

Drainage Planning Details

Subject: This City Residential Development, Ancoats – Rodney Street

Ref: 079056/DPC Rev V02

Date: 10/08/2022

The Planning Application Ref: 134154/VO/2022
Response to draft drainage condition

(a) the development shall not commence until a scheme for the drainage of surface water from the development shall be submitted for approval in writing by the City Council as the Local Planning Authority. This shall include: • Consideration of alternative green SuDS solution (such as SuDS enabled street trees) if practicable. • 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 in any part of a building. • Assessment of overland flow routes for extreme events that is diverted away from buildings (including basements). 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. • Hydraulic calculation of the proposed drainage system. • Construction details of flow control and SuDS elements. (b) The development shall then be constructed in accordance with the approved details, within an agreed timescale.	Pre-Commencement
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Proposed Drainage:

The proposed drainage system consists of a separate foul and surface water network. Reference should be made to the following drainage design documents:

- RODSTA-CUR-XX-XX-DR-C-92500-P04_Drainage Layout
- RODSTA-CUR-XX-XX-DR-C-92510-P01_Manhole Schedule
- RODSTA-CUR-XX-XX-DR-C-92520-P02_Typical Drainage Details Sheet 1
- RODSTA-CUR-XX-XX-DR-C-92521-P01_Typical Drainage Details Sheet 2
- RODSTA-CUR-XX-XX-DR-C-92522-P01_Typical Drainage Details Sheet 3
- 079056-CUR-XX-XX-DR-C-94700-P03_External Works Layout
- RODSTA-CUR-XX-XX-DR-C-92540-P01_Overland Flow Routes
- Surface Water Calcs – 1, 30, 100 year +45%

With specific reference to the points covered by draft condition:

Consideration of alternative green SuDS solution (such as SuDS enabled street trees) if practicable.

In accordance with the National Planning Policy Framework (NPPF) a sustainable drainage system (SuDS) should be provided unless demonstrated to be inappropriate. The following options have been considered for the site:

Infiltration Systems:

Systems such as infiltration trenches and soakaways were considered as part of the surface water management strategy however, the ground conditions indicate significant depths of made ground across the site and the testing completed to date indicates negligible results for infiltration. Therefore, infiltration systems are not considered suitable for the site.

Green/Blue roofs:

Green/Blue roofs were considered for the site however, they are not considered viable.

Swales, Wetlands and Attenuation Ponds:

Due to the nature of the site and the limited space available, pre-treatment steps and retention systems such as swales, wetlands and ponds are not considered suitable for the site due to their space requirements.

Permeable Paving

Permeable paving has been considered and will be used in various areas across the site.

The hardstanding areas noted as permeable construction will have a variety of permeable surface finishes which will be constructed over a permeable sub-base.

The sub-base construction will provide approximately 30% of its depth as storage capacity which will intercept run-off prior to discharge into the wider drainage system and traditional storage provision on site.

As the sub-base is being used to create voids, it is important that this is not heavily trafficked by construction vehicles prior to completion as this can cause crushing of the stone and affect the ability of water to percolate through the granular material. Areas likely to be subject to continuous overrun during construction will be directed towards a rain garden, where surface falls or connection depths allow.

Rain Gardens and Drained Soft Landscaping

It is currently proposed to include localised rain gardens which will locally drain external paved areas.

The rain gardens will be planted shallow basins constructed over a free draining sub-base.

The rain gardens are proposed in areas where localised run-off from hardstanding can be directed towards the rain gardens. The rain garden will act as a collection facility which will intercept run-off prior to discharge into the wider drainage system and traditional storage provision on site.

Further co-ordination of the detail and capacity is required with the Landscape Architect.

Rainwater Recycling

The extensive planting around the site within the public realm, is located in Manchester, a city well known for its rainfall. Whilst future climate change may well decrease the rainfall or make the weather patterns more sporadic, the plant species selected will be robust, whether native or ornamental.

A percentage of planting will be selected to create 'Rain Gardens' capable of accommodating surges of surface water and periods of dry-spells.

The growing medium will be a minimum of 450mm soil, with a mulch material to suppress weeds and retain moisture.

Inclusion of an extensive irrigation system is not considered necessary and omission of this will remove future liability and maintenance - accidental damage (replanting) or vandalism.

It has been concluded that an irrigation system will be excluded.

We have alternatively looked at the opportunity to introduce rainwater harvesting for the WCs for example, but this would require a large tank to accommodate the necessary demand for each building.

As an example, for Block A there are 116 WCs which would be 6 litres per flush, estimating say 8 uses per day, this would require a 6 m³ storage tank, pump system, header tank, control unit and backup water supply. On this basis, this would not be viable in the current scheme.

SuDS Conclusion

The development is proposing to include:

- Permeable Paving

- Rain gardens

The current scheme utilises a combination of rain gardens and permeable paving across the site to intercept flows prior to entering the drainage system. Refer to Drainage Layout, Drainage Details Drawings and External Works drawings for details.

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 in any part of a building.

The system has been designed to accommodate the 100-year event with an allowance of 45% climate change. Refer to calculations enclosed in Appendix B.

Assessment of overland flow routes for extreme events that is diverted away from buildings (including basements). 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.

Refer to the Overland Flow Routes drawing enclosed in Appendix A.

Hydraulic calculation of the proposed drainage system.

Refer to calculations enclosed in Appendix B.

Construction details of flow control and SuDS elements

Refer to the Drainage Details drawing enclosed in Appendix A.

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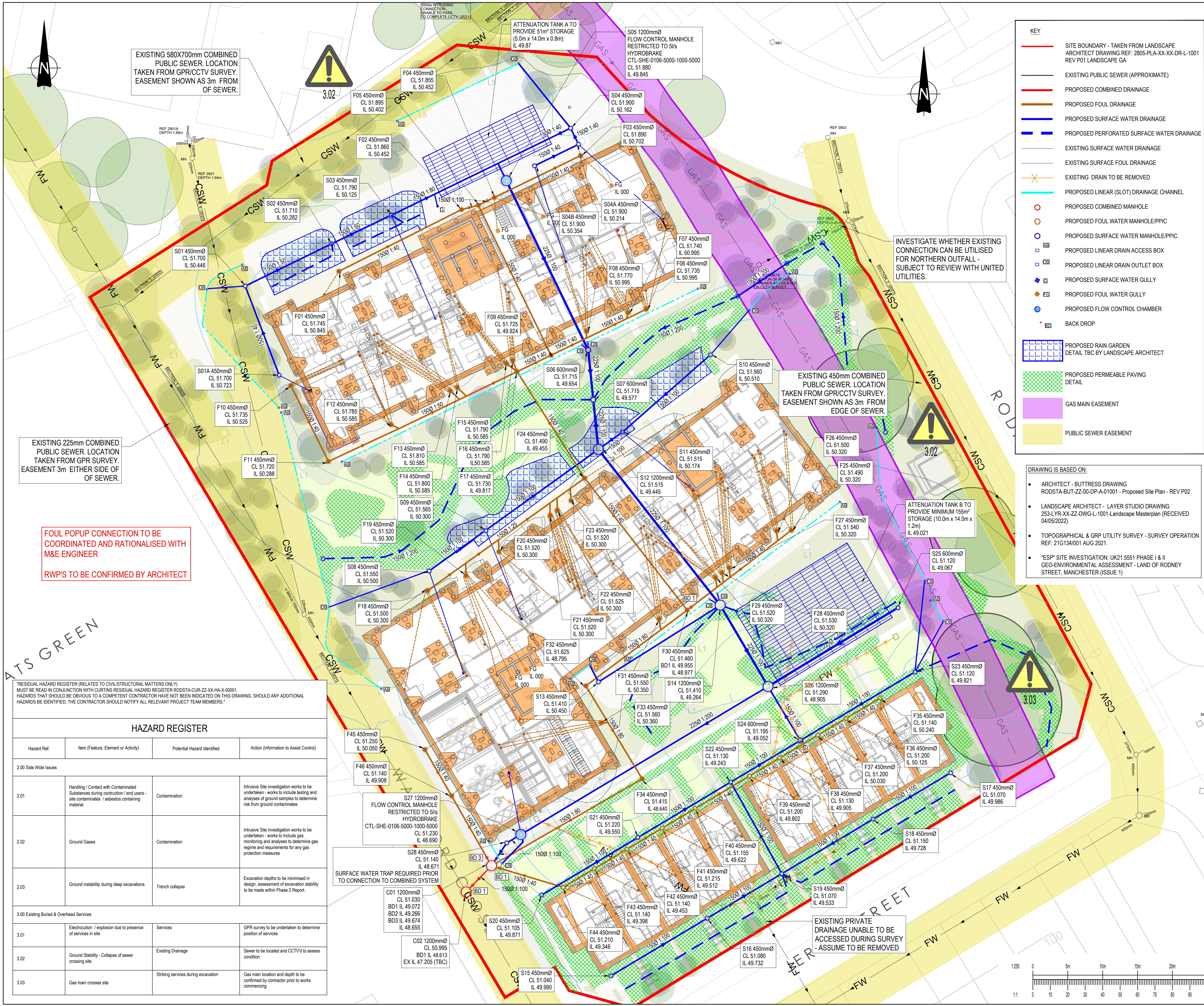
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Appendix A

- RODSTA-CUR-XX-XX-DR-C-92500-P04_Drainage Layout
- RODSTA-CUR-XX-XX-DR-C-92510-P01_Manhole Schedule
- RODSTA-CUR-XX-XX-DR-C-92520-P02_Typical Drainage Details Sheet 1
- RODSTA-CUR-XX-XX-DR-C-92521-P01_Typical Drainage Details Sheet 2
- RODSTA-CUR-XX-XX-DR-C-92522-P01_Typical Drainage Details Sheet 3
- 079056-CUR-XX-XX-DR-C-94700-P03_External Works Layout
- RODSTA-CUR-XX-XX-DR-C-92540-P01_Overland Flow Routes



GENERAL NOTES:

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
- DESIGN BASED ON TOPOGRAPHICAL SURVEY AND CCTV SURVEY INFORMATION AVAILABLE AT THE TIME OF DESIGN.
- ALL EXISTING SEWERS, CONNECTIONS, PIPE SIZES AND INVERT LEVELS TO BE CONFIRMED BY CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS TO ENSURE CONNECTIVITY. ANY VARIANCE FROM THE INFORMATION SHOWN SHOULD BE REPORTED TO THE ENGINEER FOR REVIEW.
- DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
- ALL DIMENSIONS ARE IN METRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE NOTED.
- WHERE EXISTING DRAINAGE IS BEING USED, ALLOWANCES SHOULD BE MADE TO REMEDIATE THIS DRAINAGE IN LINE WITH AVAILABLE CCTV SURVEY INFORMATION. IF NO SURVEY IS AVAILABLE, IT IS ADVISED TO OBTAIN ONE PRIOR TO COMMENCEMENT OF WORKS.
- ALL EXISTING SERVICES TO BE LOCATED PRIOR TO COMMENCEMENT OF ANY DRAINAGE WORKS, AND WHERE NECESSARY PROTECTION OR DIVERSIONS TO BE UNDERTAKEN TO AVOID CONFLICT WITH THE PROPOSED WORK.
- ALL RAINWATER AND FOUL POP UPS LOCATIONS AND SIZES INDICATIVE ONLY AND TO BE CONFIRMED BY THE ARCHITECT AND M&E ENGINEER.
- COVER LEVELS, GULLY POSITIONS, AND BUILDINGS LOCATION ARE APPROXIMATE AND SHALL BE CONFIRMED BY ARCHITECT/ LANDSCAPE ARCHITECT.
- ALL PIPE DIAMETERS GIVEN ARE NOMINAL INTERNAL PIPE DIAMETERS. THESE ARE TO BE CONFIRMED BY A DETAILED CAPACITY CHECK HAS BEEN UNDERTAKEN AT A LATER DESIGN STAGE.
- OUTFALL CONNECTION(S) SUBJECT TO AGREEMENT WITH THE APPROVING AUTHORITY.

KEY

- SITE BOUNDARY - TAKEN FROM LANDSCAPE ARCHITECT DRAWING REF: 2805-PLA-XX-XX-DR-L-1001 REV P01 LANDSCAPE GA
- EXISTING PUBLIC SEWER (APPROXIMATE)
- PROPOSED COMBINED DRAINAGE
- PROPOSED FOUL DRAINAGE
- PROPOSED SURFACE WATER DRAINAGE
- PROPOSED PERFORATED SURFACE WATER DRAINAGE
- EXISTING SURFACE WATER DRAINAGE
- EXISTING SURFACE FOUL DRAINAGE
- EXISTING DRAIN TO BE REMOVED
- PROPOSED LINEAR (SLOT) DRAINAGE CHANNEL
- PROPOSED COMBINED MANHOLE
- PROPOSED FOUL WATER MANHOLE/PPIC
- PROPOSED SURFACE WATER MANHOLE/PPIC
- PROPOSED LINEAR DRAIN ACCESS BOX
- PROPOSED LINEAR DRAIN OUTLET BOX
- PROPOSED SURFACE WATER GULLY
- PROPOSED FOUL WATER GULLY
- PROPOSED FLOW CONTROL CHAMBER
- BACK DROP
- PROPOSED RAIN GARDEN
DETAIL TBC BY LANDSCAPE ARCHITECT
- PROPOSED PERMEABLE PAVING
DETAIL
- GAS MAIN EASEMENT
- PUBLIC SEWER EASEMENT

DRAWING IS BASED ON:

- ARCHITECT - BUTTRESS DRAWING
RODSTA-BUT-ZZ-00-DP-A-01001 - Proposed Site Plan - REV P02
- LANDSCAPE ARCHITECT - LAYER STUDIO DRAWING
253-LYR-XX-ZZ-DWG-L-1001-Landscape Masterplan (RECEIVED 04/05/2022)
- TOPOGRAPHICAL & GRP UTILITY SURVEY - SURVEY OPERATION
REF: 21G134/001 AUG 2021.
- *ESP* SITE INVESTIGATION: UK21.5551 PHASE I & II
GEO-ENVIRONMENTAL ASSESSMENT - LAND OF RODNEY STREET, MANCHESTER (ISSUE 1)

P05	DRAFT STAGE 4 ISSUE	05/08/22	LK	CG
P04	ISSUED FOR PLANNING	09/06/22	LK	CG
P03	STAGE 3 ISSUE	27/05/22	LK	AR
P02	DRAFT STAGE 3 ISSUE	13/05/22	LK	CG
P01	STAGE 2	20/10/21	CG	CG

Rev:	Description:	Date:	By:	Chkd:

ISSUED FOR PLANNING

RODNEY STREET

DRAINAGE LAYOUT

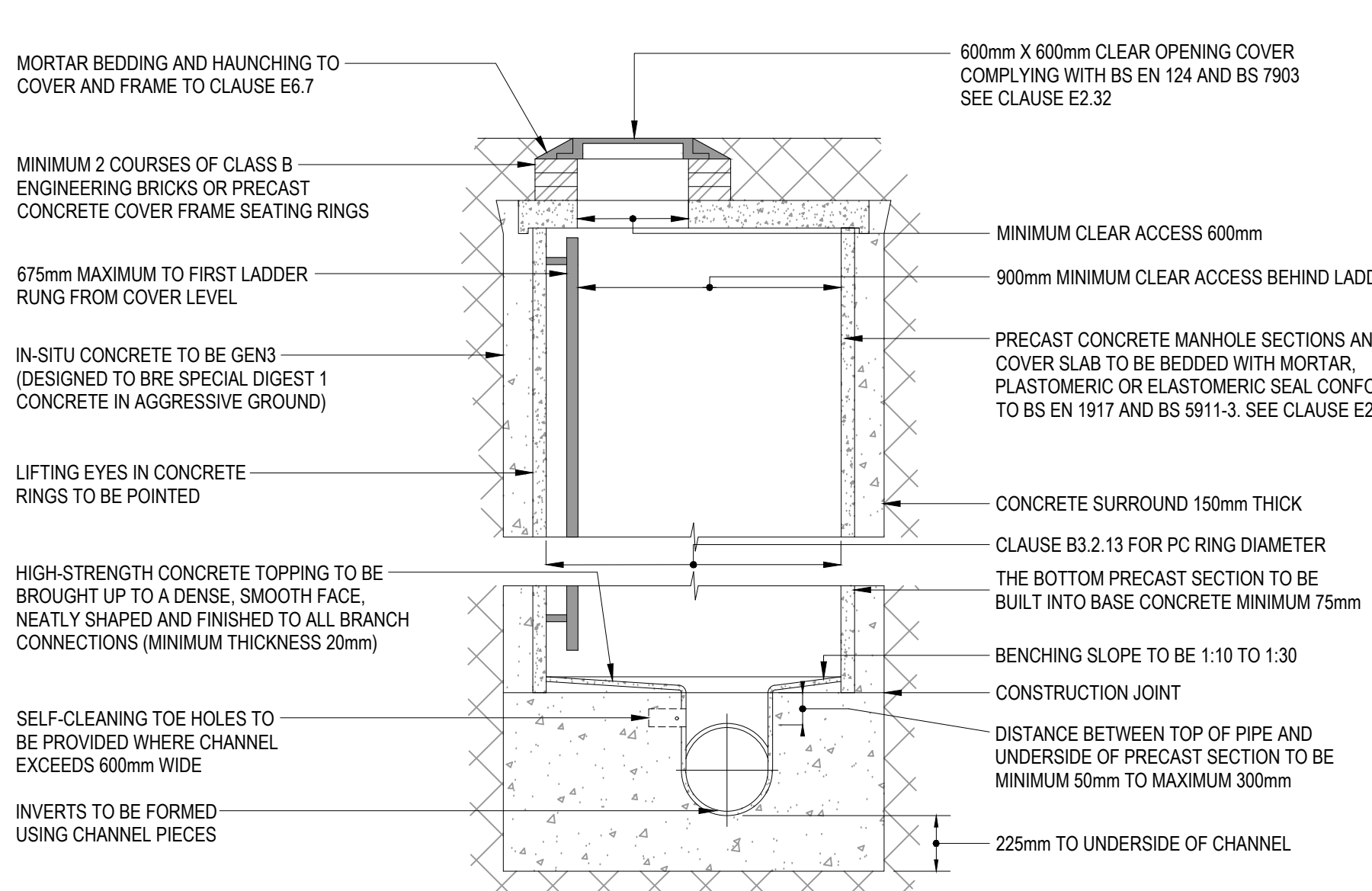
Size:	Date:	Drawn By:	Designed By:	Checked By:
A1	20/10/21	CG	CG	CG

Scale:	1:250			
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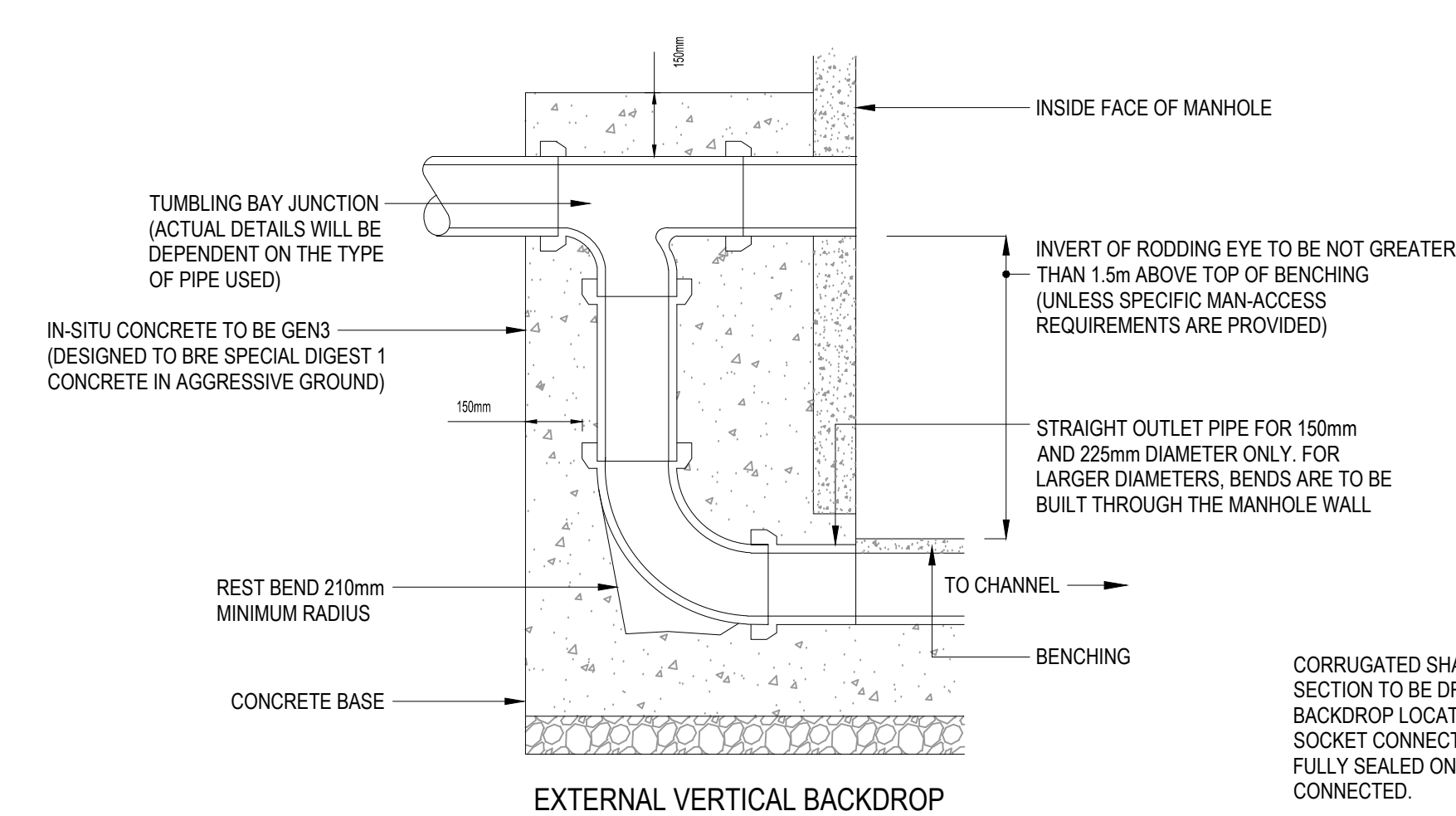
Project No:	Originator:	Volume:	Level:	Type:	Role:	Category/Number:	Rev:
RODSTA-CUR-XX-XX-DR-C-92500							P05

HAZARD REGISTER			
Hazard Ref.	Item (Feature, Element or Activity)	Potential Hazard Identified	Action (Information to Assist Control)
2.00 Side Wide Issues			
2.01	Handling / Contact with Contaminated Substances during construction / end users - site contaminants / asbestos containing material	Contamination	Intrusive Site investigation works to be undertaken - works to include testing and analyses of ground samples to determine risk from ground contaminants
2.02	Ground Gases	Contamination	Intrusive Site investigation works to be undertaken - works to include gas monitoring and analyses to determine gas regime and requirements for any gas protection measures
2.03	Ground instability during deep excavations	Trench collapse	Excavation depths to be minimised in design, assessment of excavation stability to be made within Phase 2 Report.
3.00 Existing Buried & Overhead Services			
3.01	Electrocution / explosion due to presence of services in site	Services	GPR survey to be undertaken to determine position of services
3.02	Ground Stability - Collapse of sewer crossing site	Existing Drainage	Sewer to be located and CCTV'd to assess condition
3.03	Gas main crosses site	Striking services during excavation	Gas main location and depth to be confirmed by contractor prior to works commencing.

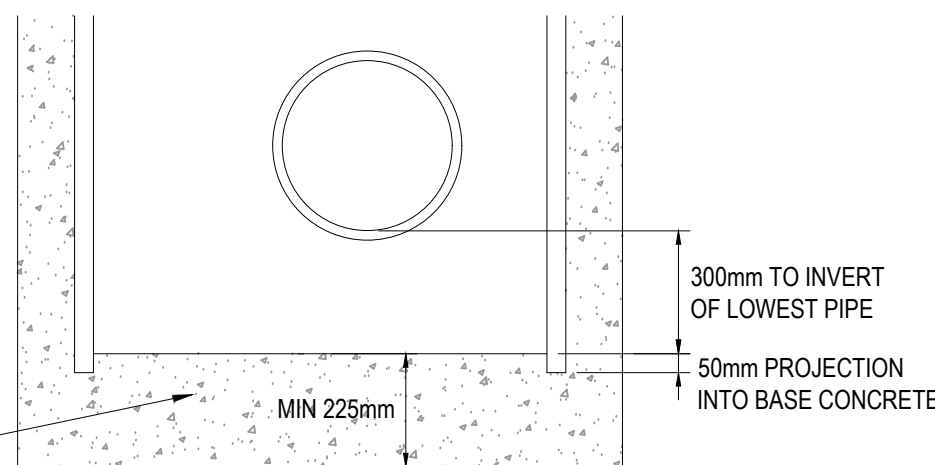
Manhole schedule																	
MH REF	CL (mAOD)	IL (mAOD)	DEPTH TO SOFFIT (m)	DS PIPE DIA (mm)	MH DIA (mm)	MH TYPE	CATCHPIT	COVER SIZE (mm)	COVER CLASS	COVER TYPE	RECESSED	RESTRICTED ACCESS	BACK DROP	Back drop IL (mAOD)	COMMENTS	EASTING	NORTHING
Foul Water																	
F01	51.745	50.845	0.75	150	450	PPIC	N	450X450	D400	DOUBLE SEALED	SUBJECT TO ARCHITECT CONFIRMATION	N	N	N/A	UNRESTRICTED;	385272.829	398983.465
F02	51.860	50.452	1.26	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385286.887	398990.537
F03	51.890	50.702	1.04	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385300.517	398996.721
F04	51.855	50.452	1.25	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385290.631	398991.922
F05	51.895	50.402	1.34	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385288.810	398991.039
F06	51.735	50.995	0.59	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385308.028	398979.116
F07	51.740	50.995	0.60	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385305.954	398978.723
F08	51.770	50.995	0.63	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385301.209	398976.588
F09	51.725	49.924	1.65	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385297.140	398973.846
F10	51.735	50.525	1.06	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385267.328	398970.385
F11	51.720	50.288	1.28	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385271.630	398961.678
F12	51.785	50.585	1.05	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385278.817	398965.904
F13	51.810	50.585	1.08	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385285.616	398969.770
F14	51.800	50.585	1.07	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385286.401	398970.150
F15	51.790	50.585	1.06	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385292.043	398972.884
F16	51.790	50.585	1.06	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385292.744	398973.223
F17	51.730	49.817	1.76	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385293.259	398971.971
F18	51.500	50.300	1.05	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385283.003	398946.897
F19	51.520	50.300	1.07	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385287.390	398948.634
F20	51.520	50.300	1.07	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385291.160	398951.330
F21	51.520	50.300	1.07	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385297.038	398955.532
F22	51.525	50.300	1.08	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385297.857	398956.118
F23	51.520	50.300	1.07	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385299.425	398957.193
F24	51.490	49.455	1.89	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385300.994	398959.764
F25	51.490	50.320	1.02	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385324.658	398953.785
F26	51.500	50.320	1.03	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385322.981	398953.713
F27	51.540	50.320	1.07	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385317.540	398949.472
F28	51.530	50.320	1.06	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385316.720	398948.900
F29	51.520	50.320	1.05	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385315.995	398948.336
F30	51.460	49.955	1.36	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385312.737	398944.640
F31	51.550	50.350	1.05	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385309.529	398943.626
F32	51.625	48.795	2.68	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385301.126	398935.965
F33	51.560	50.360	1.05	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385302.922	398931.748
F34	51.415	48.640	2.63	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385307.588	398925.302
F35	51.140	50.240	0.75	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385334.881	398934.597
F36	51.200	50.125	0.93	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385330.931	398932.238
F37	51.200	50.030	1.02	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385327.686	398930.300
F38	51.130	49.905	1.08	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385323.372	398927.722
F39	51.200	49.802	1.25	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385319.851	398925.620
F40	51.155	49.622	1.38	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385313.647	398921.914
F41	51.215	49.512	1.55	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385309.889	398919.670
F42	51.140	49.453	1.54	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385305.837	398917.249
F43	51.140	49.398	1.59	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385302.092	398915.012
F44	51.210	49.346	1.71	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385298.527	398912.883
F45	51.250	50.050	1.05	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385282.683	398928.66
F46	51.140	49.908	1.08	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385285.752	398923.354
Surface Water																	
S01A	51.700	50.723	0.83	150	450	PPIC	N	450X450	D400	SINGLE SEALED	SUBJECT TO ARCHITECT CONFIRMATION	N	N	N/A	UNRESTRICTED;	385265.987	398971.553
S01	51.700	50.446	1.10	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385262.969	398982.194
S02	51.710	50.282	1.28	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385270.343	398985.812
S03	51.790	50.125	1.52	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385278.825	398989.898
S04B	51.885	50.354	1.38	150	450	PPIC	Y	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385295.245	398995.555
S04A	51.885	50.214	1.52	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385300.285	398998.012
S04	51.900	50.162	1.59	150	450	PPIC	Y	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385299.384	398999.871
S05	51.885	49.845	1.82	225	1200	TYPE B	N	600X600	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385292.83	398993.634
S06	51.774	49.654	1.90	225	600	PPIC	N	600X600	D400			N	N	N/A	UNRESTRICTED;	385301.06	398976.388
S07	51.600	49.577	1.80	225	600	PPIC	N	600X600	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385301.974	398968.751
S08	51.550	50.500	0.90	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385283.171	398949.134
S09	51.570	50.300	1.12	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385289.682	398953.752
S10	51.560	50.510	0.90	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385315.414	398973.908
S11	51.510	50.174	1.19	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385305.324	398965.045
S12	51.514	49.445	1.77	300	1200	TYPE B	N	600X600	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385302.561	398963.059
S13	51.500	50.450	0.90	150	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385298.72	398935.27
S14	51.408	49.264	1.84	300	1200	TYPE B	N	600X600	D400			N	N	N/A	UNRESTRICTED;	385316.529	398945.213
S15	51.040	49.990	0.95	100	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385303.995	398902.745
S16	51.080	49.732	1.25	100	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385315.049	398909.347
S17	51.070	49.986	0.98	100	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385342.939	398925.94
S18	51.140	49.728	1.31	100	450	PPIC	N	450X450	D400			N	N	N/A	UNRESTRICTED;	385334.052	398920.698
S19	51.070	49.533	1.39	150	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385323.584	398914.445
S20	51.100	49.871	1.13	100	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385296.058	398911.999
S21	51.220	49.550	1.57	100	450	PPIC	N	450X450	D400			Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385307.086	398918.586
S22	51.130	49.243	1.74	150	450	PPIC	N	450X450	D400	Y	N	N/A	RESTRICTED ACCESS 350mm DIA MAX;	385317			



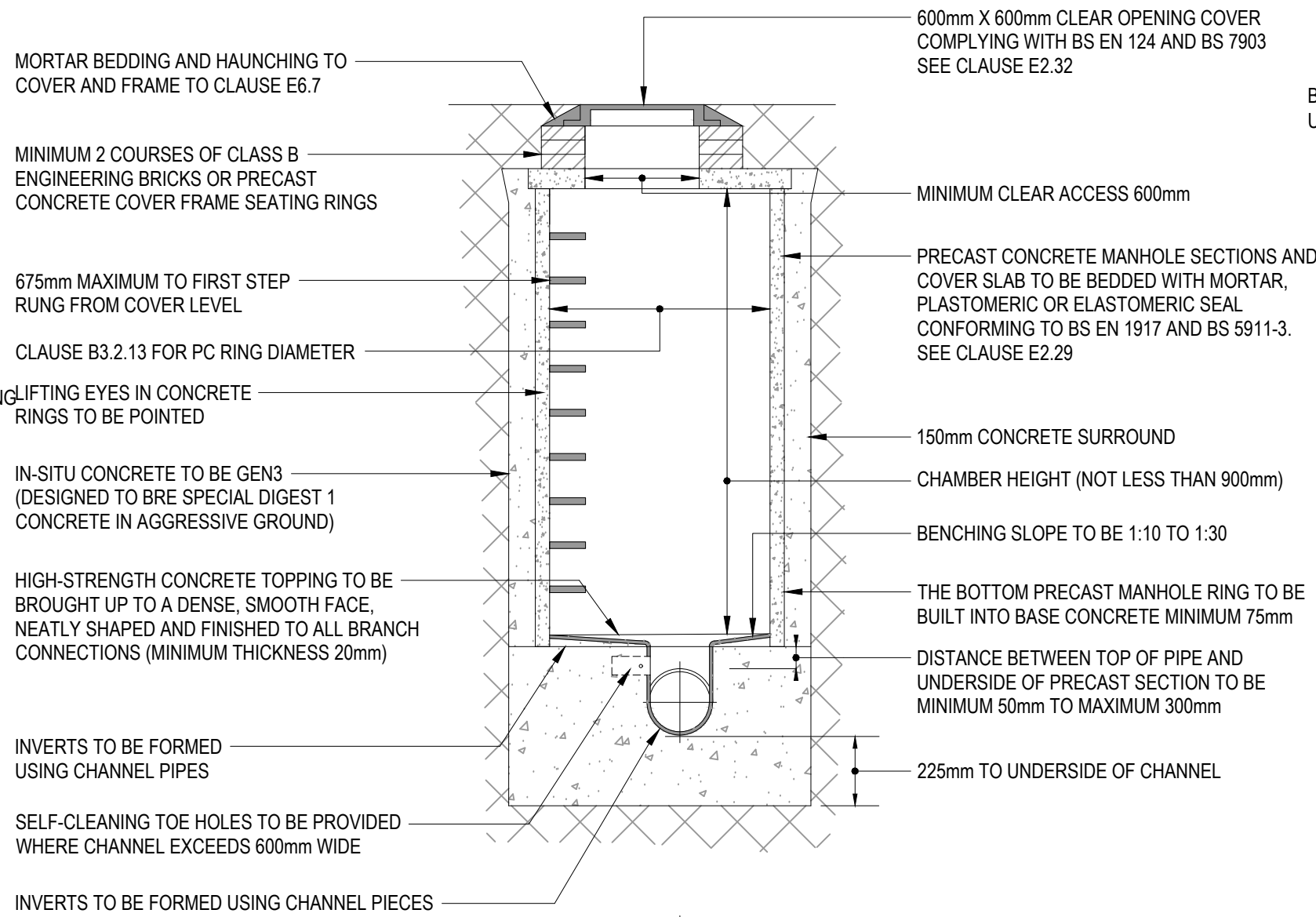
TYPICAL MANHOLE DETAIL - TYPE A1/2
(DEPTH FROM COVER TO SOFFIT OF PIPE 3m TO 6m)



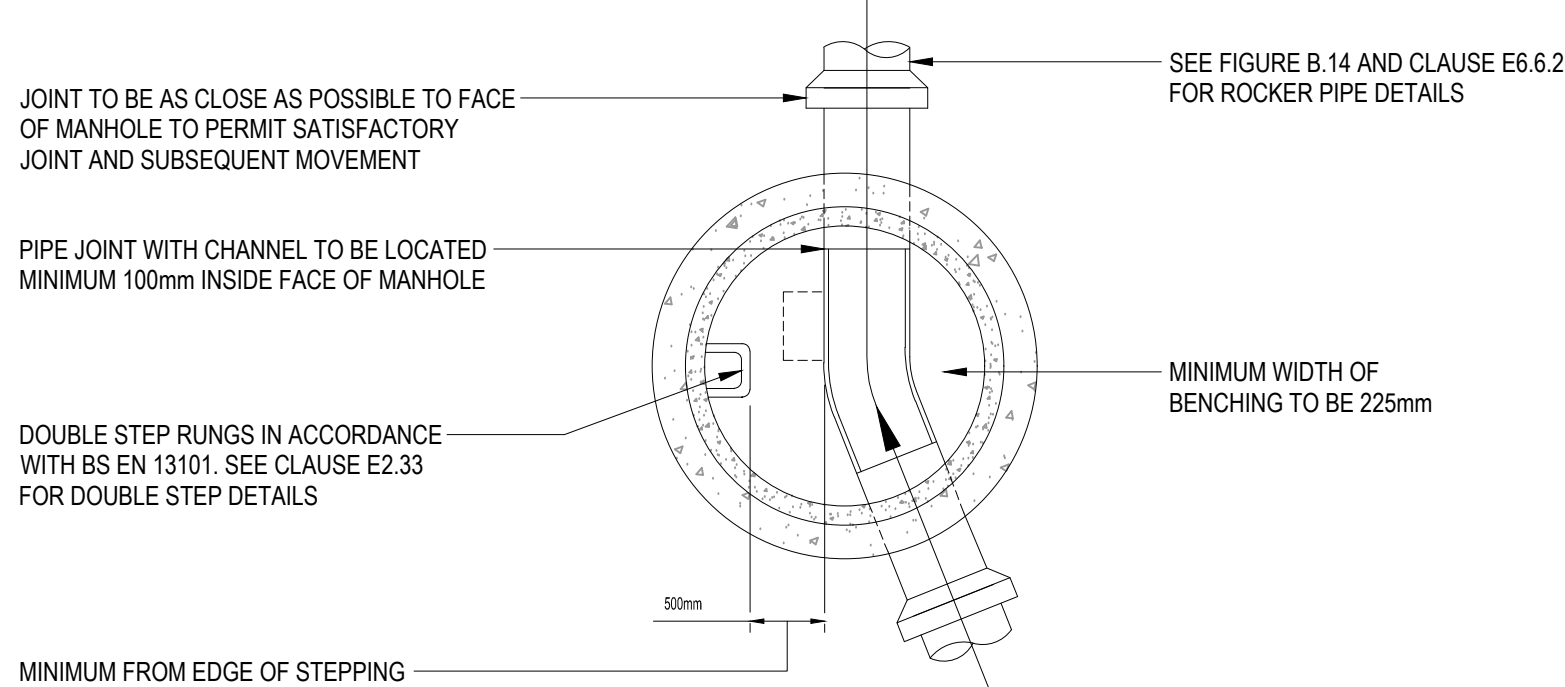
EXTERNAL VERTICAL BACKDROP



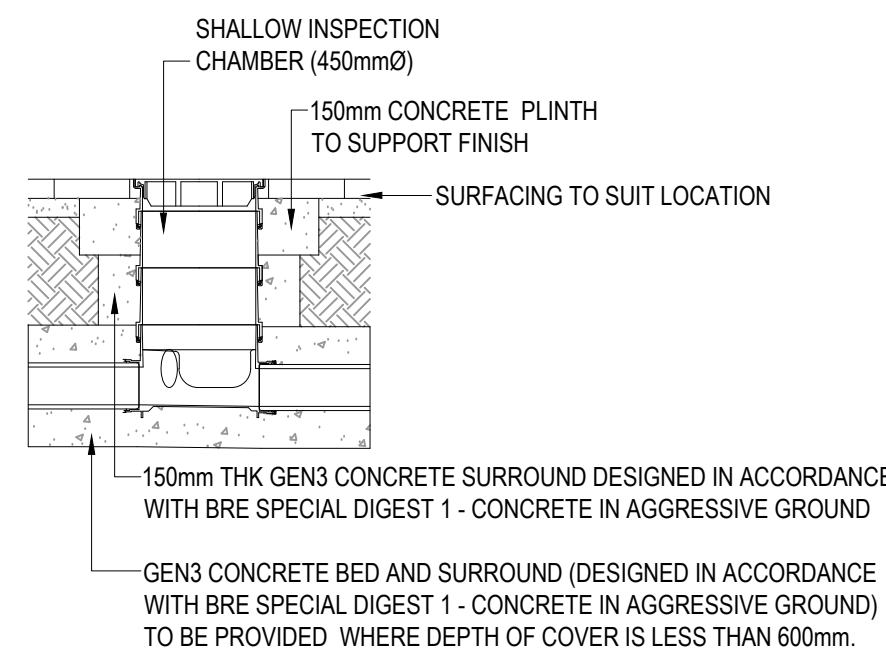
CATCH PIT DETAIL



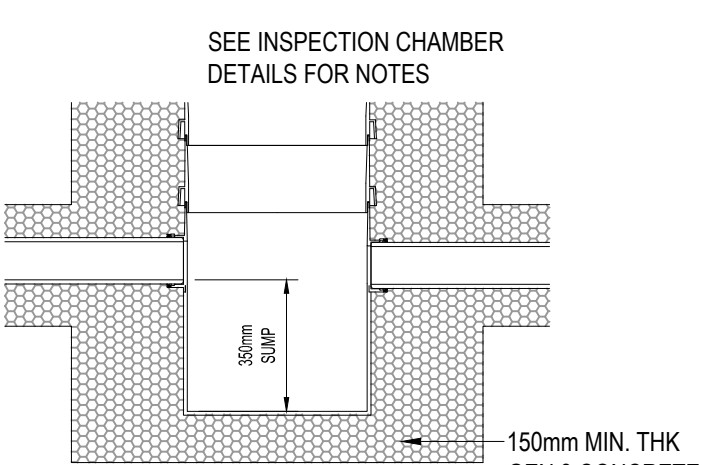
TYPICAL MANHOLE DETAIL - TYPE B
(MAXIMUM DEPTH FROM COVER TO SOFFIT OF PIPE 3.0 m)



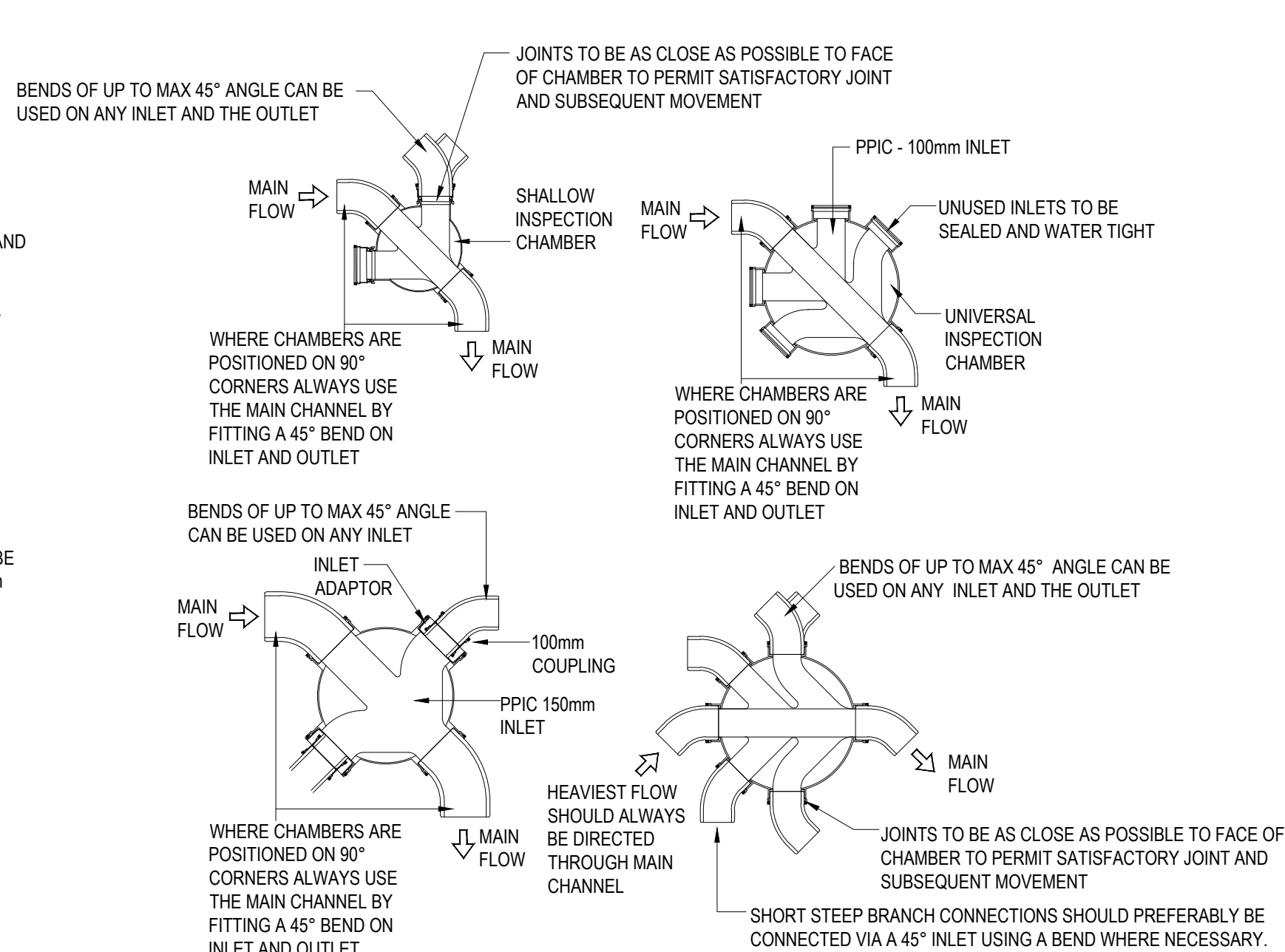
TYPICAL INSPECTION
CHAMBER BACKDROP DETAIL



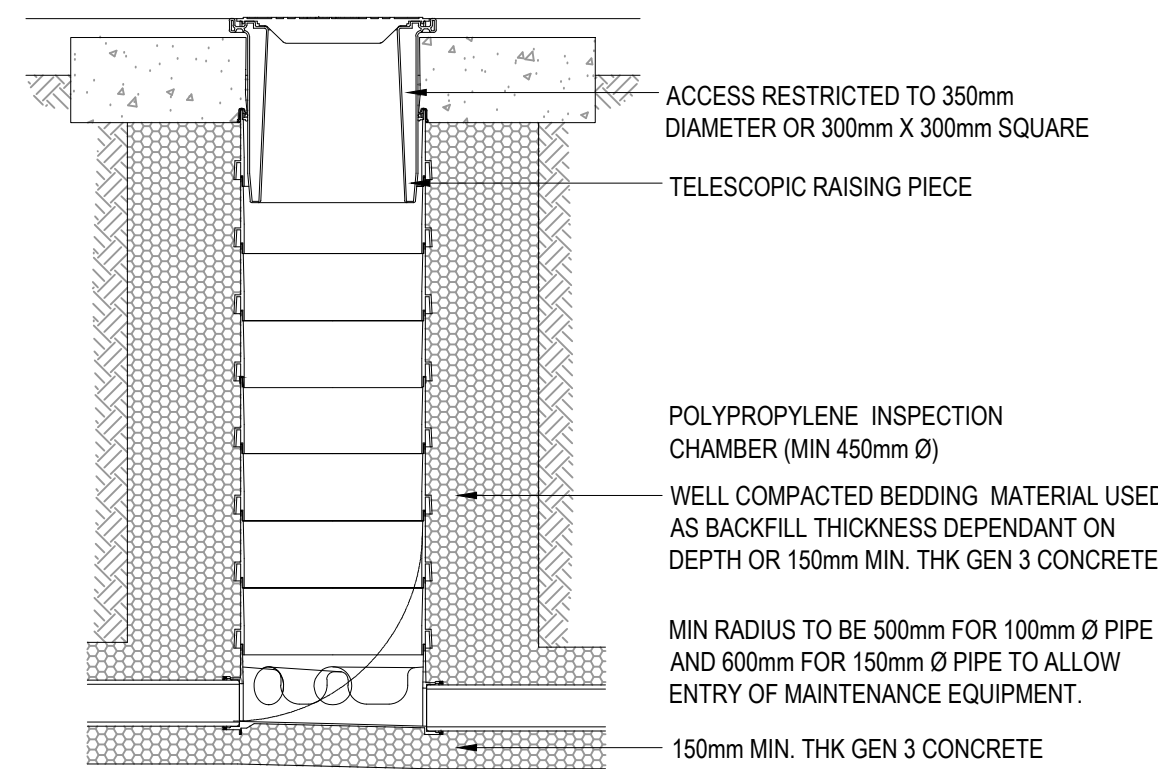
SHALLOW INSPECTION CHAMBER
MAX DEPTH 0.6m



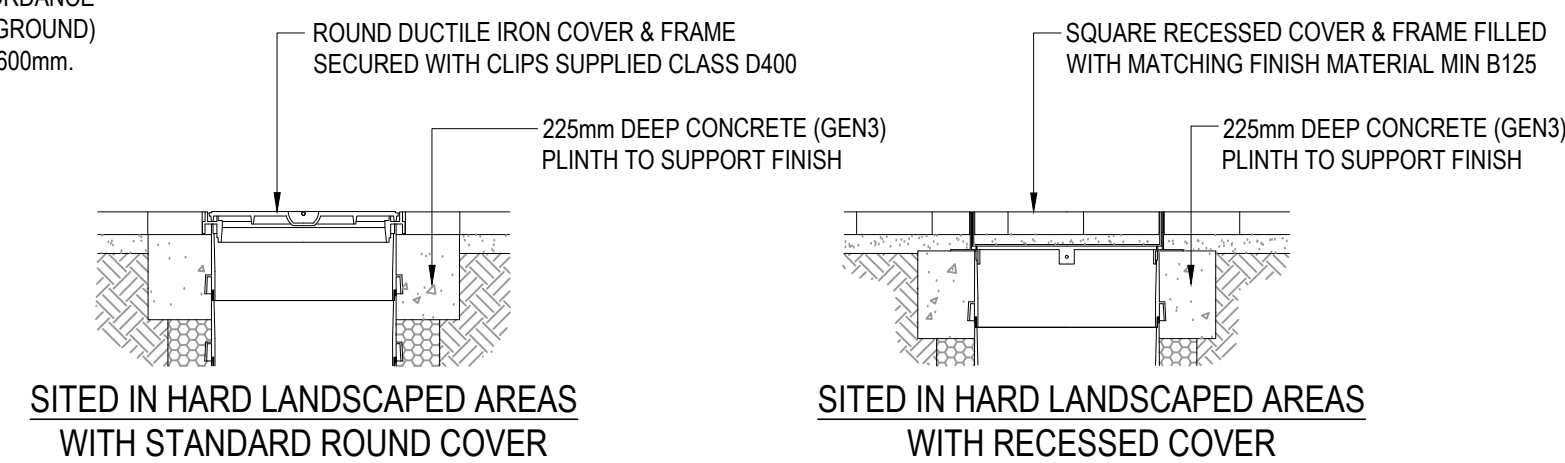
PPIC CATCHPIT BASE
DETAIL



INSPECTION CHAMBER BASE DETAILS



DEEP INSPECTION CHAMBER
DEPTHS BETWEEN 1.2m AND 3.0m



TYPICAL INSPECTION CHAMBER COVER DETAILS

GENERAL NOTES:

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
- DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
- REFER TO DRAWING RODSTA-CUR-XX-XX-DR-C-92530_GENERAL DRAINAGE NOTES.

P02	DRAFT STAGE 4 ISSUE	05/08/22	LK	CG
P01	STAGE 3 ISSUE	31/05/22	LK	CG
Rev:	Description:	Date:	By:	Chkd:



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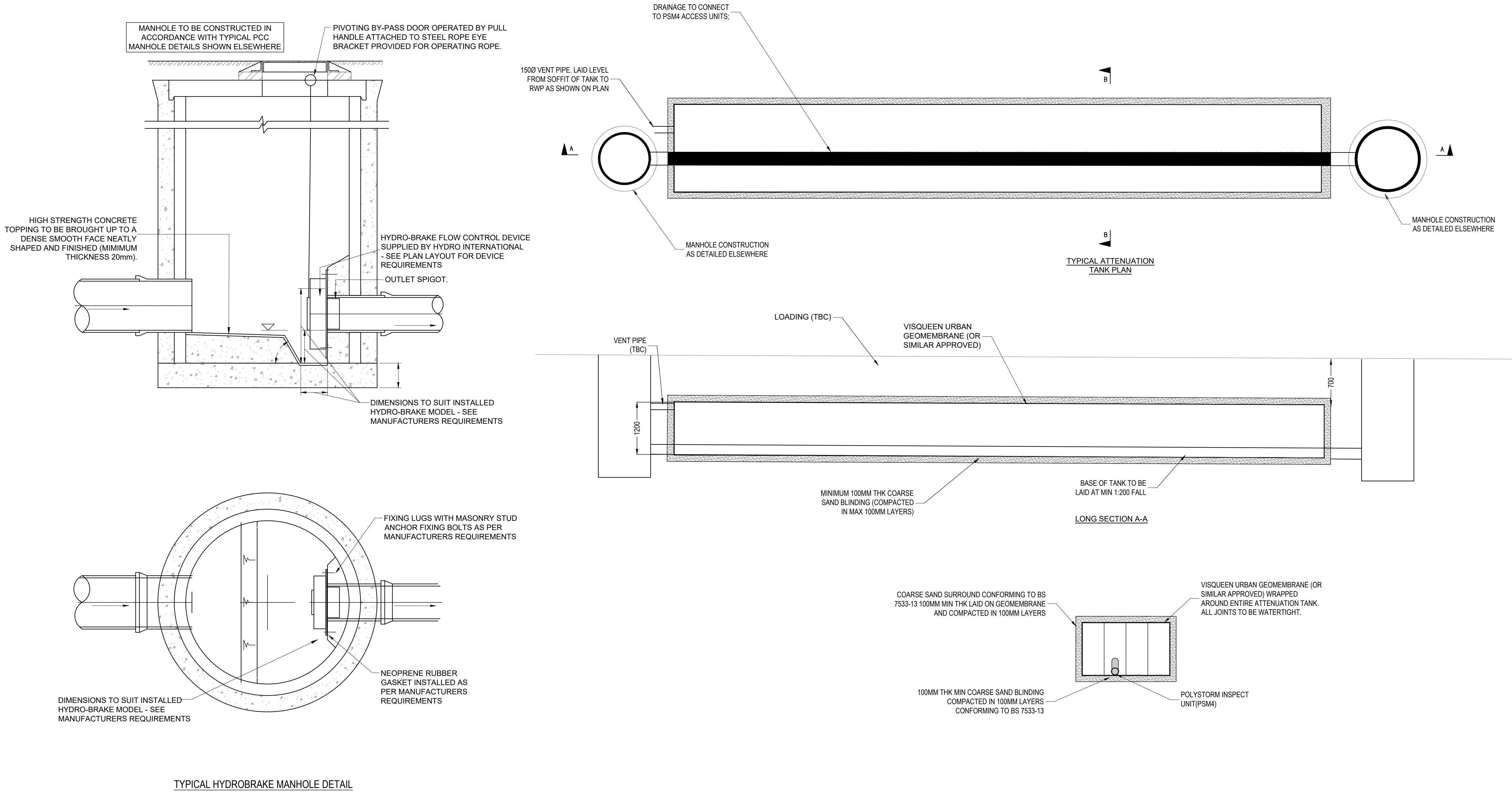
Status:	SUITABLE FOR INFORMATION	S2
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Project:	RODNEY STREET
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Orig Title:	TYPICAL DRAINAGE DETAILS SHEET 1
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Size:	Date:	Drawn By:	Designed By:	Checked By:
A1	27/05/22	LK	CG	CG
Scale:	1:20			
Project No:	Originator:	Volume:	Level:	Type:
				Role:
				Category / Number:
				Rev:

RODSTA - CUR - XX - XX - DR - C - 92520 - P02



GENERAL NOTES:

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2. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
4. REFER TO DRAWING RODSTA-CUR-XX-XX-DR-C-92530_GENERAL DRAINAGE NOTES.

P02	DRAFT STAGE 4 ISSUE	05/08/22	LK	CG
P01	STAGE 3 ISSUE	31/05/22	LK	CG
Rev:	Description:	Date:	By:	Chkd:



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Status:	SUITABLE FOR INFORMATION	S2
Project:	RODNEY STREET	
Orig Title:	TYPICAL DRAINAGE DETAILS SHEET 3	
Size:	A1	27/05/22
Scale:	1:20	LK
Project No:	Originator:	Volume:
Level:	Type:	Role:
Category / Number:	Rev:	
RODSTA - CUR - XX - XX - DR - C - 92522	- P02	



GENERAL NOTES:

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3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

KEY

-  INDICATES THE FLOW ROUTE BASED ON FULL INLET CAPACITY OF COMPONENTS . i.e FALLS AT SURFACE
-  INDICATES THE GENERAL GROUND LEVEL FALLS TO THE DRAINAGE SYSTEM

GROUND LEVELS TO FALL AWAY FROM THE PROPOSED BUILDING

DRAWING IS BASED ON:

- ARCHITECT - BUTTRESS DRAWING
RODSTA-BUT-ZZ-00-DP-A-01001 - Proposed Site Plan - REV P02
- LANDSCAPE ARCHITECT - LAYER STUDIO DRAWING
253-LYR-XX-ZZ-DWG-L-1001-Landscape Masterplan (RECEIVED 04/05/2022)
- TOPOGRAPHICAL & GRP UTILITY SURVEY - SURVEY OPERATION
REF: 21G134/001 AUG 2021.
- "ESP" SITE INVESTIGATION: UK21.5551 PHASE I & II
GEO-ENVIRONMENTAL ASSESSMENT - LAND OF RODNEY STREET, MANCHESTER (ISSUE 1)

P01	ISSUED FOR PLANNING	08/08/22	CG	CG
Rev:	Description:	Date:	By:	Chkd:



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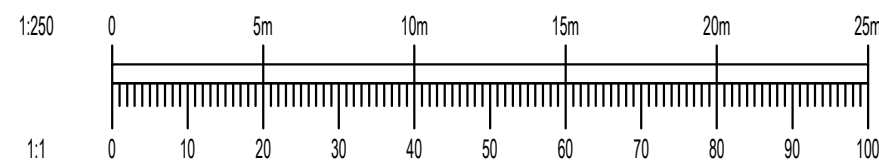
Status:	ISSUED FOR PLANNING	S2
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Project:	RODNEY STREET
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Orig Title:	OVERLAND FLOW ROUTES
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Size:	A1	Date:	20/10/21	Drawn By:	CG	Designed By:	CG	Checked By:	CG
Scale:	1:250	Project No:	Originator:	Volume:	Level:	Type:	Role:	Category / Number:	Rev:

RODSTA- CUR - XX - XX - DR - C - 92500 - P01





KEY:

SOFT LANDSCAPING
TO LANDSCAPE ARCHITECTS SPECIFICATION

RAIN GARDEN
TO LANDSCAPE ARCHITECTS SPECIFICATION

ASSUMED SPECIFICATIONS BASED ON LANDSCAPE ARCHITECTS LAYOUT. PROPOSED LOCATIONS, FINISH TYPES AND PEDESTRIAN/VEHICLE ROUTE AREAS TO BE CONFIRMED

16mm RESIN BOUND AGGREGATE (TO LANDSCAPE ARCHITECTS SPECIFICATION)
30mm THK, 10mm SUPERDRAIN ASPHALT* (COLOUR TO LANDSCAPE ARCHITECTS SPECIFICATION)
60mm THK, 20mm SUPERDRAIN ASPHALT
UPPER PERMEABLE GEOTEXTILE
100mm HBCGA**
150mm CLEAN ANGULAR STONE TYPE 4/20 TO BS EN 13242:2000
LOWER PERMEABLE GEOTEXTILE

PERMEABLE RESIN BOUND SEATING AREA (MEWP LOADING)
SCALE 1:20

* Surfacing requires protecting prior to any mewp loading/movement above to prevent damage to surface finish

** HBCGA refers to hydraulically bound coarse-graded aggregate (conforming to BS EN 14227-1:2013), minimum cement content 3%, strength class C5/6 as defined in BS EN 14227-1 and minimum permeability 10,000 mm/hr when tested in accordance with ASTM C1701M-09 or other suitable test).

MINIMUM 120mm THICK PERMEABLE CONCRETE PAVING* (TO LANDSCAPE ARCHITECTS DETAILS)
50mm LAYING COURSE (TO PAVING SUPPLIERS SPECIFICATION)
UPPER PERMEABLE GEOTEXTILE
100mm HBCGA**
150mm CLEAN ANGULAR STONE TYPE 4/20 TO BS EN 13242:2000
LOWER PERMEABLE GEOTEXTILE
150mm CAPPING (BASED ON 5% CBR)

PERMEABLE GREEN GAP (MEWP LOADING)
SCALE 1:20

* Surfacing requires protecting prior to any mewp loading/movement above to prevent damage to surface finish

** HBCGA refers to hydraulically bound coarse-graded aggregate (conforming to BS EN 14227-1:2013), minimum cement content 3%, strength class C5/6 as defined in BS EN 14227-1 and minimum permeability 10,000 mm/hr when tested in accordance with ASTM C1701M-09 or other suitable test).

20mm PORCELAIN TILE TO BS7533 (TO LANDSCAPE ARCHITECTS SPECIFICATION)
40mm MORTAR LAYING COURSE TO BS7533
200mm TYPE 1 GRANULAR SUB-BASE TO CLAUSE 803.

IMPERMEABLE PORCELAIN SEATING AREA (PEDESTRIAN LOADING)
SCALE 1:20

30mm THK, 10mm SUPERDRAIN ASPHALT* (COLOUR TO LANDSCAPE ARCHITECTS SPECIFICATION)
60mm THK, 20mm SUPERDRAIN ASPHALT
UPPER PERMEABLE GEOTEXTILE
100mm HBCGA**
150mm TYPE 1 GRANULAR SUB-BASE TO CLAUSE 803.
LOWER PERMEABLE GEOTEXTILE

PERMEABLE ASPHALT FOOTPATH (MEWP LOADING)
SCALE 1:20

* Surfacing requires protecting prior to any mewp loading/movement above to prevent damage to surface finish

** HBCGA refers to hydraulically bound coarse-graded aggregate (conforming to BS EN 14227-1:2013), minimum cement content 3%, strength class C5/6 as defined in BS EN 14227-1 and minimum permeability 10,000 mm/hr when tested in accordance with ASTM C1701M-09 or other suitable test).

20mm AC 6 DENSE SURF 100/150 TO BS EN 13108-1*
40mm AC20 DENSE BIN 100/150 TO BS EN 13108-1
200mm TYPE 1 GRANULAR SUB-BASE TO CLAUSE 803.

IMPERMEABLE ASPHALT FOOTPATH (MEWP LOADING)
SCALE 1:20

* Surfacing requires protecting prior to any mewp loading/movement above to prevent damage to surface finish

30mm THK, 10mm SUPERDRAIN ASPHALT (COLOUR TO LANDSCAPE ARCHITECTS SPECIFICATION)
60mm THK, 20mm SUPERDRAIN ASPHALT
UPPER PERMEABLE GEOTEXTILE
100mm HBCGA**
100mm CELLWEB TRP WITH CLEAN ANGULAR STONE TYPE 4/20 TO BS EN 13242:2000
LOWER PERMEABLE GEOTEXTILE

PERMEABLE ASPHALT FOOTPATH NO DIG (MEWP LOADING)
SCALE 1:20

* Surfacing requires protecting prior to any mewp loading/movement above to prevent damage to surface finish

** HBCGA refers to hydraulically bound coarse-graded aggregate (conforming to BS EN 14227-1:2013), minimum cement content 3%, strength class C5/6 as defined in BS EN 14227-1 and minimum permeability 10,000 mm/hr when tested in accordance with ASTM C1701M-09 or other suitable test).

40mm AC10 SURF TO BS-EN13108-4
40mm AC20 BINDER TO BS-EN13108-1
100mm AC32 BASE TO BS-EN13108-1
200mm TYPE 1 GRANULAR SUB-BASE TO CLAUSE 803.
250mm CAPPING (BASED ON 5% CBR)

IMPERMEABLE ASPHALT CAR PARK (REGULAR HEAVY VEHICLE LOADING)
SCALE 1:20

DESIGNED IN ACCORDANCE WITH DMRB - CD239

MINIMUM 80mm THICK PERMEABLE CONCRETE PAVING (TO LANDSCAPE ARCHITECTS DETAILS)
50mm LAYING COURSE (TO PAVING SUPPLIERS SPECIFICATION)
UPPER PERMEABLE GEOTEXTILE
100mm HBCGA*
150mm CLEAN ANGULAR STONE TYPE 4/20 TO BS EN 13242:2000
LOWER PERMEABLE GEOTEXTILE
150mm CAPPING (BASED ON 5% CBR)

PERMEABLE BLOCK DRIVEWAY (LIGHT VEHICLE LOADING)
SCALE 1:20

* HBCGA refers to hydraulically bound coarse-graded aggregate (conforming to BS EN 14227-1:2013), minimum cement content 3%, strength class C5/6 as defined in BS EN 14227-1 and minimum permeability 10,000 mm/hr when tested in accordance with ASTM C1701M-09 or other suitable test).

GENERAL NOTES:

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
- DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
- ALL WORKS AND MATERIALS TO BE IN ACCORDANCE WITH CURRENT BRITISH STANDARDS AND BUILDING REGULATIONS.
- THE LANDSCAPE ARCHITECT'S DRAWING HAS BEEN USED AS A BASE FOR THIS PLAN. PLEASE REFER TO THE LATEST LANDSCAPING LAYOUT.
- REFER TO LANDSCAPE ARCHITECTS SPECIFICATION FOR SURFACE FINISHES.
- KERBING REQUIREMENTS/DETAIL TO BE CONFIRMED BY LANDSCAPE ARCHITECT.
- ALL SUB-BASES AND CAPPING LAYERS TO BE GRADED AND COMPACTED IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS (SFHW).
- ALL PAVEMENT CONSTRUCTIONS ARE BASED ON AN ASSUMED CBR VALUE OF 5%. TO BE CONFIRMED BY INSITU TESTING AT FORMATION.
- IT IS RECOMMENDED THAT CBR TESTS ARE CARRIED OUT TO CONFIRM AND SUB-BASE ADJUSTED IN ACCORDANCE WITH THE CAPPING AND SUB-BASE THICKNESS TABLE.
- CBR TEST PROCEDURE IS DETAILED WITHIN DMRB IAN73/06 AND BS 1377-4.
- MEASURED CBR VALUE TO BE AT FORMATION LEVEL AND TO BE A 'SOAKED' CONDITION.
- ANY VARIATIONS IN GROUND CONDITIONS SHOULD BE NOTIFIED TO THE ENGINEER PRIOR TO CONSTRUCTION.
- THE CONSTRUCTION DEPTHS GIVEN ARE THE MINIMUM REQUIRED (COMPACTED).
- THE CONSTRUCTION DEPTHS GIVEN ASSUME FORMATION IS NON-FROST SUSCEPTIBLE.
- WHERE FORMATION IS FROST SUSCEPTIBLE PROVIDE CAPPING MATERIAL TO GIVE A MINIMUM 450mm OVERALL CONSTRUCTION THICKNESS.
- THE CONSTRUCTIONS GIVEN ARE FOR PRIVATE AREAS ONLY AND NOT FOR ADOPTABLE AREAS.
- IN AREAS WHERE LEVELS ARE TO BE RAISED, ACCEPTABLE FILL MATERIAL IS TO BE USED TO THE UNDERSIDE OF THE PROPOSED CONSTRUCTION MAKE UP.
- NO REGULATING OR FILL MATERIAL HAS BEEN INCLUDED IN CONSTRUCTION BUILD UP. CONTRACTOR TO INCLUDE FOR REGULATING/FILL MATERIAL IN THEIR RATES.
- IN AREAS WHERE LEVELS ARE TO BE LOWERED, EXISTING CONSTRUCTION IS TO BE REMOVED (FULL DEPTH).
- LAYING COURSE TO BE NATURALLY OCCURRING SAND OR MORTAR IN ACCORDANCE WITH BS7533 REQUIREMENTS.
- CBM1 TO BE TO BS7533 REQUIREMENTS.
- TYPE 1 SUB-BASE IN ACCORDANCE WITH SFHW.
- CAPPING MATERIAL TO BE 6F1, 6F2 OR 6F5 MATERIAL IN ACCORDANCE WITH SFHW 600 SERIES.
- FIRE TENDER AND MAINTENANCE VEHICLE TYPE & ROUTE TO BE CONFIRMED. PREVENTION OF VEHICLES FROM ACCESSING PEDESTRIAN SPECIFIED AREAS TO BE CONFIRMED.
- SPECIFICATIONS BASED ON PERMANENT USE AND NOT FOR CONSTRUCTION LOADINGS.

P03	DRAFT STAGE 4 ISSUE	05.08.22	LK	CG
P02	STAGE 3	10.06.22	LK	HS
P01	STAGE 2	20.10.21	CG	CG
Rev:	Description:	Date:	By:	Chkd:



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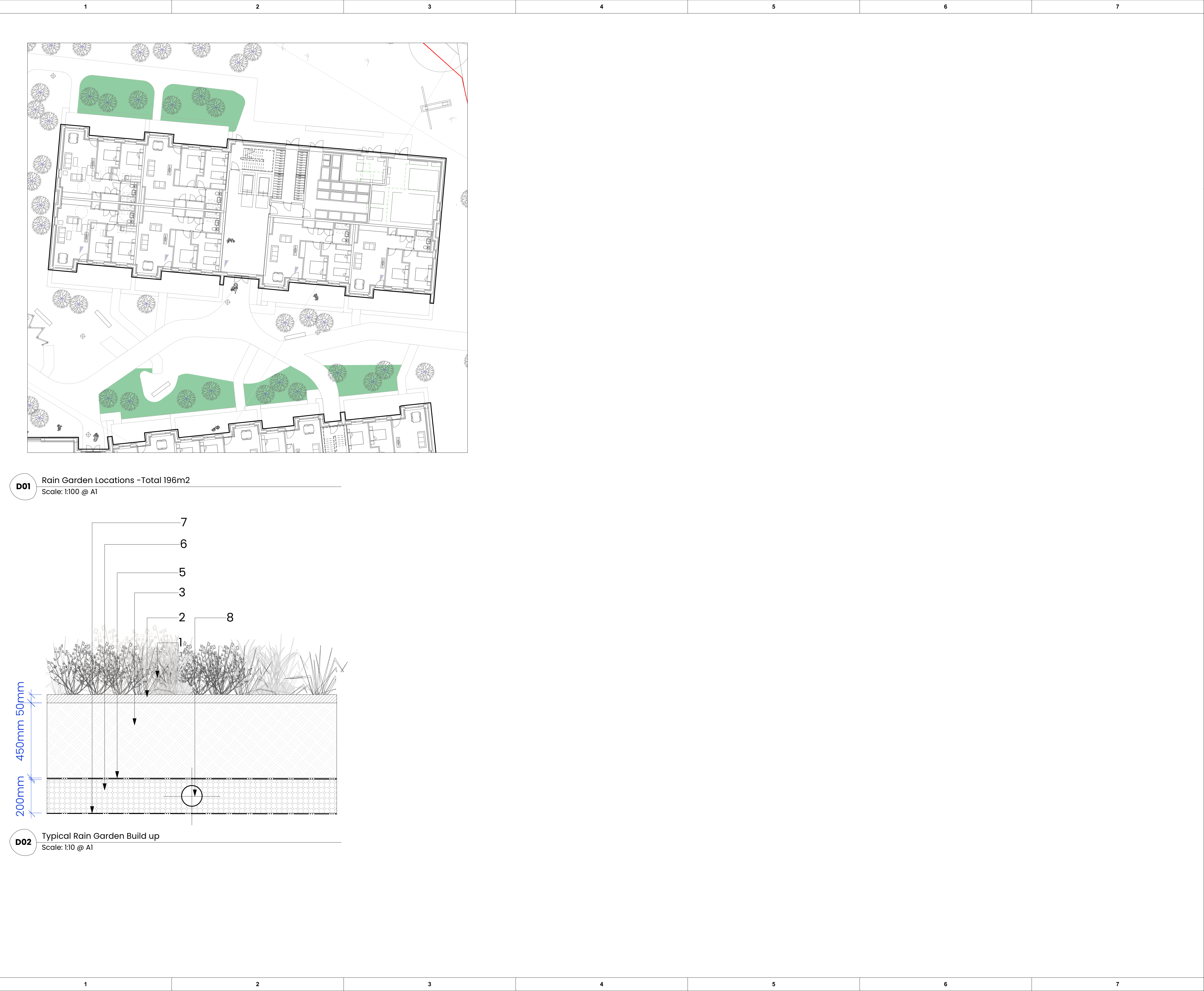
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Status: **SUITABLE FOR INFORMATION**

Project: **RODNEY STREET**

Orig Title: **EXTERNAL WORKS GENERAL ARRANGEMENT**

Size:	Date:	Drawn By:	Designed By:	Checked By:
A1	20/10/21	CG	CG	CG
Scale:	1:250			
Project No:	Originator:	Volume:	Level:	Type:
				Role:
				Category / Number:
				Rev:
RODSTA - CUR - XX - XX - DR - C - 94700 - P03				



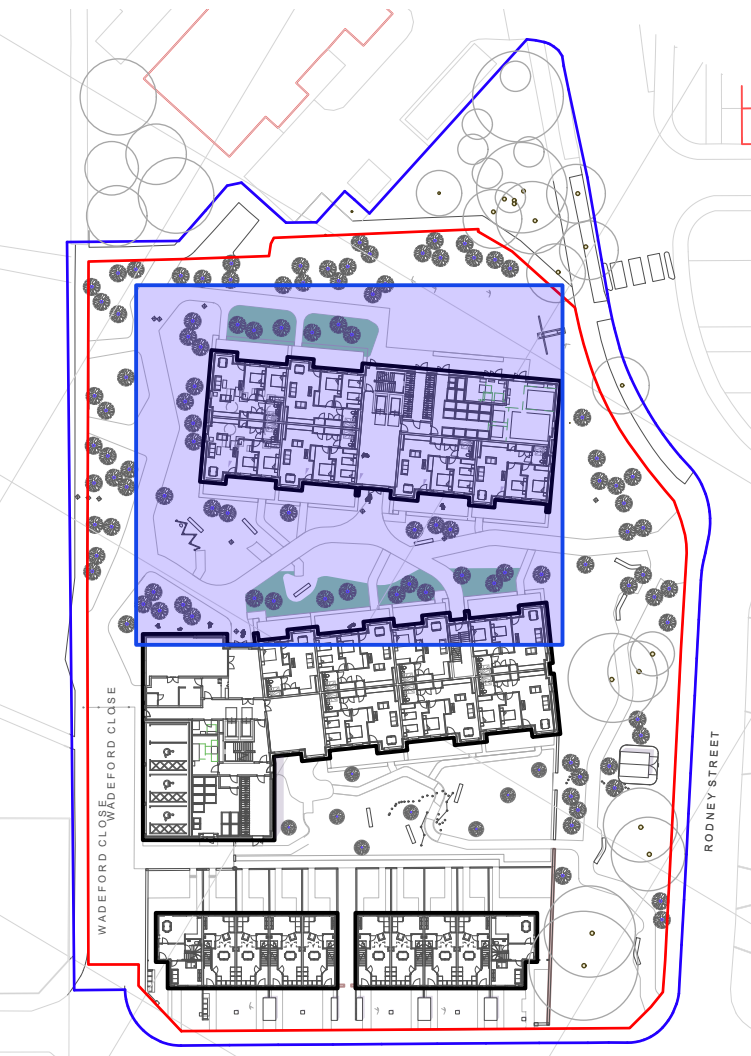
NOTES:
1. DO NOT SCALE FROM THIS DRAWING. ALWAYS WORK TO NOTED DIMENSIONS.
2. ALL SETTING OUT, LEVELS AND DIMENSIONS TO BE CHECKED ON SITE PRIOR TO THE INSTALLATION OF MATERIALS AND ANY DISCREPANCIES ARE TO BE BROUGHT TO THE ATTENTION OF THE CONTRACT ADMINISTRATOR IMMEDIATELY.
3. THIS DRAWING MUST BE READ WITH THE RELEVANT SPECIFICATION DOCUMENTS AND DETAIL DRAWINGS. ANY DISCREPANCIES MUST BE BROUGHT TO THE ATTENTION OF THE CONTRACT ADMINISTRATOR IMMEDIATELY.
4. THIS DRAWING IS COPYRIGHT PROTECTED AND MAY NOT BE REPRODUCED IN WHOLE OR PART WITHOUT WRITTEN AUTHORITY.
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.

THIS DRAWING WAS PLOTTED ON:
01/08/2022

REVISION HISTORY				
DATE	REV	ZONE	DESCRIPTION	CHK
01/08/2022	1		Preliminary Issue	ST

KEY

1. Planting- refer to softworks 3000 series
2. 50mm bark mulch
3. 450mm free draining topsoil -Approx 40% sand 40% topsoil, 20% compost - Infiltration rate of approx 25-150mm ph
4. Sub soil - to clause Q28 334
5. Filtration Geotextile membrane Terram T1000 OSA- to clause Q31 513
6. Clean stone/ Type 3- To engineers specification
7. 1mm thick impermiable membrane-To engineers specification
8. Perorated pipe to engineers specification



LOCATION PLAN



ORIGINATOR			
	W	layer.studio	MANCHESTER
	T	01625 523 157	NEWCASTLE
	E	manchester or newcastle@layer.studio	

Client			
Wates Construction			
Project			
Land to the west of Rodney St			
London			
Drawing Title			
Softworks Typical Details 01			
Created By	Checked By	Scale	Sheet Size
OK	ST	As Shown	A1
Project Number	Originator	Volume	Level
253	LYR	XX-ZZ-DWG-L-6004	
Work Stage	Status	Revision	
Stage 4	S3 Review & comment	1	

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Appendix B

- Surface Water Calcs – 1, 30, 100 year +45%

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	11.061	40.0	150	Circular	51.700	50.723	0.827	51.700	50.446	1.104
1.001	8.214	50.0	150	Circular	51.700	50.446	1.104	51.710	50.282	1.278
1.002	9.415	60.0	150	Circular	51.710	50.282	1.278	51.790	50.125	1.515
1.003	14.234	80.0	150	Circular	51.790	50.125	1.515	51.900	49.947	1.803
2.000	5.607	40.0	150	Circular	51.885	50.354	1.381	51.885	50.214	1.521
2.001	2.066	40.0	150	Circular	51.885	50.214	1.521	51.900	50.162	1.588
2.002	8.616	40.0	150	Circular	51.900	50.162	1.588	51.900	49.947	1.803
1.004	2.744	100.0	225	Circular	51.900	49.872	1.803	51.885	49.845	1.815
1.005	19.109	100.0	225	Circular	51.885	49.845	1.815	51.774	49.654	1.895
1.006	7.691	100.0	225	Circular	51.774	49.654	1.895	51.600	49.577	1.798
1.007	5.722	100.0	225	Circular	51.600	49.577	1.798	51.514	49.520	1.769
3.000	7.982	40.0	150	Circular	51.550	50.500	0.900	51.570	50.300	1.120
3.001	15.890	40.0	150	Circular	51.570	50.300	1.120	51.514	49.903	1.461
4.000	13.430	40.0	150	Circular	51.560	50.510	0.900	51.510	50.174	1.186
4.001	3.403	40.0	150	Circular	51.510	50.174	1.186	51.514	50.089	1.275
1.008	22.662	125.0	300	Circular	51.514	49.445	1.769	51.408	49.264	1.844
5.000	20.397	40.0	150	Circular	51.500	50.450	0.900	51.408	49.940	1.318
1.009	10.805	150.0	300	Circular	51.408	49.264	1.844	51.291	49.192	1.799
6.000	12.875	50.0	100	Circular	51.040	49.990	0.950	51.080	49.732	1.248

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S01A	450	Manhole	Adoptable	S01	450	Manhole	Adoptable
1.001	S01	450	Manhole	Adoptable	S02	450	Manhole	Adoptable
1.002	S02	450	Manhole	Adoptable	S03	450	Manhole	Adoptable
1.003	S03	450	Manhole	Adoptable	TANK A	1200	Manhole	Adoptable
2.000	S04B	450	Manhole	Adoptable	S04A	450	Manhole	Adoptable
2.001	S04A	450	Manhole	Adoptable	S04	450	Manhole	Adoptable
2.002	S04	450	Manhole	Adoptable	TANK A	1200	Manhole	Adoptable
1.004	TANK A	1200	Manhole	Adoptable	S05	1200	Manhole	Adoptable
1.005	S05	1200	Manhole	Adoptable	S06	600	Manhole	Adoptable
1.006	S06	600	Manhole	Adoptable	S07	600	Manhole	Adoptable
1.007	S07	600	Manhole	Adoptable	S12	1200	Manhole	Adoptable
3.000	S08	450	Manhole	Adoptable	S09	450	Manhole	Adoptable
3.001	S09	450	Manhole	Adoptable	S12	1200	Manhole	Adoptable
4.000	S10	450	Manhole	Adoptable	S11	450	Manhole	Adoptable
4.001	S11	450	Manhole	Adoptable	S12	1200	Manhole	Adoptable
1.008	S12	1200	Manhole	Adoptable	S14	1200	Manhole	Adoptable
5.000	S13	450	Manhole	Adoptable	S14	1200	Manhole	Adoptable
1.009	S14	1200	Manhole	Adoptable	S26	1200	Manhole	Adoptable
6.000	S15	450	Manhole	Adoptable	S16	450	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
6.001	9.942	50.0	100	Circular	51.080	49.732	1.248	51.070	49.533	1.437
7.000	10.318	40.0	100	Circular	51.070	49.986	0.984	51.140	49.728	1.312
7.001	12.193	62.5	100	Circular	51.140	49.728	1.312	51.070	49.533	1.437
6.002	12.021	50.0	150	Circular	51.070	49.533	1.387	51.130	49.293	1.687
8.000	12.845	40.0	100	Circular	51.100	49.871	1.129	51.220	49.550	1.570
8.001	12.392	48.2	100	Circular	51.220	49.550	1.570	51.130	49.293	1.737
6.003	9.295	80.0	150	Circular	51.130	49.243	1.737	51.197	49.127	1.920
9.000	15.291	23.7	100	Circular	51.120	49.821	1.199	51.197	49.177	1.920
6.004	7.212	100.0	225	Circular	51.197	49.052	1.920	51.291	48.980	2.086
10.000	9.132	200.0	225	Circular	51.370	49.067	2.078	51.370	49.021	2.124
10.001	8.276	200.0	225	Circular	51.370	49.021	2.124	51.291	48.980	2.086
1.010	33.020	153.6	300	Circular	51.291	48.905	2.086	51.230	48.690	2.240
1.011	1.889	100.0	150	Circular	51.230	48.690	2.390	51.134	48.671	2.313
1.012	3.138	100.0	150	Circular	51.134	48.671	2.313	51.066	48.640	2.276
1.013	4.185	100.0	150	Circular	51.066	48.655	2.261	50.994	48.613	2.231

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
6.001	S16	450	Manhole	Adoptable	S19	450	Manhole	Adoptable
7.000	S17	450	Manhole	Adoptable	S18	450	Manhole	Adoptable
7.001	S18	450	Manhole	Adoptable	S19	450	Manhole	Adoptable
6.002	S19	450	Manhole	Adoptable	S22	450	Manhole	Adoptable
8.000	S20	450	Manhole	Adoptable	S21	450	Manhole	Adoptable
8.001	S21	450	Manhole	Adoptable	S22	450	Manhole	Adoptable
6.003	S22	450	Manhole	Adoptable	S24	600	Manhole	Adoptable
9.000	S23	450	Manhole	Adoptable	S24	600	Manhole	Adoptable
6.004	S24	600	Manhole	Adoptable	S26	1200	Manhole	Adoptable
10.000	S25	450	Manhole	Adoptable	TANK B		Junction	
10.001	TANK B		Junction		S26	1200	Manhole	Adoptable
1.010	S26	1200	Manhole	Adoptable	S27	1200	Manhole	Adoptable
1.011	S27	1200	Manhole	Adoptable	S28	450	Manhole	Adoptable
1.012	S28	450	Manhole	Adoptable	C01	1200	Manhole	Adoptable
1.013	C01	1200	Manhole	Adoptable	C02	1200	Manhole	Adoptable

Node S27 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	48.690	Product Number	CTL-SHE-0106-5000-1000-5000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node S05 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	49.845	Product Number	CTL-SHE-0106-5000-1000-5000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node TANK A Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	49.872
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	168

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	70.0	0.0	0.800	70.0	0.0	0.801	0.0	0.0

Node TANK B Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	49.021
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	140.0	0.0	1.200	140.0	0.0	1.201	0.0	0.0

Node S07 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	51.375	Slope (1:X)	400.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.225
Safety Factor	2.0	Width (m)	2.000	Inf Depth (m)	
Porosity	0.33	Length (m)	115.000		

Results for 2 year Critical Storm Duration. Lowest mass balance: 97.20%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S01A	10	50.755	0.032	2.9	0.0178	0.0000	OK
15 minute winter	S01	10	50.497	0.051	5.7	0.0227	0.0000	OK
15 minute winter	S02	10	50.333	0.051	5.6	0.0081	0.0000	OK
15 minute winter	S03	10	50.208	0.083	11.0	0.0483	0.0000	OK
15 minute winter	S04B	10	50.395	0.041	4.3	0.0213	0.0000	OK
15 minute winter	S04A	10	50.271	0.057	6.0	0.0167	0.0000	OK
15 minute winter	S04	10	50.229	0.067	10.1	0.0314	0.0000	OK
30 minute winter	TANK A	26	49.986	0.114	16.2	8.1344	0.0000	OK
30 minute winter	S05	26	49.986	0.141	4.6	0.1593	0.0000	OK
30 minute winter	S06	20	49.706	0.052	5.4	0.0206	0.0000	OK
15 minute winter	S07	11	49.648	0.071	9.5	0.0418	0.0000	OK
15 minute winter	S08	10	50.544	0.044	5.4	0.0366	0.0000	OK
15 minute winter	S09	10	50.371	0.071	11.9	0.0580	0.0000	OK
15 minute winter	S10	11	50.521	0.011	0.3	0.0022	0.0000	OK
15 minute winter	S11	10	50.231	0.057	6.9	0.0458	0.0000	OK
15 minute winter	S12	11	49.558	0.113	27.5	0.1275	0.0000	OK
15 minute winter	S13	10	50.463	0.013	0.5	0.0029	0.0000	OK
15 minute winter	S14	11	49.396	0.132	30.9	0.1723	0.0000	OK
15 minute winter	S15	10	50.010	0.020	0.8	0.0051	0.0000	OK
15 minute winter	S16	11	49.759	0.027	1.4	0.0059	0.0000	OK
15 minute winter	S17	11	50.003	0.017	0.6	0.0040	0.0000	OK
15 minute winter	S18	10	49.753	0.025	1.1	0.0051	0.0000	OK
15 minute winter	S19	10	49.592	0.059	7.6	0.0353	0.0000	OK
15 minute winter	S20	10	49.890	0.019	0.8	0.0046	0.0000	OK
15 minute winter	S21	11	49.577	0.027	1.4	0.0055	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S01A	1.000	S01	2.9	0.725	0.102	0.0445	
15 minute winter	S01	1.001	S02	5.6	1.069	0.223	0.0432	
15 minute winter	S02	1.002	S03	5.6	0.729	0.242	0.0722	
15 minute winter	S03	1.003	TANK A	10.8	1.115	0.543	0.1378	
15 minute winter	S04B	2.000	S04A	4.3	0.857	0.152	0.0281	
15 minute winter	S04A	2.001	S04	5.9	0.862	0.210	0.0142	
15 minute winter	S04	2.002	TANK A	10.0	1.392	0.356	0.0621	
30 minute winter	TANK A	1.004	S05	4.6	0.354	0.088	0.0637	
30 minute winter	S05	Hydro-Brake®	S06	4.5				
30 minute winter	S06	1.006	S07	5.4	0.741	0.104	0.0646	
15 minute winter	S07	1.007	S12	9.4	0.939	0.182	0.0576	
15 minute winter	S08	3.000	S09	5.4	0.863	0.190	0.0500	
15 minute winter	S09	3.001	S12	11.7	1.478	0.415	0.1258	
15 minute winter	S10	4.000	S11	0.3	0.106	0.011	0.0451	
15 minute winter	S11	4.001	S12	6.8	1.205	0.242	0.0192	
15 minute winter	S12	1.008	S14	27.6	1.025	0.278	0.6113	
15 minute winter	S13	5.000	S14	0.4	0.588	0.016	0.0154	
15 minute winter	S14	1.009	S26	31.1	1.111	0.344	0.3027	
15 minute winter	S15	6.000	S16	0.8	0.550	0.089	0.0180	
15 minute winter	S16	6.001	S19	1.4	0.425	0.157	0.0320	
15 minute winter	S17	7.000	S18	0.6	0.511	0.062	0.0124	
15 minute winter	S18	7.001	S19	1.1	0.339	0.137	0.0385	
15 minute winter	S19	6.002	S22	7.4	1.205	0.294	0.0741	
15 minute winter	S20	8.000	S21	0.8	0.573	0.080	0.0173	
15 minute winter	S21	8.001	S22	1.4	0.728	0.155	0.0279	

Results for 2 year Critical Storm Duration. Lowest mass balance: 97.20%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S22	11	49.332	0.089	11.3	0.0302	0.0000	OK
15 minute winter	S23	10	49.847	0.026	1.9	0.0090	0.0000	OK
15 minute winter	S24	10	49.227	0.175	13.9	0.0576	0.0000	OK
120 minute winter	S25	114	49.224	0.157	0.2	0.0250	0.0000	OK
120 minute winter	TANK B	114	49.224	0.203	13.7	27.0324	0.0000	OK
120 minute winter	S26	116	49.224	0.319	17.4	0.3958	0.0000	SURCHARGED
15 minute summer	S27	10	49.234	0.544	17.7	0.7442	0.0000	SURCHARGED
720 minute winter	S28	360	48.736	0.065	5.0	0.0104	0.0000	OK
720 minute winter	C01	360	48.714	0.074	5.0	0.0842	0.0000	OK
720 minute winter	C02	360	48.667	0.054	5.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S22	6.003	S24	11.4	1.057	0.575	0.1085	
15 minute winter	S23	9.000	S24	1.9	1.018	0.149	0.0425	
15 minute winter	S24	6.004	S26	15.8	0.832	0.304	0.2630	
120 minute winter	S25	10.000	TANK B	-0.2	-0.056	-0.005	0.3078	
120 minute winter	TANK B	10.001	S26	-13.7	-0.863	-0.374	0.3209	
120 minute winter	S26	1.010	S27	7.3	0.335	0.082	2.3252	
15 minute summer	S27	Hydro-Brake®	S28	5.0				
720 minute winter	S28	1.012	C01	5.0	0.618	0.280	0.0253	
720 minute winter	C01	1.013	C02	5.0	0.814	0.280	0.0256	95.6

Results for 30 year Critical Storm Duration. Lowest mass balance: 97.20%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S01A	10	50.768	0.045	5.5	0.0245	0.0000	OK
15 minute winter	S01	10	50.519	0.073	10.7	0.0328	0.0000	OK
15 minute winter	S02	10	50.353	0.071	10.6	0.0113	0.0000	OK
15 minute winter	S03	11	50.285	0.160	20.7	0.0928	0.0000	SURCHARGED
15 minute winter	S04B	10	50.414	0.060	8.2	0.0314	0.0000	OK
15 minute winter	S04A	10	50.304	0.090	11.3	0.0263	0.0000	OK
15 minute winter	S04	10	50.263	0.101	19.1	0.0475	0.0000	OK
60 minute winter	TANK A	49	50.129	0.257	20.5	18.2469	0.0000	SURCHARGED
60 minute winter	S05	49	50.128	0.283	5.1	0.3199	0.0000	SURCHARGED
600 minute winter	S06	435	49.837	0.183	3.9	0.0726	0.0000	OK
600 minute winter	S07	435	49.837	0.260	4.7	0.1534	0.0000	SURCHARGED
15 minute winter	S08	10	50.565	0.065	10.2	0.0537	0.0000	OK
15 minute winter	S09	10	50.408	0.108	22.3	0.0888	0.0000	OK
15 minute winter	S10	10	50.525	0.015	0.6	0.0029	0.0000	OK
15 minute winter	S11	10	50.259	0.085	13.1	0.0681	0.0000	OK
600 minute winter	S12	435	49.837	0.392	8.0	0.4435	0.0000	SURCHARGED
15 minute winter	S13	10	50.468	0.018	0.9	0.0039	0.0000	OK
600 minute winter	S14	435	49.837	0.573	8.2	0.7492	0.0000	SURCHARGED
15 minute winter	S15	10	50.018	0.028	1.5	0.0071	0.0000	OK
600 minute winter	S16	435	49.837	0.105	0.2	0.0228	0.0000	SURCHARGED
15 minute winter	S17	10	50.010	0.024	1.2	0.0055	0.0000	OK
600 minute winter	S18	435	49.836	0.108	0.2	0.0219	0.0000	SURCHARGED
600 minute winter	S19	435	49.836	0.303	1.3	0.1824	0.0000	SURCHARGED
15 minute winter	S20	10	49.898	0.027	1.5	0.0064	0.0000	OK
600 minute winter	S21	435	49.836	0.286	0.2	0.0593	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S01A	1.000	S01	5.5	0.848	0.194	0.0718	
15 minute winter	S01	1.001	S02	10.6	1.259	0.419	0.0689	
15 minute winter	S02	1.002	S03	10.5	0.804	0.455	0.1210	
15 minute winter	S03	1.003	TANK A	20.0	1.213	1.009	0.2402	
15 minute winter	S04B	2.000	S04A	8.1	0.924	0.289	0.0495	
15 minute winter	S04A	2.001	S04	11.2	0.946	0.398	0.0245	
15 minute winter	S04	2.002	TANK A	18.9	1.600	0.672	0.1019	
60 minute winter	TANK A	1.004	S05	5.1	0.354	0.099	0.1091	
60 minute winter	S05	Hydro-Brake®	S06	5.0				
600 minute winter	S06	1.006	S07	3.9	0.696	0.074	0.2864	
600 minute winter	S07	1.007	S12	4.6	0.765	0.088	0.2276	
15 minute winter	S08	3.000	S09	10.1	0.962	0.359	0.0835	
15 minute winter	S09	3.001	S12	22.0	1.691	0.781	0.2068	
15 minute winter	S10	4.000	S11	0.6	0.116	0.020	0.0749	
15 minute winter	S11	4.001	S12	12.9	1.396	0.458	0.0315	
600 minute winter	S12	1.008	S14	7.6	0.695	0.076	1.5958	
15 minute winter	S13	5.000	S14	0.8	0.711	0.030	0.0243	
600 minute winter	S14	1.009	S26	8.0	0.668	0.088	0.7609	
15 minute winter	S15	6.000	S16	1.5	0.655	0.172	0.0291	
600 minute winter	S16	6.001	S19	0.2	0.283	0.023	0.0778	
15 minute winter	S17	7.000	S18	1.2	0.615	0.122	0.0199	
600 minute winter	S18	7.001	S19	0.2	0.245	0.026	0.0954	
600 minute winter	S19	6.002	S22	1.3	0.687	0.052	0.2116	
15 minute winter	S20	8.000	S21	1.5	0.673	0.154	0.0556	
600 minute winter	S21	8.001	S22	0.2	0.457	0.023	0.0970	

Results for 30 year Critical Storm Duration. Lowest mass balance: 97.20%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute winter	S22	435	49.837	0.594	2.0	0.2013	0.0000	SURCHARGED
15 minute winter	S23	10	49.857	0.036	3.5	0.0124	0.0000	OK
600 minute winter	S24	435	49.837	0.785	2.3	0.2582	0.0000	SURCHARGED
600 minute winter	S25	435	49.837	0.770	0.1	0.1224	0.0000	SURCHARGED
600 minute winter	TANK B	435	49.837	0.816	10.6	108.5119	0.0000	SURCHARGED
600 minute winter	S26	435	49.838	0.933	10.7	1.1566	0.0000	SURCHARGED
600 minute winter	S27	435	49.836	1.146	5.0	1.5667	0.0000	SURCHARGED
600 minute winter	S28	435	49.623	0.952	4.9	0.1513	0.0000	SURCHARGED
600 minute winter	C01	435	49.618	0.978	4.9	1.1065	0.0000	SURCHARGED
15 minute summer	C02	1	49.613	1.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
600 minute winter	S22	6.003	S24	1.9	0.474	0.094	0.1636	
15 minute winter	S23	9.000	S24	3.5	1.119	0.278	0.0793	
600 minute winter	S24	6.004	S26	2.1	0.381	0.041	0.2868	
600 minute winter	S25	10.000	TANK B	-0.1	-0.006	-0.002	0.3632	
600 minute winter	TANK B	10.001	S26	-10.6	-0.322	-0.289	0.3291	
600 minute winter	S26	1.010	S27	4.7	0.229	0.053	2.3252	
600 minute winter	S27	Hydro-Brake®	S28	4.9				
600 minute winter	S28	1.012	C01	4.9	0.277	0.275	0.0552	
600 minute winter	C01	1.013	C02	4.9	0.277	0.275	0.0737	84.2

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 97.20%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S01A	12	50.935	0.212	10.3	0.1160	0.0000	SURCHARGED
15 minute winter	S01	12	50.904	0.458	18.7	0.2041	0.0000	SURCHARGED
15 minute winter	S02	12	50.810	0.528	16.3	0.0840	0.0000	SURCHARGED
15 minute winter	S03	12	50.705	0.580	33.1	0.3358	0.0000	SURCHARGED
360 minute winter	S04B	352	50.630	0.276	2.2	0.1449	0.0000	SURCHARGED
360 minute winter	S04A	344	50.631	0.417	4.0	0.1212	0.0000	SURCHARGED
360 minute winter	S04	344	50.629	0.467	5.2	0.2197	0.0000	SURCHARGED
360 minute winter	TANK A	344	50.629	0.757	10.8	53.8520	0.0000	SURCHARGED
360 minute winter	S05	344	50.629	0.784	5.0	0.8867	0.0000	SURCHARGED
480 minute winter	S06	360	50.599	0.945	5.5	0.3741	0.0000	SURCHARGED
480 minute winter	S07	360	50.600	1.023	7.2	0.6023	0.0000	SURCHARGED
15 minute winter	S08	11	51.051	0.551	19.1	0.4547	0.0000	SURCHARGED
15 minute winter	S09	11	50.952	0.652	39.0	0.5347	0.0000	SURCHARGED
480 minute winter	S10	360	50.599	0.089	0.1	0.0176	0.0000	OK
480 minute winter	S11	360	50.599	0.425	4.2	0.3415	0.0000	SURCHARGED
480 minute winter	S12	360	50.599	1.154	14.5	1.3050	0.0000	SURCHARGED
480 minute winter	S13	360	50.599	0.149	0.2	0.0321	0.0000	OK
480 minute winter	S14	360	50.599	1.335	15.8	1.7460	0.0000	SURCHARGED
480 minute winter	S15	360	50.600	0.610	0.3	0.1550	0.0000	SURCHARGED
480 minute winter	S16	360	50.600	0.868	0.7	0.1893	0.0000	SURCHARGED
480 minute winter	S17	360	50.600	0.614	0.2	0.1431	0.0000	SURCHARGED
480 minute winter	S18	360	50.600	0.872	0.6	0.1762	0.0000	SURCHARGED
480 minute winter	S19	360	50.600	1.067	2.7	0.6413	0.0000	SURCHARGED
480 minute winter	S20	360	50.600	0.729	0.5	0.1750	0.0000	SURCHARGED
480 minute winter	S21	360	50.600	1.050	1.0	0.2173	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S01A	1.000	S01	9.5	0.919	0.338	0.1947	
15 minute winter	S01	1.001	S02	16.3	1.260	0.648	0.1446	
15 minute winter	S02	1.002	S03	16.3	0.928	0.711	0.1657	
15 minute winter	S03	1.003	TANK A	32.1	1.825	1.616	0.2506	
360 minute winter	S04B	2.000	S04A	2.2	0.759	0.078	0.0987	
360 minute winter	S04A	2.001	S04	3.1	0.798	0.110	0.0364	
360 minute winter	S04	2.002	TANK A	5.2	1.058	0.184	0.1517	
360 minute winter	TANK A	1.004	S05	5.0	0.302	0.097	0.1091	
360 minute winter	S05	Hydro-Brake®	S06	4.9				
480 minute winter	S06	1.006	S07	5.3	0.682	0.103	0.3059	
480 minute winter	S07	1.007	S12	7.1	0.830	0.136	0.2276	
15 minute winter	S08	3.000	S09	16.7	0.977	0.591	0.1405	
15 minute winter	S09	3.001	S12	36.9	2.096	1.309	0.2797	
480 minute winter	S10	4.000	S11	0.1	0.106	0.004	0.1915	
480 minute winter	S11	4.001	S12	2.7	0.956	0.096	0.0599	
480 minute winter	S12	1.008	S14	14.4	0.737	0.145	1.5958	
480 minute winter	S13	5.000	S14	0.2	0.459	0.007	0.3589	
480 minute winter	S14	1.009	S26	15.6	0.693	0.173	0.7609	
480 minute winter	S15	6.000	S16	0.3	0.424	0.035	0.1007	
480 minute winter	S16	6.001	S19	-0.5	0.319	-0.063	0.0778	
480 minute winter	S17	7.000	S18	0.2	0.398	0.021	0.0807	
480 minute winter	S18	7.001	S19	-0.5	0.245	-0.070	0.0954	
480 minute winter	S19	6.002	S22	2.6	0.726	0.101	0.2116	
480 minute winter	S20	8.000	S21	0.3	0.417	0.031	0.1005	
480 minute winter	S21	8.001	S22	-0.8	0.457	-0.092	0.0970	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 97.20%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute winter	S22	360	50.600	1.357	3.8	0.4600	0.0000	SURCHARGED
480 minute winter	S23	360	50.599	0.778	1.3	0.2677	0.0000	SURCHARGED
480 minute winter	S24	360	50.599	1.547	4.6	0.5090	0.0000	SURCHARGED
480 minute winter	S25	360	50.599	1.532	0.1	0.2436	0.0000	SURCHARGED
480 minute winter	TANK B	360	50.599	1.578	18.1	159.6665	0.0000	SURCHARGED
480 minute winter	S26	360	50.599	1.694	20.6	2.1002	0.0000	SURCHARGED
480 minute winter	S27	360	50.599	1.909	5.2	2.6090	0.0000	SURCHARGED
30 minute summer	S28	18	49.635	0.964	5.0	0.1533	0.0000	SURCHARGED
15 minute summer	C01	11	49.626	0.986	5.0	1.1154	0.0000	SURCHARGED
15 minute summer	C02	1	49.613	1.000	5.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
480 minute winter	S22	6.003	S24	3.7	0.545	0.185	0.1636	
480 minute winter	S23	9.000	S24	-0.8	0.587	-0.065	0.1196	
480 minute winter	S24	6.004	S26	4.5	0.427	0.086	0.2868	
480 minute winter	S25	10.000	TANK B	1.5	0.038	0.042	0.3632	
480 minute winter	TANK B	10.001	S26	-18.1	-0.454	-0.493	0.3291	
480 minute winter	S26	1.010	S27	4.8	0.293	0.053	2.3252	
480 minute winter	S27	Hydro-Brake®	S28	5.0				
30 minute summer	S28	1.012	C01	5.0	0.540	0.282	0.0552	
15 minute summer	C01	1.013	C02	5.0	0.286	0.283	0.0737	7.5