

**PLP Construction Ltd
On behalf of Guinness Developments Ltd**

Surface Water Drainage Design

**Site off Dob Brook Close
Newton Heath
Manchester**

**April 2021
JSD/J072
(Revision A)**

Surface Water Drainage Design

With Reference to Planning Permission 126281/FO/2020, Bowker Sadler Architects Proposed Site Layout 18-079-1002 and WML Consulting Drainage Strategy Plan 8948-WML-XX-01-DR-C-0001-P1, the following drainage design provides detailed layout and MicroDrainage design calculations for the surface water drainage system serving the development.

The drainage hierarchy has been confirmed at planning stage (refer to WML Consulting drawing) that infiltration is not appropriate, there is no suitable watercourse nearby and so the drainage solution is to discharge to the public surface water sewer in Dob Brook Close.

The surface water system has received technical approval for Section 104 adoption with United Utilities which was based on the design principles of a Developer Enquiry 4200037753 and also proposed at Planning stage. See Appendix A for copies of the developer enquiry and S104 technical approval correspondence. Once constructed and adopted United Utilities will be responsible for the future maintenance of the main drainage system serving the site, which will include all SUDS elements (oversized pipework and Hydrobrake control).

Foul and surface water are to drain in separate systems with foul drainage connecting to the Foul Water sewer in Dob Brook Close (Section 104 agreed with United Utilities, see Appendix A).

Surface Water is designed to greenfield run-off rates, however, to maintain self-cleansing flow is to be limited to, as close to, 5.0l/s. United Utilities require an absolute minimum orifice in a control to be 100mm, which in this case due to design head, the lowest flow from an adoptable Hydrobrake control results in a peak flow slightly greater.

MicroDrainage Calculations are appended and the peak flows are as follows :-

2 Year + 40% climate change allowance = 5.0l/s

30 Year + 40% climate change allowance = 5.0l/s

100 Year + 40% climate change allowance = 5.6l/s

Water levels within the drainage system are also provided with no surcharge (apart from downstream of the control) for the 2 Year + 40% c.c, all storm water contained within the main sewers/manholes for the 30 Year + 40% c.c and also for the 100 Year + 40% c.c with no flooding. United Utilities also require that a surcharged outfall (1.0m surcharge) be checked for the 15, 30 and 60 minute 2 Year and 30 Year events with no flooding, which is also checked and confirmed. The maximum water level for the 100 Year + 40% c.c is 88.330 which is lower than the lowest drained site level confirming all water is stored within the system with no flooding.

Site levels/gradients have been considered and exceedance flows are to mimic the existing situation i.e. generally to the North (Dob Brook Close) and also more locally to the South (Rochdale Canal). Off-site flows to the North (Dob Brook Close) and South (Rochdale Canal) are not altered and do not affect the development.

The following drawings forming part of the Section 104 applications to United Utilities and the Building Regulation submission are appended :-

J072/100 – Drainage Appraisal

J072/101A – Foul and Surface Water Drainage

J072/104 – Drainage Details

J072/105 – Overland Flows

J072/110 – S104 Storm Scheme

J072/112A – S104 Longitudinal Sections

J072/114 – S104 Control Manhole S2 Details

Summary

The 'mains' drainage, including the SUDS aspects, are to be adopted and maintained by United Utilities. Private 'plot' drainage is designed in accordance with Building Regulations and easily maintained by usual household maintenance i.e. no special requirements.

The development generally maintains the existing exceedance run-off flows and therefore will not increase flood risk off site. The properties are typically to be set 150mm above external ground levels and with the site being generally elevated compared to the surrounding area there is no significant flood risk associated with the properties.

As such the drainage and flood risk aspects of the development are considered appropriate.



J S DICKINSON

B.Eng., C.Eng., M.I.Struct.E.

On behalf of D and D Consulting Engineers Ltd

Appendices

Appendix A – United Utilities Developer Enquiry and Section 104 Correspondence

Appendix B - Drainage Design Calculations

Appendix C – Drainage Drawings

Appendix A – United Utilities Developer Enquiry Response and S104 Correspondence

James@DandDconsulting.co.uk

From: Perry, Graham <Graham.Perry@uuplc.co.uk>
Sent: 18 March 2021 21:33
To: James@DandDconsulting.co.uk
Cc: Wastewater Developer Services
Subject: RE: Pre Development Enquiry for : Land off Dob Brook Close Manchester M40 1DB UU
Reference Number : 4200037753

Hello James

I can confirm that the site can drain to the dedicated surface water sewer on Dob Brook Close at a rate that must not exceed 5 l/s

Thanks

Graham Perry

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From: James@DandDconsulting.co.uk [mailto:James@DandDconsulting.co.uk]

Sent: 09 March 2021 17:53

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

Subject: RE: Pre Development Enquiry for : Land off Dob Brook Close Manchester M40 1DB UU Reference Number : 4200037753

FAO: Graham Perry

Graham

Further to your email below and our discussions relating to the previous developer enquiry on this site (4200027747) I can confirm the following regarding the drainage hierarchy :-

With reference to the WML Phase 2 report, ground conditions are clay which is not suitable for infiltration – see extract from report :-

Drainage and Soakaways

- 7.30 In consideration of the site being underlain by made ground and relatively impermeable soils, soakaways are not considered to be a feasible drainage option for the site.

The only 'watercourse' nearby is the adjacent canal and the Canal and River Trust have stated that this section of canal is not suitable to receive any surface water – refer to extract from C&RT planning consultation :-

Surface water should be disposed of to an existing main sewer.

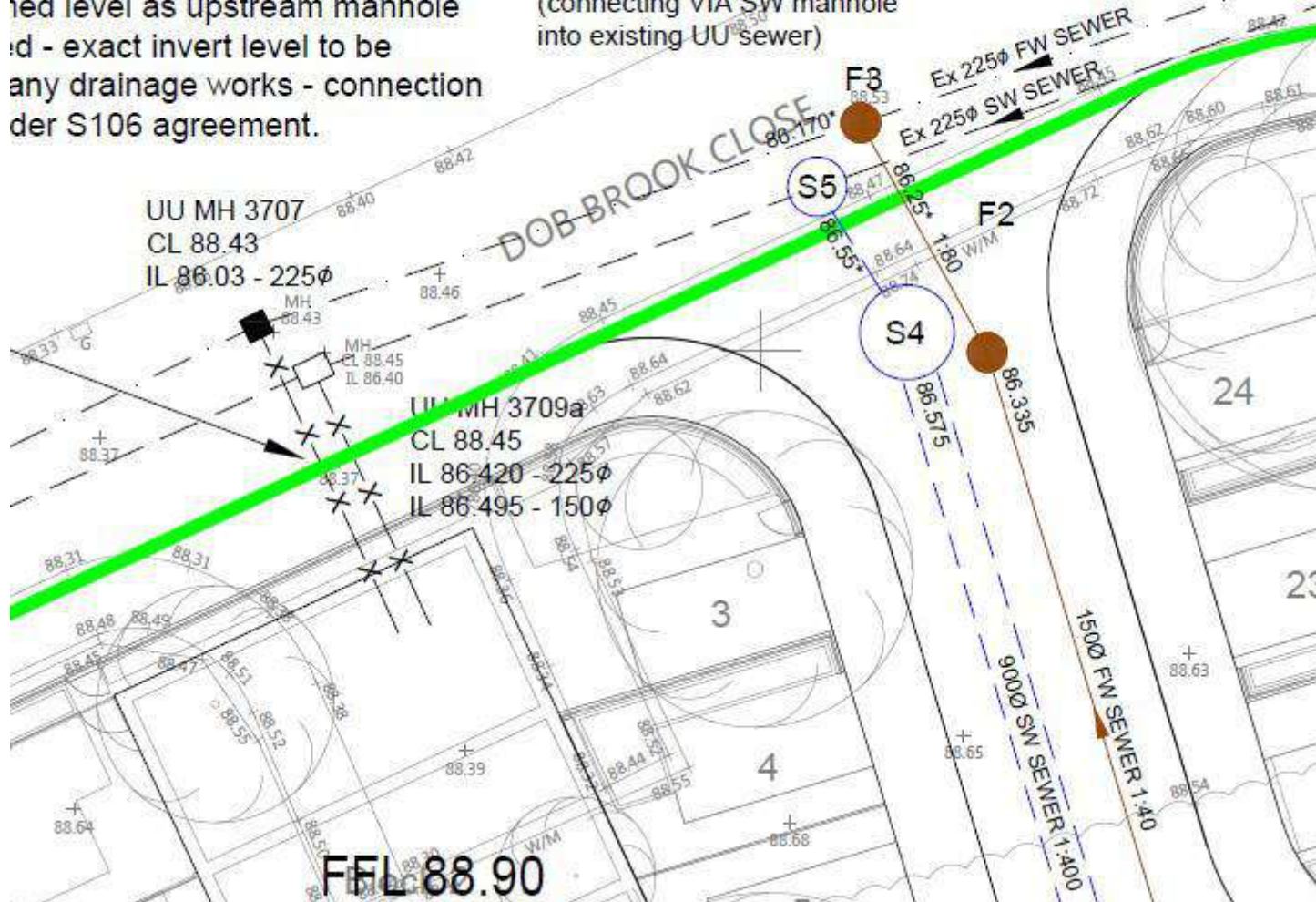
It has been advised by the Utilities team that due to the water level in that section of canal it is unlikely the Trust could accept surface water into the canal at this time. The assessment shows that the ground is unsuitable for a soakaway due to lack of capability, therefore the proposed drainage strategy showing connections to the main sewer is welcomed.

If the LPA is minded to grant planning permission, we suggest that the following

Therefore in accordance with the hierarchy the proposals are to discharge surface water to the surface water sewer in Dob Brook Close via a new manhole. Peak flow from the site will be limited to 5l/s by a Hydrobrake control and storage provided by oversized pipe (all to be adopted under S104).

to be covered under STUB agreement

HYDROBRAKE MH S4
RESTRICTED TO 5 l/sec
(connecting VIA SW manhole
into existing UU sewer)



Regards

 James@DandDconsulting.co.uk

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that it is in fact virus free.

D and D Consulting Engineers Ltd
Registered in England No. 12740931

From: Wastewater Developer Services [<mailto:WastewaterDeveloperServices@uuplc.co.uk>]
Sent: 09 March 2021 17:01
To: James@DandDconsulting.co.uk
Cc: Wastewater Developer Services
Subject: Pre Development Enquiry for : Land off Dob Brook Close Manchester M40 1DB UU Reference Number : 4200037753

Dear Sirs,

Pre Development Enquiry for: Land off Dob Brook Close Manchester M40 1DB UU Reference Number : 4200037753

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

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

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

Foul Water

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

Our preferred point of discharge would be to the 225mm diameter public foul water sewer within Dob Brook Close located to the north of your proposed development at an unrestricted rate.

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

Surface Water

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

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

This is outlined as follows, in order of priority:

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

4. to a combined sewer.

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

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

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

Infiltration

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

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

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

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

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

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

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

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 adjacent canal located south of the proposed site.

We would encourage you to identify and engage with any third party landowner and riparian owner to agree access and discharge rights to the water body if this is not in your ownership.

Public Sewer

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

Once evidence is provided as outlined above, United Utilities will consider a connection to the 225mm diameter public surface water sewer within Dob Brook Close located north of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities request that any agreed rate does not exceed 5l/s.

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

Levels

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

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 public sewerage network under any circumstances

Sewer Adoptions

You have indicated on your application form that you intend to put the sewers forward for adoption (including any SuDS components that can come within the meaning of a sewer).

United Utilities assess adoption applications based on the current Design & Construction Guidance and local practices which have now replaced 'Sewers For Adoption 6th Edition'.

We recommend that you submit a pre design assessment to the sewer adoption mailbox (SewerAdoptions@uuplc.co.uk) stating pre design assessment in the title

Please refer to links below to obtain further guidance:

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

Site drainage must be designed in accordance with Building Regulations, National Planning Policy, and local flood authority guidelines, we would recommend that you speak and make suitable agreements with the relevant statutory bodies.

If you intend to put forward your wastewater assets for adoption by United Utilities, the proposed detail design will be subject to a technical appraisal by an Adoption Engineer as we need to be sure that the proposals meets the requirements set out in the Design & Construction Guidance. The proposed design should give consideration to long term operability and give United Utilities a safe and cost effective proposal for the lifetime of the assets. In these cases, we strongly recommend that no construction commences until the detailed drainage design, submitted as part of the Section 104 application, has been assessed and accepted in writing by United Utilities. Any work carried out prior to the technical assessment being approved is done entirely at the developer's own risk and could be subject to change.

Codes For Adoption

The new Codes for Adoption are outlined on the Water UK Website. The link below takes you to their webpage:

<https://www.water.org.uk/technical-guidance/developers-services/codes-for-adoption/>

A free copy of the new Design & Construction Guidance can be downloaded via the link below:

<https://www.water.org.uk/wp-content/uploads/2020/03/SSG-App-C-Des-Con-Guide-v-2-100320-C.pdf>

Existing Water Assets Crossing the Site

It is the developer responsibility to identify utilities on-site. Where clean water assets are shown on our records, we recommend that you contact our Water Pre-Development Team, via the following email address:

DeveloperServicesWater@uuplc.co.uk. Further information for this service can be found on our website via the link below:

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

Connection Application

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

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

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

If we can be of any further assistance please don't hesitate to contact us further.

Kind regards,



Graham Perry
Development Engineer
Developer Services
M: 07557 577548
T: 01925 679405
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James@DandDconsulting.co.uk

From: Hunt, Timothy <Timothy.Hunt@uuplc.co.uk>
Sent: 11 May 2021 10:01
To: James@DandDconsulting.co.uk; SewerAdoptions
Cc: 'John Dunne'
Subject: S104 - Dob Brook Close, Newton Heath, M40 1DB UU Ref: 4200039419
Attachments: S104 Plans Accepted - Dob Brook.doc

James,

Please see technical acceptance attached

John, I will forward you an early start application together with an invoice for the balance of the fee shortly

Thanks Tim



Tim Hunt
Developer Services Engineer (North Area)
Developer Services & Metering
Customer Services
T: 01925 679376
unitedutilities.com

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From: James@DandDconsulting.co.uk [mailto:James@DandDconsulting.co.uk]
Sent: 07 May 2021 16:57
To: Hunt, Timothy <Timothy.Hunt@uuplc.co.uk>; SewerAdoptions <SewerAdoptions@uuplc.co.uk>
Cc: 'John Dunne' <John@adaptcivils.co.uk>
Subject: RE: S104 - Dob Brook Close, Newton Heath, M40 1DB Uu Ref: 4200039419

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Tim

Please find enclosed a pdf version of the MicroDrainage files previously issued (standard design and surcharged outfall).

Let me know if you need anything further.

Regards

James S Dickinson (Director)

S104 – Dobb Brook Close, Manchester – PLP Construction – 4200039419

I refer to recent correspondence and would inform you that your submission is now satisfactory for incorporating into a Water Industry Act 1991, Section 104 Agreement, providing that the works can be constructed in full accordance with the accepted drawings numbered as follows:-.

Drainage Layout: J072-111-S104
Manholes Details: J072-114, 115, 116
Long Sections: J072-112A

United Utilities Typical Details

The Developer or his contractor is responsible for verifying all existing service positions and levels on site, including those of the existing public sewerage system, before work commences.

Any costs associated with service diversions required to enable the scheme to be carried in accordance with the acceptable drawings must be borne by the developer.

Where connections are to be made to existing public sewer manholes, the costs for rebuilding the manhole to United Utilities requirements, if deemed necessary by U.U. Field Staff, must be borne by the developer. If the works cannot be constructed in accordance with the acceptable plans, the developer must submit revised proposals for appraisal before continuing with the works.

The developer must also obtain specific permission to construct any new manhole or make any connections to the public sewerage system. Please visit our web-site where you will find the S106 Sewer Connection Application form. The form is in two parts but only the second part is required for this scheme which is called '**Request for permission to work on a public sewer**' application form, which the appointed contractor must complete and return to the address on the form. Here is the link to the form: <http://www.unitedutilities.com/connecting-public-sewer.aspx>

Appendix B – Drainage Design Calculations

D and D consulting engineers		Page 0
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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	18.100	Add Flow / Climate Change (%)	0
Ratio R	0.348	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	32.354	0.120	269.6	0.091	5.00	0.0	0.600	o	1050	Pipe/Conduit	⚙
2.000	19.646	0.120	163.7	0.085	5.00	0.0	0.600	o	1050	Pipe/Conduit	⚙
1.001	22.388	0.080	279.9	0.000	0.00	0.0	0.600	o	1050	Pipe/Conduit	⚙
1.002	7.394	0.050	147.9	0.061	0.00	0.0	0.600	o	225	Pipe/Conduit	⚙

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.26	86.700	0.091	0.0	0.0	0.0	2.09	1813.1	12.3
2.000	50.00	5.12	86.700	0.085	0.0	0.0	0.0	2.69	2329.9	11.5
1.001	50.00	5.44	86.580	0.176	0.0	0.0	0.0	2.06	1779.5	23.8
1.002	50.00	5.55	86.500	0.237	0.0	0.0	0.0	1.07	42.7	32.1

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Manhole Schedules for Surface Network 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S4	88.731	2.031	Open Manhole	2400	1.000	86.700	1050				
S5	88.910	2.210	Open Manhole	2400	2.000	86.700	1050				
S3	89.113	2.533	Open Manhole	2400	1.001	86.580	1050	1.000	86.580	1050	
								2.000	86.580	1050	
S2	88.705	2.205	Open Manhole	2400	1.002	86.500	225	1.001	86.500	1050	
S1	88.475	2.025	Open Manhole	1200		OUTFALL		1.002	86.450	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S4	388318.646	400668.568	388318.646	400668.568	Required	
S5	388368.436	400683.567	388368.436	400683.567	Required	
S3	388349.625	400677.900	388349.625	400677.900	Required	
S2	388343.154	400699.333	388343.154	400699.333	Required	
S1	388336.305	400702.118			No Entry	

PIPELINE SCHEDULES for Surface Network 1

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	1050	S4	88.731	86.700	0.981	Open Manhole	2400
2.000	o	1050	S5	88.910	86.700	1.160	Open Manhole	2400
1.001	o	1050	S3	89.113	86.580	1.483	Open Manhole	2400
1.002	o	225	S2	88.705	86.500	1.980	Open Manhole	2400

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	32.354	269.6	S3	89.113	86.580	1.483	Open Manhole	2400
2.000	19.646	163.7	S3	89.113	86.580	1.483	Open Manhole	2400
1.001	22.388	279.9	S2	88.705	86.500	1.155	Open Manhole	2400
1.002	7.394	147.9	S1	88.475	86.450	1.800	Open Manhole	1200

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Area Summary for Surface Network 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.091	0.091	0.091
2.000	-	-	100	0.085	0.085	0.085
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.061	0.061	0.061
				Total	Total	Total
				0.237	0.237	0.237

Free Flowing Outfall Details for Surface Network 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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1.002	S1	88.475	86.450	0.000	1200	0
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Simulation Criteria for Surface Network 1

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.100	Storm Duration (mins)	30
Ratio R	0.348		

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Online Controls for Surface Network 1

Hydro-Brake® Optimum Manhole: S2, DS/PN: 1.002, Volume (m³): 27.3

Unit Reference MD-SHE-0100-5000-1400-5000
 Design Head (m) 1.400
 Design Flow (l/s) 5.0
 Flush-Flo™ Calculated
 Objective Minimise upstream storage
 Application Surface
 Sump Available Yes
 Diameter (mm) 100
 Invert Level (m) 86.500
 Minimum Outlet Pipe Diameter (mm) 150
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.400	5.0	Kick-Flo®	0.855	4.0
Flush-Flo™	0.416	5.0	Mean Flow over Head Range	-	4.4

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.3	0.800	4.3	2.000	5.9	4.000	8.2	7.000	10.7
0.200	4.6	1.000	4.3	2.200	6.2	4.500	8.6	7.500	11.0
0.300	4.9	1.200	4.7	2.400	6.4	5.000	9.1	8.000	11.4
0.400	5.0	1.400	5.0	2.600	6.7	5.500	9.5	8.500	11.7
0.500	5.0	1.600	5.3	3.000	7.1	6.000	9.9	9.000	12.0
0.600	4.9	1.800	5.6	3.500	7.7	6.500	10.3	9.500	12.3

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2 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for Surface Network 1

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.100 Cv (Summer) 0.750
Region England and Wales Ratio R 0.348 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 2, 30, 100
Climate Change (%) 40, 40, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.
1.000	S4 15 Winter		2	+40%	100/60 Winter				86.951	-0.799	0.000	0.01
2.000	S5 15 Winter		2	+40%	100/60 Winter				86.951	-0.799	0.000	0.01
1.001	S3 15 Summer		2	+40%	100/60 Winter				86.921	-0.709	0.000	0.01
1.002	S2 30 Summer		2	+40%	2/15 Summer				86.961	0.236	0.000	0.16

PN	US/MH Name	Half Drain Overflow (l/s)	Pipe Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S4			17.2	OK	
2.000	S5			15.8	OK	
1.001	S3			10.3	OK	
1.002	S2			5.0	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for Surface
Network 1

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.100 Cv (Summer) 0.750
Region England and Wales Ratio R 0.348 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 2, 30, 100
Climate Change (%) 40, 40, 40

PN	US/MH		Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged	Flooded	Flow / Cap.
	Name	Storm							Level (m)	Depth (m)	Volume (m ³)	
1.000	S4 15	Winter	30	+40%	100/60	Winter			87.192	-0.558	0.000	0.02
2.000	S5 15	Winter	30	+40%	100/60	Winter			87.192	-0.558	0.000	0.02
1.001	S3 15	Summer	30	+40%	100/60	Winter			87.138	-0.492	0.000	0.01
1.002	S2 15	Summer	30	+40%	2/15	Summer			87.137	0.412	0.000	0.16

PN	US/MH		Overflow (l/s)	Time (mins)	Pipe Flow (l/s)	Status	Level
	Name						Exceeded
1.000	S4				30.3	OK	
2.000	S5				28.6	OK	
1.001	S3				10.6	OK	
1.002	S2				5.0	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for Surface Network 1

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.100 Cv (Summer) 0.750
Region England and Wales Ratio R 0.348 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 2, 30, 100
Climate Change (%) 40, 40, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)
1.000	S4	15 Winter	100	+40%	100/60 Winter				87.341	-0.409	0.000
2.000	S5	15 Winter	100	+40%	100/60 Winter				87.341	-0.409	0.000
1.001	S3	15 Summer	100	+40%	100/60 Winter				87.268	-0.362	0.000
1.002	S2	180 Winter	100	+40%	2/15 Summer				88.297	1.572	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S4	0.03			39.3	OK	
2.000	S5	0.03			37.2	OK	
1.001	S3	0.01			11.9	OK	
1.002	S2	0.18			5.6	SURCHARGED	

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

1

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.100 Cv (Summer) 0.750
Region England and Wales Ratio R 0.348 Cv (Winter) 0.840

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

Profile(s)

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080

Return Period(s) (years) 2, 30, 100
Climate Change (%) 40, 40, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.
1.000	S4	60 Winter	2	+40%	100/60 Winter				87.021	-0.729	0.000	0.01
2.000	S5	60 Winter	2	+40%	100/60 Winter				87.021	-0.729	0.000	0.01
1.001	S3	60 Winter	2	+40%	100/60 Winter				87.021	-0.609	0.000	0.00
1.002	S2	60 Winter	2	+40%	2/15 Summer				87.021	0.296	0.000	0.16

PN	US/MH Name	Half Drain Overflow (l/s)	Pipe Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S4			8.8	OK	
2.000	S5			8.2	OK	
1.001	S3			5.5	OK	
1.002	S2			5.0	SURCHARGED	

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

1

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.100 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.348 Cv (Winter) 0.840

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

Profile(s)

Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080

Return Period(s) (years) 2, 30, 100
 Climate Change (%) 40, 40, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)
1.000	S4	120 Winter	30	+40%	100/60 Winter				87.489	-0.261	0.000
2.000	S5	120 Winter	30	+40%	100/60 Winter				87.489	-0.261	0.000
1.001	S3	120 Winter	30	+40%	100/60 Winter				87.489	-0.141	0.000
1.002	S2	120 Winter	30	+40%	2/15 Summer				87.488	0.763	0.000

Half Drain Pipe

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	S4	0.01			10.9	OK	
2.000	S5	0.01			10.2	OK	
1.001	S3	0.00			4.5	OK	
1.002	S2	0.16			5.0	SURCHARGED	

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

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.100 Cv (Summer) 0.750
Region England and Wales Ratio R 0.348 Cv (Winter) 0.840

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

Profile(s)

Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080

Return Period(s) (years) 2, 30, 100
Climate Change (%) 40, 40, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Surcharged Flooded		
									Level (m)	Depth (m)	Volume (m ³)
1.000	S4	120 Winter	100	+40%	100/60 Winter				88.322	0.572	0.000
2.000	S5	120 Winter	100	+40%	100/60 Winter				88.322	0.572	0.000
1.001	S3	120 Winter	100	+40%	100/60 Winter				88.324	0.694	0.000
1.002	S2	120 Winter	100	+40%	2/15 Summer				88.330	1.605	0.000

Half Drain Pipe

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	S4	0.01			14.2	SURCHARGED	
2.000	S5	0.01			13.2	SURCHARGED	
1.001	S3	0.01			5.9	SURCHARGED	
1.002	S2	0.18			5.6	SURCHARGED	

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Surcharged Outfall Details for Surcharged Outfall

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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1.002	S1	88.475	86.450	0.000	1200	0
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Datum (m) 86.450 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	1.225	53	1.225	105	1.225	157	1.225	209	1.225	261	1.225	313	1.225	365	1.225
2	1.225	54	1.225	106	1.225	158	1.225	210	1.225	262	1.225	314	1.225	366	1.225
3	1.225	55	1.225	107	1.225	159	1.225	211	1.225	263	1.225	315	1.225	367	1.225
4	1.225	56	1.225	108	1.225	160	1.225	212	1.225	264	1.225	316	1.225	368	1.225
5	1.225	57	1.225	109	1.225	161	1.225	213	1.225	265	1.225	317	1.225	369	1.225
6	1.225	58	1.225	110	1.225	162	1.225	214	1.225	266	1.225	318	1.225	370	1.225
7	1.225	59	1.225	111	1.225	163	1.225	215	1.225	267	1.225	319	1.225	371	1.225
8	1.225	60	1.225	112	1.225	164	1.225	216	1.225	268	1.225	320	1.225	372	1.225
9	1.225	61	1.225	113	1.225	165	1.225	217	1.225	269	1.225	321	1.225	373	1.225
10	1.225	62	1.225	114	1.225	166	1.225	218	1.225	270	1.225	322	1.225	374	1.225
11	1.225	63	1.225	115	1.225	167	1.225	219	1.225	271	1.225	323	1.225	375	1.225
12	1.225	64	1.225	116	1.225	168	1.225	220	1.225	272	1.225	324	1.225	376	1.225
13	1.225	65	1.225	117	1.225	169	1.225	221	1.225	273	1.225	325	1.225	377	1.225
14	1.225	66	1.225	118	1.225	170	1.225	222	1.225	274	1.225	326	1.225	378	1.225
15	1.225	67	1.225	119	1.225	171	1.225	223	1.225	275	1.225	327	1.225	379	1.225
16	1.225	68	1.225	120	1.225	172	1.225	224	1.225	276	1.225	328	1.225	380	1.225
17	1.225	69	1.225	121	1.225	173	1.225	225	1.225	277	1.225	329	1.225	381	1.225
18	1.225	70	1.225	122	1.225	174	1.225	226	1.225	278	1.225	330	1.225	382	1.225
19	1.225	71	1.225	123	1.225	175	1.225	227	1.225	279	1.225	331	1.225	383	1.225
20	1.225	72	1.225	124	1.225	176	1.225	228	1.225	280	1.225	332	1.225	384	1.225
21	1.225	73	1.225	125	1.225	177	1.225	229	1.225	281	1.225	333	1.225	385	1.225
22	1.225	74	1.225	126	1.225	178	1.225	230	1.225	282	1.225	334	1.225	386	1.225
23	1.225	75	1.225	127	1.225	179	1.225	231	1.225	283	1.225	335	1.225	387	1.225
24	1.225	76	1.225	128	1.225	180	1.225	232	1.225	284	1.225	336	1.225	388	1.225
25	1.225	77	1.225	129	1.225	181	1.225	233	1.225	285	1.225	337	1.225	389	1.225
26	1.225	78	1.225	130	1.225	182	1.225	234	1.225	286	1.225	338	1.225	390	1.225
27	1.225	79	1.225	131	1.225	183	1.225	235	1.225	287	1.225	339	1.225	391	1.225
28	1.225	80	1.225	132	1.225	184	1.225	236	1.225	288	1.225	340	1.225	392	1.225
29	1.225	81	1.225	133	1.225	185	1.225	237	1.225	289	1.225	341	1.225	393	1.225
30	1.225	82	1.225	134	1.225	186	1.225	238	1.225	290	1.225	342	1.225	394	1.225
31	1.225	83	1.225	135	1.225	187	1.225	239	1.225	291	1.225	343	1.225	395	1.225
32	1.225	84	1.225	136	1.225	188	1.225	240	1.225	292	1.225	344	1.225	396	1.225
33	1.225	85	1.225	137	1.225	189	1.225	241	1.225	293	1.225	345	1.225	397	1.225
34	1.225	86	1.225	138	1.225	190	1.225	242	1.225	294	1.225	346	1.225	398	1.225
35	1.225	87	1.225	139	1.225	191	1.225	243	1.225	295	1.225	347	1.225	399	1.225
36	1.225	88	1.225	140	1.225	192	1.225	244	1.225	296	1.225	348	1.225	400	1.225
37	1.225	89	1.225	141	1.225	193	1.225	245	1.225	297	1.225	349	1.225	401	1.225
38	1.225	90	1.225	142	1.225	194	1.225	246	1.225	298	1.225	350	1.225	402	1.225
39	1.225	91	1.225	143	1.225	195	1.225	247	1.225	299	1.225	351	1.225	403	1.225
40	1.225	92	1.225	144	1.225	196	1.225	248	1.225	300	1.225	352	1.225	404	1.225
41	1.225	93	1.225	145	1.225	197	1.225	249	1.225	301	1.225	353	1.225	405	1.225
42	1.225	94	1.225	146	1.225	198	1.225	250	1.225	302	1.225	354	1.225	406	1.225
43	1.225	95	1.225	147	1.225	199	1.225	251	1.225	303	1.225	355	1.225	407	1.225
44	1.225	96	1.225	148	1.225	200	1.225	252	1.225	304	1.225	356	1.225	408	1.225
45	1.225	97	1.225	149	1.225	201	1.225	253	1.225	305	1.225	357	1.225	409	1.225
46	1.225	98	1.225	150	1.225	202	1.225	254	1.225	306	1.225	358	1.225	410	1.225
47	1.225	99	1.225	151	1.225	203	1.225	255	1.225	307	1.225	359	1.225	411	1.225
48	1.225	100	1.225	152	1.225	204	1.225	256	1.225	308	1.225	360	1.225	412	1.225
49	1.225	101	1.225	153	1.225	205	1.225	257	1.225	309	1.225	361	1.225	413	1.225
50	1.225	102	1.225	154	1.225	206	1.225	258	1.225	310	1.225	362	1.225	414	1.225
51	1.225	103	1.225	155	1.225	207	1.225	259	1.225	311	1.225	363	1.225	415	1.225
52	1.225	104	1.225	156	1.225	208	1.225	260	1.225	312	1.225	364	1.225	416	1.225

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Surcharged Outfall Details for Surcharged Outfall

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
9689	1.225	9738	1.225	9787	1.225	9836	1.225	9885	1.225	9934	1.225	9983	1.225
9690	1.225	9739	1.225	9788	1.225	9837	1.225	9886	1.225	9935	1.225	9984	1.225
9691	1.225	9740	1.225	9789	1.225	9838	1.225	9887	1.225	9936	1.225	9985	1.225
9692	1.225	9741	1.225	9790	1.225	9839	1.225	9888	1.225	9937	1.225	9986	1.225
9693	1.225	9742	1.225	9791	1.225	9840	1.225	9889	1.225	9938	1.225	9987	1.225
9694	1.225	9743	1.225	9792	1.225	9841	1.225	9890	1.225	9939	1.225	9988	1.225
9695	1.225	9744	1.225	9793	1.225	9842	1.225	9891	1.225	9940	1.225	9989	1.225
9696	1.225	9745	1.225	9794	1.225	9843	1.225	9892	1.225	9941	1.225	9990	1.225
9697	1.225	9746	1.225	9795	1.225	9844	1.225	9893	1.225	9942	1.225	9991	1.225
9698	1.225	9747	1.225	9796	1.225	9845	1.225	9894	1.225	9943	1.225	9992	1.225
9699	1.225	9748	1.225	9797	1.225	9846	1.225	9895	1.225	9944	1.225	9993	1.225
9700	1.225	9749	1.225	9798	1.225	9847	1.225	9896	1.225	9945	1.225	9994	1.225
9701	1.225	9750	1.225	9799	1.225	9848	1.225	9897	1.225	9946	1.225	9995	1.225
9702	1.225	9751	1.225	9800	1.225	9849	1.225	9898	1.225	9947	1.225	9996	1.225
9703	1.225	9752	1.225	9801	1.225	9850	1.225	9899	1.225	9948	1.225	9997	1.225
9704	1.225	9753	1.225	9802	1.225	9851	1.225	9900	1.225	9949	1.225	9998	1.225
9705	1.225	9754	1.225	9803	1.225	9852	1.225	9901	1.225	9950	1.225	9999	1.225
9706	1.225	9755	1.225	9804	1.225	9853	1.225	9902	1.225	9951	1.225	10000	1.225
9707	1.225	9756	1.225	9805	1.225	9854	1.225	9903	1.225	9952	1.225	10001	1.225
9708	1.225	9757	1.225	9806	1.225	9855	1.225	9904	1.225	9953	1.225	10002	1.225
9709	1.225	9758	1.225	9807	1.225	9856	1.225	9905	1.225	9954	1.225	10003	1.225
9710	1.225	9759	1.225	9808	1.225	9857	1.225	9906	1.225	9955	1.225	10004	1.225
9711	1.225	9760	1.225	9809	1.225	9858	1.225	9907	1.225	9956	1.225	10005	1.225
9712	1.225	9761	1.225	9810	1.225	9859	1.225	9908	1.225	9957	1.225	10006	1.225
9713	1.225	9762	1.225	9811	1.225	9860	1.225	9909	1.225	9958	1.225	10007	1.225
9714	1.225	9763	1.225	9812	1.225	9861	1.225	9910	1.225	9959	1.225	10008	1.225
9715	1.225	9764	1.225	9813	1.225	9862	1.225	9911	1.225	9960	1.225	10009	1.225
9716	1.225	9765	1.225	9814	1.225	9863	1.225	9912	1.225	9961	1.225	10010	1.225
9717	1.225	9766	1.225	9815	1.225	9864	1.225	9913	1.225	9962	1.225	10011	1.225
9718	1.225	9767	1.225	9816	1.225	9865	1.225	9914	1.225	9963	1.225	10012	1.225
9719	1.225	9768	1.225	9817	1.225	9866	1.225	9915	1.225	9964	1.225	10013	1.225
9720	1.225	9769	1.225	9818	1.225	9867	1.225	9916	1.225	9965	1.225	10014	1.225
9721	1.225	9770	1.225	9819	1.225	9868	1.225	9917	1.225	9966	1.225	10015	1.225
9722	1.225	9771	1.225	9820	1.225	9869	1.225	9918	1.225	9967	1.225	10016	1.225
9723	1.225	9772	1.225	9821	1.225	9870	1.225	9919	1.225	9968	1.225	10017	1.225
9724	1.225	9773	1.225	9822	1.225	9871	1.225	9920	1.225	9969	1.225	10018	1.225
9725	1.225	9774	1.225	9823	1.225	9872	1.225	9921	1.225	9970	1.225	10019	1.225
9726	1.225	9775	1.225	9824	1.225	9873	1.225	9922	1.225	9971	1.225	10020	1.225
9727	1.225	9776	1.225	9825	1.225	9874	1.225	9923	1.225	9972	1.225	10021	1.225
9728	1.225	9777	1.225	9826	1.225	9875	1.225	9924	1.225	9973	1.225	10022	1.225
9729	1.225	9778	1.225	9827	1.225	9876	1.225	9925	1.225	9974	1.225	10023	1.225
9730	1.225	9779	1.225	9828	1.225	9877	1.225	9926	1.225	9975	1.225	10024	1.225
9731	1.225	9780	1.225	9829	1.225	9878	1.225	9927	1.225	9976	1.225	10025	1.225
9732	1.225	9781	1.225	9830	1.225	9879	1.225	9928	1.225	9977	1.225	10026	1.225
9733	1.225	9782	1.225	9831	1.225	9880	1.225	9929	1.225	9978	1.225	10027	1.225
9734	1.225	9783	1.225	9832	1.225	9881	1.225	9930	1.225	9979	1.225	10028	1.225
9735	1.225	9784	1.225	9833	1.225	9882	1.225	9931	1.225	9980	1.225	10029	1.225
9736	1.225	9785	1.225	9834	1.225	9883	1.225	9932	1.225	9981	1.225	10030	1.225
9737	1.225	9786	1.225	9835	1.225	9884	1.225	9933	1.225	9982	1.225	10031	1.225
												10080	1.225

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Mottram House, 43 Greek Street, Stockport, Cheshire, SK3 8AX		
Date 15/04/2021 10:57	Designed by jsd	
File 04 model.mdx	Checked by	
Innovyze	Network 2020.1	

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

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.100 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.348 Cv (Winter) 0.840

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

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60
 Return Period(s) (years) 2, 30
 Climate Change (%) 40, 40

PN	US/MH		Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth	Flooded Volume	Flow / Cap.
	Name	Storm							(m)	(m)	(m ³)	
1.000	S4	60 Winter	2	+40%					87.190	-0.560	0.000	0.01
2.000	S5	60 Winter	2	+40%					87.190	-0.560	0.000	0.01
1.001	S3	60 Winter	2	+40%	30/60 Winter				87.190	-0.440	0.000	0.00
1.002	S2	60 Winter	2	+40%	2/15 Summer				87.190	0.465	0.000	0.00

PN	US/MH		Half Drain Overflow (l/s)	Pipe Time (mins)	Pipe Flow (l/s)	Status	Level
	Name						Exceeded
1.000	S4				8.6	OK	
2.000	S5				8.0	OK	
1.001	S3				1.8	OK	
1.002	S2				0.0	SURCHARGED	

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File 04 model.mdx	Checked by	
Innovyze	Network 2020.1	

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

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.100 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.348 Cv (Winter) 0.840

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

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60
 Return Period(s) (years) 2, 30
 Climate Change (%) 40, 40

					Water		Surcharged	Flooded				
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.
1.000	S4 60 Winter		30	+40%					87.676	-0.074	0.000	0.01
2.000	S5 60 Winter		30	+40%					87.675	-0.075	0.000	0.01
1.001	S3 60 Winter		30	+40%	30/60 Winter				87.676	0.046	0.000	0.00
1.002	S2 60 Winter		30	+40%	2/15 Summer				87.676	0.951	0.000	0.00

Half Drain Pipe

PN	US/MH Name	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	S4			16.7	OK	
2.000	S5			15.6	OK	
1.001	S3			2.8	SURCHARGED	
1.002	S2			0.0	SURCHARGED	

Appendix C – Drainage Drawings



SITE AREA		
	SITE AREA/GREENFIELD AREA	### sq.m

DRAINED AREAS: PRE-DEVELOPMENT SITE		
	EXISTING ROOFS	0 sq.m
	EXISTING HARDSTANDING	0 sq.m
	EXISTING ADOPTED HIGHWAY	158 sq.m
TOTAL AREA =		158 sq.m

DRAINED AREAS: POST-DEVELOPMENT SITE		
	ROOFS	1,023sq.m
	IMPERMEABLE PAVING	579 sq.m
	ADOPTED HIGHWAY	781 sq.m
TOTAL AREA =		2383 sq.m

PAVED AREAS TO REAR AND SIDES OF PROPOSED PROPERTIES TO BE LAID TO FALL AND BE FREE DRAINING TO ADJACENT LANDSCAPED AREAS

REV.	DATE	DRN	DESCRIPTION
------	------	-----	-------------

PURPOSE OF ISSUE	PRELIMINARY
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CLIENT	PLP CONSTRUCTION LTD
PROJECT	SITE OFF DOB BROOK CLOSE NEWTON HEATH MANCHESTER
TITLE	STORMWATER DRAINAGE APPRAISAL

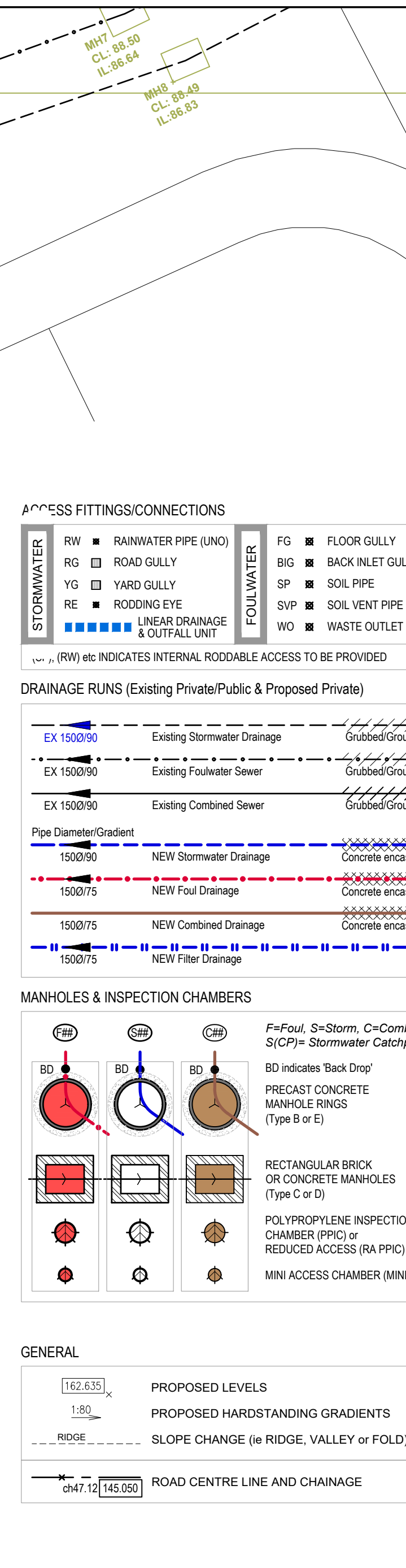
JOB No.		DRAWING No.		REVISION
J072		/ 100		
DRAWN	CHECKED	SCALE	@ SHEET SIZE	DATE
JSD	MD	1:200	A2	APR' 2021
DRAWING NOT TO BE SCALED				

Email: info@DandDconsulting.co.uk
Web: www.DandDconsulting.co.uk
Tel:
07884 975243 (J.Dickinson)
07884 936577 (M.Davenport)

DandD

consulting engineers

D and D Consulting Engineers Ltd
Mottram House, 43 Greek Street, Stockport, Cheshire SK3 8AX



- [illegible]

LEVELS ARE RELATED TO OSGM02
(OSGM02 CONVERTS GPS ELLIPSOID HEIGHTS TO
ORTHOMETRIC HEIGHTS ABOVE MEAN SEA LEVEL)

COORDINATES ARE RELATED TO NATIONAL GRID (GPS)

A	20/04/21	JSD	F2 UPDATED: S4, S5 & F2 POSITIONS ADJUSTED TO SUIT 120 MANHOLE DETAILS.
REV.	DATE	DRN	DESCRIPTION

PURPOSE OF ISSUE

PRELIMINARY

CLIENT	PLP CONSTRUCTION LTD
PROJECT	SITE OFF DOB BROOK CLOSE NEWTON HEATH MANCHESTER

TITLE	EXTERNAL WORKS G.A. FOUL SURFACE WATER DRAINAGE
-------	--

JOB No.		DRAWING No.		REVISION
J072		/ 101		A
DRAWN	CHECKED	SCALE	@ SHEET SIZE	DATE
JSD	MD	1:100	A0	APR' 2021

Email: info@DandDconsulting.co.uk
Web: www.DandDconsulting.co.uk

Tel:
07884 975243 (J.Dickinson)
07884 936577 (M.Davenport)

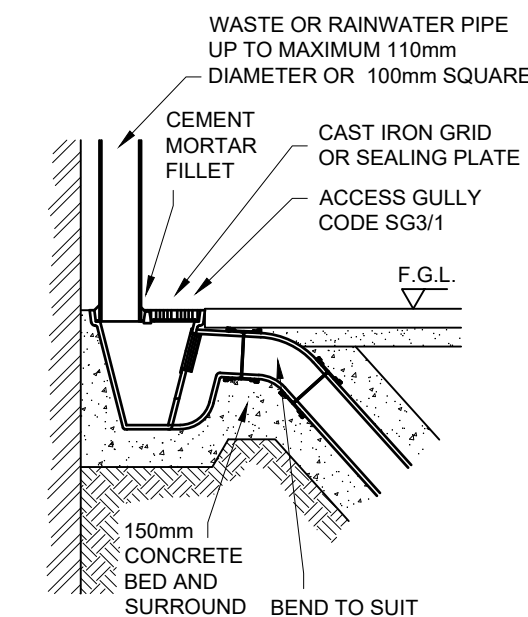
D and D
consulting engineers

D and D Consulting Engineers Ltd
Mottram House, 43 Greek Street, Stockport, Cheshire SK3 8AX

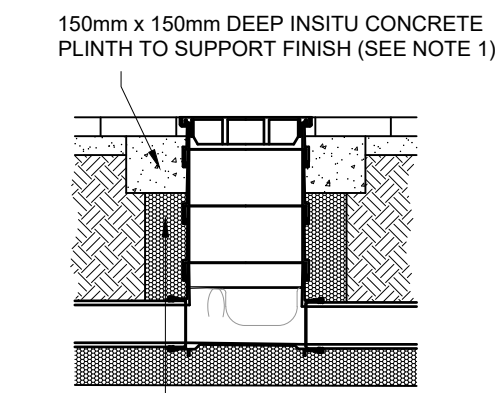
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MANHOLE SCHEDULE - ADAPTABLE FOULWATER						OPENING / COVER GRADE			COORDINATES	
REF	COVER LEVELS	INVERT LEVELS	DEPTH	TYPE	MM DMS	COVER SLAB	COVER FRAME	COVER GRADE	EASTING	NORTHING
F01 F02	88.514 88.625	86.165 86.975	2.349 1.650	TYPE B B	1200 DIA 1200 DIA	750x600 750x600	600x600 600x600	D400 D400	383841.576 383844.315	400705.442 400702.120

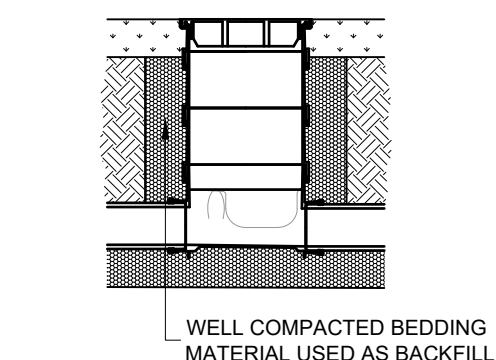
MANHOLE COVER LEVELS TO BE ADJUSTED TO THE IN WITH NEW SITE LEVELS.



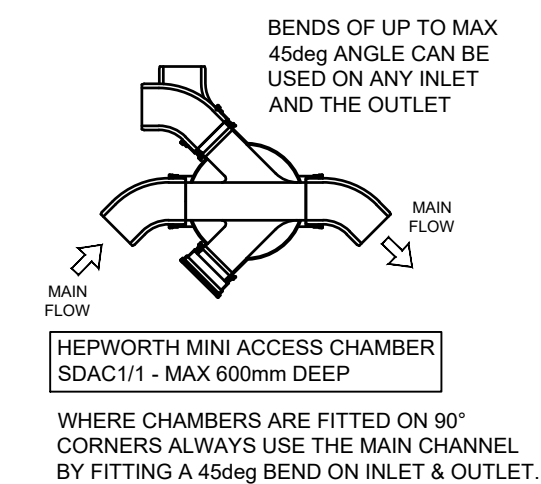
ACCESS GULLY CONNECTION
SCALE - 1:20



MINI ACCESS CHAMBER (PAVED AREAS)
SCALE - 1:20

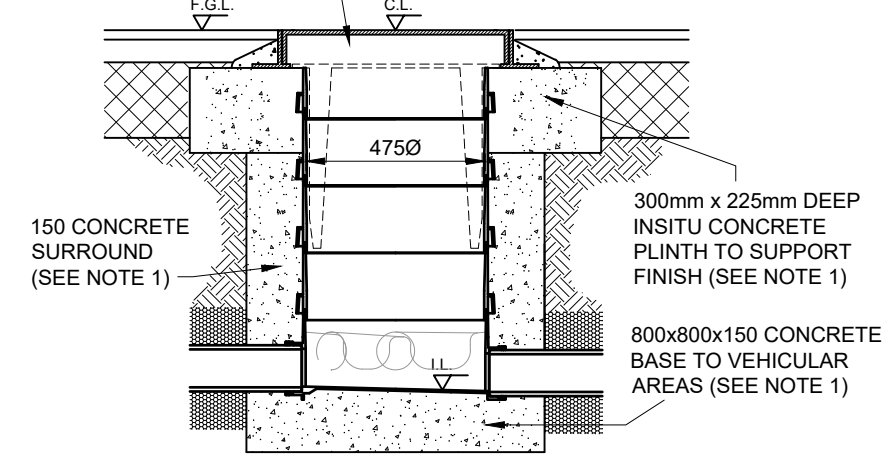


MINI ACCESS CHAMBER (SOFT LANDSCAPED AREAS)
SCALE - 1:20

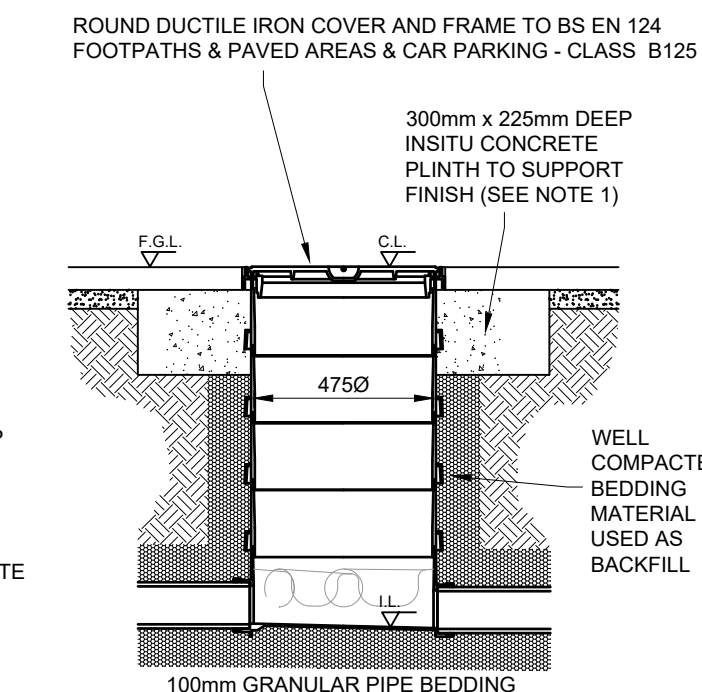


PLAN ON MINI ACCESS CHAMBER
SCALE - 1:20

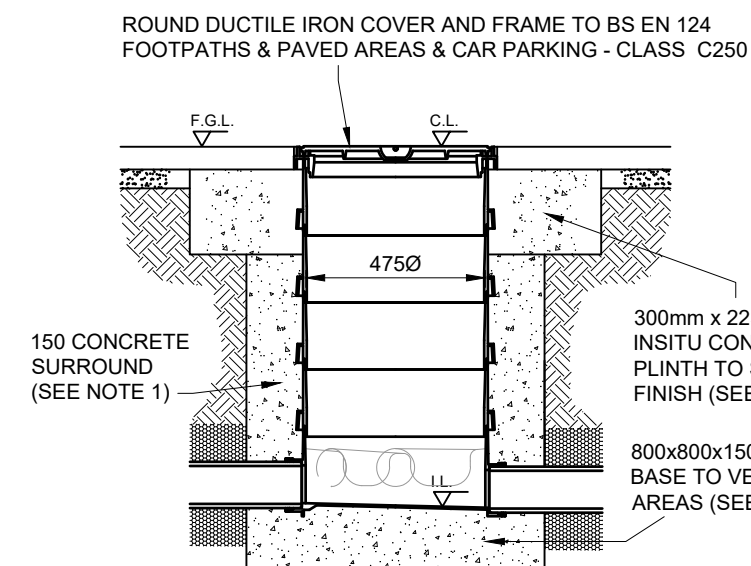
M.H. COVER & FRAME (TO BS EN124) TO PROVIDE 600x600 CLEAR OPENING, BEDDED AND HAUNCHED WITH 1:3 CEMENT:SAND MORTAR. COVER TO BE CLASS C250 (SUITABLE FOR USE IN CAR PARKS, FORECOURTS & AREAS WITH SLOW MOVING TRAFFIC). FOR REDUCED ACCESS (RA) PPIC's A SEPARATE REDUCED ACCESS COVER (OR OTHER MEANS OF RESTRICTED ENTRY) IS ALSO TO BE PROVIDED AT THE LOWER LEVEL.



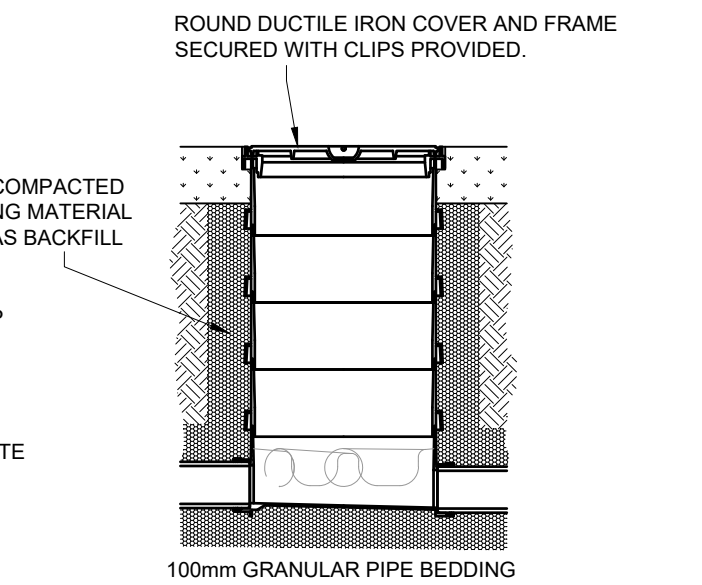
POLYPROPYLENE INSPECTION CHAMBER LOCATED IN 'SHARED ACCESS' AREAS (ACCESSABLE TO BIN WAGONS ETC)
SCALE - 1:20



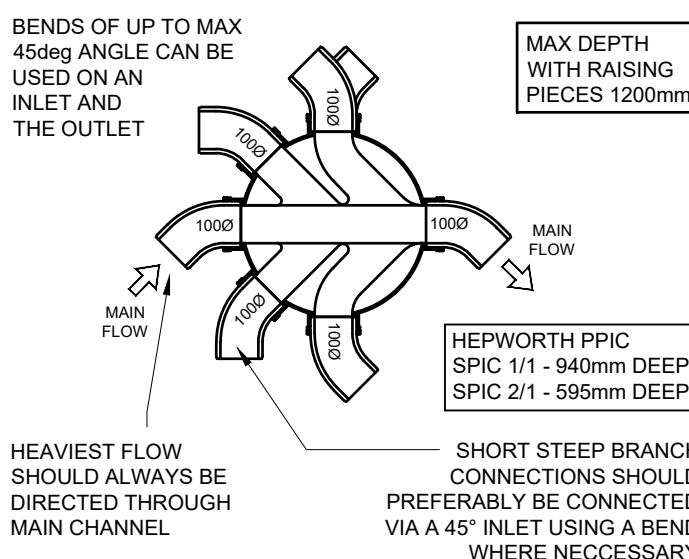
POLYPROPYLENE INSPECTION CHAMBER LOCATED IN HARD LANDSCAPED AREAS (NOT ACCESSABLE TO WHEELED VEHICLES)
SCALE - 1:20



POLYPROPYLENE INSPECTION CHAMBER LOCATED IN PRIVATE DRIVEWAY AREAS (ACCESSABLE TO DOMESTIC VEHICLES)
SCALE - 1:20

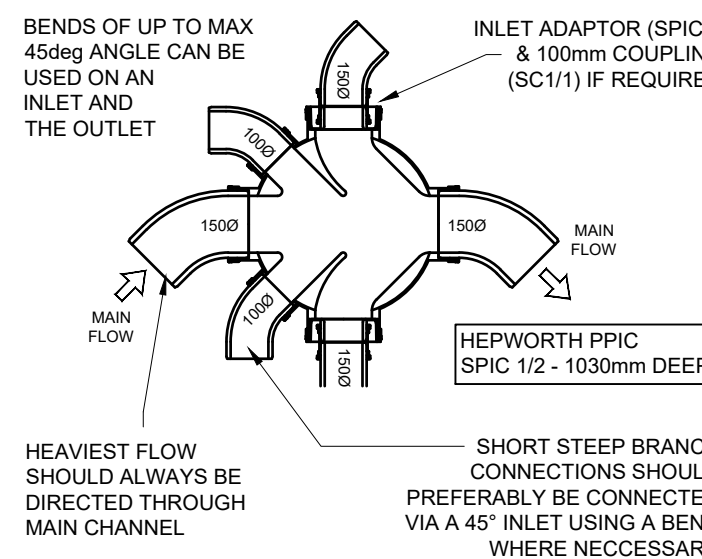


POLYPROPYLENE INSPECTION CHAMBER LOCATED IN SOFT LANDSCAPED AREAS
SCALE - 1:20



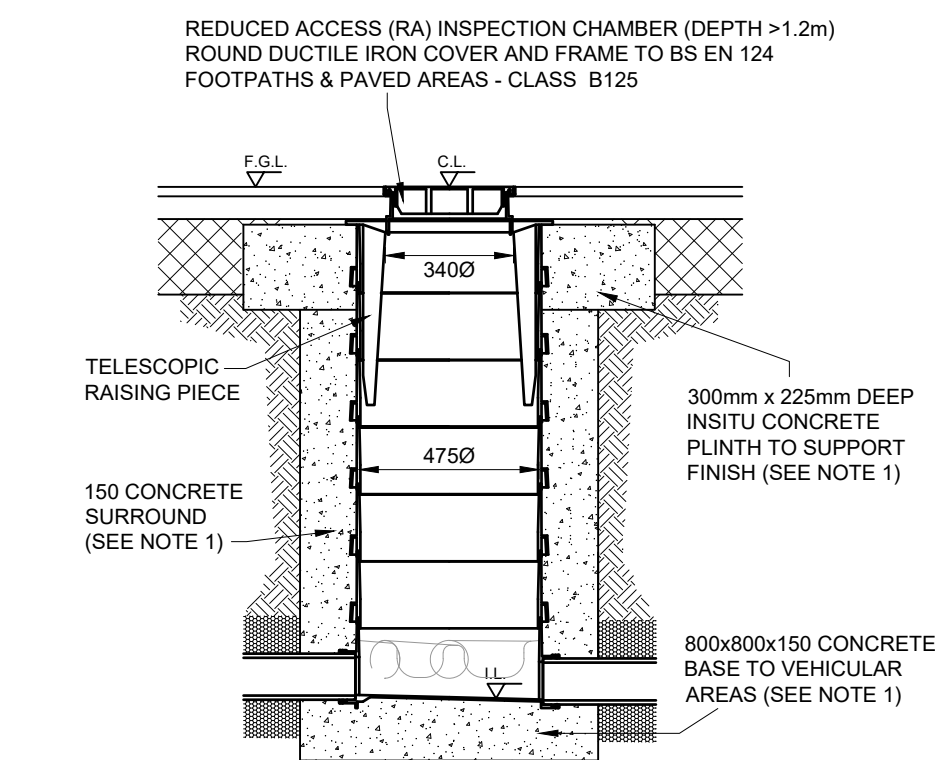
WHERE CHAMBERS ARE FITTED ON 90° CORNERS ALWAYS USE THE MAIN CHANNEL BY FITTING A 45deg BEND ON INLET & OUTLET.

PLAN ON PREFORMED BENCHING TO POLYPROPYLENE INSPECTION CHAMBER
SCALE - 1:20

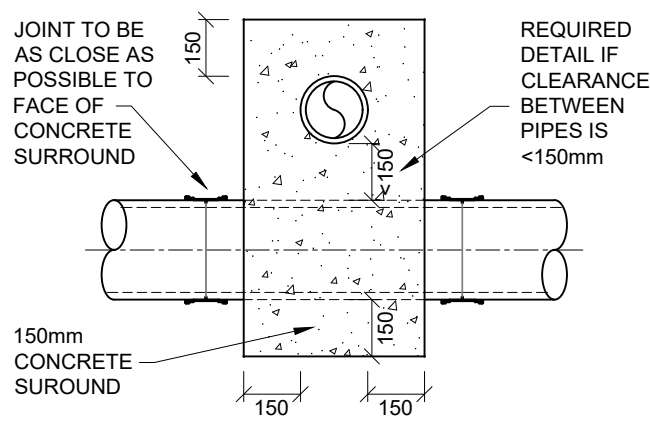


WHERE CHAMBERS ARE FITTED ON 90° CORNERS ALWAYS USE THE MAIN CHANNEL BY FITTING A 45deg BEND ON INLET & OUTLET.

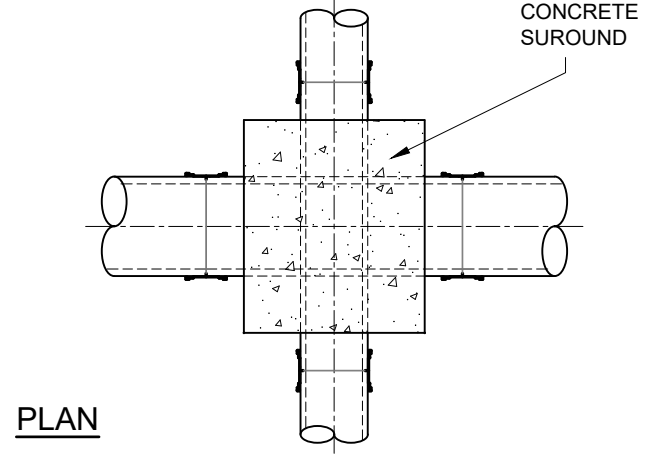
PLAN ON PREFORMED BENCHING TO POLYPROPYLENE INSPECTION CHAMBER
SCALE - 1:20



REDUCED ACCESS POLYPROPYLENE INSPECTION CHAMBER
SCALE - 1:20



ELEVATION



CONCRETE SURROUND DETAIL AT PIPE CROSSOVERS, NEEDED IF CLEARANCE BETWEEN PIPE CROSSINGS IS < 150mm
SCALE - 1:20

CLASS 'B' HALF DEPTH GRANULAR SURROUND
a) LAY AND COMPACT TO A THICKNESS NOT LESS THAN 100mm OVER FULL WIDTH OF TRENCH. WHERE TRENCH BOTTOM IS UNEVEN DUE TO HARD SPOTS INCREASE DEPTH BY 100mm. LAY PIPES DIGGING SLIGHTLY INTO BED AND RESTING UNIFORMLY. ADJUST TO LINE AND GRADIENT.
b) LAY & COMPACT GRANULAR MATERIAL UNIFORMLY TO HALF WAY UP EACH SIDE OF PIPE.
c) BACKFILL WITH SELECTED CUSHION OF 'SELECTED FILL'. COMPACT BY HAND IN 100mm LAYERS TO 150mm (250mm FOR ADAPTABLE SEWERS) ABOVE CROWN OF PIPE.

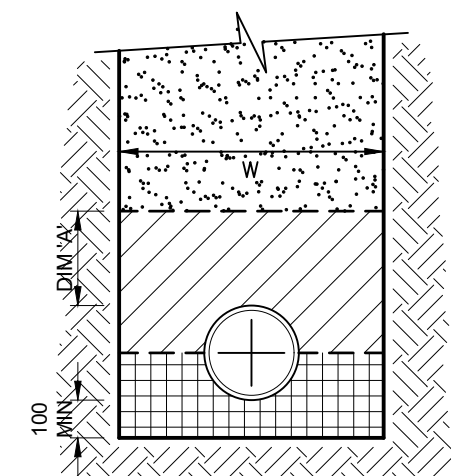
CLASS 'S' GRANULAR SURROUND
a) LAY AND COMPACT TO A THICKNESS NOT LESS THAN 100mm OVER FULL WIDTH OF TRENCH. WHERE TRENCH BOTTOM IS UNEVEN DUE TO HARD SPOTS INCREASE DEPTH BY 100mm. LAY PIPES DIGGING SLIGHTLY INTO BED AND RESTING UNIFORMLY. ADJUST TO LINE AND GRADIENT.
b) LAY & COMPACT GRANULAR MATERIAL IN 100mm LAYERS TO 100mm ABOVE CROWN OF PIPE. SIDEFILL MATERIAL TO BE PLACED EVENLY ON BOTH SIDES OF PIPE TAKING CARE TO WORK THE MATERIAL UNDER THE LOWER QUADRANT OF THE PIPE (ENSURING THE PIPE IS NOT LIFTED). BOTH SIDES OF THE TRENCH SHOULD BE FILLED SIMULTANEOUSLY TO AVOID HORIZONTAL MOVEMENT OF THE PIPE.
c) BACKFILL WITH SELECTED CUSHION OF 'SELECTED FILL'. COMPACT BY HAND IN 100mm LAYERS TO 150mm (250mm FOR ADAPTABLE SEWERS) ABOVE CROWN OF PIPE.

CLASS 'Z' CONCRETE SURROUND
a) FOR CONCRETE MIX SEE NOTE 2
b) LAY CONCRETE BLINDING, 25mm THICK OVER FULL WIDTH OF TRENCH & ALLOW TO SET.
c) LAY PIPES ON BLINDING ON FOLDING WEDGES OF COMPRESSIBLE BOARD TO GIVE MIN 150mm CLEARANCE UNDER THE PIPE.
d) FORM VERTICAL CONSTRUCTION JOINTS IN SURROUND AT FACE OF FLEXIBLE PIPE JOINTS AT MAX 5m c/c USING 18mm THICK COMPRESSIBLE BOARD PRECUT TO PROFILE OF PIPE. FILL ANY GAP BETWEEN SPIGOT AND SOCKET WITH RESILIENT MATERIAL TO PREVENT ENTRY OF CONCRETE.
e) AFTER INITIAL TESTING, PLACE AND COMPACT MORE CONCRETE FOR FULL WIDTH OF TRENCH TO ENCASE PIPE TO 150mm ABOVE CROWN.

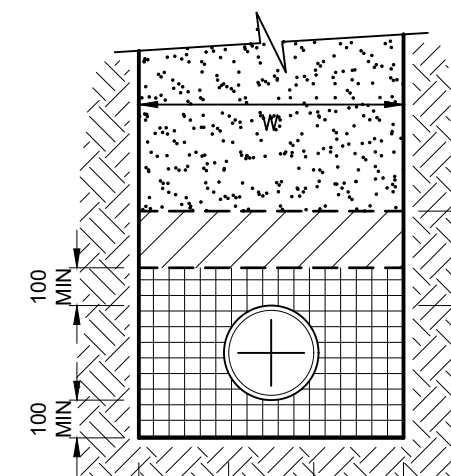
PIPE DIA.	WIDTH
150	600
225	700
300	750
375	1050
400	1100
450	1150
525	1200
600	1350
675	1450
750	1500
900	1900

DIM 'A'
MIN 250 (ADAPTABLE)
MIN 150 (GENERALY)

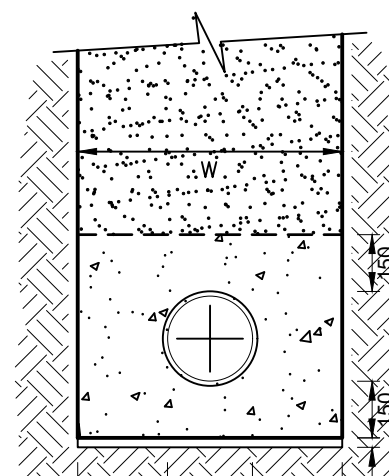
CLASS 'Y' CONCRETE SURROUND
a) WHERE CROWN OF PIPE IS LESS THAN 300mm BELOW UNDERSIDE OF SLAB, ENCASE PIPE IN CONCRETE OF SAME MIX AS SLAB AND CAST INTEGRALLY WITH SLAB. EXTEND LENGTH OF CONCRETE TO WITHIN 150mm OF NEAREST FLEXIBLE JOINT.
b) EXCAVATE TRENCH AFTER HARDWARE HAS BEEN LAID AND COMPACTED.
c) LAY CONCRETE BLINDING, 25mm THICK OVER FULL WIDTH OF TRENCH & ALLOW TO SET.
d) LAY PIPES ON BLINDING ON FOLDING WEDGES OF COMPRESSIBLE BOARD TO GIVE A MINIMUM 150mm CLEARANCE UNDER THE PIPE.



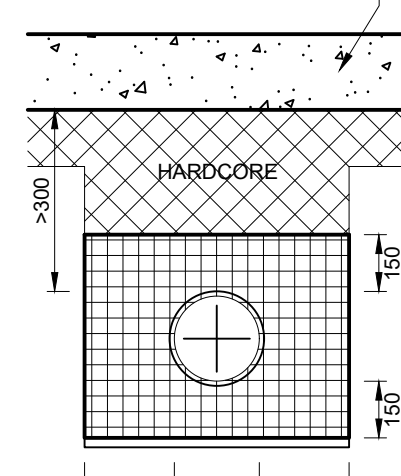
CLASS 'B' HALF DEPTH GRANULAR SUPPORT FOR VITRIFIED CLAY PIPEWORK
COVER > 1200mm in ROADS/PARKING
COVER > 600mm in SOFT LANDSCAPING
SCALE - 1:20



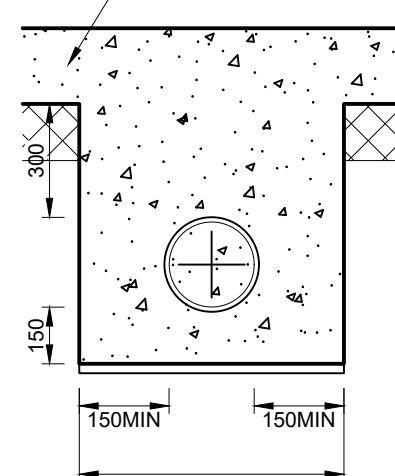
CLASS 'S' GRANULAR SURROUND FOR PVC STRUCTURED PIPES
COVER > 1200mm in ROADS/PARKING
COVER > 600mm in SOFT LANDSCAPING
SCALE - 1:20



CLASS 'Z' CONCRETE SURROUND
COVER < 1200mm in ROADS/PARKING
COVER < 600mm in SOFT LANDSCAPING
SCALE - 1:20



PIPE BEDDING DETAIL BELOW SLAB
(WHERE MORE THAN 300mm COVER)
SCALE - 1:20



CLASS 'Y' CONCRETE SURROUND BELOW SLAB
(WHERE LESS THAN 300mm COVER)
SCALE - 1:20



GENERAL FILL MATERIALS
TRENCHES SHALL BE BACKFILLED WITH MATERIAL EXCAVATED FROM WITHIN THE SITE OR IMPORTED ON TO THE SITE WHICH MEETS THE REQUIREMENTS OF A CLASS 1, 2 OR 3 GENERAL FILL MATERIAL COMPLYING WITH OF THE 'SPECIFICATION FOR HIGHWAY WORK, SERIES 600, TABLE 6/1. MECHANICAL COMPACTION OF MAIN BACKFILL MATERIAL SHOULD NOT BE COMMENCED UNTIL THEIR IS A TOTAL COVER DEPTH OF 300mm ABOVE THE CROWN OF PIPE.



SELECTED FILL (FILL SELECTED FROM EXCAVATED MATERIAL)
SELECTED FILL FROM EXCAVATED MATERIAL SHOULD BE READILY COMPACTABLE BY HAND AND FREE FROM TIMBER, FROZEN MATERIAL, VEGETABLE MATTER AND EXCLUDE HARD LUMPS OF CLAY RETAINED ON A 100mm SIEVE AND STONES RETAINED ON A 40mm SIEVE.



GRANULAR PIPE BEDDING PRIVATE PIPEWORK
FOR PIPE SIZE DN100 & DN150, GRANULAR SUPPORT TO COMPLY WITH THE REQUIREMENTS OF A MATERIAL OF DESIGNATION TYPE 4/10 TO BS EN 12620:2002 (i.e. 10mm SINGLE SIZED). FOR PIPE SIZE DN225 & DN300, GRANULAR SUPPORT TO COMPLY WITH THE REQUIREMENTS OF A MATERIAL OF DESIGNATION TYPE 4/20 TO BS EN 12620:2002 (i.e. THE MATERIAL SHOULD HAVE A PARTICLE SIZE THAT IS PREDOMINANTLY WITHIN THE RANGE OF 5 TO 20mm).
ADOPTED PIPEWORK
BEDDING AND SIDEFILL MATERIAL TO CONFORM TO THE REQUIREMENTS OF WATER INDUSTRY SPECIFICATION (WIS) 4-06-02 - 'SPECIFICATION FOR BEDDING AND SIDEFILL MATERIALS INCLUDING RECYCLED AGGREGATES FOR BURIED PIPELINES' (FEBRUARY 1994, INCORPORATING NOVEMBER 2008 AMMENDMENTS).

PIPE SIZE / STRENGTH CLASS / BEDDING
FOR EACH PIPE SIZE THE STRENGTH CLASS AND BEDDING/SIDEFILL (DEPENDANT ON COVER PROVIDED AND DESIGNATION OF SURFACING ie ROADS/PARKING, SOFT LANDSCAPING) SHOULD BE AS FOLLOWS ->

CLAY PIPEWORK
VITRIFIED CLAY DRAINAGE GOODS TO BE HEPWORTH SUPERSLEVE OR SIMILAR APPROVED TO BS EN 295-1 (KITEMARKED).

SIZE: DN 100 DN150 DN225 DN300
STRENGTH: FN 40 FN 40 FN 45 FN 72
BEDDING: CLASS 'B' CLASS 'B' CLASS 'B' CLASS 'B'

PVC-U PIPEWORK
PVC-U DRAINAGE GOODS TO BE HEPWORTH PLASTIDRAIN (110 to 1600), HEPWORTH SEWERDRAIN (200 to 6300) OR SIMILAR APPROVED TO BS 4660:2000 AND BS EN 1401-1:1998.

SIZE: DN 110 DN160 DN225 DN300
BEDDING: CLASS 'B' CLASS 'B' CLASS 'B' CLASS 'B'

1.0 GENERAL

- 1.1 THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S, ENGINEER'S & SPECIALIST'S DRAWINGS & SPECIFICATIONS.
- 1.2 WORK TO BE CARRIED OUT IN ACCORDANCE WITH CURRENT GOOD PRACTICE, BUILDING REGULATIONS AND SUBSEQUENT AMENDMENTS, THE PROJECT SPECIFICATION, RELEVANT BRITISH STANDARDS AND CODES OF PRACTICE. MATERIALS AND COMPONENTS TO BE SUITABLE FOR THEIR INTENDED USE.

REV	DATE	DRN	DESCRIPTION
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PURPOSE OF ISSUE
PRELIMINARY

CLIENT
PLP CONSTRUCTION LTD

PROJECT
**SITE OFF DOB BROOK CLOSE
NEWTON HEATH
MANCHESTER**

TITLE
**TYPICAL DRAINAGE DETAILS
(PRIVATE)**

JOB No.	DRAWING No.	REVISION
J072	/ 104	
DRAWN	CHECKED	@ SHEET SIZE
JSD	MD	A1
DATE	DATE	DATE
	AS NOTED	APR' 2021
	DRAWING NOT TO BE SCALED	

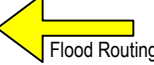
Email: info@DandDConsulting.co.uk
Web: www.DandDConsulting.co.uk
Tel: 07884 975243 (J. Dickinson)
07884 936577 (M. Davenport)

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consulting engineers

D and D Consulting Engineers Ltd
Mottram House, 43 Greek Street, Stockport, Cheshire SK3 8AX



FLOOD ROUTING

 Flood Routing

OVERLAND FLOOD ROUTING

REV.	DATE	DRN	DESCRIPTION
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PURPOSE OF ISSUE	PRELIMINARY
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CLIENT	PLP CONSTRUCTION LTD
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PROJECT	SITE OFF DOB BROOK CLOSE NEWTON HEATH MANCHESTER
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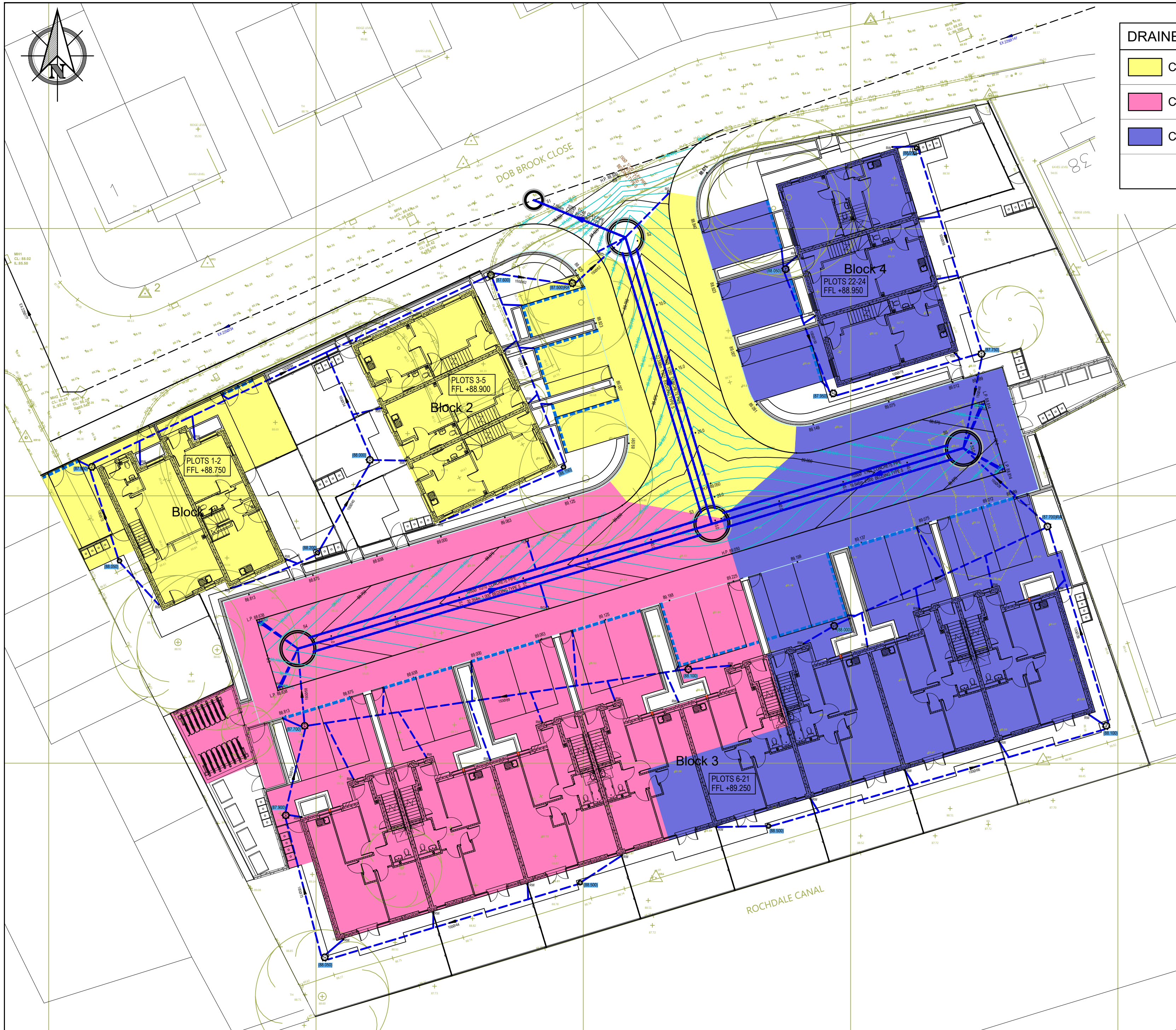
TITLE	STORMWATER EXCEEDENCE OVERLAND FLOW ROUTES
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JOB No.		DRAWING No.		REVISION
J072		/ 105		
DRAWN	CHECKED	SCALE	@ SHEET SIZE	DATE
JSD	MD	1:200	A2	APR' 2021
DRAWING NOT TO BE SCALED				

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DRAINED AREAS:		
	CONNECTING INTO 1.001 (u/s MH S2)	604 sq.m
	CONNECTING INTO 1.000 (u/s MH S4)	908 sq.m
	CONNECTING INTO 2.000 (u/s MH S5)	842 sq.m
		TOTAL AREA = 2,354sq.m

REV.	DATE	DRN	DESCRIPTION
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PURPOSE OF ISSUE	Information
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CLIENT	PLP CONSTRUCTION LTD
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PROJECT	SITE OFF DOB BROOK CLOSE NEWTON HEATH MANCHESTER
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TITLE	S104 STORMWATER DRAINAGE SCHEME
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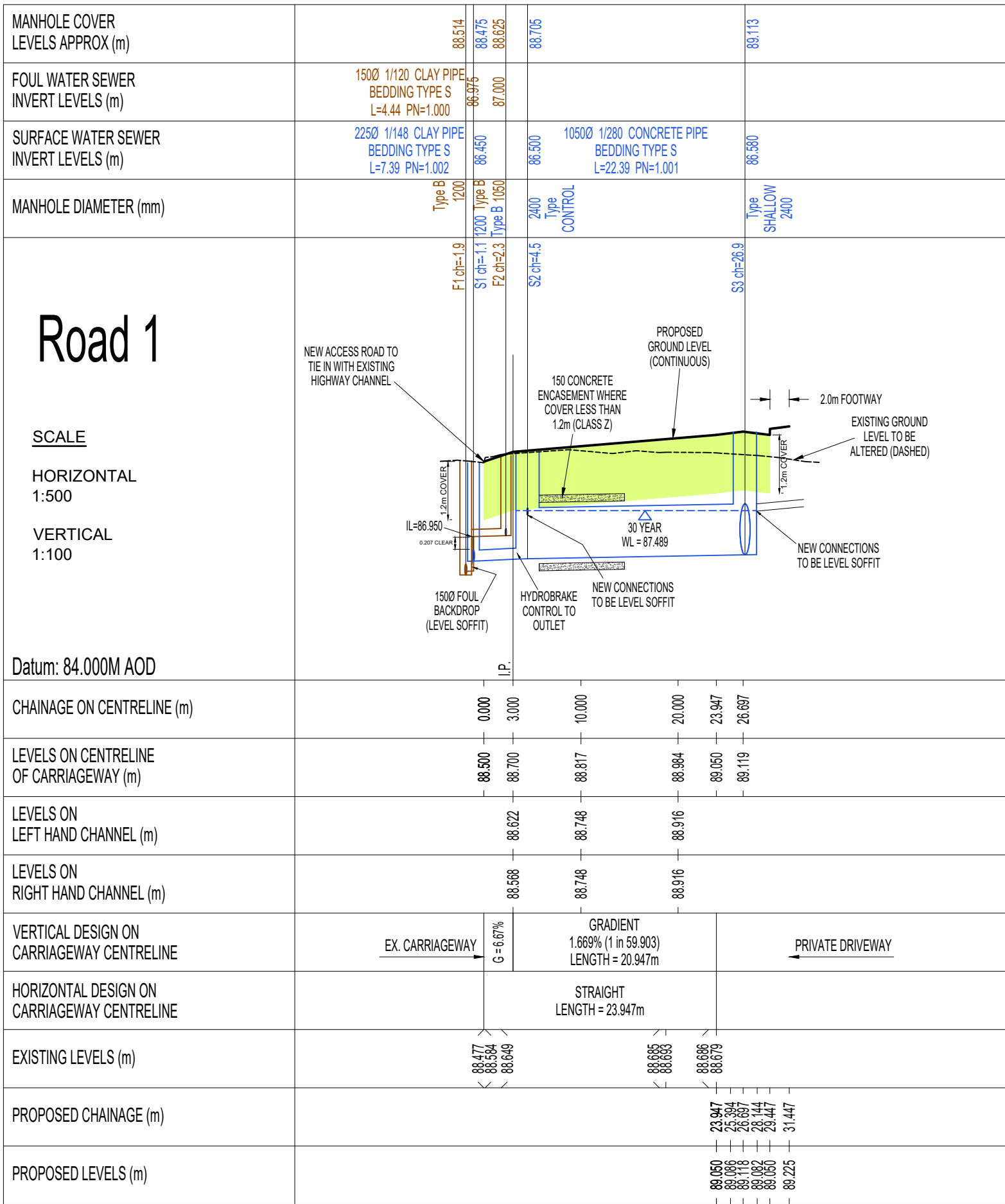
JOB No.		DRAWING No.		REVISION
J072		/ 110		
DRAWN	CHECKED	SCALE	@ SHEET SIZE	DATE
JSD	MD	1:200	A2	APR' 2021
DRAWING NOT TO BE SCALED				

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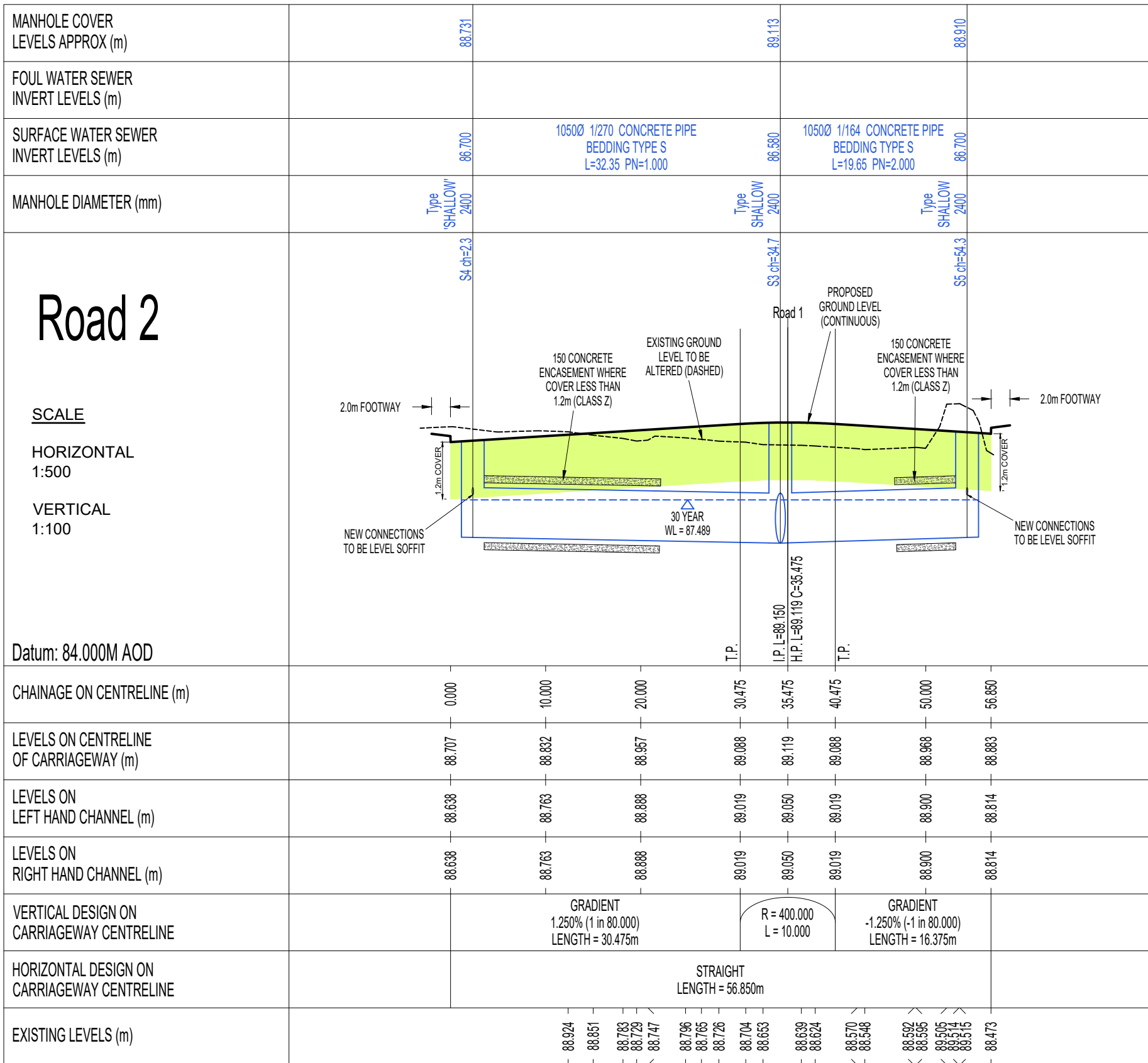
Tel:
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Road 1											
Chainage (m)	Easting (m)	Northing (m)	Level (m)	Curve/Straight	Left Channel Easting (m)	Left Channel Northing (m)	Left Channel Level (m)	Right Channel Easting (m)	Right Channel Northing (m)	Right Channel Level (m)	Right Channel Level (m)
0.000	388342.812	400702.864	88.500	Start of Channel	388342.857	400702.357	88.500				
0.000	388342.812	400702.864	88.500	Straight	388342.857	400702.357	88.500				
5.000	388344.056	400699.077	88.733	Straight	388344.056	400699.077	88.733				
10.000	388344.500	400694.280	88.817	Straight	388344.500	400694.280	88.817				
15.000	388346.943	400688.503	88.900	Straight	388346.943	400688.503	88.900				
20.000	388348.387	400684.715	88.884	Straight	388348.387	400684.715	88.884				
23.847	388349.527	400680.636	89.050	End of Channel	388349.527	400680.636	89.050				
25.000	388349.630	400678.303	89.075	Straight	388349.630	400678.303	89.075				
26.667	388350.320		89.119	End	388350.320		89.119				



Road 2											
Chainage (m)	Easting (m)	Northing (m)	Level (m)	Curve/Straight	Left Channel Easting (m)	Left Channel Northing (m)	Left Channel Level (m)	Right Channel Easting (m)	Right Channel Northing (m)	Right Channel Level (m)	Right Channel Level (m)
0.000	388316.354	400668.071	88.707	Start	388316.561	400670.704	88.638	388317.147	400665.438	88.638	
5.000	388321.141	400665.513	88.769	Straight	388321.141	400665.513	88.769	388321.141	400665.513	88.769	
10.000	388325.929	400670.065	88.832	Straight	388325.929	400670.065	88.832	388325.929	400670.065	88.832	
15.000	388330.716	400672.307	88.894	Straight	388330.716	400672.307	88.894	388330.716	400672.307	88.894	
20.000	388335.504	400674.549	88.957	Straight	388335.504	400674.549	88.957	388335.504	400674.549	88.957	
25.000	388340.291	400676.791	89.019	Straight	388340.291	400676.791	89.019	388340.291	400676.791	89.019	
30.000	388345.079	400679.033	89.082	Straight	388345.079	400679.033	89.082	388345.079	400679.033	89.082	
35.000	388349.866	400681.275	89.145	Straight	388349.866	400681.275	89.145	388349.866	400681.275	89.145	
40.000	388354.654	400683.517	89.208	Straight	388354.654	400683.517	89.208	388354.654	400683.517	89.208	
45.000	388359.441	400685.759	89.271	Straight	388359.441	400685.759	89.271	388359.441	400685.759	89.271	
50.000	388364.229	400688.001	89.334	Straight	388364.229	400688.001	89.334	388364.229	400688.001	89.334	
55.000	388369.016	400690.243	89.397	Straight	388369.016	400690.243	89.397	388369.016	400690.243	89.397	
56.850	388370.787	400691.994	89.460	End	388370.787	400691.994	89.460	388370.787	400691.994	89.460	

- NOTES -
- 1.0 GENERAL**
- 1.1 THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST DRAWINGS & SPECIFICATIONS.
- 1.2 WORK TO BE CARRIED OUT IN ACCORDANCE WITH CURRENT GOOD PRACTICE, BUILDING REGULATIONS AND SUBSEQUENT AMENDMENTS, THE PROJECT SPECIFICATION, RELEVANT BRITISH STANDARDS AND CODES OF PRACTICE. MATERIALS AND COMPONENTS TO BE SUITABLE FOR THEIR INTENDED USE.
- 1.3 FOR SETTING OUT REFER TO ARCHITECTS DRAWINGS.

THIS DRAWING IS SUBJECT TO SECTION 104 & SECTION 38 TECHNICAL APPROVALS.

A	26/04/21	JSD	FOUL MANHOLE F2 UPDATED.
REV	DATE	DRN	DESCRIPTION

PURPOSE OF ISSUE

PRELIMINARY

CLIENT

PLP CONSTRUCTION LTD

PROJECT

SITE OFF DOB BROOK CLOSE
NEWTON HEATH
MANCHESTER

TITLE

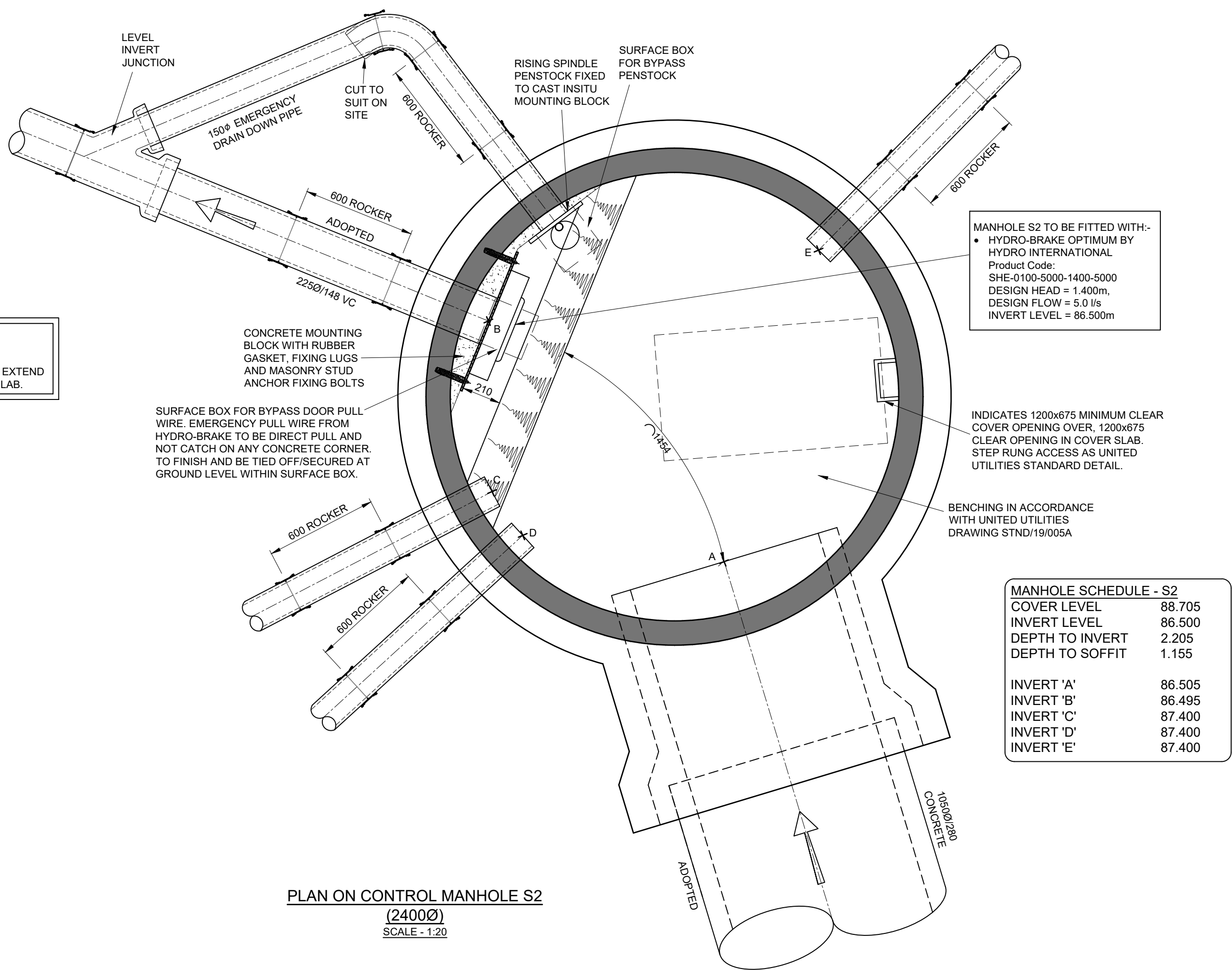
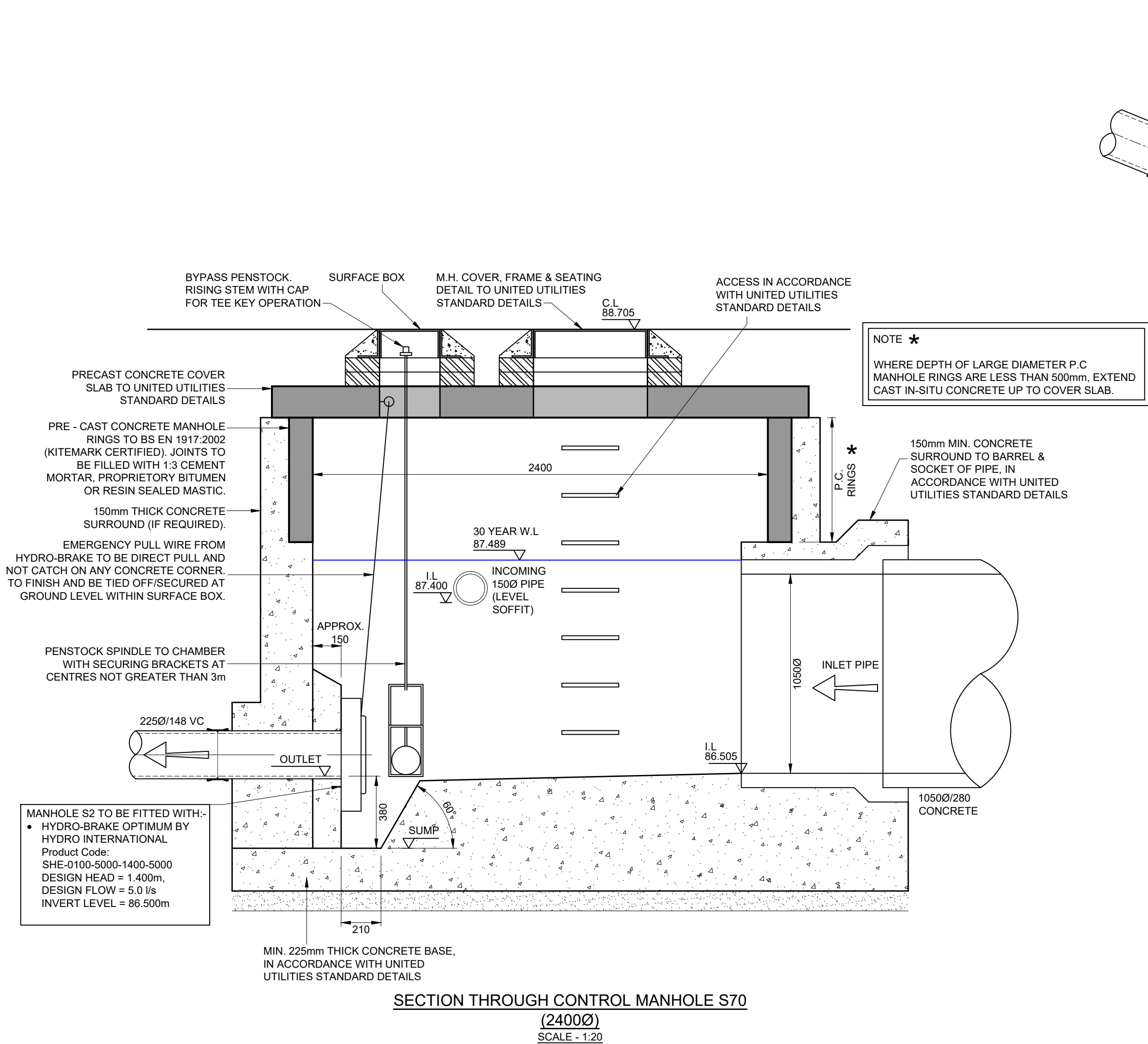
S104/S38 LONGITUDINAL SECTIONS

JOB No.	DRAWING No.	REVISION
J072	/ 112	A
DRAWN	CHECKED	SCALE
JSD	MD	AS NOTED A1
		DRAWING NOT TO BE SCALED

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Mottram House, 43 Greek Street, Stockport, Cheshire SK3 8AX



NOTES -

1.0 ADOPTED DRAINAGE (UNITED UTILITIES)

1.1 ALL ADOPTABLE SEWER WORKS AND MATERIAL TO BE IN ACCORDANCE WITH SEWER FOR ADOPTION SIXTH EDITION, THE RELEVANT BRITISH/EUROPEAN STANDARDS AND UNITED UTILITIES REQUIREMENTS.

1.2 THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT UNITED UTILITIES PLC DEVELOPER SERVICES CONSTRUCTION DETAIL DRAWINGS.

1.3 MANHOLE COVERS TO HAVE CLASS D400 TO BS EN 124 WITH 150mm DEEP FRAMES IN HIGHWAYS.

1.4 COVER SLABS MUST CARRY THE BSI KITEMARK. WHERE THE CLEAR OPENING OF THE KITE MARKED PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME A LOAD BEARING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN TO THE SPECIFIED OPENING. PLEASE REFER TO CONCRETE PIPES SYSTEMS ASSOCIATION (CPSA) TECHNICAL BULLETIN AUTUMN 2004 FOR KITEMARKED COVER SLAB OPENING SIZES.

1.5 CHANNEL REFERENCES REFER TO HEPWORTH DRAINAGE PRODUCTS

ALL CONNECTIONS TO THE ADOPTED SYSTEM TO BE MADE AT LEVEL SOFFITS.

FOR MANHOLES DEEPER THAN 3.0m TO BENCHING A LADDER IS REQUIRED. INSTALLED IN ACCORDANCE WITH UNITED UTILITIES STANDARD DETAILS.

ACCESS LADDERS, REDUCING SLABS, HANDRAILING, SAFETY CHAINS ETC. ALL TO BE IN ACCORDANCE WITH UNITED UTILITIES STANDARD DRAWINGS AS NOTED IN 1.2 ABOVE.

BENCHING DETAILS FOR OVERSIZED SEWERS TO BE IN ACCORDANCE WITH UNITED UTILITIES STANDARD DRAWING NUMBERS STND/19/002 REV A, 004 REV A & 010 REV A.

REV	DATE	DRN	DESCRIPTION
PURPOSE OF ISSUE PRELIMINARY			
CLIENT PLP CONSTRUCTION LTD			
PROJECT SITE OFF DOB BROOK CLOSE NEWTON HEATH MANCHESTER			
TITLE S104 CONTROL MANHOLE S2 SECTION & DETAILS			
JOB No.	DRAWING No.	REVISION	
J072	/ 114		
DRAWN JSD	CHECKED MD	SCALE 1:20 DRAWING NOT TO BE SCALED	@ SHEET SIZE A1 DATE APR' 2021
Email: info@DandDconsulting.co.uk Web: www.DandDconsulting.co.uk Tel: 07884 975243 (J.Dickinson) 07884 936577 (M.Davenport)			
D and D Consulting Engineers Ltd Mottram House, 43 Greek Street, Stockport, Cheshire SK3 8AX			