

DRAINAGE CONDITION REPORT

for

**Manchester University
NHS Foundation Trust**

at

**Crumpsall Vale Car Park
North Manchester General Hospital
Delaunays Road, Manchester, M8 5RB**

Quality Management

Job No	13788		
Project	Crumpsall Vale Car Park		
Location	North Manchester General Hospital, Delaunays Road, Manchester, M8 5RB		
Title	Drainage Condition Report		
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Revision History

Rev	Date	Issue / Purpose/ Comment	Prepared	Checked
01	20.07.23	Final Issue	AJ	DG

Contents

1	Introduction	3
2	Drainage Strategy	4
2.1	Existing Drainage	4
2.2	Existing Runoff Rates	4
2.3	Geotechnical Assessment	4
2.4	SuDS Hierarchal Approach.....	5
2.5	Surface Water Drainage Strategy	5
3	Drainage Related Planning Condition and Responses	6
3.1	Planning Conditions.....	6

Appendix A – Marston & Grundy Drawings

Appendix B – Hydraulic Calculations

1 Introduction

In February 2023 a planning application was submitted to Manchester City Council for the Creation of parking area including widening of the existing service road and improved provisions of pathways North Manchester General Hospital, Delaunays Road, Manchester, M8 5RB.

Planning approval was granted in April 2023 (Ref: 135552/FO/2022) subject to a number of planning conditions, including a condition relating to the drainage of the development.

This report has been prepared to remove this drainage related planning condition (No. 3).

Curtins Consulting Engineering prepared a drainage technical note to support the planning application. Due to the limited option, this strategy proposed a 5l/s discharge to the adjacent combined sewer passing through the hospital site.

2 Drainage Strategy

2.1 Existing Drainage

The United Utilities sewer records have been reviewed and confirms there is a 1100x700mm brick egg combined sewer flowing south along the western boundary of the wider hospital site.

There are no surface waters in close proximity.

A CCTV has been undertaken of the drainage serving the adjacent development buildings and existing access road. This identified a number of surface water drains that pass through a small attenuation pond and flow control before outfalling to the UU combined sewer on the boundary via a large network of private drainage.

2.2 Existing Runoff Rates

Figure 2 below identifies the existing peak discharge rates discharging from the site for the respective storm events.

Proposed Impermeable Area (m²)	1yr	30yr	100yr
1500	0.1l/s	0.2l/s	0.2l/s

Figure 2: Existing Greenfield Runoff Rates

2.3 Geotechnical Assessment

A review of the BGS dataset would indicate the superficial deposits to encompass Glacial Till, Silts and clays.

Furthermore the area of the car park was historically used as a pit to which Japanese knotweed was placed.

In light of these findings, infiltration as a means of draining the site has been discounted.

2.4 SuDS Hierarchal Approach

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

Method	Suitability	Suitability for Development
Infiltration to Ground	No	Investigation of local ground conditions has confirmed that the underlying ground is unsuitable for infiltration.
Connection to Watercourse	No	No watercourse in close proximity.
Connection to Surface Water Sewer	No	No surface water sewer exists in close proximity.
Connection to Combined Water Sewer	Yes	Reuse existing connection to combined public sewer at restricted rates.

Figure 2: SuDS Hierarchal Approach

2.5 Surface Water Drainage Strategy

The general principal of the surface water drainage strategy is to collect the runoff from the new tarmac car parking area via a number of gullies that will pass into a new below ground surface water network. This new drainage network will then pass into a geocellular tank before outfalling to a GRP package pump station that will pump the flows to the existing surface water drainage network at a peak rate of 5.0l/s. In turn this then outfalls to the combined public sewer.

A detailed drainage GA drawing can be found in Appendix A with detailed hydraulic calculations in Appendix B.

3 Drainage Related Planning Condition and Responses

3.1 Planning Conditions

The specific drainage related planning condition is written below in italic with the M&G response in Blue beneath

Condition 3

No above ground development shall take place until surface water drainage works have been implemented in accordance with Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015) or any subsequent replacements national standards and details that have been submitted to and approved in writing by the Local Planning Authority.

In order to avoid/discharge the above drainage condition the following additional information has to be provided:

- *A finalised drainage layout showing all components, outfalls, levels and connectivity;*

Refer to the drainage GA in Appendix A.

- *Maximised integration of green SuDS components (utilising infiltration or attenuation) if practicable;*

Green SuDS are not possible on this scheme due to the steep grades and underlying Japanese knotweed that cannot be moved.

- *Details of surface water attenuation that offers a reduction in surface water runoff rate in line with the Manchester Trafford and Salford Strategic Flood Risk Assessment, i.e. at least a 50% reduction in runoff rate compared to the existing rates with the aim of reducing to the Greenfield runoff rates, as the site is located within Conurbation Core Critical Drainage Area;*

A maximum pump rate of 5l/s is proposed to achieve the minimum pumping velocities.

- *An existing and proposed impermeable areas drawing to accompany all discharge rate calculations;*

Site is currently greenfield and so no existing impermeable areas.

- *Runoff volume in the 1 in 100-year, 6 hours rainfall shall be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but never to exceed the runoff volume from the development site prior to redevelopment;*

Site is greenfield. Volume will increase as site not fully impermeable.

- *Evidence that the drainage system has been designed (unless an area is designated to hold and/or convey water as part of the design) so that flooding does not occur during a 1 in 100-year rainfall event with allowance for 45% climate change;*

Small exceedance flooding held on surface of new car park at low lying point, located away from the buildings.

- *Assessment of overland flow routes for extreme events. Overland flow routes need to be designed to convey the flood water in a safe manner in the event of a blockage or exceedance of the proposed drainage system capacity including inlet structures. A layout with overland flow routes needs to be presented with appreciation of these overland flow routes with regards to the properties on site and adjacent properties off site;*

Car park levels all fall away from the existing buildings. Any exceedance or overland flooding would pass onto the adjacent unmade land.

- *Where surface water is connected to the public sewer, agreement in principle from United Utilities is required that there is adequate spare capacity in the existing system taking future development requirements into account. An email of acceptance of proposed flows and/or new connection will suffice;*

UU have confirmed acceptance of a peak rate of 5l/s.

- *Where a public sewer diversion is required, an agreement in principle from United Utilities is required. An email of acceptance will suffice;*

No UU sewer diversion is required.

- *For sites where proposed development would cause pollution risk to surface water, evidence of pollution control measures (preferably through SuDS) is required;*

A petrol interceptor is proposed.

- *Hydraulic calculations of the proposed drainage system;*

Refer to Appendix B for details of the hydraulic calculations.

- *Construction details of flow control and SuDS elements.*

Refer to Appendix A for flow control and SuDS details.

Reason - To promote sustainable development, secure proper drainage and to manage the risk of flooding and pollution, pursuant to policies EN8 and EN14 of the Manchester Core Strategy and National Planning Policy Framework (NPPF).

Appendix A – Marston & Grundy Drawings

OUTLINE PUMP CHAMBER SPECIFICATION

No. OF PUMPS	2 (DUTY/STANDBY)
PUMP TYPE	TBC BY SUPPLIER
LIQUID HANDLED	SURFACE WATER
PUMP CAPACITY	3 LITRES PER SECOND (MIN)
TOTAL DESIGN HEAD	5m
RIISING MAIN LENGTH	58m
IMPELLER DESIGN	VORTEX (TBC BY SUPPLIER)
MOTOR RATING	3.0KW (EXPLOSION PROOF)
ELECTRICITY SUPPLY	400V, 50Hz, 3 PHASE (METER & ELECTRICITY SUPPLY BY OTHERS)
FULL CURRENT LOAD A	7.3 AMPS
STARTING METHOD	DIRECT ON LINE
LEVEL CONTROLS	FLOAT SWITCHES (INTRINSICALLY SAFE)
TELEMETRY UNIT	SUPPLIED BY PUMP SUPPLIER (WITH MOBILE SYSTEM LINKED TO AGREED MAINTENANCE CONTRACTOR)
COVER LEVEL	60.25m AOD
LOWEST INCOMING LEVEL	58.85m AOD
SUMP LEVEL	58.25m AOD (TBC BY SUPPLIER)
CHAMBER SIZE	GRP CHAMBER, SIZED BY SUPPLIER
CHAMBER DEPTH	2.00m (Min)
COVER AND FRAME	LOCKING GALVANISED MILD STEEL ACCESS COVER 5t WHEEL LOAD. GRP, FLOOR FIXED. (CONCRETE PLINTH/ DUCTS BY OTHERS)
KIOSK	STANDARD SPECIFICATION, PLUS VOLT FREE CONTACTS FOR HIGH SUMP LEVEL ALARMS AND PUMP 1 & 2 FAILED CONDITION. A SEPARATE EARTH SPIKE TO BE INSTALLED. GENERATOR SOCKET. 10m OF CABLEING IS INCLUDED, KIOSK TO BE WITHIN 5m HORIZONTAL DISTANCE FROM PUMPING CHAMBER.
CABLEING	

UNABLE TO SURVEY WITHOUT
EXTENSIVE SITE CLEARANCE
DUE TO DENSE VEGETATION

Vent to be located within
landscaped area. Indicative
location shown and subject to
final location by tank supplier.

Geocellular Storage Tank sized at
10mx5x0.8m high (40m3). Wrapped
in impermeable membrane and
designed by manufacturer to suit
ground conditions and loadings.
CL: 60.500
I.L: 58.900
Min depth of cover = 0.8m.

Surface Water GRP Package
Pumping Station with duty /
standby pumps, rated at 5/s.
Kiosk alarmed and vented.
CL: 60.250
I.L: 58.250
1500Ø

UNABLE TO SURVEY WITHOUT
EXTENSIVE SITE CLEARANCE
DUE TO DENSE VEGETATION

Rising main to connect to
existing system. Pipe size
and design by specialist.

NSB2 by pass petrol interceptor
with vent, alarm and telemetry
unit (with mobile system linked to
agreed maintenance contractor)
Impermeable area - 0.145Ha.

Rising main to connect to
existing system. I.L. T.B.C
to allow for final design.

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individual consultant's drawings for exact setting out, size and type of
component.

LEGEND

- EXISTING SW DRAINAGE
- PROPOSED SW DRAINAGE (150Ø U.N.O.)
- PROPOSED RISING MAIN ROUTE.
DESIGN BY SPECIALIST.
- PROPOSED ROAD GULLY.
- OVERLAND FLOOD FLOWS

P1	ISSUED FOR APPROVAL	AMT	21.07.23	DAG
Rev	Description	By	Date	CHK'd

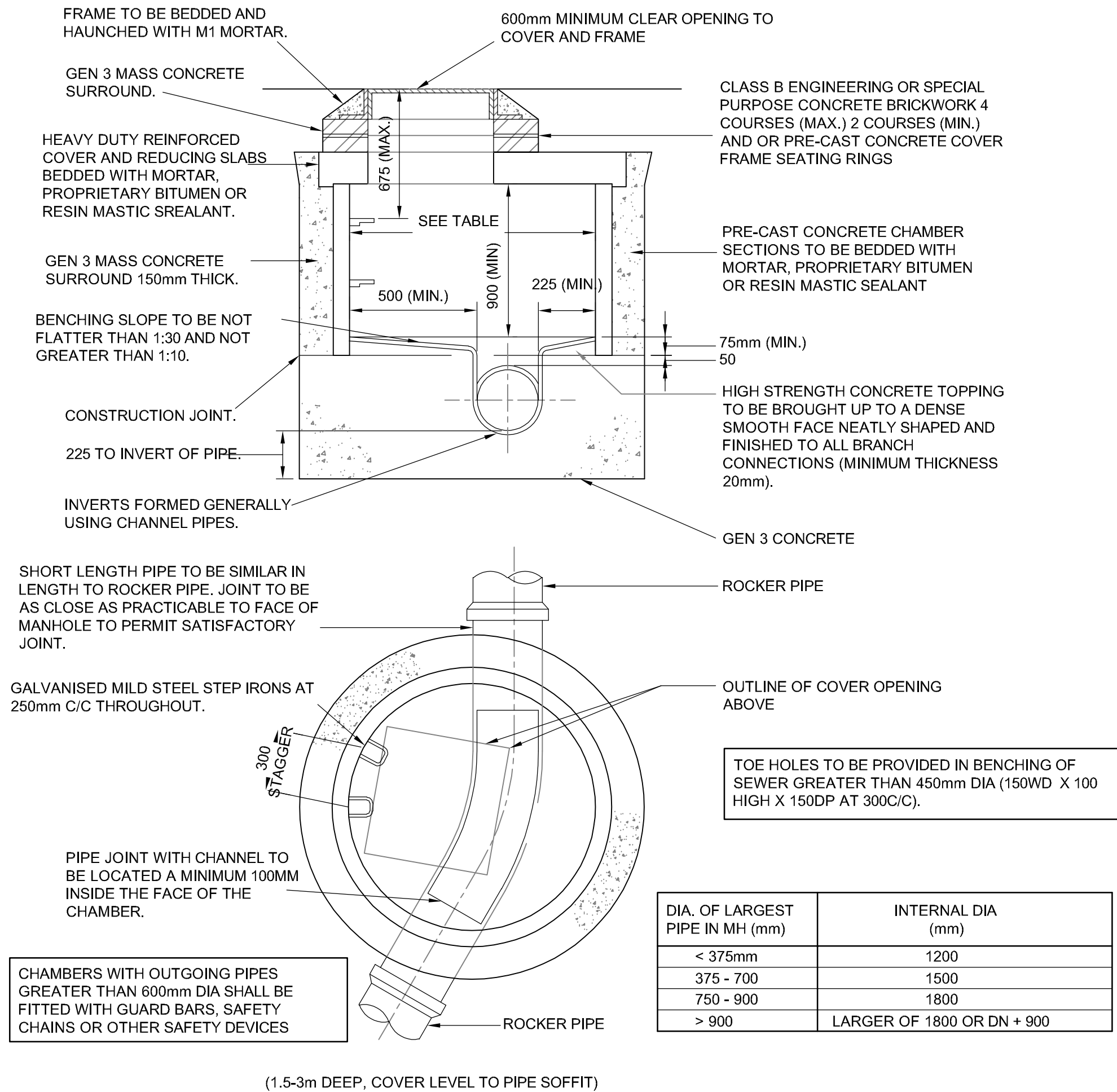
Marston & Grundy LLP
Consulting Engineers
Priory House, Ellesmere Ave
Marple, Stockport, Cheshire, SK6 7AN
Telephone: 0161 427 7231
Email: mail@marstonandgrundy.com

Client
**MANCHESTER UNIVERSITY
NHS FOUNDATION TRUST**

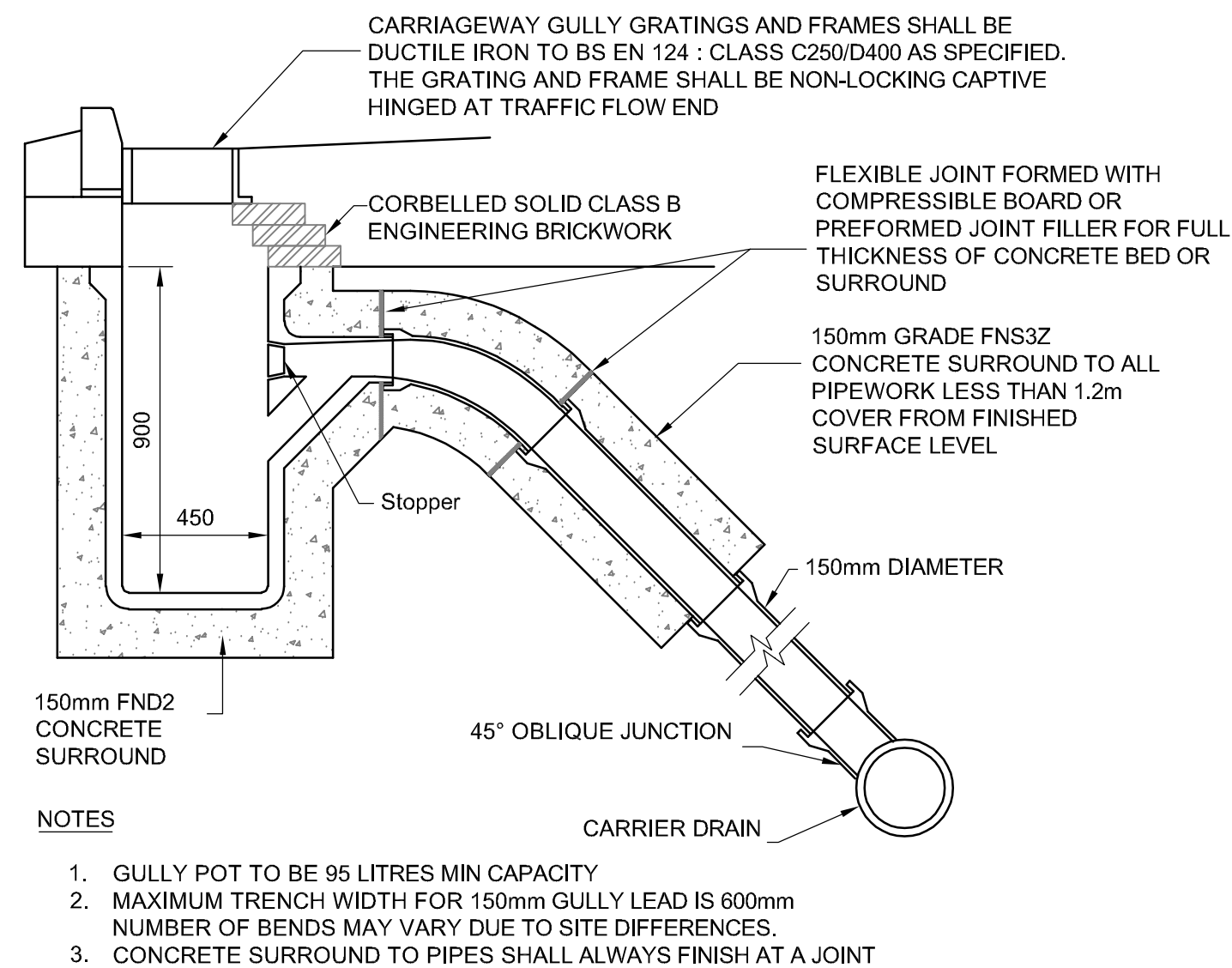
Project
**CRUMPSALL VALE, NMGH
PROPOSED CAR PARK**

Drawing
PROPOSED DRAINAGE PLAN

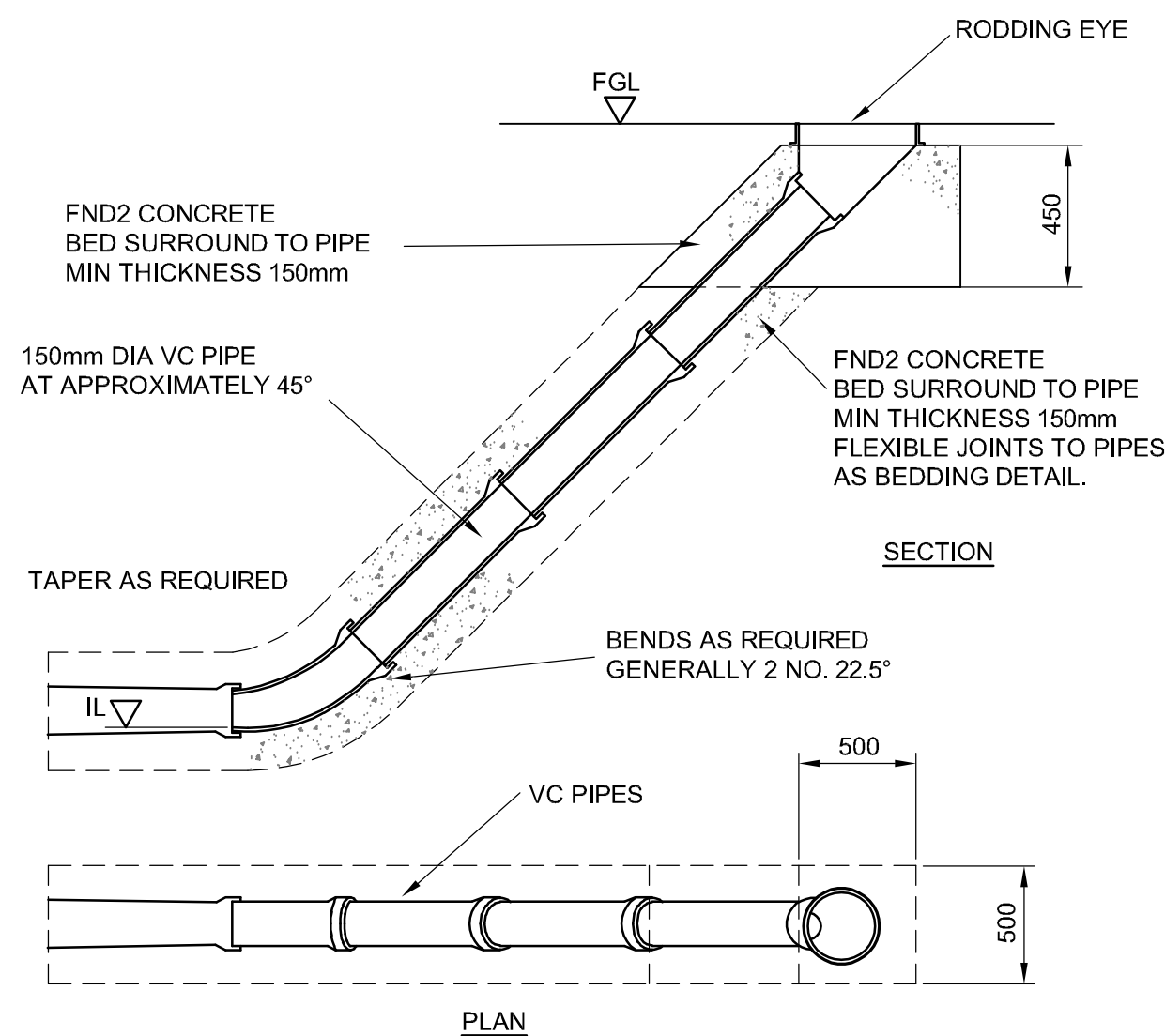
Purpose of Issue	Approval	Status	S4
Scale @ A1	1:125	Date	June '23
Drawn	AMT	Checked	DAG
Project No.	13788	Drawing No.	005
Revision			P1



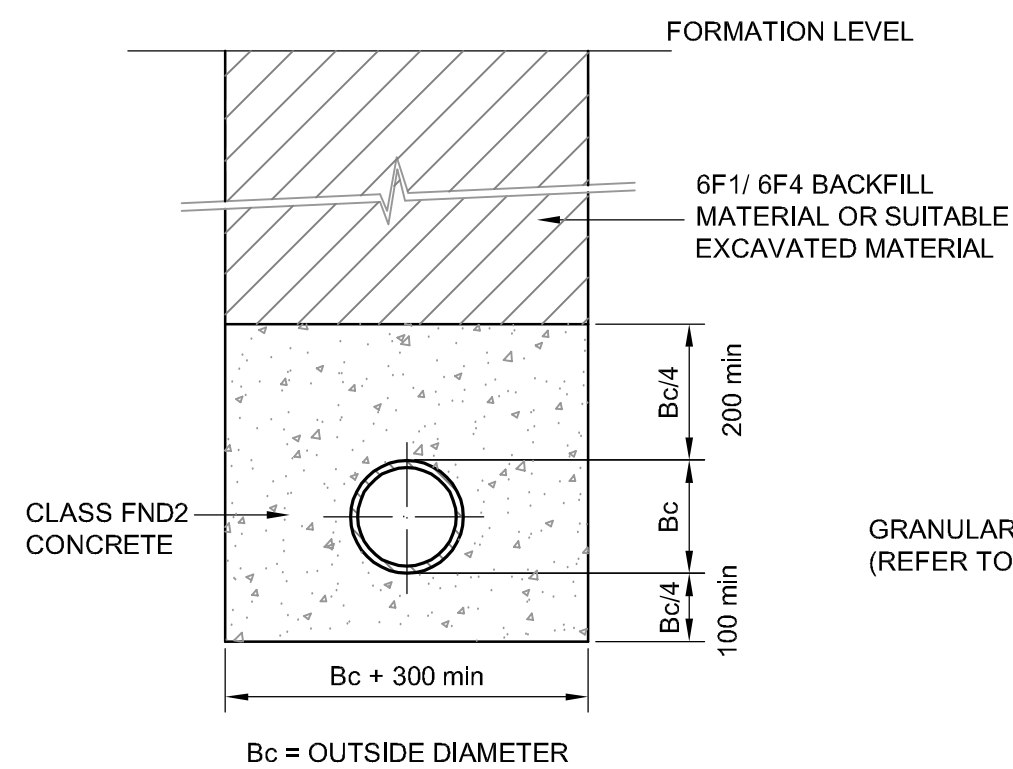
TYPICAL MANHOLE



GULLY DETAIL WITH CONNECTION TO CARRIER DRAIN

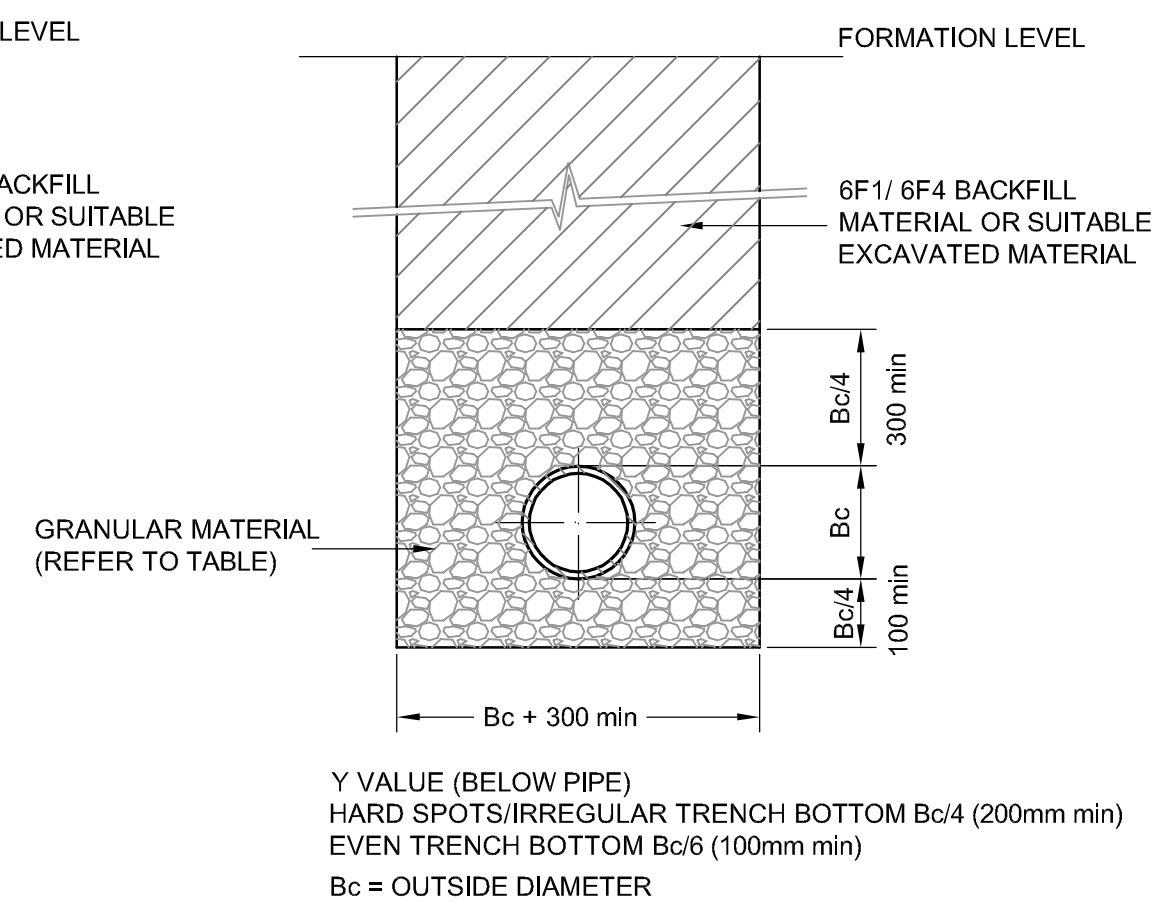


RODDING EYE



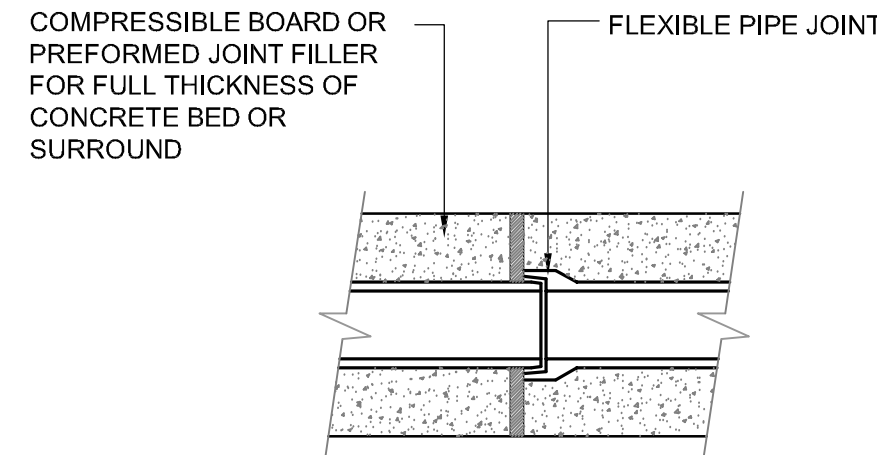
CLASS Z BEDDING DETAIL

Bc = OUTSIDE DIAMETER



CLASS S BEDDING DETAIL

NB- WHERE DRAINAGE IS IN CLOSE PROXIMITY TO EXISTING OR PROPOSED LANDSCAPE PLANTING, THE GRANULAR BED AND SURROUND SHALL BE WRAPPED WITH A DOUBLE THICKNESS OF LOTRAK 1800 OR SIMILAR APPROVED.



JOINTS FOR CONCRETE SURROUND TO PIPES

(TO OCCUR AT EACH PIPE JOINT)

Pipe Ø	Joint thickness
< 450	18mm
450-1200	36mm
1200 >	54mm

COMPRESSIBLE FILLER TABLE

(BITUMEN IMPREGNATED INSULATING BOARD TO BS 1142: PART 3)

TRENCH WIDTHS	
PIPE I.D	OVERALL TRENCH WIDTH
100	550
150	600
225	700
300	850
375	1050
450	1150
525	1200
600	1350
675	1450
750	1500
825	1600
900	1900
1050	2100
1200	2300
1350	2500
1500	2700
1800	3100

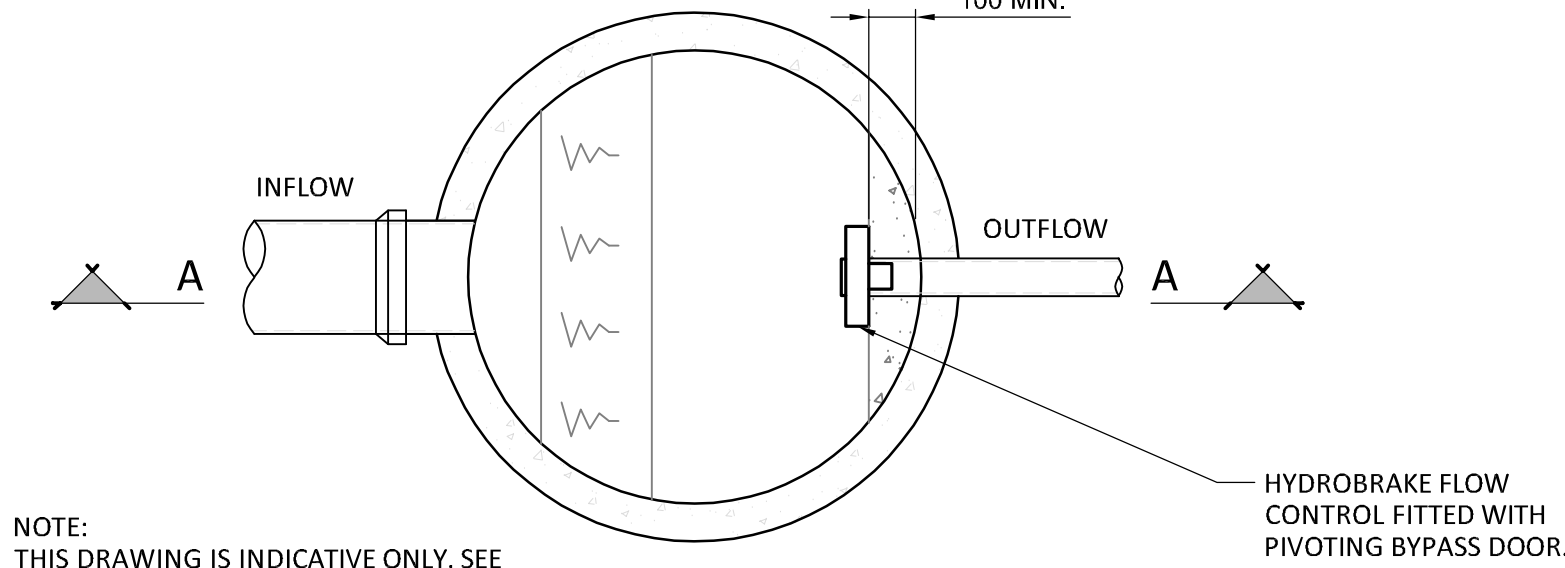
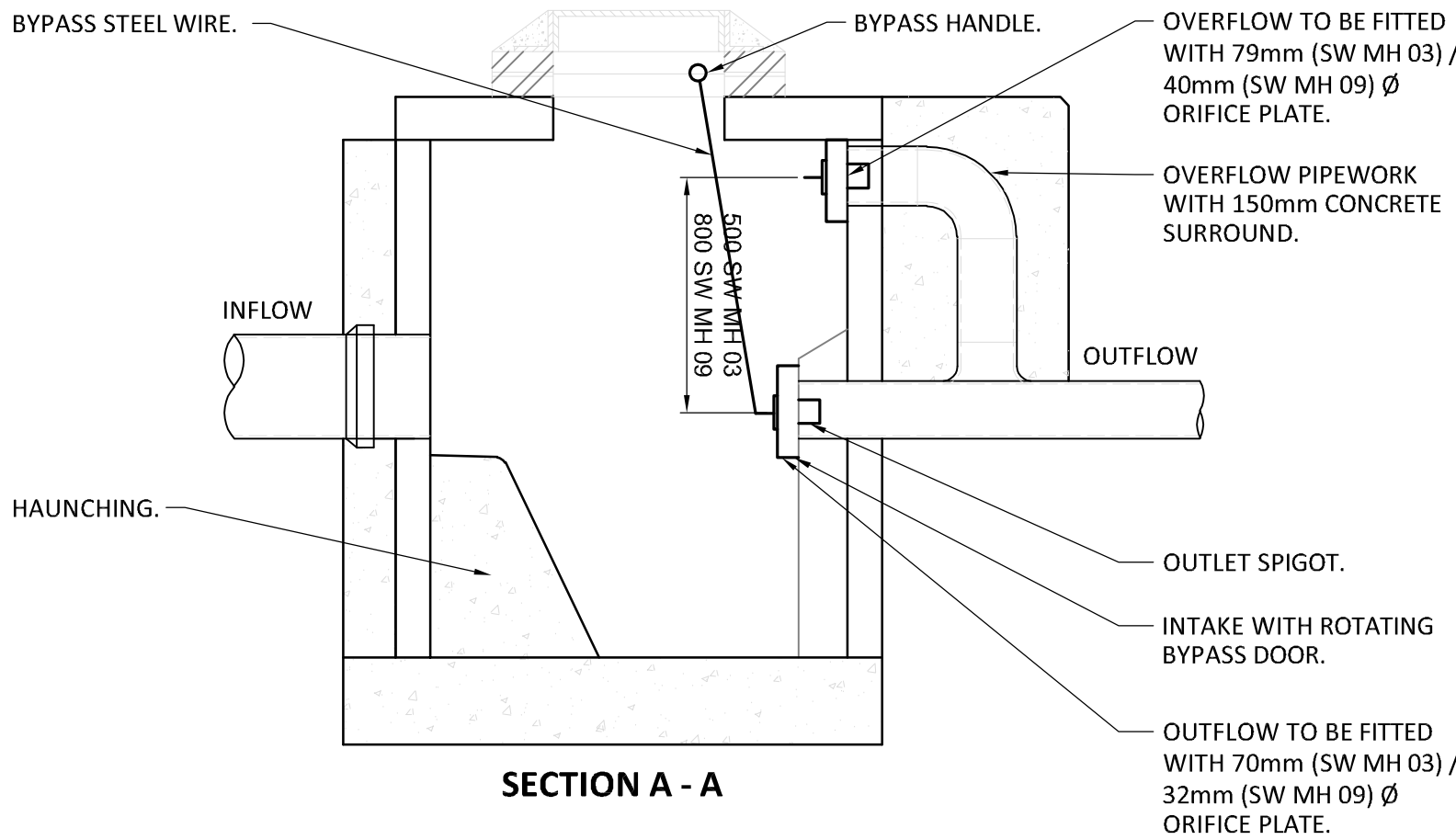
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P1	ISSUED FOR APPROVAL		AMT	21.07.23	DAG
Rev	Description		By	Date	CHK'd
Marston & Grundy LLP Consulting Engineers Priory House, Ellesmere Ave Marple, Stockport, Cheshire, SK6 7AN Telephone: 0161 427 7231 Email: mail@marstonandgrundy.com					
Client MANCHESTER UNIVERSITY NHS FOUNDATION TRUST					
Project CRUMPSALL VALE, NMGH PROPOSED CAR PARK					
Drawing DRAINAGE DETAILS SHEET 1					
Purpose of Issue APPROVAL				Status S4	
Scale @ A1 1:20		Date July '23	Drawn AMT	Checked DAG	
Project No. 13788			Drawing No. 006		Revision P1

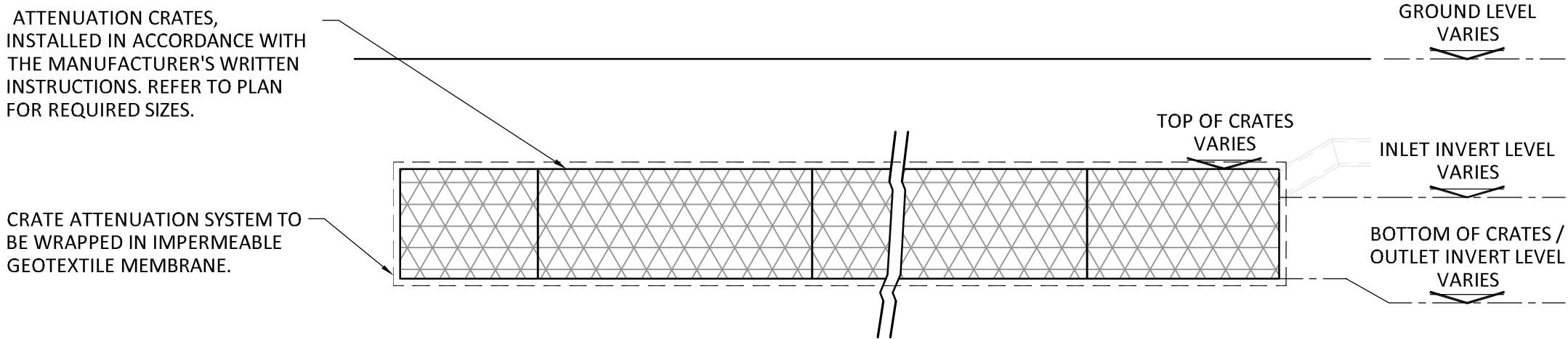


NOTE:
THIS DRAWING IS INDICATIVE ONLY. SEE
MANUFACTURER'S DRAWINGS AND
SPECIFICATION FOR CONSTRUCTION DETAILS.

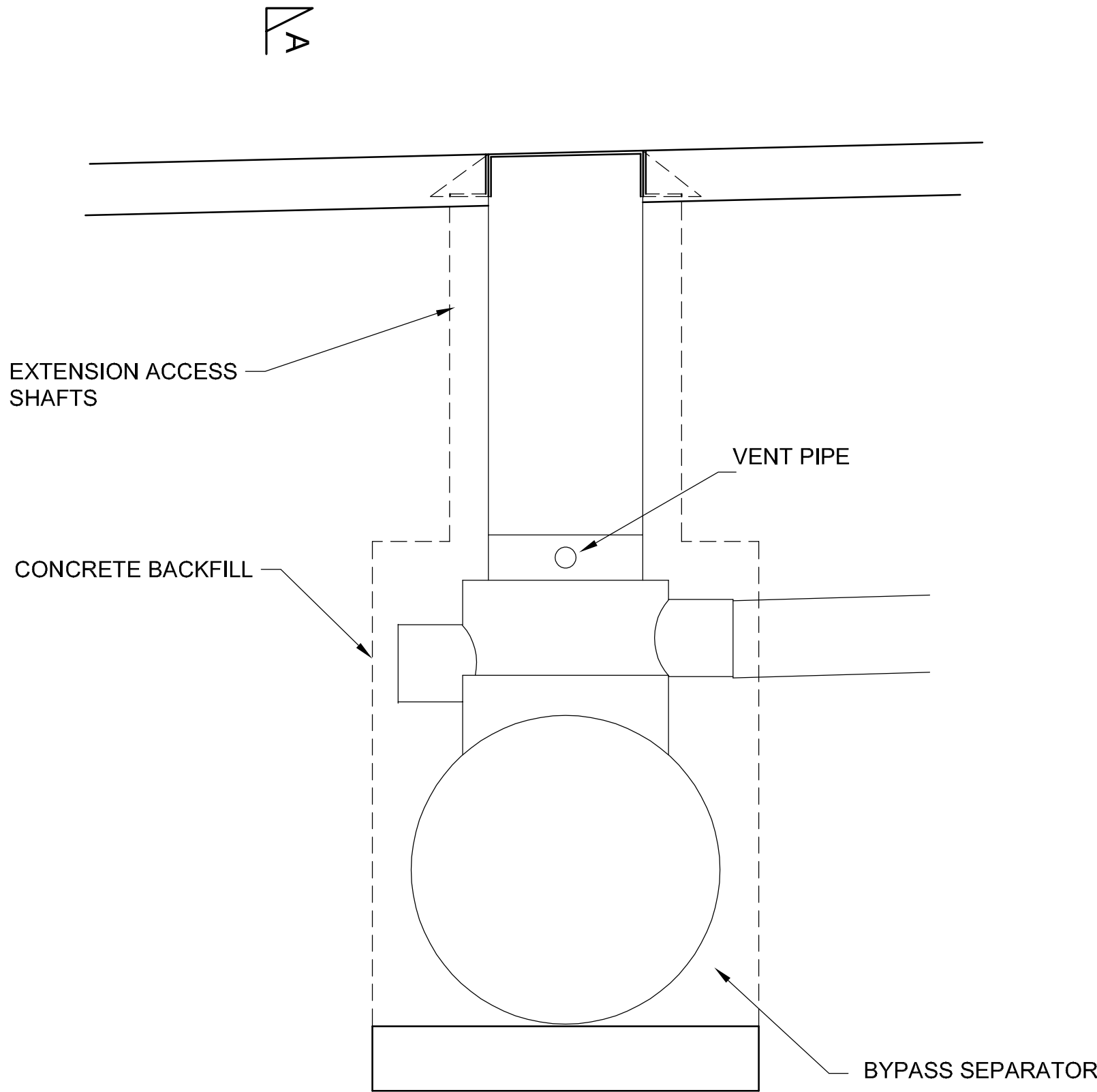
TYPICAL VORTEX CONTROL CHAMBER DETAIL
SCALE 1:20

OPERATION AND MAINTENANCE REQUIREMENTS FOR ATTENUATION STORAGE TANKS

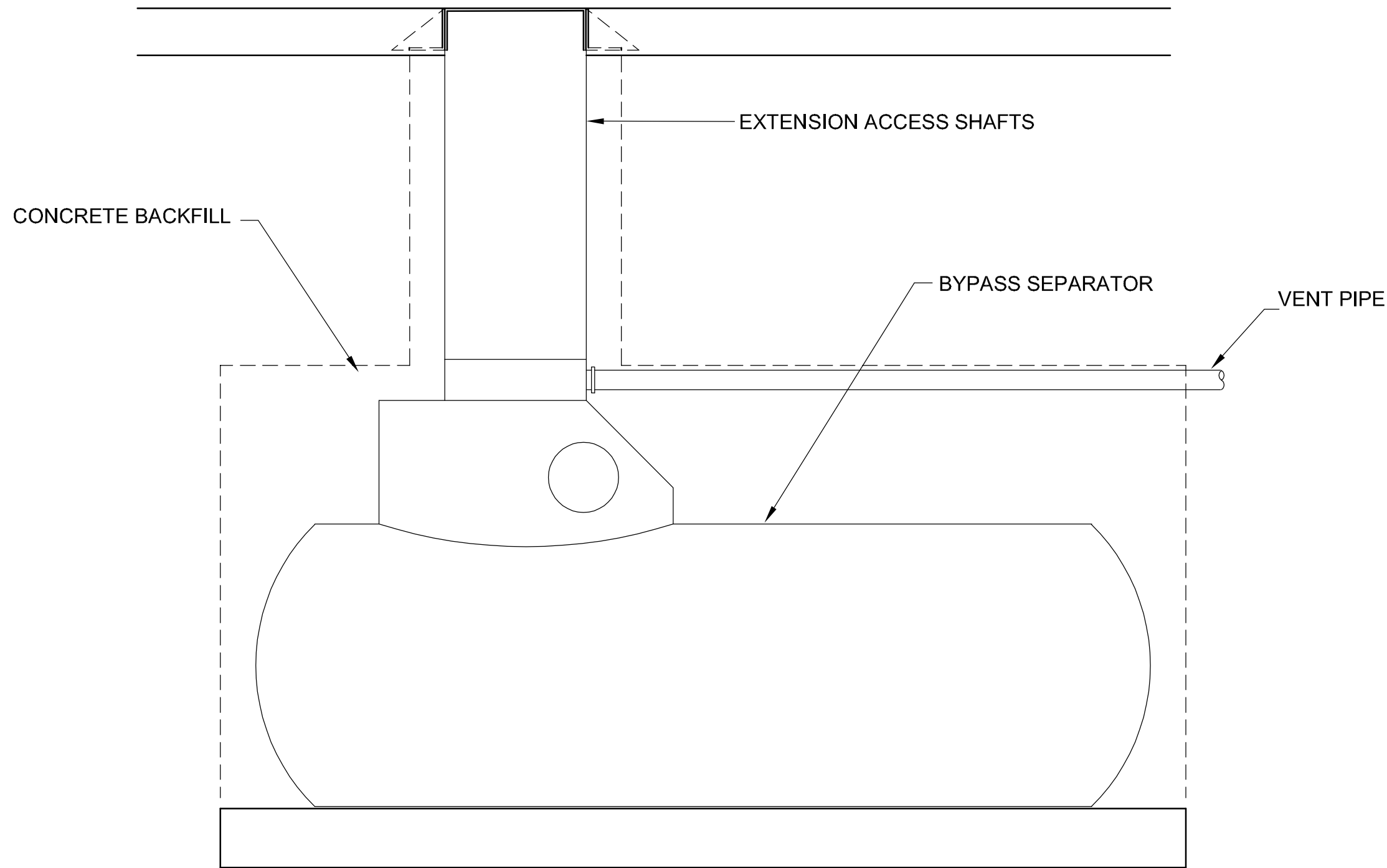
MAINTENANCE SCHEDULE	REQUIRED ACTION	TYPICAL FREQUENCY
REGULAR MAINTENANCE	INSPECT AND IDENTIFY ANY AREAS THAT ARE NOT OPERATING CORRECTLY. IF REQUIRED, TAKE REMEDIAL ACTION.	MONTHLY FOR 3 MONTHS, THEN ANNUALLY
	REMOVE DEBRIS FROM THE CATCHMENT SURFACE (WHERE IT MAY CAUSE RISKS TO PERFORMANCE.)	MONTHLY
	FOR SYSTEMS WHERE RAINFALL INFILTRATES INTO THE TANK FROM ABOVE, CHECK SURFACE OF FILTER FOR BLOCKAGE BY SEDIMENT, ALGAE OR OTHER MATTER: REMOVE AND REPLACE SURFACE INFILTRATION MEDIUM AS NECESSARY.	ANNUALLY
	REMOVE SEDIMENT FROM PRE-TREATMENT STRUCTURES AND/OR INTERNAL FOREBAYS.	ANNUALLY OR AS REQUIRED
REMEDIAL ACTIONS	REPAIR/REHABILITATE INLETS, OUTLET, OVERFLOWS AND VENTS.	AS REQUIRED
MONITORING	INSPECT/CHECK ALL INLETS, OUTLETS, VENTS AND OVERFLOWS 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



TYPICAL ATTENUATION DETAIL
SCALE 1:20



DETAIL OF FUEL INTERCEPTOR
(SCALE 1:25)



SECTION A-A
(SCALE 1:25)

INSTALLATION NOTES

- EXCAVATE TO TANK DIMENSIONS ALLOWING A MINIMUM CLEARANCE OF 150 BETWEEN THE TANK AND THE SIDES OF THE EXCAVATION. DEPTH OF EXCAVATION WILL BE DETERMINED BY INLET/OUTLET INVERTS AND A MINIMUM 230 THK. BASE SLAB.
- CAST 230 MINIMUM BASE SLAB.
- PLACE TANK ONTO CONCRETE BASE BEFORE CONCRETE SETS. (INLET PIPE IS THE HIGHEST PIPE) CONNECT & SEAL PIPE WORK TO THE TANK ENSURING CORRECT FALLS TO EACH PIPE.
- BACKFILL AROUND TANK WITH CONCRETE, FILL INTERCEPTOR WITH CLEAN WATER VIA THE TANK TURRET ENSURING EQUAL WATER/CONCRETE LEVELS.
- CAST CONCRETE IN LIFT HEIGHTS (RATE OF RISE) ENSURING THAT THE NETT LATERAL PRESSURE (P MAX) ON THE TANK IS LESS THAN 10 kN/m. NEVER INCREASE THE LIFT HEIGHT OR ACCELERATE THE RATE OF RISE OR ALLOW THE CONCRETE TO BE COMPACTED TO AN EXTENT WHICH WILL CAUSE THE TANK WALLS TO DISTORT.
- ACCESS EXTENSIONS SHALL BE SURROUNDED WITH CONCRETE POURED IN 400 LIFTS ALLOWING INITIAL SET BETWEEN EACH LIFT.

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Client MANCHESTER UNIVERSITY NHS FOUNDATION TRUST				
Project CRUMPSALL VALE, NMGH PROPOSED CAR PARK				
Drawing DRAINAGE DETAILS SHEET 2				
Purpose of Issue APPROVAL				Status S4
Scale @ A1 1:20	Date July '23	Drawn AMT	Checked DAG	
Project No. 13788	Drawing No. 007		Revision P1	

Appendix B – Hydraulic Calculations

		Page 1
	Crumpsall Car Park Surface Water Network V1 18.07.23	
Date 18/07/2023 File Crumpsall Vale Car Park...	Designed by paulg Checked by	
Innovyze	Network 2017.1.2	

		Page 3						
		Crumpsall Car Park Surface Water Network V1 18.07.23						
Date 18/07/2023 File Crumpsall Vale Car Park...	Designed by paulg Checked by							
Innovyze		Network 2017.1.2						
PIPELINE SCHEDULES for Storm								
Upstream Manhole								
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	150	SW01	60.955	59.805	1.000	Open Manhole	1200
2.000	o	150	SW02	60.400	59.250	1.000	Open Manhole	1200
1.001	o	150	SW03	60.800	59.150	1.500	Open Manhole	1200
1.002	o	150	TANK	60.500	58.900	1.450	Open Manhole	100
1.003	o	225	PS	60.250	58.250	1.775	Open Manhole	1500
Downstream Manhole								
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	7.000	35.0	SW03	60.800	59.605	1.045	Open Manhole	1200
2.000	12.000	120.0	SW03	60.800	59.150	1.500	Open Manhole	1200
1.001	6.000	34.3	TANK	60.500	58.975	1.375	Open Manhole	100
1.002	13.000	130.0	PS	60.250	58.800	1.300	Open Manhole	1500
1.003	20.000	168.1	DRAINAGE	61.930	58.131	3.574	Open Manhole	0
Free Flowing Outfall Details for Storm								
Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)		
1.003	DRAINAGE	61.930	58.131	60.840	0	0		
Simulation Criteria for Storm								
Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow		0.000				
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage		2.000				
Hot Start (mins)	0	Inlet Coefficient		0.800				
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)		0.000				
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)		60				
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)		1				
Number of Input Hydrographs		0	Number of Storage Structures		1			
Number of Online Controls		1	Number of Time/Area Diagrams		0			
Number of Offline Controls		0	Number of Real Time Controls		0			
Synthetic Rainfall Details								
Rainfall Model		FSR	Region		England and Wales			
Return Period (years)		2	M5-60 (mm)		18.500			
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		Page 4
	Crumpsall Car Park Surface Water Network V1 18.07.23	
Date 18/07/2023 File Crumpsall Vale Car Park...	Designed by paulg Checked by	
Innovyze	Network 2017.1.2	
Synthetic Rainfall Details Ratio R 0.348Cv (Winter) 0.840 Profile Type Summer Storm Duration (mins) 30 Cv (Summer) 0.750		
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		Page 5
	Crumpsall Car Park Surface Water Network V1 18.07.23	
Date 18/07/2023 File Crumpsall Vale Car Park...	Designed by paulg Checked by	
Innovyze	Network 2017.1.2	

Online Controls for Storm

Pump Manhole: PS, DS/PN: 1.003, Volume (m³): 3.7

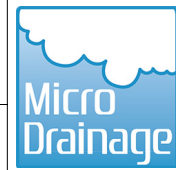
Invert Level (m) 58.725

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	5.0000	1.800	5.0000	3.400	5.0000	5.000	5.0000
0.400	5.0000	2.000	5.0000	3.600	5.0000	5.200	5.0000
0.600	5.0000	2.200	5.0000	3.800	5.0000	5.400	5.0000
0.800	5.0000	2.400	5.0000	4.000	5.0000	5.600	5.0000
1.000	5.0000	2.600	5.0000	4.200	5.0000	5.800	5.0000
1.200	5.0000	2.800	5.0000	4.400	5.0000	6.000	5.0000
1.400	5.0000	3.000	5.0000	4.600	5.0000		
1.600	5.0000	3.200	5.0000	4.800	5.0000		

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		Page 6																																																																																				
	Crumpsall Car Park Surface Water Network V1 18.07.23																																																																																					
Date 18/07/2023 File Crumpsall Vale Car Park...	Designed by paulg Checked by																																																																																					
Innovyze	Network 2017.1.2																																																																																					
Storage Structures for Storm Cellular Storage Manhole: TANK, DS/PN: 1.002 Invert Level (m) 58.900 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>60.0</td><td>60.0</td><td>5.200</td><td>0.0</td><td>84.8</td></tr><tr><td>0.400</td><td>60.0</td><td>72.4</td><td>5.600</td><td>0.0</td><td>84.8</td></tr><tr><td>0.800</td><td>60.0</td><td>84.8</td><td>6.000</td><td>0.0</td><td>84.8</td></tr><tr><td>0.801</td><td>0.0</td><td>84.8</td><td>6.400</td><td>0.0</td><td>84.8</td></tr><tr><td>1.600</td><td>0.0</td><td>84.8</td><td>6.800</td><td>0.0</td><td>84.8</td></tr><tr><td>2.000</td><td>0.0</td><td>84.8</td><td>7.200</td><td>0.0</td><td>84.8</td></tr><tr><td>2.400</td><td>0.0</td><td>84.8</td><td>7.600</td><td>0.0</td><td>84.8</td></tr><tr><td>2.800</td><td>0.0</td><td>84.8</td><td>8.000</td><td>0.0</td><td>84.8</td></tr><tr><td>3.200</td><td>0.0</td><td>84.8</td><td>8.400</td><td>0.0</td><td>84.8</td></tr><tr><td>3.600</td><td>0.0</td><td>84.8</td><td>8.800</td><td>0.0</td><td>84.8</td></tr><tr><td>4.000</td><td>0.0</td><td>84.8</td><td>9.200</td><td>0.0</td><td>84.8</td></tr><tr><td>4.400</td><td>0.0</td><td>84.8</td><td>9.600</td><td>0.0</td><td>84.8</td></tr><tr><td>4.800</td><td>0.0</td><td>84.8</td><td>10.000</td><td>0.0</td><td>84.8</td></tr></tbody></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	60.0	60.0	5.200	0.0	84.8	0.400	60.0	72.4	5.600	0.0	84.8	0.800	60.0	84.8	6.000	0.0	84.8	0.801	0.0	84.8	6.400	0.0	84.8	1.600	0.0	84.8	6.800	0.0	84.8	2.000	0.0	84.8	7.200	0.0	84.8	2.400	0.0	84.8	7.600	0.0	84.8	2.800	0.0	84.8	8.000	0.0	84.8	3.200	0.0	84.8	8.400	0.0	84.8	3.600	0.0	84.8	8.800	0.0	84.8	4.000	0.0	84.8	9.200	0.0	84.8	4.400	0.0	84.8	9.600	0.0	84.8	4.800	0.0	84.8	10.000	0.0	84.8
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)																																																																																	
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Crumpsall Car Park
Surface Water Network
V1 18.07.23



Date 18/07/2023
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.348
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.500	Cv (Winter)	0.840

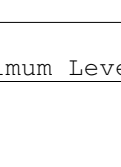
Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 45

PN	US/MH		Return Period	Climate Change	First (X)		First (Y)		First (Z)		Overflow Act.
	Name	Storm			Surcharge		Flood		Overflow		
1.000	SW01	15 Summer	1	+0%	100/15	Summer					
2.000	SW02	15 Summer	1	+0%	30/15	Summer	100/15	Summer			
1.001	SW03	15 Summer	1	+0%	30/15	Summer					
1.002	TANK	30 Winter	1	+0%	30/15	Summer					
1.003	PS	30 Winter	1	+0%	1/15	Summer	100/60	Winter			

PN	US/MH Name	Water	Surcharged	Flooded	Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)		
1.000	SW01	59.861	-0.094	0.000	0.30		7.6	OK
2.000	SW02	59.350	-0.050	0.000	0.78		11.4	OK
1.001	SW03	59.248	-0.052	0.000	0.75		19.1	OK
1.002	TANK	59.028	-0.022	0.000	0.58		8.3	OK
1.003	PS	59.008	0.533	0.000	0.14		5.0	SURCHARGED

		Crumpsall Car Park Surface Water Network V1 18.07.23		Page 8					
Date 18/07/2023		Designed by paulg							
File Crumpsall Vale Car Park...		Checked by							
Innovyze		Network 2017.1.2							
30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm									
Simulation Criteria									
Areal Reduction Factor		1.000	Additional Flow - % of Total Flow		0.000				
Hot Start (mins)		0	MADD Factor * 10m³/ha Storage		2.000				
Hot Start Level (mm)		0	Inlet Coefficient		0.800				
Manhole Headloss Coeff (Global)		0.500	Flow per Person per Day (l/per/day)		0.000				
Foul Sewage per hectare (l/s)		0.000							
Number of Input Hydrographs		0	Number of Storage Structures		1				
Number of Online Controls		1	Number of Time/Area Diagrams		0				
Number of Offline Controls		0	Number of Real Time Controls		0				
Synthetic Rainfall Details									
Rainfall Model		FSR	Ratio R		0.348				
Region England and Wales Cv (Summer)		0.750							
M5-60 (mm)		18.500	Cv (Winter)		0.840				
Margin for Flood Risk Warning (mm)		300.0							
Analysis Timestep		2.5 Second Increment (Extended)							
DTS Status		OFF							
DVD Status		ON							
Inertia Status		ON							
Profile(s)		Summer and Winter							
Duration(s) (mins)		15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440							
Return Period(s) (years)		1, 30, 100							
Climate Change (%)		0, 0, 45							
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	
1.000	SW01	15 Summer	30	+0%	100/15 Summer				
2.000	SW02	15 Winter	30	+0%	30/15 Summer	100/15 Summer			
1.001	SW03	15 Winter	30	+0%	30/15 Summer				
1.002	TANK	60 Winter	30	+0%	30/15 Summer				
1.003	PS	60 Winter	30	+0%	1/15 Summer	100/60 Winter			
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW01	59.900	-0.055	0.000	0.73		18.7	OK	
2.000	SW02	59.838	0.438	0.000	1.63		23.9	SURCHARGED	7
1.001	SW03	59.574	0.274	0.000	1.61		40.8	SURCHARGED	
1.002	TANK	59.337	0.287	0.000	0.46		6.5	SURCHARGED	
1.003	PS	59.318	0.843	0.000	0.14		5.0	SURCHARGED	5
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		Crumpsall Car Park Surface Water Network V1 18.07.23		Page 9
Date 18/07/2023		Designed by paulg		
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Innovyze		Network 2017.1.2		

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.348
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.500	Cv (Winter)	0.840

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

Profile(s)

Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	SW01	60 Winter	100	+45%	100/15 Summer			
2.000	SW02	15 Winter	100	+45%	30/15 Summer	100/15 Summer		
1.001	SW03	120 Winter	100	+45%	30/15 Summer			
1.002	TANK	120 Winter	100	+45%	30/15 Summer			
1.003	PS	120 Winter	100	+45%	1/15 Summer	100/60 Winter		

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW01	60.407	0.452	0.000	0.70		18.1	SURCHARGED	
2.000	SW02	60.403	1.003	3.457	2.22		32.5	FLOOD	7
1.001	SW03	60.387	1.087	0.000	1.05		26.6	SURCHARGED	
1.002	TANK	60.352	1.302	0.000	0.99		14.1	FLOOD RISK	
1.003	PS	60.260	1.785	10.321	0.14		5.0	FLOOD	5

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