 \$2.002 \$2.003 \$2.004 \$1.006	US/MH Name SS.01 SS.02 SS.03 SS.04 SS.05 SS.06 SS.09 SS.10 SS.11 SS.12 SS.13 STANK	Duration( urn Period(s Climate C Storm 15 Summer 15 Summer 15 Summer 15 Summer 1440 Winter 15 Summer 15 Summer 15 Summer 15 Summer 1440 Winter 1440 Winter	s) (mins ) (years hange ( Return Period 30 30 30 30 30 30 30 30 30 30	<pre>s) s) 15, 3 s) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%</pre>	<pre>First (X) Surcharge 100/15 Summer 1/360 Summer 1/360 Summer</pre>	0, 240, 360 First (Y)	), 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Level (m) 7.96° 7.529 7.302 7.106 6.670 6.670 6.692 6.692 6.29°
\$1.000 \$1.001 \$1.002 \$1.003 \$1.004 \$1.005 \$2.000 \$2.001 \$2.002 \$2.003 \$2.004 \$1.006	US/MH Name SS.01 SS.02 SS.03 SS.04 SS.05 SS.06 SS.09 SS.10 SS.11 SS.12 SS.13 STANK	Duration( urn Period(s Climate C Storm 15 Summer 15 Summer 15 Summer 15 Summer 1440 Winter 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 1440 Winter	s) (mins ) (years hange ( Return Period 30 30 30 30 30 30 30 30 30 30	<pre>s) s) 15, 3 s) Climate Change +40% +40% +40% +40% +40% +40% +40% +40%</pre>	<pre>First (X) Surcharge 100/15 Summer 1/360 Summer 1/360 Summer</pre>	0, 240, 360 First (Y)	), 480, 60 960, 144 1, 40, First (Z)	Winter 0, 720, 0, 2160 30, 100 40, 40 Overflow	Level (m) 7.96 7.529 7.302 7.100 6.670 6.670 6.692 7.850 7.722 7.403 6.692 6.29

Furness Partnership		Page 9
20 Britton Street	LEISURE CENTRE NETWORK	
London	MILLOM SCHOOL	
EC1M 5TX	MILLOM	Mirco
Date 11/08/2023	Designed by MH	Dcainago
File LEISURE CENTRE NETWORK.MDX	Checked by CJH	Diamage
Micro Drainage	Network 2020.1.3	

 $\frac{\rm 30 \ year \ Return \ Period \ Summary \ of \ Critical \ Results \ by \ Maximum \ Level \ (Rank \ 1)}{\rm for \ Storm}$ 

PN	US/MH Name	Surcharged Depth (m)			Overflow (1/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SS.01	-0.033	0.000	0.96			22.2	OK	
S1.001	SS.02	-0.071	0.000	0.80			38.3	OK	
S1.002	SS.03	-0.098	0.000	0.77			62.4	OK	
S1.003	SS.04	-0.114	0.000	0.68			88.0	OK	
S1.004	SS.05	-0.100	0.000	0.76			90.0	OK	
S1.005	SS.06	0.973	0.000	0.06			7.2	SURCHARGED	
S2.000	SS.09	-0.150	0.000	0.00			0.0	OK	
S2.001	SS.10	-0.178	0.000	0.10			6.9	OK	
S2.002	SS.11	-0.170	0.000	0.14			13.3	OK	
S2.003	SS.12	-0.083	0.000	0.87			61.9	OK	
S2.004	SS.13	0.972	0.000	0.03			3.7	SURCHARGED	
S1.006	STANK	1.072	0.000	0.05		1229	2.3	SURCHARGED	
S1.007	SS.07	-0.110	0.000	0.16			2.3	OK	

0 D	rtnershi	-p					Page 10
U Britton	Street		I	LEISURE CENTR	RE NETWORK		
ondon			N	IILLOM SCHOOI	1		No.
C1M 5TX			N	IILLOM			Micco
ate 11/08	/2023		I	Designed by M	1H		- Micro
'ile LEISU		R NETWOI		Checked by CJ			Urainac
licro Drai	-			Jetwork 2020.			
	nage			100W01R 2020.	1.0		
<u>100 year</u>	Return 1	Period S	ummary of		sults by I	Maximum L	evel (Rank 1
				for Storm			
			Simu	alation Criteri	a		
	Areal			000 Addition			
			t (mins)		Factor * 1		2
Manho			vel (mm) (Clobal) 0	0 500 Flow per P		t Coeffiec	
			(GIODAI) 0. re (l/s) 0.		erson per r	ay (i/pei/d	uay) 0.000
		1	- ( ) - )				
							/Area Diagrams
Number of	Unline C	ontrois 1	Number of	storage Struct	ures 1 Numb	er of Real	Time Controls
				ic Rainfall Det		0.0.57	
		Rainfall		FSR and and Wales (	Ratio R		
			(mm)		Cv (Winter)		
			. ,				
	Margin	for Flood	Risk Warnin	-			0.0
			-	imestep 2.5 Sec	cond Increme		
				Status Status			OFF OFF
			Inertia				OFF
			11101010	00000			011
		Profi	le(s)		S	Summer and	Winter
	Dura	Profi tion(s) (1		30, 60, 120, 18			
		tion(s) (	mins) 15, 3	30, 60, 120, 18		, 480, 600 960, 1440	, 720, , 2160
R	leturn Per	tion(s) (n	mins) 15, 3 ears)	30, 60, 120, 18		960, 1440 1, 3	, 720, , 2160 0, 100
R	leturn Per	tion(s) (	mins) 15, 3 ears)	30, 60, 120, 18		960, 1440 1, 3	, 720, , 2160
R	leturn Per	tion(s) (n	mins) 15, 3 ears)	30, 60, 120, 18		960, 1440 1, 3	, 720, , 2160 0, 100
US/	Return Per Clim <b>/MH</b>	tion(s) (n iod(s) (y ate Chang <b>Retu</b>	mins) 15, 3 ears) e (%) mrn Climate	First (X)	0, 240, 360 First (Y)	), 480, 600 960, 1440 1, 3 40, First (Z) (	, 720, , 2160 0, 100 40, 40 Water Overflow Level
	Return Per Clim <b>/MH</b>	tion(s) (n iod(s) (y ate Chang <b>Retu</b>	mins) 15, 3 ears) e (%)		0, 240, 360	9, 480, 600 960, 1440 1, 3 40,	, 720, , 2160 0, 100 40, 40 Water
us/	Return Per Clim /MH me Sto	tion(s) (n riod(s) (y nate Chang Retu orm Peri	mins) 15, 3 ears) e (%) arn Climate Lod Change	First (X)	0, 240, 360 First (Y)	), 480, 600 960, 1440 1, 3 40, First (Z) (	, 720, , 2160 0, 100 40, 40 Water Overflow Level
US/ PN Naj	Return Per Clim /MH me Sto .01 15 St	tion(s) ( riod(s) (y hate Chang Retu rm Peri	mins) 15, 3 ears) e (%) arn Climate od Change	First (X) Surcharge	0, 240, 360 First (Y)	), 480, 600 960, 1440 1, 3 40, First (Z) (	, 720, , 2160 0, 100 40, 40 Water Overflow Level Act. (m)
US/ PN Nat S1.000 SS. S1.001 SS. S1.002 SS.	MH MH Me Sto .01 15 St .02 15 St .03 15 St	tion(s) (n niod(s) (y nate Chang Retu nrm Peri numer 1 numer 1 numer 1	mins) 15, 3 ears) e (%) arn Climate od Change .00 +40% .00 +40% .00 +40%	First (X) Surcharge	0, 240, 360 First (Y)	), 480, 600 960, 1440 1, 3 40, First (Z) (	<pre>, 720, , 2160 0, 100 40, 40 Water Overflow Level Act. (m) 8.155 7.555 7.33<sup>-</sup></pre>
US/ PN Nau S1.000 SS. S1.001 SS. S1.002 SS. S1.003 SS.	MH MH Me Sto .01 15 St .02 15 St .03 15 St .04 15 St	tion(s) (n iod(s) (y ate Chang Retu rm Peri ummer 1 ummer 1 ummer 1 ummer 1	mins) 15, 3 ears) e (%) arn Climate od Change .00 +40% .00 +40% .00 +40% .00 +40%	First (X) Surcharge	0, 240, 360 First (Y)	), 480, 600 960, 1440 1, 3 40, First (Z) (	<pre>, 720, , 2160 0, 100 40, 40 Water Overflow Level Act. (m) 8.155 7.555 7.33 7.138</pre>
US/ PN Nau S1.000 SS. S1.001 SS. S1.002 SS. S1.003 SS. S1.004 SS.	Aeturn Per Clim /MH me Sto .01 15 St .02 15 St .03 15 St .04 15 St .05 960 WH	tion(s) (n iod(s) (y ate Chang Retu rm Peri ummer 1 ummer 1 ummer 1 ummer 1 ummer 1 ummer 1	mins) 15, 3 ears) e (%) arn Climate od Change .00 +40% .00 +40% .00 +40% .00 +40%	First (X) Surcharge 100/15 Summer	0, 240, 360 First (Y)	), 480, 600 960, 1440 1, 3 40, First (Z) (	<pre>, 720, , 2160 0, 100 40, 40 Water Overflow Level Act. (m) 8.155 7.555 7.33<sup>-</sup> 7.138 6.735</pre>
US/ PN Nat S1.000 SS. S1.001 SS. S1.002 SS. S1.003 SS. S1.004 SS. S1.005 SS.	Aeturn Per Clim MH me Sto .01 15 St .02 15 St .03 15 St .03 15 St .04 15 St .05 960 Wi .06 960 Wi	tion(s) (n iod(s) (y ate Chang Retu rm Peri ummer 1 ummer 1 ummer 1 ummer 1 ummer 1 ummer 1 ummer 1 ummer 1 ummer 1 ummer 1	mins) 15, 3 ears) e (%) nrn Climate od Change .00 +40% .00 +40% .00 +40% .00 +40% .00 +40% .00 +40%	First (X) Surcharge	0, 240, 360 First (Y)	), 480, 600 960, 1440 1, 3 40, First (Z) (	<pre>, 720, , 2160 0, 100 40, 40 Water Overflow Level Act. (m) 8.155 7.555 7.33<sup>-</sup> 7.138 6.735</pre>
US/ PN Nar S1.000 SS. S1.001 SS. S1.002 SS. S1.003 SS. S1.004 SS. S1.005 SS. S2.000 SS.	Aeturn Per Clim MH me Sto .01 15 St .02 15 St .03 15 St .03 15 St .04 15 St .05 960 Wi .06 960 Wi .09 15 St	tion(s) (n iod(s) (y ate Chang Retu rm Peri ummer 1 ummer 1 ummer 1 ummer 1 inter 1 ummer 1 ummer 1	mins) 15, 3 ears) e (%) nrn Climate od Change .00 +40% .00 +40% .00 +40% .00 +40% .00 +40% .00 +40%	First (X) Surcharge 100/15 Summer	0, 240, 360 First (Y)	), 480, 600 960, 1440 1, 3 40, First (Z) (	<pre>, 720, , 2160 0, 100 40, 40</pre> Water Overflow Level Act. (m) 8.155 7.555 7.337 7.138 6.738 6.738 7.850
US/ PN Nar S1.000 SS. S1.001 SS. S1.002 SS. S1.003 SS. S1.004 SS. S1.005 SS. S2.000 SS. S2.001 SS.	Aeturn Per Clim MH me Sto .01 15 St .02 15 St .03 15 St .03 15 St .04 15 St .05 960 Wi .06 960 Wi .09 15 St .10 15 St	Returner 1 ummer 1	mins) 15, 3 ears) e (%) nrn Climate od Change .00 +40% .00 +40% .00 +40% .00 +40% .00 +40% .00 +40% .00 +40% .00 +40%	First (X) Surcharge 100/15 Summer	0, 240, 360 First (Y)	), 480, 600 960, 1440 1, 3 40, First (Z) (	<pre>, 720, , 2160 0, 100 40, 40</pre> Water Overflow Level Act. (m) 8.155 7.555 7.33 <sup>-</sup> 7.138 6.732 6.738 7.850 7.728
US/ PN Nar S1.000 SS. S1.001 SS. S1.002 SS. S1.003 SS. S1.004 SS. S1.005 SS. S2.000 SS. S2.001 SS. S2.002 SS.	/MH me Sto .01 15 St .02 15 St .03 15 St .03 15 St .04 15 St .05 960 Wi .06 960 Wi .09 15 St .10 15 St .11 15 St	tion(s) (n iod(s) (y ate Change Returner Peri ummer 1 ummer 1 ummer 1 inter 1 ummer 1 ummer 1 ummer 1 ummer 1 ummer 1	mins) 15, 3 ears) e (%) nrn Climate od Change 00 +40% 00 +40% 00 +40% 00 +40% 00 +40% 00 +40% 00 +40% 00 +40%	First (X) Surcharge 100/15 Summer 1/360 Summer	0, 240, 360 First (Y)	), 480, 600 960, 1440 1, 3 40, First (Z) (	<pre>, 720, , 2160 0, 100 40, 40</pre> Water Overflow Level Act. (m) 8.155 7.555 7.33 <sup>-</sup> 7.136 6.732 6.732 7.850 7.728 7.413
US/ PN Nar S1.000 SS. S1.001 SS. S1.002 SS. S1.003 SS. S1.004 SS. S1.005 SS. S2.000 SS. S2.001 SS.	/MH me Sto .01 15 St .02 15 St .03 15 St .03 15 St .04 15 St .05 960 Wi .06 960 Wi .09 15 St .10 15 St .11 15 St .12 15 St	tion(s) (n iod(s) (y ate Change Returner Peri ammer 1 ammer 1	mins) 15, 3 ears) e (%) arn Climate od Change do +40% do +40%	First (X) Surcharge 100/15 Summer	0, 240, 360 First (Y)	), 480, 600 960, 1440 1, 3 40, First (Z) (	<pre>, 720, , 2160 0, 100 40, 40</pre> Water Overflow Level Act. (m) 8.155 7.555 7.33 <sup>-</sup> 7.136 6.732 6.732 6.732 7.413 6.782
US/ PN Nar S1.000 SS. S1.001 SS. S1.002 SS. S1.003 SS. S1.004 SS. S1.005 SS. S2.000 SS. S2.001 SS. S2.002 SS. S2.003 SS.	/MH me Sto .01 15 St .02 15 St .03 15 St .03 15 St .04 15 St .04 15 St .05 960 Wi .06 960 Wi .09 15 St .10 15 St .11 15 St .12 15 St .13 960 Wi	Returner 1 ummer 1	mins) 15, 3 ears) e (%) nrn Climate od Change 00 +40% 00 +40% 00 +40% 00 +40% 00 +40% 00 +40% 00 +40% 00 +40%	First (X) Surcharge 100/15 Summer 1/360 Summer 1/360 Summer	0, 240, 360 First (Y)	), 480, 600 960, 1440 1, 3 40, First (Z) (	<pre>, 720, , 2160 0, 100 40, 40</pre> Water Overflow Level Act. (m) 8.155 7.555 7.33 <sup>-</sup> 7.136 6.732 6.732 7.850 7.728 7.413
US/ PN Nar S1.000 SS. S1.001 SS. S1.002 SS. S1.003 SS. S1.004 SS. S1.005 SS. S2.000 SS. S2.001 SS. S2.001 SS. S2.002 SS. S2.003 SS. S2.004 SS.	/MH me Sto .01 15 St .02 15 St .03 15 St .03 15 St .04 15 St .04 15 St .05 960 Wi .06 960 Wi .09 15 St .10 15 St .11 15 St .12 15 St .13 960 Wi ANK 960 Wi	Returns (s) (s) iod(s) (y) ate Change Returns Perion ammer 1 ammer 1	mins) 15, 3 ears) e (%) arn Climate od Change do +40% do +40%	First (X) Surcharge 100/15 Summer 1/360 Summer 1/360 Summer 1/360 Summer 1/180 Summer	0, 240, 360 First (Y)	), 480, 600 960, 1440 1, 3 40, First (Z) (	<pre>, 720, , 2160 0, 100 40, 40</pre> Water Overflow Level Act. (m) 8.155 7.555 7.33 <sup>-</sup> 7.136 6.739 6.738 6.739 6.736 7.413 6.783 6.731
US/ PN Nar S1.000 SS. S1.001 SS. S1.002 SS. S1.003 SS. S1.004 SS. S1.005 SS. S2.000 SS. S2.001 SS. S2.001 SS. S2.002 SS. S2.003 SS. S2.004 SS. S1.006 STP	/MH me Sto .01 15 St .02 15 St .03 15 St .03 15 St .04 15 St .04 15 St .05 960 Wi .06 960 Wi .09 15 St .10 15 St .11 15 St .12 15 St .13 960 Wi ANK 960 Wi	Returns (s) (s) iod(s) (y) ate Change Returns Perion ammer 1 ammer 1	mins) 15, 3 ears) e (%) arn Climate od Change do +40% do +40%	First (X) Surcharge 100/15 Summer 1/360 Summer 1/360 Summer 1/360 Summer 1/180 Summer	0, 240, 360 First (Y)	), 480, 600 960, 1440 1, 3 40, First (Z) (	<pre>, 720, , 2160 0, 100 40, 40</pre> Water Overflow Level Act. (m) 8.155 7.555 7.33 <sup>-</sup> 7.136 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 6.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.735 7.7357 7.7357 7.7357 7.7357777777777

Furness Partnership		Page 11
20 Britton Street	LEISURE CENTRE NETWORK	
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File LEISURE CENTRE NETWORK.MDX	Checked by CJH	Diamaye
Micro Drainage	Network 2020.1.3	

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

PN	US/MH Name	Surcharged Depth (m)			Overflow (1/s)	Half Drain Time (mins)	Pipe Flow (1/s)	Status	Level Exceeded
S1.000	SS.01	0.155	0.000	1.18			27.3	SURCHARGED	
S1.001	SS.02	-0.045	0.000	0.96			46.4	OK	
S1.002	SS.03	-0.063	0.000	0.95			77.4	OK	
S1.003	SS.04	-0.082	0.000	0.85			110.4	OK	
S1.004	SS.05	-0.031	0.000	0.08			9.9	OK	
S1.005	SS.06	1.413	0.000	0.10			12.1	SURCHARGED	
S2.000	SS.09	-0.150	0.000	0.00			0.0	OK	
S2.001	SS.10	-0.172	0.000	0.13			8.9	OK	
S2.002	SS.11	-0.162	0.000	0.18			17.1	OK	
S2.003	SS.12	0.008	0.000	1.12			79.7	SURCHARGED	
S2.004	SS.13	1.412	0.000	0.05			6.2	SURCHARGED	
S1.006	STANK	1.512	0.000	0.05		1210	2.6	SURCHARGED	
S1.007	SS.07	-0.107	0.000	0.18			2.6	OK	

## CAR PARK DEVELOPMENT HYDRAULIC CALCULATIONS

Furness Partnership	Page 1
20 Britton Street	CAR PARK DEVELOPMENT
London	MILLOM SCHOOL
EC1M 5TX	MILLOM
Date 11/08/2023	Designed by MH
File CAR PARK NETWORK.MDX	Checked by CJH
Micro Drainage	Network 2020.1.3
	NCCWOIR 2020.1.5
	by the Modified Rational Method Criteria for Storm
	ANDARD Manhole Sizes STANDARD
	ANDRID MAINING SIZES STRIDARD
Return Period (years) M5-60 (mm) Ratio R	18.000Add Flow / Climate Change (%)00.267Minimum Backdrop Height (m)0.20050Maximum Backdrop Height (m)1.50030 Min Design Depth for Optimisation (m)1.2000.000Min Vel for Auto Design only (m/s)1.00
Design	ed with Level Soffits
Time Ar	ea Diagram for Storm
Time	Area Time Area
	) (ha) (mins) (ha)
0-	4 0.084 4-8 0.040
Total Area	Contributing (ha) = 0.124
Total P.	ipe Volume (m³) = 1.353
Network I	Design Table for Storm
« - Indica	ates pipe capacity < flow
PN Length Fall Slope I.Area T. (m) (m) (1:X) (ha) (mi	E. Base k HYD DIA Section Type Auto ns) Flow (l/s) (mm) SECT (mm) Design
1.000 10.800 0.072 150.0 0.059 5	.00 0.0 0.600 o 225 Pipe/Conduit 🔒
2.000 2.300 0.040 57.5 0.051 5	.00 0.0 0.600 o 225 Pipe/Conduit 🔒
Netw	ork Results Table
PN Rain T.C. US/ILΣI.A (mm/hr) (mins) (m) (ha	rea E Base Foul Add Flow Vel Cap Flow ) Flow (l/s) (l/s) (l/s) (m/s) (l/s) (l/s)
1.000 39.74 5.17 7.227 0.	059 0.0 0.0 0.0 1.07 42.4 8.5
2.000 40.18 5.02 7.195 0.	051 0.0 0.0 0.0 1.73 68.7 7.4
©19	82-2020 Innovyze

Furness	Partne	rshi	0									I	age 2
20 Britt	on Str	reet			CA	R PA	RK DE'	VELOPI	MENT			[	
London					MI	LLOM	SCHO	OL					The second
EC1M 5TX					MI	LLOM							Micro
Date 11/						2	ed by						Nainad
File CAR			ORK.ME	X			d by (						brainage
Aicro Dr	ainage	•			Ne	twor	k 202	0.1.3					
				Networ	ck Desi	ign I	able	for S	torm				
PN	Length (m)		-	I.Area (ha)			ase (1/s)	k (mm)	HYD SECT	DIA (mm)	Sect:	ion Typ	pe Auto Design
1.002	5.400	0.015	360.0	0.014 0.000 0.000	0.00		0.0	0.600 0.600 0.600	0	225	Pipe,	/Condu: /Condu: /Condu:	it 🧴
				N	etwork	Res	ults '	Table					
PI	N Ra	in	т.с.	US/IL Σ	I.Area	ΣΙ	Base	Foul	Add 1	low	Vel	Cap	Flow
	(mm/	'hr) (	mins)	(m)	(ha)	Flow	(1/s)	(1/s)	(1/	s)	(m/s)	(1/s)	(1/s)
1.0	02 38	3.70		7.155 7.085 7.070			0.0 0.0 0.0	0.0		0.0 0.0 0.0	0.68	37.6 27.2 <mark>6.0«</mark>	17.5
			utfall e Numbe	r Name		m)	(m)	I.	Min Level (m)		(mm)		
			1.00	3	8	.350	6.9	60	6.960	C	) 0		
				Simul	ation	Crite	eria :	for St	torm				
Number of	nhole H Foul Se f Input	Areal Hot eadlos wage p Hydro	Reduct Hot St Start Start Der hec ographs		cor 1.0 ns) nm) al) 0.5 /s) 0.0 nber of	00 0 Flo 00 00 0ffli	MA) ow per ine Cor	ntrols	tor * Inl n per utput 0 Nur	10m <sup>3</sup> / et Co Day Run T Inter mber o	/ha St peffie (l/per Fime ( rval ( pf Tim	orage cient /day) mins) mins) e/Area	1.000 0.800
				Synt	thetic	Rain	fall	Detai	ls				
	Retu		M5-60		ngland	18		torm D	Cv Cv	(Sum (Win	mer) ter)		
					©1982-	2020	Inno	vyze					

Furness Partner											Pa	.ge 3
20 Britton Stre	eet		(	CAR P	ARK DE	EVEI	OPME	NT				
London			I	MILLO	M SCHO	DOL						Leg.
EC1M 5TX			I	MILLOM						N	licco	
Date 11/08/2023	3		]	Designed by MH						ľ	rainac	
File CAR PARK N	IETWORK	.MDX	(	Checke	ed by	СЈН						
licro Drainage				Netwo	rk 202	20.1	.3					
		Onl	ine (	Contro	ols fo	or S	torm					
Hydro-Bra	ake® Op	timum Ma	nhole	: TAN	K, DS	/PN	: 1.0	02, V	/olume	e (m	<sup>3</sup> ):	2.0
			Unit	Refere	nce MD	-SHE	-0059	-1400-	0800-1	400		
			-	Head						800		
		De	-	low (l lush-F				C	alcula	1.4 ted		
					ive M	inim	ise u					
			Ap	plicat	ion				Surf	-		
			-	Availa						Yes		
		т		eter ( Level	'				7	59 085		
Ν	linimum (	Jutlet Pipe			. ,				· •	75		
	Sugges	ted Manhole	e Diam	eter (	mm)				1	200		
Control Poi	nts	Head (m)	Flow	(l/s)		Cont	rol P	oints	1	Head	(m)	Flow (1/
Design Point (Cal	culated			1.4	Maan	71			-Flo®	0.	.510	1
L 3		0.231		1.4	Mean 1	TOW	over	пеац г	lige		-	T
The hydrologica Hydro-Brake® Op Hydro-Brake Opt	timum as	specified	. Sho	ould ar	nother	type	e of c	ontrol	devic	e ot	her t	han a
Depth (m) Flo												
0.100	1.2	1.200		1.7	3	.000		2.6	7	.000		3.8
0.200	1.4			1.8	3	.500		2.7	1	.500		3.9
0.300	1.4			1.9		.000		2.9		.000		4.0
0.400 0.500	1.3 1.2			2.0 2.1		.500		3.1 3.2	1	.500		4.2 4.3
0.600	1.2			2.1		.500		3.4	1	.500		4.3
0.800	1.4	2.400		2.3	6	.000		3.5				-
1.000	1.5	2.600		2.4	6	.500		3.7				
					) Innc							

Furness Partnership		Page 4
20 Britton Street	CAR PARK DEVELOPMENT	
London	MILLOM SCHOOL	
EC1M 5TX	MILLOM	Micco
Date 11/08/2023	Designed by MH	Drainage
File CAR PARK NETWORK.MDX	Checked by CJH	Drainage
Micro Drainage	Network 2020.1.3	

#### Storage Structures for Storm

#### Cellular Storage Manhole: TANK, DS/PN: 1.002

Invert Level (m) 7.085 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

#### Depth (m) Area (m<sup>2</sup>) Inf. Area (m<sup>2</sup>) Depth (m) Area (m<sup>2</sup>) Inf. Area (m<sup>2</sup>)

0.000	144.0	0.0	0.801	0.0	0.0
0.800	144.0	0.0			

0 Britton	rtnership					Page 5
0 DIICCON	Street		CAR PARK DEV	ELOPMENT		
ondon		1	MILLOM SCHOO	L		
C1M 5TX		1	MILLOM			Micro
ate 11/08	/2023		Designed by	MH		Desinar
ile CAR P	ARK NETWORK.N	1DX	Checked by C	JH		Diamay
licro Drain	nage	I	Network 2020	.1.3		
. year Ret	urn Period S	ummary of Cr	itical Resul <u>Storm</u>	ts by Maximu.	m Level (I	Rank 1) fo
Fou	Hot S	tion Factor 1 Start (mins) Level (mm) off (Global) 0 octare (l/s) 0	0 MAD 0 .500 Flow per 3 .000	nal Flow - % of D Factor * 10m³ Inlet C Person per Day	/ha Storage oeffiecient (l/per/day)	1.000 0.800 0.000
	Online Control	s 1 Number of		cures 1 Number		-
		all Model	FSR and and Wales	Ratio R 0.2 Cv (Summer) 1.0 Cv (Winter) 1.0	000	
	Manain fre 71	and Dials Mary	ng (mm)		200 0	
	Margin for Fl	ood Risk Warni Analysis T	-	cond Increment	300.0 (Extended)	
		-	Status		OFF	
			) Status		OFF	
		Inertia	Status		OFF	
			30, 60, 120, 1	80, 240, 360, 4	er and Wint 80, 600, 72 0, 1440, 21 1, 30, 1	0, 60
D					40, 40,	
R	Climate Ch					
R US/ PN Nai	Climate Ch MH	Return Climate Period Change		First (Y) Firs Flood Over	t (Z) Overfi	
us/	Climate Ch MH : ne Storm :	Period Change				low Level
US/ PN Nar	Climate Ch MH : ne Storm : 20 15 Summer	Period Change	Surcharge			low Level . (m)
US/ PN Nar 1.000 S. 2.000 S. 1.001 S.	Climate Ch MH Storm 20 15 Summer 23 15 Summer 21 15 Summer	Period         Change           1         +40%           1         +40%           1         +40%           1         +40%	Surcharge 30/15 Summer 30/15 Summer 30/15 Summer			Level . (m) 7.324 7.303 7.298
US/ PN Nar 1.000 S. 2.000 S. 1.001 S. 1.002 TA	Climate Ch MH Storm 20 15 Summer 23 15 Summer 21 15 Summer 21 5 Summer NK 960 Summer	Period         Change           1         +40%           1         +40%           1         +40%           1         +40%           1         +40%           1         +40%	Surcharge           30/15         Summer           30/15         Summer			Level . (m) 7.324 7.303 7.298 7.290
US/ PN Nar 1.000 S. 2.000 S. 1.001 S. 1.002 TA	Climate Ch MH Storm 20 15 Summer 23 15 Summer 21 15 Summer	Period         Change           1         +40%           1         +40%           1         +40%           1         +40%	Surcharge           30/15         Summer           30/15         Summer			Level . (m) 7.324 7.303 7.298
US/ PN Nau 1.000 S. 2.000 S. 1.001 S. 1.002 TA	Climate Ch MH Storm 20 15 Summer 23 15 Summer 21 15 Summer 21 25 Summer 22 960 Summer 22 960 Summer	Period Change 1 +40% 1 +40% 1 +40% 1 +40% 1 +40% 1 +40% 1 +40%	Surcharge 30/15 Summer 30/15 Summer 30/15 Summer 30/30 Summer		flow Act	Level . (m) 7.324 7.303 7.298 7.290
US/ PN Nau 1.000 S. 2.000 S. 1.001 S. 1.002 TA	Climate Ch MH Storm 20 15 Summer 23 15 Summer 21 15 Summer 21 25 Summer 22 960 Summer 22 960 Summer	Period Change 1 +40% 1 +40% 1 +40% 1 +40% 1 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40% 2 +40%	Surcharge 30/15 Summer 30/15 Summer 30/15 Summer 30/30 Summer	Flood Over Half Drain Pip Time Flo	flow Act	Level Level
US/ PN Nar 1.000 S. 2.000 S. 1.001 S. 1.002 TA 1.003 S.	Climate Ch MH Storm 20 15 Summer 23 15 Summer 21 15 Summer 21 2960 Summer 22 960 Summer 22 960 Summer US/MH Depth Name (m)	Period Change 1 +40% 1 +40% 1 +40% 1 +40% 1 +40% red Flooded Volume Flo (m <sup>3</sup> ) Co	Surcharge 30/15 Summer 30/15 Summer 30/30 Summer w / Overflow ap. (1/s)	Flood Over Half Drain Pip Time Flo (mins) (1/s	flow Act Act Status Ex	Level Level
US/ PN Nar 1.000 S. 2.000 S. 1.001 S. 1.002 TA 1.003 S.	Climate Ch MH 5 ne Storm 5 20 15 Summer 23 15 Summer 21 15 Summer 21 15 Summer 22 960 Summer 22 960 Summer US/MH Depth Name (m) S.20 -0.1	Period Change 1 +40% 1 +40% 1 +40% 1 +40% 1 +40% red Flooded Volume Flo (m <sup>3</sup> ) C	Surcharge 30/15 Summer 30/15 Summer 30/15 Summer 30/30 Summer	Flood Over Half Drain Pip Time Flo	e w 3) Status Ex 4 OK	low Level . (m) 7.324 7.303 7.298 7.290 7.103 Level

Furness Partnership		Page 6
20 Britton Street	CAR PARK DEVELOPMENT	
London	MILLOM SCHOOL	
EC1M 5TX	MILLOM	Micco
Date 11/08/2023	Designed by MH	Dcainago
File CAR PARK NETWORK.MDX	Checked by CJH	Diamaye
Micro Drainage	Network 2020.1.3	

 $\frac{1 \ {\rm year} \ {\rm Return} \ {\rm Period} \ {\rm Summary} \ {\rm of} \ {\rm Critical} \ {\rm Results} \ {\rm by} \ {\rm Maximum} \ {\rm Level} \ ({\rm Rank} \ 1) \ {\rm for} \ {\rm Storm}$ 

PN	US/MH Name	Surcharged Depth (m)			Overflow (1/s)	Half Drain Time (mins)	Flow	Status 1	Level Exceeded
1.002 1.003	TANK S.22	-0.020 -0.067	0.000 0.000	0.06 0.24		379	1.3 1.3	OK OK	

Furness	Partne	rship							Page 7		
20 Britt	on Str	eet		CA	AR PARK DEV	DEVELOPMENT					
London				M	ILLOM SCHOO	)OL					
EC1M 5TX				M	LLOM		Micro				
Date 11/	08/202	3		De	esigned by						
File CAR	PARK 1	NETWORK.M	1DX	Cł	necked by C	CJH			Drainag		
licro Dr	ainage			Ne	etwork 2020	0.1.3					
<u>30 yea</u> 1	r Retui	<u>rn Period</u>	l Summar		Critical Re For Storm	esults by	<u>y</u> Max:	imum Leve	el (Rank 1)		
H Number of	nhole He Foul Sew E Input	Hot S Hot Start eadloss Coe vage per he Hydrograph	Start (mi E Level ( eff (Glob ectare (1 .s 0 Nu	tor 1.0 ns) mm) al) 0.5 /s) 0.0 mber of	00 Flow per 00 Offline Con	nnal Flow DD Factor I Person pe trols 0 N	* 10m³ nlet C r Day umber	/ha Storac oeffiecier (l/per/day of Time/An	ge 1.000 ht 0.800 7) 0.000 rea Diagrams (		
Number	of Unli	ne Control	s i Numb	er of S	torage Struc	tures I N	umber	or Real Ti	ime Controls		
				-	c Rainfall De		_ ^				
		Rainfa	all Modei Region	-	FSR nd and Wales	Ratic					
		M	5-60 (mm)			Cv (Winte					
	M	ain for T	and Dial-	Monsie	~ (mm)			200	0		
	Mar	gin for Fl			g (mm) nestep 2.5 Se	econd Incr	ement.	300. (Extended			
				-	Status			OF			
					Status			OF			
			I	nertia :	Status			OF	F		
			ofile(s)			00 040		ner and Wir			
		Duration(s	s) (mins)	15, 30	), 60, 120, 1	.80, 240,		180, 600, 1 50, 1440, 2			
	Return	Period(s)	(years)					1, 30,	100		
		Climate Ch	ange (%)					40, 40,	40		
									Water		
υ	S/MH		Return C	limate	First (X)	First (Y	) Firs	st (Z) Ove	rflow Level		
PN 1	Name	Storm	Period (	Change	Surcharge	Flood	Ove	rflow A	ct. (m)		
1.000	s.20 9	60 Summer	30	+40%	30/15 Summer				7.599		
		60 Summer	30	+40%	30/15 Summer				7.598		
		60 Summer	30		30/15 Summer				7.598		
		60 Summer 60 Winter	30 30	+40% +40%	30/30 Summer				7.596 7.104		
1.003	J.22 21	oo wincer	20	T4U6					/.104		
		Surcharged	Flooded	1	<b>U</b> -	alf Drain	Pipe				
	US/MH	Depth			Overflow	Time	Flow		Level		
	Name	(m)	(m <sup>3</sup> )	Cap.	(1/s)	(mins)	(1/s)	Status	Exceeded		
PN				0.11			2 0		_		
	c	0 1 / 7									
1.000		0.147						SURCHARGE			
	S.23	0.147 0.178 0.218	0.000	0.11			3.3	SURCHARGE SURCHARGE	D		

Furness Partnership		Page 8
20 Britton Street	CAR PARK DEVELOPMENT	
London	MILLOM SCHOOL	
EC1M 5TX	MILLOM	Micro
Date 11/08/2023	Designed by MH	Dcainago
File CAR PARK NETWORK.MDX	Checked by CJH	Diamaye
Micro Drainage	Network 2020.1.3	

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

PN	US/MH Name	Surcharged Depth (m)			Overflow (1/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.002 1.003	TANK S.22	0.286 -0.066	0.000	0.06 0.25		638	1.4 1.4	SURCHARGED OK	

urness Pa	artnersh	ip								Pag	re 9
20 Brittor	n Street			CA	AR PAR	K DEV	ELOPMEN	ſ			
ondon				M	MILLOM SCHOOL						-
EC1M 5TX				M	ILLOM					M	icro
Date 11/08	3/2023			De	esigne	d by					
Tile CAR F	PARK NET	WORK.M	DX	Cł	necked	by C	JH			U	alliay
licro Drai	inage			Ne	etwork	2020	.1.3				
100 year	Return	Perioc	l Summaı	-			esults b	y Max	imum L	evel (1	Rank 1)
				1	for St	orm					
				Simul	ation (	Criter	ia				
	Area						nal Flow				
	Но		tart (min Level (n			MAD	D Factor			rage 1.0 ient 0.8	
Manho	ole Headlo					w per i					
	ul Sewage					1	C	- 1	1 / .	_, .,	
March 6	T		- 0 1-		0.651			1-	- f . m '	/ 7	
Number of 1 Number of	Input Hydr f Online (	5 1									2
Number 01	- 0117110 (				-			anio C L	or neur	11110 00	
				yntheti	c Rainf						
		Rainfa	ill Model		, ,	FSR					
		M	Region 6-60 (mm)	2			Cv (Summe Cv (Winte				
			, 00 (nun)		-		0.0 (	, 1,			
	Margin	for Flo	od Risk		-					0.0	
			Analy		mestep Status	2.5 Se	cond Incr	rement		led) OFF	
					Status Status					OFF	
			Ir	nertia :	Status					OFF	
		Pr	ofile(s)					Summ	er and	Winter	
	Dura	ation(s	) (mins)	15, 30	D, 60,	120, 1	80, 240,	360, 4	80, 600	, 720,	
								96	0, 1440		
F	Return Per		(years) ange (%)						-	0, 100 40, 40	
		late th	alige (%)						40,	40, 40	
115		T	oturn Cl	imato	First	(¥)	First (V)	Fire	- (7) 0	monflow	Water
	/мн		Return Cl Period C		First Surch		First (Y) Flood			verflow Act.	
PN Na	/MH ame Sto	orm I	Period C	hange	Surch	arge			t (Z) O flow		Level (m)
<b>PN Na</b> 1.000 S	/MH ame Sto .20 960 S	o <b>rm H</b> ummer	Period C	<b>hange</b> +40응	<b>Surch</b> 30/15 S	<b>arge</b> Summer					Level (m) 7.777
<b>PN Na</b> 1.000 S 2.000 S	<b>:/MH</b> ame Sto :.20 960 s :.23 960 s	ummer ummer	2 eriod C 100 100	<b>hange</b> +40응 +40응	<b>Surch</b> 30/15 s 30/15 s	<b>arge</b> Summer Summer					Level (m) 7.777 7.777
PN         Na           1.000         S           2.000         S           1.001         S	2/MH ame Sto 2.20 960 s 2.23 960 s 5.21 960 s	orm H ummer ummer ummer	Period C 100 100 100	<b>hange</b> +40왕 +40왕 +40왕	Surch 30/15 s 30/15 s 30/15 s	arge Summer Summer Summer					Level (m) 7.777 7.777 7.776
PN         Na           1.000         S           2.000         S           1.001         S           1.002         T	<b>:/MH</b> ame Sto :.20 960 s :.23 960 s	ummer ummer ummer ummer	2 eriod C 100 100	<b>hange</b> +40왕 +40왕 +40왕	<b>Surch</b> 30/15 s 30/15 s	arge Summer Summer Summer					Level (m) 7.777 7.777
PN         Na           1.000         S           2.000         S           1.001         S           1.002         T.	2/MH ame Sto 3.20 960 S 3.23 960 S 3.21 960 S 3.21 960 S 3.21 960 S	ummer ummer ummer ummer	Period C 100 100 100 100	hange +40% +40% +40% +40%	Surch 30/15 s 30/15 s 30/15 s	arge Summer Summer Summer					Level (m) 7.777 7.777 7.776 7.774
PN         Na           1.000         S           2.000         S           1.001         S           1.002         T.	Ame Sto 2.20 960 s 2.23 960 s 2.21 960 s 2.21 960 s 2.21 960 s 2.22 720 w	ummer ummer ummer ummer inter	Period         C           100         100           100         100           100         100           100         100	hange +40% +40% +40% +40% +40%	Surch 30/15 s 30/15 s 30/15 s	arge Summer Summer Summer	Flood	Over			Level (m) 7.777 7.777 7.776 7.774
PN         Na           1.000         S           2.000         S           1.001         S           1.002         T.           1.003         S	Ame Sto 2.20 960 s 2.23 960 s 2.21 960 s 2.21 960 s 2.22 720 W Surce	ummer ummer ummer ummer inter	Period C 100 100 100 100	hange +40% +40% +40% +40% +40%	Surch 30/15 s 30/15 s 30/15 s 30/30 s	arge Summer Summer Summer Ha		Over		Act.	Level (m) 7.777 7.777 7.776 7.774
PN         Na           1.000         S           2.000         S           1.001         S           1.002         T           1.003         S	Ame Sto 2.20 960 s 2.23 960 s 2.21 960 s 2.21 960 s 2.22 720 W Surce	orm H ummer ummer ummer inter	Period C 100 100 100 100 100 Flooded	hange +40% +40% +40% +40% +40%	Surch 30/15 s 30/15 s 30/15 s 30/30 s	arge Summer Summer Summer Ha	Flood lf Drain	Over		Act.	Level (m) 7.777 7.777 7.776 7.774 7.104
PN         Na           1.000         S           2.000         S           1.001         S           1.002         T.           1.003         S           V         PN	2/MH ame Sto 2.20 960 S 2.23 960 S 2.21 960 S 2.22 720 W Surc JS/MH D Name	orm E ummer ummer ummer inter charged epth (m)	Period C 100 100 100 100 100 Flooded Volume (m <sup>3</sup> )	hange +40% +40% +40% +40% +40% Flow / Cap.	Surch 30/15 s 30/15 s 30/15 s 30/30 s ' Overf (1/s	arge Summer Summer Summer Ha	Flood lf Drain Time	Over Pipe Flow (l/s)	flow Statu	Act. Le us Exc	Level (m) 7.777 7.777 7.776 7.774 7.104
PN         Na           1.000         S           2.000         S           1.001         S           1.002         T.           1.003         S           V         N           1.003         S           1.003         S           1.003         S	2/MH ame Sto 2.20 960 S 2.23 960 S 2.21 960 S 2.21 960 S 2.22 720 W Surce DS/MH D Name S.20	orm E ummer ummer ummer inter charged epth (m) 0.325	Period C 100 100 100 100 100 Flooded Volume (m <sup>3</sup> ) 0.000	<pre>hange     +40%     +40%     +40%     +40%     +40%     Flow /     Cap.     0.14</pre>	Surch 30/15 s 30/15 s 30/15 s 30/30 s ' Overf: (1/s	arge Summer Summer Summer Ha	Flood lf Drain Time	Over Pipe Flow (1/s) 4.9	flow Statu SURCHAR	Act. Le us Exc	Level (m) 7.777 7.777 7.776 7.774 7.104
PN         Na           1.000         S           2.000         S           1.001         S           1.002         T.           1.003         S           V         PN           1.000         1.000	2/MH ame Sto 2.20 960 S 2.23 960 S 2.21 960 S 2.22 720 W Surc JS/MH D Name	orm E ummer ummer ummer inter charged epth (m)	Period C 100 100 100 100 100 Flooded Volume (m <sup>3</sup> ) 0.000	<pre>hange     +40%     +40%     +40%     +40%     +40%     Flow /     Cap.     0.14     0.14</pre>	Surch 30/15 s 30/15 s 30/15 s 30/30 s ' Overf: (1/s	arge Summer Summer Summer Ha	Flood lf Drain Time	Over Pipe Flow (1/s) 4.9 4.2	flow Statu	Act. Le us Exc GED GED	Level (m) 7.777 7.777 7.776 7.776 7.774 7.104

Furness Partnership		Page 10
20 Britton Street	CAR PARK DEVELOPMENT	
London	MILLOM SCHOOL	
EC1M 5TX	MILLOM	Micco
Date 11/08/2023	Designed by MH	Dcainago
File CAR PARK NETWORK.MDX	Checked by CJH	Diamage
Micro Drainage	Network 2020.1.3	

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

PN	US/MH Name	Surcharged Depth (m)			Overflow (1/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.002	TANK	0.464	0.000	0.06		800	1.4	SURCHARGED	
1.003	S.22	-0.066	0.000	0.25			1.4	OK	

## PLAYGROUND DEVELOPMENT HYDRAULIC CALCULATIONS

Furness Partnership	Page 1
20 Britton Street	PLAYGROUND EXTENSION
London	MILLOM SCHOOL
EC1M 5TX	MILLOM MICCO
Date 11/08/2023	Designed by MU
File PLAYGROUND NETWORK.MDX	Checked by CJH
Micro Drainage	Network 2020.1.3
STORM SEWER DESIGN Design Pipe Sizes ST FSR Rainfal Return Period (years) M5-60 (mm) Ratio F Maximum Rainfall (mm/hr) Maximum Time of Concentration (mins) Foul Sewage (1/s/ha) Volumetric Runoff Coeff. Design <u>Time Ar</u> ime (mins 0- Total Area	by the Modified Rational Method A Criteria for Storm CANDARD Manhole Sizes STANDARD CANDARD MANHOLE SUBARD CANDARD MANHOLE SUBARD
Total P:	ipe Volume (m³) = 11.599
Network	Design Table for Storm
« - Indic	cates pipe capacity < flow
	.E. Base k HYD DIA Section Type Auto ins) Flow (l/s) (mm) SECT (mm) Design
1.001 40.400 0.200 202.0 0.052 (	5.00       0.0       0.600       o       150       Pipe/Conduit       1         0.00       0.0       0.600       o       300       Pipe/Conduit       1       1         0.00       0.0       0.600       o       375       Pipe/Conduit       1       1
Netw	work Results Table
PN Rain T.C. US/IL E I.A (mm/hr) (mins) (m) (ha	
1.000 39.17 5.37 <mark>6.850</mark> 0.	.023 0.0 0.0 0.0 1.00 17.7 3.3
	.075 0.0 0.0 0.0 1.10 77.9 10.2
1.002 36.29 6.49 6.205 0.	.180 0.0 0.0 0.0 1.28 141.1 23.6
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Furness Partnership						Page 2		
20 Britton Street	PLA	YGROUND E	XTENSION			1		
London	MIL	LOM SCHOO		The second				
EC1M 5TX	MIL	MILLOM MICCO						
Date 11/08/2023	Des	Designed by MH						
File PLAYGROUND NETWORK.MD	X Che	cked by C	JH			Drainage		
Micro Drainage	Net	work 2020	0.1.3					
Ne	etwork Desig	n Table :	for Storm					
PN Length Fall Slope I.	DTA S	Section Ty	rpe Auto					
, , , , , , , , , , , , , , , , , , ,		Base [low (l/s)	k HYD (mm) SECT			Design		
1.003 8.600 0.043 200.0 0	.054 0.00	0.0	0.600 0	375 E	Pipe/Condu	it 🤒		
1.004 18.600 0.115 161.7 0			0.600 0	375 E	Pipe/Condu	it 🔒		
1.005 8.400 0.031 271.0 0					Pipe/Condu			
1.006 8.800 2.000 4.4 0	.000 0.00	0.0	0.600 0	100 E	Pipe/Condu	it 🔒		
	Network 1	Results I	able					
	IL Σ I.Area	Σ Base	Foul Add		el Cap			
(mm/hr) (mins) (m	1) (ha) F	'low (l/s)	(l/s) (l/	s) (n	1/s) (l/s)	(1/s)		
1.003 36.03 6.60 <mark>6.0</mark>	08 0.234	0.0	0.0	0.0 1	.28 141.1	30.4		
1.004 35.54 6.82 5.9		0.0	0.0		.42 157.1			
1.005 35.26 6.95 5.8		0.0	0.0		.10 121.0			
1.006 35.17 6.99 5.8	19 0.234	0.0	0.0	0.0 3	.71 29.2«	30.4		
Outfall Pipe Number 1.006		(m)	el Min I. Level (m)		<b>W</b> (mm)			
				0	0			
S	imulation C:	riteria f	or Storm					
Volumetric Runof Areal Reductior Hot Start Hot Start Lev Manhole Headloss Coeff Foul Sewage per hectar	Factor 1.000 (mins) 0 rel (mm) 0 Global) 0.500	MAD Flow per	Person per	10m³/ha et Coe Day (1 Run Tin	a Storage ffiecient	1.000 0.800		
Number of Input Hydrographs 0 Number of Online Controls 1								
	Synthetic R	Rainfall	Details					
Rainfall Mo	del	FSR	Pro	file Ty	vpe Summer			
Return Period (yea		1		(Summe				
Reg M5-60 (: Rati			Cv torm Durati	(Winte on (min				

Design Point (Calculated)       1.200       1.9       Kick-Flo®       0.558         Flush-Flo™       0.274       1.7       Mean Flow over Head Range       -         The hydrological calculations have been based on the Head/Discharge relationship for th Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalided that the storage routing calculations will be invalided to the storage routing calculations at the storage routing calculations will be invalided to the storage routing calculations at the storage r	ess Partnership	Page 3
ECIM 5TX       MILLOM         Date 11/08/2023       Designed by MH Checked by CJH         File PLAYGROUND NETWORK.MDX       Checked by CJH         Micro Drainage       Network 2020.1.3         Online Controls for Storm         Hydro-Brake® Optimum Manhole: TANK, DS/FN: 1.005, Volume (m³): 4.5         Unit Reference MD-SHE-0063-1900-1200-1900 Design Head (m)         Design Flow (1/s)         Design Flow (1/s)         Design Flow (1/s)         Sump Available         Yes         Diameter (mm)         Ontrol Points         Head (m) Flow (1/s)         Diameter (mm)         Diameter (mm)         Suggested Manhole Diameter (mm)         Suggested Manhole Diameter (mm)         Suggested Manhole Diameter (mm)         Design Flow (1/s)         Flush-Flow         Ontrol Points         Head (m) Flow (1/s)         Control Points         Head (m) Flow (1/s)         Mean Flow over Head Range         The hydrological calculations have been based on the Head/Discharge relationshilp for th <td>itton Street</td> <td></td>	itton Street	
Date 11/08/2023       Designed by MH Checked by CJH         File PLAYGROUND NETWORK.MDX       Network 2020.1.3         Micro Drainage       Network 2020.1.3         Online Controls for Storm         Hydro-Brake@ Optimum Manhole: TANK, DS/FN: 1.005, Volume (m³): 4.5         Unit Reference MD-SHE-0063-1900-1200-1900 Design Head (m)         Design Flow (1/s)       1.9         Flush-Flow       Calculated Objective Minimise upstream storage Application         Sump Available       Yes         Diameter (mm)       63         Invert Level (m)       5.850         Minimum Outlet Pipe Diameter (mm)       1200         Control Points       Head (m) Flow (1/s)         Control Points       Head (m) Flow (1/s)       Control Points       Head (m) Flow (1/s)         Plush-Flo <sup>®</sup> 0.274       1.7       Mean Flow over Head Range       -         The hydrological calculations have been based on the Head/Discharge relationship for th Hydro-Brake@ Optimum as specified. Should another type of control device other than a Hydro-Brake@ Optimum as specified. Should another type of control device other than a Hydro-Brake@ Optimum as specified. Should another type of control device other than a Hydro-Brake@ Optimum as specified. Should another type of control device other than a Hydro-Brake@ Optimum as specified. Should another type of another type of a control device other than a Hydro-Brake@ Optimum as specified. Should another type of	on	
Date 11/08/2023 Designed by MH Checked by CJH Checked by CJH Checked by CJH Micro Drainage Network 2020.1.3 Online Controls for Storm Hydro-Brake@ Optimum Manhole: TANK, DS/PN: 1.005, Volume (m³): 4.5 Unit Reference MD-SHE-0063-1900-1200-1900 Design Head (m) 1.200 Design Flow (1/s) 1.9 Flush=Flo <sup>m</sup> Calculated Objective Minimise upstream storage Application Surface Sump Available Yes Diameter (mm) 63 Invert Level (m) 75 Suggested Manhole Diameter (mm) 1200 Control Points Head (m) Flow (1/s) Control Points Head (m) Flow (/ Design Point (Calculated) 1.200 1.9 Flush=Flo <sup>m</sup> 0.274 1.7 Mean Flow over Head Range - The hydrological calculations have been based on the Head/Discharge relationship for th Hydro-Brake@ Optimum as specified. Should another type of control device other than a Hydro-Brake@ Optimum as specified. Should another type of control device other than a Hydro-Brake@ Optimum as specified. Should another type of control device other than a Hydro-Brake@ Optimum as specified. Should another type of control device other than a Hydro-Brake@ Optimum as specified. Should another type of control device other than a Hydro-Brake@ Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum as specified. Should another type of should another type of control device other than a Hydro-Brake Optimum as specified. Should another type of a shou	5TX	Micro
Micro Drainage         Network 2020.1.3           Online Controls for Storm           Hydro-Brake® Optimum Manhole: TANK, DS/PN: 1.005, Volume (m³): 4.5           Unit Reference MD-SHE-0063-1900-1200-1900           Design Head (m)         1.200           Design Head (m)         1.200           Design Flow (1/s)         1.9           Flush-Flo <sup>m</sup> Calculated           Objective Minimise upstream storage           Application         Surface           Sump Available         Yes           Diameter (mm)         63           Invert Level (m)         5.850           Minimum Outlet Pipe Diameter (mm)         1200           Control Points         Head (m) Flow (1/s)         Control Points           Control Points         Head (m) Flow (1/s)         Control Points         Head (m) Flow (control Points           Flush-Flo <sup>m</sup> 0.274         1.7         Mean Flow over Head Range         -           The hydrological calculations have been based on the Head/Discharge relationship for th         Hydro-Brake@ Optimum@ be utilised then these storage routing calculations will be invalit           Depth (m) Flow (1/s)         Depth (m) Flow (1/s)         Depth (m) Flow (1/s)         Depth (m) Flow (1/s)           0.100         1.4         1.200         1.9         3.000<	11/08/2023	and a first sector in the sector is a sector in the sector is a sector is a sector in the sector is a
Online Controls for Storm           Hydro-Brake® Optimum Manhole: TANK, DS/FN: 1.005, Volume (m³): 4.5           Unit Reference MD-SHE-0063-1900-1200-1900           Design Head (m)         1.200           Design Flow (1/s)         1.9           Flush-Flo**         Calculated           Objective Minimise upstream storage         Application           Sump Available         Yes           Diameter (mm)         63           Invert Level (m)         5.850           Minimum Outlet Pipe Diameter (mm)         75           Suggested Manhole Diameter (mm)         1200           Control Points         Head (m) Flow (1/s)           Control Points         Head (m) Flow (1/s)           Mean Flow over Head Range         -           The hydrological calculations have been based on the Head/Discharge relationship for th           Hydro-Brake® Optimum as specified. Should another type of control device other than a           Hydro-Brake Optimum be utilised then these storage routing calculations will be invalit           0.100         1.4           0.200         1.6           0.400         1.6           0.400         1.600           0.300         1.7           0.400         1.6           0.400         1.6 <t< td=""><td>PLAYGROUND NETWORK.MDX</td><td>Diamage</td></t<>	PLAYGROUND NETWORK.MDX	Diamage
Hydro-Brake@ Optimum Manhole: TANK, DS/PN: 1.005, Volume (m <sup>3</sup> ): 4.5           Unit Reference MD-SHE-0063-1900-1200-1900 Design Head (m)         1.200 Design Flow (1/s)           Flush-Flo <sup>m</sup> Calculated Objective Minimise upstream storage Application         1.9           Sump Available         Yes           Diameter (mm)         63 Invert Level (m)         5.850           Minimum Outlet Pipe Diameter (mm)         1200           Control Points         Head (m) Flow (1/s)         Control Points         Head (m) Flow (1/s)           Design Point (Calculated)         1.200         1.9         Kick-Flo@         0.558           Flush-Flo <sup>m</sup> 0.274         1.7         Mean Flow over Head Range         -           The hydrological calculations have been based on the Head/Discharge relationship for th Hydro-Brake@ Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum (1/s)         Pepth (m) Flow (1/s)         Pepth (m) Flow (1/s)         Pepth (m) Flow (1/s)           0.100         1.4         1.200         1.9         3.000         2.9         7.000         4.3           0.200         1.6         1.400         2.0         3.500         3.1         7.500         4.4           0.300         1.7         1.600         2.2	Drainage	
Unit Reference         MD-SHE-0063-1900-1200-1900 Design Head (m)         1.200 1.200           Design Flow (1/s)         1.9           Flush-Flo <sup>™</sup> Calculated           Objective         Minimise upstream storage           Application         Sump Available           Sump Available         Yes           Diameter (mm)         63           Invert Level (m)         5.850           Minimum Outlet Pipe Diameter (mm)         75           Suggested Manhole Diameter (mm)         1200           Control Points         Head (m) Flow (1/s)         Control Points           Design Point (Calculated)         1.200         1.9           Flush-Flo <sup>™</sup> 0.274         1.7         Mean Flow over Head Range         -           The hydrological calculations have been based on the Head/Discharge relationship for th         Hydro-Brake@ Optimum as specified. Should another type of control device other than a         Hydro-Brake@ Optimum@ be utilised then these storage routing calculations will be invalit           0.100         1.4         1.200         1.9         3.000         2.9         7.000         4.3           0.200         1.6         1.400         2.0         3.500         3.1         7.500         4.4           0.300         1.6         1.800	Or	
Design Head (m)         1.200           Design Flow (1/s)         1.9           Flush-Flom         Calculated           Objective         Minimise upstream storage           Application         Surface           Sump Available         Yes           Diameter (mm)         63           Invert Level (m)         5.850           Minimum Outlet Pipe Diameter (mm)         75           Suggested Manhole Diameter (mm)         1200           Control Points         Head (m) Flow (1/s)         Control Points         Head (m) Flow (1/s)           Design Point (Calculated)         1.200         1.9         Kick-Flo®         0.558           Flush-Flo <sup>m</sup> 0.274         1.7         Mean Flow over Head Range         -           The hydrological calculations have been based on the Head/Discharge relationship for th         Hydro-Brake@ Optimum as specified. Should another type of control device other than a           Hydro-Brake Optimum@ be utilised then these storage routing calculations will be invalid         0.100         1.4         1.200         1.9         3.000         2.9         7.000         4.3           0.200         1.6         1.400         2.9         7.000         4.3           0.200         1.6         1.800         2.3         4.5	Hydro-Brake® Optimum M	)lume (m³): 4.5
Design Flow (1/s)         1.9           Flush-Flo <sup>m</sup> Calculated           Objective         Minimise upstream storage           Application         Surface           Sump Available         Yes           Diameter (mm)         63           Invert Level (m)         5.850           Minimum Outlet Pipe Diameter (mm)         75           Suggested Manhole Diameter (mm)         1200           Control Points         Head (m) Flow (1/s)         Control Points         Head (m) Flow (1/s)           Design Point (Calculated)         1.200         1.9         Kick-Flo®         0.558           Flush-Flo <sup>m</sup> 0.274         1.7         Mean Flow over Head Range         -           The hydrological calculations have been based on the Head/Discharge relationship for th         Hydro-Brake® Optimum as specified. Should another type of control device other than a         Hydro-Brake® Optimum® be utilised then these storage routing calculations will be invali           Depth (m) Flow (1/s)         Pepth (m) Flow (1/s)         Pepth (m) Flow (1/s)         Pepth (m) Flow (1/s)           0.100         1.4         1.200         1.9         3.000         2.9         7.000         4.3           0.200         1.6         1.400         2.0         3.500         3.5         8.500		
Objective       Minimise upstream storage         Application       Surface         Sump Available       Yes         Diameter (mm)       63         Invert Level (m)       5.850         Minimum Outlet Pipe Diameter (mm)       75         Suggested Manhole Diameter (mm)       1200         Control Points       Head (m) Flow (1/s)       Control Points       Head (m) Flow (1/s)         Design Point (Calculated)       1.200       1.9       Kick-Flo®       0.558         Flush-Flo™       0.274       1.7       Mean Flow over Head Range       -         The hydrological calculations have been based on the Head/Discharge relationship for th       Hydro-Brake@ Optimum as specified. Should another type of control device other than a         Hydro-Brake@ Optimum@ be utilised then these storage routing calculations will be invalided then the calculation calculations are calculated to the calculation calculation calculation calculation calculations calculation calculatio	D	
Application         Surface           Sump Available         Yes           Diameter (mm)         63           Invert Level (m)         5.850           Minimum Outlet Pipe Diameter (mm)         75           Suggested Manhole Diameter (mm)         1200           Control Points         Head (m) Flow (1/s)         Control Points         Head (m) Flow (1/s)           Design Point (Calculated)         1.200         1.9         Kick-Flo®         0.558           Flush-Flo™         0.274         1.7         Mean Flow over Head Range         -           The hydrological calculations have been based on the Head/Discharge relationship for th         Hydro-Brake@ Optimum as specified. Should another type of control device other than a           Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalided then the calculation calculations are calculated to the calculation ca		
Sump Available Diameter (mm)         Yes G3 Invert Level (m)           Invert Level (m)         5.850           Minimum Outlet Pipe Diameter (mm)         75           Suggested Manhole Diameter (mm)         7200           Control Points         Head (m) Flow (l/s)         Control Points         Head (m) Flow (l/s)           Design Point (Calculated)         1.200         1.9 Flush-Flo <sup>m</sup> Kick-Flo®         0.558           The hydrological calculations have been based on the Head/Discharge relationship for th Hydro-Brake@ Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalia           Depth (m) Flow (l/s)         Depth (m) Flow (l/s)         Depth (m) Flow (l/s)         Depth (m) Flow (l/s)           0.100         1.4         1.200         1.9         3.000         2.9         7.000         4.3           0.200         1.6         1.400         2.0         3.500         3.1         7.500         4.4           0.300         1.7         1.600         2.2         4.000         3.3         8.000         4.6           0.400         1.6         1.800         2.3         4.500         3.7         9.000         4.8           0.600         1.4         2.200         2.5         <		-
Diameter (mm)         63           Invert Level (m)         5.850           Minimum Outlet Pipe Diameter (mm)         75           Suggested Manhole Diameter (mm)         1200           Control Points         Head (m) Flow (1/s)         Control Points         Head (m) Flow (1/s)           Design Point (Calculated)         1.200         1.9         Kick-Flo®         0.558           Flush-Flo™         0.274         1.7         Mean Flow over Head Range         -           The hydrological calculations have been based on the Head/Discharge relationship for th         Hydro-Brake® Optimum as specified. Should another type of control device other than a           Hydro-Brake Optimum® be utilised then these storage routing calculations will be invali         0.100         1.4         1.200         1.9         3.000         2.9         7.000         4.3           0.200         1.6         1.400         2.0         3.500         3.1         7.500         4.4           0.300         1.7         1.600         2.2         4.000         3.3         8.000         4.6           0.400         1.6         1.800         2.3         4.500         3.5         8.500         4.7           0.500         1.5         2.000         2.4         5.000         3.7		
Invert Level (m)       5.850         Minimum Outlet Pipe Diameter (mm)       75         Suggested Manhole Diameter (mm)       1200         Control Points       Head (m) Flow (l/s)       Control Points       Head (m) Flow (m)         Design Point (Calculated)       1.200       1.9       Kick-Flo®       0.558         Flush-Flo™       0.274       1.7       Mean Flow over Head Range       -         The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalid         Depth (m) Flow (1/s)         0.100       1.4       1.200       1.9       3.000       2.9       7.000       4.3         0.200       1.6       1.400       2.0       3.500       3.1       7.500       4.4         0.300       1.7       1.600       2.2       4.000       3.3       8.000       4.6         0.400       1.6       1.800       2.3       4.500       3.7       9.000       4.8         0.500       1.5       2.000       2.4       5.000       3.7       9		
Suggested Manhole Diameter (mm)         1200           Control Points         Head (m) Flow (1/s)         Control Points         Head (m) Flow (n)           Design Point (Calculated)         1.200         1.9         Kick-Flo®         0.558           Flush-Flo™         0.274         1.7         Mean Flow over Head Range         -           The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalided then these storage calculations are specified.         Depth (m) Flow (1/s)         Pepth (m) Flow (1/s)         Pepth (m) Flow (1/s)           0.100         1.4         1.200         1.9         3.000         2.9         7.000         4.3           0.200         1.6         1.400         2.0         3.500         3.1         7.500         4.4           0.300         1.7         1.600         2.2         4.500         3.5         8.500         <		
Control Points         Head (m) Flow (1/s)         Control Points         Head (m) Flow (m)           Design Point (Calculated)         1.200         1.9         Kick-Flo®         0.558           Flush-Flo™         0.274         1.7         Mean Flow over Head Range         -           The hydrological calculations have been based on the Head/Discharge relationship for th Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalided then these storage routing calculations will be invalided then these storage routing calculations will be invalided the flow (1/s)         Depth (m) Flow (1/s)         0.100         1.4         1.200         1.9         3.000         2.9         7.000         4.3           0.100         1.4         1.200         1.9         3.000         2.9         7.000         4.3           0.200         1.6         1.400         2.0         3.500         3.1         7.500         4.4           0.300         1.7         1.600         2.2         4.000         3.5         8.500         4.7           0.500         1.5         2.000         2.4         5.000         3.7         9.000         4.8		
Design Point (Calculated)       1.200       1.9       Kick-Flo®       0.558         Flush-Flo™       0.274       1.7       Mean Flow over Head Range       -         The hydrological calculations have been based on the Head/Discharge relationship for th         Hydro-Brake® Optimum as specified. Should another type of control device other than a         Hydro-Brake® Optimum® be utilised then these storage routing calculations will be invali         Depth (m) Flow (1/s)       Depth (m) Flow (1/s)       Depth (m) Flow (1/s)       Depth (m) Flow (1/s)         0.100       1.4       1.200       1.9       3.000       2.9       7.000       4.3         0.200       1.6       1.400       2.0       3.500       3.1       7.500       4.4         0.300       1.7       1.600       2.2       4.000       3.3       8.000       4.6         0.400       1.6       1.800       2.3       4.500       3.7       9.000       4.8         0.500       1.5       2.000       2.4       5.000       3.7       9.000       4.8         0.600       1.4       2.200       2.5       5.500       3.8       9.500       5.0         0.800       1.6       2.400       2.6       6.000       4.0       4.0	Suggested Manho	1200
Flush-Flo™       0.274       1.7       Mean Flow over Head Range       -         The hydrological calculations have been based on the Head/Discharge relationship for th         Hydro-Brake® Optimum as specified. Should another type of control device other than a         Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalid         0.100       1.4         1.200       1.9         0.200       1.6         1.400       2.0         0.300       1.7         1.600       2.2         4.000       3.3         8.000       4.6         0.400       1.6         0.500       1.5         0.600       1.4         2.200       2.5         5.500       3.8         9.500       5.0         0.800       1.6	Control Points Head (m	Head (m) Flow (l/s)
Depth       (m)       Flow       (1/s)       Quaditation of the		
Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invaliant of the invalue of the invaliant of the invalue of the invaliant of the invalue of the invaliant of the invaliant of the invalue of the inva		-
Depth (m)Flow (1/s)Depth (m)Flow (1/s)Depth (m)Flow (1/s)Depth (m)Flow (1/s) $0.100$ $1.4$ $1.200$ $1.9$ $3.000$ $2.9$ $7.000$ $4.3$ $0.200$ $1.6$ $1.400$ $2.0$ $3.500$ $3.1$ $7.500$ $4.4$ $0.300$ $1.7$ $1.600$ $2.2$ $4.000$ $3.3$ $8.000$ $4.6$ $0.400$ $1.6$ $1.800$ $2.3$ $4.500$ $3.5$ $8.500$ $4.7$ $0.500$ $1.5$ $2.000$ $2.4$ $5.000$ $3.7$ $9.000$ $4.8$ $0.600$ $1.4$ $2.200$ $2.5$ $5.500$ $3.8$ $9.500$ $5.0$ $0.800$ $1.6$ $2.400$ $2.6$ $6.000$ $4.0$	ro-Brake® Optimum as specifie	device other than a
0.100         1.4         1.200         1.9         3.000         2.9         7.000         4.3           0.200         1.6         1.400         2.0         3.500         3.1         7.500         4.4           0.300         1.7         1.600         2.2         4.000         3.3         8.000         4.6           0.400         1.6         1.800         2.3         4.500         3.5         8.500         4.7           0.500         1.5         2.000         2.4         5.000         3.7         9.000         4.8           0.600         1.4         2.200         2.5         5.500         3.8         9.500         5.0           0.800         1.6         2.400         2.6         6.000         4.0         5.0		
0.200         1.6         1.400         2.0         3.500         3.1         7.500         4.4           0.300         1.7         1.600         2.2         4.000         3.3         8.000         4.6           0.400         1.6         1.800         2.3         4.500         3.5         8.500         4.7           0.500         1.5         2.000         2.4         5.000         3.7         9.000         4.8           0.600         1.4         2.200         2.5         5.500         3.8         9.500         5.0           0.800         1.6         2.400         2.6         6.000         4.0         5.00         5.0		
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0.4001.61.8002.34.5003.58.5004.70.5001.52.0002.45.0003.79.0004.80.6001.42.2002.55.5003.89.5005.00.8001.62.4002.66.0004.05.0005.0		
0.6001.42.2002.55.5003.89.5005.00.8001.62.4002.66.0004.0		
0.800 1.6 2.400 2.6 6.000 4.0		
		9.500 5.0
1.000 1.7 2.600 2.7 6.500 4.1		
	1.000 1.7 2.60	
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Furness Partnership		Page 4
20 Britton Street	PLAYGROUND EXTENSION	
London	MILLOM SCHOOL	
EC1M 5TX	MILLOM	Micro
Date 11/08/2023	Designed by MH	Drainage
File PLAYGROUND NETWORK.MDX	Checked by CJH	Diamage
Micro Drainage	Network 2020.1.3	

#### Storage Structures for Storm

## Cellular Storage Manhole: TANK, DS/PN: 1.005

Invert Level (m) 5.850 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

### Depth (m) Area (m<sup>2</sup>) Inf. Area (m<sup>2</sup>) Depth (m) Area (m<sup>2</sup>) Inf. Area (m<sup>2</sup>)

0.000	185.0	0.0	1.201	0.0	0.0
1.200	185.0	0.0			

	s Par	tners	ship								Page	5
0 Brit	tton	Stree	et			PLAYG	GROUND E	XTENSION				
ondon						MILLC	OM SCHOO	L				-
C1M 5	ТХ					MILLC	M				Mic	10
ate 11	1/08/	2023				Desig	ned by 1	МН				
'ile PI	LAYGF	ROUND	NETWOF	RK.MDX			ked by C				Uld	IIIdy
licro I							ork 2020					
		2										
_ year	Reti	irn P	eriod S	Summar	y of (		al Resul corm	ts by Max	<u>kimum</u>	Level	(Rank	1) fc
Number	Foul of In	le Hea Sewa	Hot Hot Star dloss Co ge per f ydrograp	Start Et Leve Deff (G Dectare	Factor (mins) l (mm) lobal) (l/s) Number	1.000 0 0.500 1 0.000	MADI Flow per H Eline Cont	nal Flow - D Factor *	10m³/h et Coe Day (1 ber of	a Stor ffieci /per/d Time/	age 1.00 ent 0.80 ay) 0.00 Årea Dia	0 0 grams (
NUMBE	er or	OUTTUE	e contro	JS I N	umper c	or Stora	ige struct	ures i Num	ber of	. Keal	TIME CON	LIOIS
						etic Ra	infall De					
			Rain	fall Mc		al a r -1		Ratio H Cv (Summer)				
				-		gland a		Cv (Summer) Cv (Winter)				
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		D			D Inert (s)	VD Stat ia Stat	us us	80, 240, 36	0, 480	c and W , 600,	DFF DFF Jinter 720,	
			uration	(s) (mi)	D Inert (s) ns) 15	VD Stat ia Stat	us us	80, 240, 36	0, 480	( c and W ), 600, 1440,	DFF DFF 720, 2160	
	Re	eturn i	uration( Period(s	(s) (min s) (yea:	D Inert (s) ns) 15 rs)	VD Stat ia Stat	us us	80, 240, 36	0, 480	c and W ), 600, 1440, 1, 30	DFF DFF 720, 2160 0, 100	
	Re	eturn i	uration	(s) (min s) (yea:	D Inert (s) ns) 15 rs)	VD Stat ia Stat	us us	80, 240, 36	0, 480	c and W ), 600, 1440, 1, 30	DFF DFF 720, 2160	
	Re	eturn i	uration( Period(s	(s) (min s) (yea:	D Inert (s) ns) 15 rs)	VD Stat ia Stat	us us	80, 240, 36	0, 480	c and W ), 600, 1440, 1, 30	DFF DFF 720, 2160 0, 100	
		eturn : C.	uration( Period(s	(s) (min s) (yea: Change	D Inert (s) ns) 15 rs) (%)	VD Stat ia Stat , 30, 6	us us 0, 120, 1		0, 480 960,	c and W ), 600, 1440, 1, 30 40, 4	DFF DFF 720, 2160 0, 100 10, 40	
PN	US/MH	eturn : C.	uration( Period(s limate C	(s) (min s) (yea: Change <b>Return</b>	D Inert (s) ns) 15 rs) (%) Climat	VD Stat ia Stat , 30, 6 :e <b>Fi</b>	us us 0, 120, 1 <b>rst (X)</b>	First (Y)	0, 480 960, First	c and W ), 600, 1440, 1, 30 40, 4 c (Z) C	DFF DFF 720, 2160 0, 100 10, 40	Level
PN		eturn : C.	uration( Period(s	(s) (min s) (yea: Change <b>Return</b>	D Inert (s) ns) 15 rs) (%)	VD Stat ia Stat , 30, 6 :e <b>Fi</b>	us us 0, 120, 1		0, 480 960, First	c and W ), 600, 1440, 1, 30 40, 4	DFF DFF 720, 2160 0, 100 10, 40	
1.000	US/MH Name S.30	eturn : C. <b>S</b> 15	uration( Period(s limate C <b>torm</b> Summer	(s) (min s) (yea: Change Return Period	D Inert (s) ns) 15 rs) (%) Climat Chang +40	VD Stat ia Stat , 30, 6 :e Fi e Su	us us 0, 120, 1 rst (X) rcharge	First (Y) Flood	0, 480 960, First	c and W ), 600, 1440, 1, 30 40, 4 c (Z) C	DFF DFF 720, 2160 0, 100 10, 40	Level (m) 6.903
1.000 1.001	US/MH Name S.30 S.31	eturn : C. <b>S</b> 15 15	uration( Period(s limate C <b>torm</b> Summer Summer	(s) (min s) (yea: Change Return Period 1 1	D Inert (s) ns) 15 (%) Climat Chang +40 +40	VD Stat ia Stat , 30, 6 :e Fi e Su % 100/3	us us 0, 120, 1 rst (X) rcharge 360 Summer	First (Y) Flood	0, 480 960, First	c and W ), 600, 1440, 1, 30 40, 4 c (Z) C	DFF DFF 720, 2160 0, 100 10, 40	Level (m) 6.903 6.566
1.000 1.001 1.002	US/MH Name S.30 S.31 S.32	eturn : C. 15 15 15	uration( Period(s limate C <b>torm</b> Summer Summer Summer	(s) (min s) (yea: Change Return Period 1 1 1	D Inert (s) ns) 15 (%) Climat Chang +40 +40 +40	VD Stat ia Stat , 30, 6 ; e Fi e Su % 100/3 % 30/3	us us 0, 120, 1 rst (X) rcharge 360 Summer 360 Summer	First (Y) Flood	0, 480 960, First	c and W ), 600, 1440, 1, 30 40, 4 c (Z) C	DFF DFF 720, 2160 0, 100 10, 40	Leve] (m) 6.903 6.566 6.328
1.000 1.001 1.002 1.003	US/MH Name S.30 S.31 S.32 S.33	eturn : C. 15 15 15 15 15	uration( Period(s limate C torm Summer Summer Summer Summer	(s) (min s) (yea: Change Return Period 1 1 1 1	D Inert (s) ns) 15 rs) (%) Climat Chang +40 +40 +40 +40	VD Stat ia Stat , 30, 6 ; e Fi e Su % 100/3 % 30/3 % 30/3	us us 0, 120, 1 rst (X) rcharge 360 Summer 360 Summer /15 Summer	First (Y) Flood	0, 480 960, First	c and W ), 600, 1440, 1, 30 40, 4 c (Z) C	DFF DFF 720, 2160 0, 100 10, 40	Level (m) 6.903 6.566 6.328 6.186
1.000 1.001 1.002	US/MH Name S.30 S.31 S.32 S.33 S.34	eturn : C: 15 15 15 15 1440 1440	uration( Period(s limate C <b>torm</b> Summer Summer Summer	(s) (min s) (yea: Change Return Period 1 1 1	D Inert (s) ns) 15 rs) (%) Climat Chang +40 +40 +40 +40	VD Stat ia Stat , 30, 6 ; e Fi e Su % 100/3 % 30/3 % 30/3	us us 0, 120, 1 rst (X) rcharge 360 Summer 360 Summer	First (Y) Flood	0, 480 960, First	c and W ), 600, 1440, 1, 30 40, 4 c (Z) C	DFF DFF 720, 2160 0, 100 10, 40	Level (m) 6.903 6.566 6.328 6.186 6.186
1.000 1.001 1.002 1.003 1.004	US/MH Name S.30 S.31 S.32 S.33 S.34 TANK	eturn : C: 15 15 15 1440 1440 : 1440	uration( Period(s limate C torm Summer Summer Summer Summer Summer	(s) (min s) (yea: Change Return Period 1 1 1 1 1	D Inert (s) ns) 15 rs) (%) Climat Chang +40 +40 +40 +40 +40 +40 +40	VD Stat ia Stat , 30, 6 ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	us us 0, 120, 1 rst (X) rcharge 360 Summer 360 Summer /15 Summer 120 Summer	First (Y) Flood	0, 480 960, First	c and W ), 600, 1440, 1, 30 40, 4 c (Z) C	DFF DFF 720, 2160 0, 100 10, 40	Level (m) 6.903 6.566 6.328 6.186 6.186
1.000 1.001 1.002 1.003 1.004 1.005	US/MH Name S.30 S.31 S.32 S.33 S.34 TANK	eturn : C: 15 15 15 1440 1440 : 1440	uration( Period(s limate C torm Summer Summer Summer Summer Summer Summer	(s) (min s) (yeas Change Return Period 1 1 1 1 1 1	D Inert (s) ns) 15 rs) (%) Climat Chang +40 +40 +40 +40 +40 +40 +40	VD Stat ia Stat , 30, 6 ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	us us 0, 120, 1 rst (X) rcharge 360 Summer 360 Summer /15 Summer 120 Summer	First (Y) Flood	0, 480 960, First	c and W ), 600, 1440, 1, 30 40, 4 c (Z) C	DFF DFF 720, 2160 0, 100 10, 40	Level (m) 6.903 6.566 6.328 6.186 6.186
1.000 1.001 1.002 1.003 1.004 1.005	US/MH Name S.30 S.31 S.32 S.33 S.34 TANK	eturn : C: 15 15 15 1440 1440 : 1440	uration( Period(s limate C Summer Summer Summer Summer Summer Summer Summer	(s) (min s) (yeas Change Return Period 1 1 1 1 1 1 1 1	D Inert (s) ns) 15 rs) (%) Climat Chang +40 +40 +40 +40 +40 +40 +40 +40	VD Stat ia Stat , 30, 6 ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	us us 0, 120, 1 (x) (x) (x) (x) (x) (x) (x) (x) (x) (x)	First (Y) Flood	0, 480 960, First Over	c and W ), 600, 1440, 1, 30 40, 4 c (Z) C	DFF DFF 720, 2160 0, 100 10, 40	Level (m) 6.903 6.566 6.328 6.186 6.186 6.185
1.000 1.001 1.002 1.003 1.004 1.005	US/MH Name S.30 S.31 S.32 S.33 S.34 TANK S.35	eturn : C: 15 15 15 1440 1440 : 1440 : 1440 : 2160	vration ( Period (s limate C torm Summer Summer Summer Summer Summer Summer Summer	(s) (min s) (yea: Change Return Period 1 1 1 1 1 1 1 2 3 3 4 5 3 6 4 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	D Inert (s) ns) 15 rs) (%) Climat Chang +40 +40 +40 +40 +40 +40 +40 +40	VD Stat ia Stat , 30, 6 ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	us us 0, 120, 1 nst (X) ncharge 360 Summer /15 Summer /15 Summer /60 Summer	First (Y) Flood	960, 960, First Over	c and W ), 600, 1440, 1, 30 40, 4 c (Z) C	DFF DFF 720, 2160 0, 100 0, 40 <b>Overflow</b> Act.	(m) 6.903 6.566 6.328 6.186 6.186 6.185 5.835
1.000 1.001 1.002 1.003 1.004 1.005	US/MH Name S.30 S.31 S.32 S.33 S.34 TANK S.35	eturn : C: 15 15 15 1440 1440 : 1440 : 1440 : 2160 US/MH	uration ( Period (s limate C torm Summer Summer Summer Summer Summer Summer Summer Summer Summer	(s) (min s) (yea: Change Return Period 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	D Inert (s) (s) 15 (%) Climat Chang +40 +40 +40 +40 +40 +40 +40 +40 +40 +40	VD Stat ia Stat , 30, 6 ; e Fi e Su % 100/: % 30/: % 30/: % 30/: % 30/: % 30/: % 30/: % 30/: % 30/: % 30/:	us us 0, 120, 1 rst (X) rcharge 360 Summer 715 Summer 715 Summer 760 Summer	First (Y) Flood	Pipe Flow	c and W ), 600, 1440, 1, 30 40, 4 <b>c (Z) C</b> flow	DFF DFF 720, 2160 0, 100 0, 40 <b>Overflow</b> Act.	Level (m) 6.903 6.566 6.328 6.186 6.186 6.185 5.835
1.000 1.001 1.002 1.003 1.004 1.005	US/MH Name S.30 S.31 S.32 S.33 S.34 TANK S.35	eturn : C: 15 15 15 1440 1440 : 1440 : 1440 : 2160	uration ( Period (s limate C torm Summer Summer Summer Summer Summer Summer Summer	(s) (min s) (yea: Change Return Period 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	D Inert (s) ns) 15 rs) (%) Climat Chang +40 +40 +40 +40 +40 +40 +40 +40	VD Stat ia Stat , 30, 6 ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	us us 0, 120, 1 nst (X) ncharge 360 Summer /15 Summer /15 Summer /60 Summer	First (Y) Flood	Pipe Flow	c and W ), 600, 1440, 1, 30 40, 4 <b>c (Z) C</b> flow	DFF DFF 720, 2160 0, 100 0, 40 <b>Overflow</b> Act.	Level (m) 6.903 6.566 6.328 6.186 6.186 6.185 5.835

Furness Partnership		Page 6
20 Britton Street	PLAYGROUND EXTENSION	
London	MILLOM SCHOOL	
EC1M 5TX	MILLOM	Micco
Date 11/08/2023	Designed by MH	Dcainago
File PLAYGROUND NETWORK.MDX	Checked by CJH	Diamage
Micro Drainage	Network 2020.1.3	

 $\frac{1 \ {\rm year} \ {\rm Return} \ {\rm Period} \ {\rm Summary} \ {\rm of} \ {\rm Critical} \ {\rm Results} \ {\rm by} \ {\rm Maximum} \ {\rm Level} \ ({\rm Rank} \ 1) \ {\rm for} \ {\rm Storm}$ 

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (1/s)	Half Drain Time (mins)	Flow	Status	Level Exceeded
1.001	s.31	-0.214	0.000	0.18			12.7	OK	
1.002	S.32	-0.252	0.000	0.23			29.3	OK	
1.003	s.33	-0.197	0.000	0.06			6.1	OK	
1.004	S.34	-0.154	0.000	0.05			6.0	OK	
1.005	TANK	-0.040	0.000	0.02		572	1.7	OK	
1.006	s.35	-0.084	0.000	0.06			1.7	OK	

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	Partner									Page 7
0 Britt	ton Stre	et		PI	AYGRO	UND EX	TENSIO	N		
ondon				MI	LLOM S	SCHOOL	i			
С1М 5ТХ	ζ			MI	LLOM					Micro
ate 11/	/08/2023	3		De	signe	d by M	IH			Drainag
ile PLA	AYGROUNE	) NETWORK	.MDX	Ch	ecked	by CJ	Н			Diamay
icro Dr	rainage			Ne	twork	2020.	1.3			
<u>30 yea</u>	<u>r Retur.</u>	n Period	Summary		critica for Sto		ults b	y Maxin	num Lev	el (Rank 1)
Number o	nhole Hea Foul Sewa f Input H	Hot S Hot Start adloss Coe age per he Hydrograph		or 1.0 s) a) c) 0.5 s) 0.0 cer of	00 Ac 0 00 Flow 00 0fflin	MADD v per Pe ne Conti	al Flow Factor Person pe	* 10m³/ Inlet Co er Day ( Number c	ha Stora effiecie l/per/da f Time/A	ge 1.000 nt 0.800 y) 0.000 rea Diagrams
Number	of Onlir	ie Control	s l Numbeı	r of S	torage	Structi	ures 1 1	Jumber c	f Real T	ime Controls
				thetic	Rainf	all Det				
		Rainfa	all Model Region	Englar	id and t	FSR Wales (		o R 0.2 er) 1.0		
		M.	5-60 (mm)				v (Wint			
	۸ <i>۴</i> – –	tin for D	and Distant	anal-	· ()				200	0
	Marg	JIN IOT FI	ood Risk W Analys	-		2.5 Sec	ond Inc	rement	. 300 Extendec	
					Status				OF	
			_		Status				OI	
			Ine	rtia S	status				OF	ΓF'
	1		ofile(s) ) (mins)	15. 30	. 60 .	120. 19	0. 240		r and Wi	
	1	Juracion(5	) (111113)	10, 00	,,	120, 10	0, 240,		, 1440,	
		Period(s)	-						1, 30,	
	(	Climate Ch	ange (%)						40, 40	, 40
										Water
			atumn Clim	ate	First		First (	Y) Firs	t (Z) Ov	erflow Level
	JS/MH		eturn Clim	100	Suraha	rae	Flood	0	flow	Act (m)
			eriod Char	ıge	Surcha	arge	Flood	Over	flow	Act. (m)
<b>PN 1</b> 1.000	Name \$	Storm Pe	ariod Char 30 +	40%		-	Flood	Over	flow	6.939
<b>PN</b> 1 1.000 1.001	Name \$ s.30 15 s.31 960	Storm Pe Summer Winter	<b>30</b> + 30 +	40% 40% 10	0/360	Summer	Flood	Over	flow	6.939 6.677
<b>PN 1</b> 1.000 1.001 1.002	Name \$	Storm Pe Summer Winter Winter	30 + 30 + 30 + 30 +	40% 40% 10		Summer Summer	Flood	Over	flow	6.939
PN     I       1.000     1.001       1.002     1.003       1.004	Name         S           S.30         15           S.31         960           S.32         960           S.33         960           S.34         960	Storm Pe Summer Winter Winter Winter Winter	ariod         Char           30         +           30         +           30         +           30         +           30         +           30         +           30         +	40% 40% 10 40% 3 40% 40% 3	00/360 30/360 30/15 30/120	Summer Summer Summer Summer	Flood	Over	flow	6.939 6.677 6.677 6.676 6.675
PN         I           1.000         .001           1.002         .003           1.004         .005	Name         S           S.30         15           S.31         960           S.32         960           S.33         960           S.34         960           TANK         960	Storm Pe Summer Winter Winter Winter Winter Winter	ariod         Char           30         +           30         +           30         +           30         +           30         +           30         +           30         +           30         +           30         +           30         +	40% 40% 10 40% 3 40% 3 40% 3 40% 3	00/360 30/360 30/15	Summer Summer Summer Summer	Flood	Ove	flow	6.939 6.677 6.677 6.676 6.675 6.674
PN         I           1.000         .001           1.002         .003           1.004         .005	Name         S           S.30         15           S.31         960           S.32         960           S.33         960           S.34         960	Storm Pe Summer Winter Winter Winter Winter Winter	ariod         Char           30         +           30         +           30         +           30         +           30         +           30         +           30         +           30         +           30         +           30         +	40% 40% 10 40% 3 40% 40% 3	00/360 30/360 30/15 30/120	Summer Summer Summer Summer	Flood	Ove	flow	6.939 6.677 6.677 6.676 6.675 6.674
PN         I           1.000         .001           1.002         .003           1.004         .005	Name         S           S.30         15           S.31         960           S.32         960           S.33         960           S.34         960           TANK         960           S.35         240	Storm Pe	ariod         Char           30         +           30         +           30         +           30         +           30         +           30         +           30         +           30         +           30         +           30         +           30         +	40% 40% 10 40% 3 40% 3 40% 3 40% 3	00/360 30/360 30/15 30/120	Summer Summer Summer Summer			flow	6.939 6.677 6.677
PN         I           1.000         .001           1.002         .003           1.004         .005	Name \$ 5.30 15 5.31 960 5.32 960 5.33 960 5.34 960 TANK 960 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 240 \$ 5.35 2	Storm Pe Summer Winter Winter Winter Winter Winter	30 + 30 + 30 + 30 + 30 + 30 + 30 + 30 +	40% 40% 10 40% 3 40% 40% 3 40% 40%	00/360 30/360 30/15 30/120 30/60	Summer Summer Summer Summer Hal	f Drain	Pipe	flow	6.939 6.677 6.677 6.676 6.675 6.675 5.835
PN         I           1.000         .001           1.002         .003           1.004         .005	Name         S           S.30         15           S.31         960           S.32         960           S.33         960           S.34         960           TANK         960           S.35         240	Storm Pe	ariod         Char           30         +           30         +           30         +           30         +           30         +           30         +           30         +           30         +           30         +           30         +           30         +           Volume         I	40% 40% 10 40% 3 40% 3 40% 40% 40% Flow /	00/360 30/360 30/15 30/120 30/60	Summer Summer Summer Summer Hal		Pipe Flow	flow .	6.939 6.677 6.677 6.676 6.675 6.674
PN         I           1.000         1.001           1.002         1.003           1.004         1.005           1.006         1.006	Name \$ 5.30 15 5.31 960 5.32 960 5.33 960 5.34 960 TANK 960 5.35 240 US/MH Name	Storm Pe Summer Winter Winter Winter Winter Winter Surcharged Depth	30 + 30 + 30 + 30 + 30 + 30 + 30 + 30 +	40% 40% 10 40% 3 40% 40% 3 40% 40%	00/360 30/360 30/15 30/120 30/60 30/60 Overfl (1/s	Summer Summer Summer Summer Hal	f Drain Time	Pipe	Status	6.939 6.677 6.677 6.676 6.675 6.674 5.835

Furness Partnership		Page 8
20 Britton Street	PLAYGROUND EXTENSION	
London	MILLOM SCHOOL	
EC1M 5TX	MILLOM	Micro
Date 11/08/2023	Designed by MH	Dcainago
File PLAYGROUND NETWORK.MDX	Checked by CJH	Diamage
Micro Drainage	Network 2020.1.3	

 $\frac{\rm 30 \ year \ Return \ Period \ Summary \ of \ Critical \ Results \ by \ Maximum \ Level \ (Rank \ 1)}{\rm for \ Storm}$ 

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (1/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.001	s.31	-0.103	0.000	0.04			3.2	OK	
1.002	s.32	0.097	0.000	0.06			7.7	SURCHARGED	
1.003	s.33	0.293	0.000	0.09			9.4	SURCHARGED	
1.004	s.34	0.335	0.000	0.07			9.2	SURCHARGED	
1.005	TANK	0.449	0.000	0.02		964	1.7	SURCHARGED	
1.006	s.35	-0.084	0.000	0.06			1.7	OK	

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		-0.042	0.000	0.0						K
PN	S US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow , Cap.	/ Overf (1/:	low	f Drain Time mins)	Pipe Flow (l/s)	Status	Level Exceeded
	S	Surcharged	Flooded			Hal	f Drain	Pipe		
1.006	s.35 960	Winter	100	+40%						5.836
	S.34 960 TANK 960			+40% +40%		Summer Summer				6.955 6.954
	S.33 960			+40%		Summer				6.955 6.955
	s.31 960 s.32 960			+40% 1		Summer				6.957
1.000 1.001	s.30 960 s.31 960			+40% +40% 1	00/360	Summer				6.958 6.957
			eriod Cha	-	Surch	arge	Flood	u Over	flow A	Act. (m)
	JS/MH		eturn Cli		First				t (Z) Ove	
		Period(s) Climate Ch	-						1, 30, 40, 40	
				±0 <b>,</b> 0	.,,	120 <b>,</b> 10	210,		), 1440,	2160
	г	Pr Duration(s	ofile(s) ) (mins)	15 २	0.60	120 19	0. 240		er and Wi	
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		Hot S Hot Start	tart (mir Level (n			MADD			ha Stora effiecie	
	A	real Reduc		or 1.0	000 A	ddition	al Flow			
				C	lation	Criteri	2			
					for St	orm				
100 yea	ar Retur	n Period	d Summar	y of	Criti	cal Re	sults k	oy Maxi	.mum Lev	vel (Rank 1)
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ondon	ion Stre	el				SCHOOI	TENSIC	/11		

Furness Partnership		Page 10
20 Britton Street	PLAYGROUND EXTENSION	
London	MILLOM SCHOOL	
EC1M 5TX	MILLOM	Micro
Date 11/08/2023	Designed by MH	Dcainago
File PLAYGROUND NETWORK.MDX	Checked by CJH	Diamage
Micro Drainage	Network 2020.1.3	

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

PN	US/MH Name	Surcharged Depth (m)		Flow / Cap.	Overflow (1/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.001	s.31	0.177	0.000	0.06			4.1	SURCHARGED	
1.002	s.32	0.377	0.000	0.07			9.4	SURCHARGED	
1.003	s.33	0.572	0.000	0.12			11.7	SURCHARGED	
1.004	s.34	0.615	0.000	0.09			11.6	SURCHARGED	
1.005	TANK	0.729	0.000	0.02		1156	1.8	SURCHARGED	
1.006	S.35	-0.083	0.000	0.07			1.8	OK	

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# **APPENDIX F – SuDS MAINTENANCE SCHEDULE**

## FURNESS PARTNERSHIP

**Consulting Structural and Civil Engineers** 

Project Title:	Millom Leisure Centre Development			
Furness Ref:	L2762	Date:	11.08.23	

## Proposed SuDS Maintenance Schedule

The following maintenance schedule has been produced in line with CIRIA C753 'The SuDS Manual' recommendations for the Millom Leisure Centre Development. Prior to the completion of the development, ownership & maintenance responsibility for the site drainage network should be clearly defined and agreed between the client, operator, & maintenance contractor/local authority.

## Party Responsible for Implementing Maintenance Schedule: <u>Cumberland Council</u> Refer to following drawings for details: <u>L2762-FUR-XX-XX-DR-D-0921, 0922, 0923, 0931, 0932</u>

Maintenance Schedule	Action	Frequency
Degular Maintananaa	Cleaning of gutters and filters on downpipes and brushing/sweeping of leaves debris that may cause blockages in gullies.	Annually
Regular Maintenance	Inspect for sediment and debris in pre-treatment components (i.e., catchpits and gully silt traps), and inside manhole rings.	Annually (or as required)
Occasional Maintenance	Remove sediment/debris from pre-treatment components (i.e., catchpits).	As required, based on regular inspections
	Trimming of roots that may be causing blockages and patch repair of pipework that has cracked or deformed.	As required
Remedial Actions	Repair/rehabilitate manhole and gully inlets & outlets.	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in 1 <sup>st</sup> year, then annually
	Check to ensure gullies and manholes are emptying fully.	Annually

## Table 1 – Pipe, Manhole & Gully Maintenance Schedule

# Table 2 – Cellular Attenuation/Soakaway Tank Maintenance Schedule – Tank supplier should be contacted once confirmed for product specific maintenance requirements

Maintenance Schedule	Action	Frequency
	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then annually.
Regular Maintenance	Remove debris from the catchment surface (where it may cause risks to performance [i.e., leaves]).	Monthly (or as required)
	Remove sediment from pre-treatment structures (i.e., catchpits)	Annually (or as required)
Remedial Actions	Repair/rehabilitate inlets, outlets and vents. As required	
Monitoring	Inspect/check all inlets, outlets and vents to ensure that they are in good condition and operating as designed.	Annually
	Survey inside of tank for sediment build-up and remove if necessary.	Every 5 years (or as required)



London Bradford

Table 3 - Oil Separator Maintenance Schedule - Oil Separator supplier should be contacted once confirmed for product specific maintenan	се
requirements	

Maintenance Schedule	Action	Frequency
	Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
Routine Maintenance	Remove sediment, oil, grease and floating debris.	As necessary - indicated by system inspections or immediately following significant spill
Remedial Actions	Replace malfunctioning parts or structures.	As required
	Inspect for evidence of poor operation.	Six monthly
Monitoring	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every six months



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