



Surface Water Drainage Management and Maintenance Plan And Verification Report

**The Enterprise Centre
Benchill Road
Wythenshawe**

**Client Name: Wythenshawe Community Housing
Our Ref: LRD33029/A
Date: December 2023**

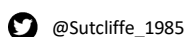
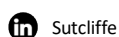
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MMP & Verification

DOCUMENT VERIFICATION

Report Reference: LRD33029

Issue: A

Date: December 2023

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Revision History:

Rev	Date	Description	Prepared	Checked	Approved
A	22.12.2023	Initial Issue	SB	MP	MP

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Surface Water Drainage Maintenance and Management Plan

1. Introduction
 - 1.1 Planning condition 15 requires details of the implementation, maintenance and management of the surface water drainage scheme is submitted and approved by the local planning authority.
 - 1.2 The scheme is to be implemented in accordance with the details submitted to discharge planning condition 14.
 - 1.3 The verification report should include:
 - 1.3.1 Photographic evidence of the construction confirming installation as per the approved details.
 - 1.3.2 As built drawings if the constructed surface water management system differs from the design construction drawings.
 - 1.3.3 A Management and Maintenance Plan for the lifetime of the development which should identify arrangements to secure operation of the sustainable drainage scheme for the lifetime of the development.
 - 1.4 The proposed surface water system consists of a piped network, permeable surfacing, an attenuation system, and flow control.
 - 1.5 The permeable surface offers water quality improvements to the surface water runoff from the car park by removing hydrocarbons, metals, and suspended solids.
 - 1.6 Storage for all events is provided with in the cellular attenuation system.
 - 1.7 The rate of discharge to the public combined sewer is controlled by a vortex flow control (i.e. a Hydrobrake).

2 Verification of Installation

[Contractor to provide verification information including photographic evidence, to be inserted in to report as an addendum post construction.]

3. Maintenance and Management

- 3.1. The proposed drainage network will remain unadopted and will be managed by the housing association.
- 3.2. The piped network and flow controls will be designed to be largely maintenance free. The flow controls should be inspected at least annually and after major storms.
- 3.3. The SuDS features within the development will be managed and maintained by the housing association (cellular attenuation) and residents (permeable driveways).
- 3.4. Table 20.15 of the SuDS Manual (C753) identifies the operation and maintenance requirements of permeable pavements and Table 21.3 of the SuDS Manual (C753) identifies the requirements for attenuation storage tanks.

TABLE 20.15	Operation and maintenance requirements for pervious pavements		
	Maintenance schedule	Required action	Typical frequency
	Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
	Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
		Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
	Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
		Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
		Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
	Monitoring	Initial inspection	Monthly for three months after installation
		Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
		Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
		Monitor inspection chambers	Annually

Figure 1: Operation and maintenance requirements for Permeable Pavements (Source: C753)

TABLE 21.3 Operation and maintenance requirements for attenuation storage tanks		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Figure 2: Operation and maintenance requirements for Storage Tanks (Source C753)

- 3.5. The funding required for the maintenance of the SuDS features and drainage network will be provided by the housing association.

4. Appendix

Appendix A – Design Drawings

GENERAL NOTES

- THIS DRAWING TO READ IN CONJUNCTION WITH ALL RELEVANT STRUCTURAL AND ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.
- ALL WORKS TO BE CARRIED OUT IN STRICT ACCORDANCE WITH THE ENGINEER'S SPECIFICATIONS, RELEVANT BRITISH STANDARDS AND WHERE APPLICABLE LOCAL AUTHORITIES REQUIREMENTS.
- ALL MAIN SEWERS TO BE CONSTRUCTED IN ACCORDANCE WITH THE 'DESIGN AND CONSTRUCTION GUIDANCE FOR FOUL AND SURFACE WATER SEWERS OFFERED FOR ADOPTION' AND UNITED UTILITIES STANDARD DETAILS.
- ALL MATERIALS TO BE MARKED WITH BSI KITE MARK WHERE APPLICABLE.
- ALL DRAINAGE UNDER VERGES WITH LESS THAN 900MM OF COVER AND DRAINAGE UNDER THE HIGHWAY WITH LESS THAN 1200mm OF COVER WILL REQUIRE 150mm THICK CONCRETE BED AND SURROUND.
- ALL PIPES TO HAVE CLASS 'S' GRANULAR SURROUND WITH BEDDING FACTOR OF 2.2 UNLESS STATED OTHERWISE ON THE LONGITUDINAL SECTIONS AND TO BE CLASS 2 SULPHATE RESISTANT. GRANULAR MATERIAL FOR SURROUND TO BE EITHER 10, 14 OR 20mm NOMINAL SINGLE SIZED.
- STONE BACKFILL IS REQUIRED TO ALL SEWER TRENCHES UNDER VEHICULAR AREAS. AS DUG MATERIAL MAY BE USED ON OTHER AREAS SUBJECT TO THE WRITTEN APPROVAL OF THE DRAINAGE AUTHORITY.
- ALL CONCRETE PRODUCTS MANUFACTURED OR CAST INSITU TO BE SULPHATE RESISTANT UNLESS PROVED OTHERWISE BY SITE INVESTIGATION OR SUBSEQUENT TESTING.
- SEWERS MUST HAVE 5 METRES CLEARANCE FROM TREES AND HEDGES, WHERE IT IS NOT POSSIBLE TO ACHIEVE THIS CLEARANCE CONCRETE BED AND SURROUND IS REQUIRED.
- THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BENDS.
- MANHOLE COVERS MUST HAVE A MINIMUM CLEAR OPENING OF 600MM AND SHALL BE CLASS D400 TO BS EN 124 WITH 150mm DEEP FRAMES IN HIGHWAYS. SOME MANHOLES MAY REQUIRE DOUBLE COVER ACCESS. REFER TO MANHOLE SCHEDULES TO CONFIRM SIZES.
- FILLED GROUND MUST BE FILLED AND CONSOLIDATED UNDER THE SUPERVISION AND TO THE SATISFACTION OF UNITED UTILITIES BEFORE ANY SEWER WORKS ARE CARRIED OUT.
- ADAPTABLE SEWERS SHOULD BE A MINIMUM OF 1m AND MANHOLES 0.5m FROM KERB FACES AND SERVICE MARGINS.
- ANY LAND DRAIN OR WATERCOURSE ON SITE TO BE DIVERTED SO AS NOT TO PASS UNDER PROPOSED BUILDING.
- DIVERSION TO BE INSPECTED ON SITE BY LOCAL AUTHORITY.
- ALL GULLIES TO BE PROTECTED FROM SILT DURING THE CONSTRUCTION PROCESS WITH A LAYER OF HESSIAN SHEETING PLACED UNDER THE GULLY GRATING. THE HESSIAN SHALL BE CLEANED AND MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
- ALL LIVE CONNECTIONS IDENTIFIED IN THE CCTV SURVEY, MUST BE RE-PIPED TO THE DIVERTED SEWER.
- ALL ABANDONMENTS MUST BE WITNESSED BY A UU REPRESENTATIVE FOR THE STATUS OF THE PIPE TO BE CHANGED ON THE PUBLIC SEWER RECORDS. MINIMUM 72 HOURS NOTICE WILL BE PROVIDED.
- METHOD OF SEWER ABANDONMENT SHALL BE BY GRUBBING UP AND REPLACING PIPE TRENCHES WITH APPROVED SUITABLY COMPACTED BACKFILL.
- CONNECTIONS OF SEWERS TO BE ABANDONED TO THE LIVE SEWERS SHALL BE CAPPED TO THE APPROVAL OF THE UNITED UTILITIES REPRESENTATIVE.
- PIPE MATERIALS INDICATED ON THIS DRAWING ARE AS REQUIRED BY UNITED UTILITIES. ALTERNATIVE MATERIALS TO THOSE LISTED ON THIS DRAWING MAY BE OFFERED TO UNITED UTILITIES FOR APPROVAL.

EXISTING SERVICE DIVERSIONS

- PRIOR TO CONSTRUCTION THE CONTRACTOR IS TO ENSURE THAT:
 - NO PROPOSED DRAINAGE CLASHES WITH ANY OF THE EXISTING SERVICES.
 - ANY NEW HIGHWAY WORKS DO NOT ADVERSELY AFFECT THE COVER TO EXISTING SERVICES BELOW THE RELEVANT MINIMUM COVER REQUIREMENTS.
- THE CONTRACTOR IS TO ALLOW FOR THIS PROVISION WITHIN THE TENDER SUM.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ATTAINING ALL NECESSARY APPROVAL FOR ANY SERVICE DIVERSIONS REQUIRED TO FACILITATE THE PROPOSED WORKS.

P02	REVISED TO SUIT NEW SITE PLAN / REVISED LEVELS	05.12.23	CR	SB
P01	PRELIMINARY DRAWING	21.06.23	CR	SB
Rev	Description	Date	By	Chkd

Drawing Status
PRELIMINARY DRAWING

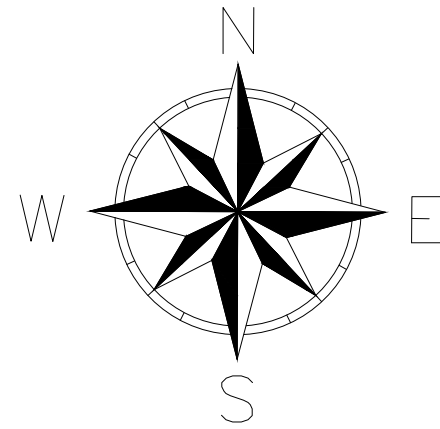


Client
WYTHENSHAW COMMUNITY HOUSING

Project
**THE ENTERPRISE CENTRE
BENCHILL ROAD
MANCHESTER**

Drawing Title
PROPOSED DRAINAGE

Date 21.06.23	Drawn By CR	Checked By SB
Scale at A1 1:200	Project Number 33029	Revision P02
Sheet Number 33029-SUT-ZZ-XX-DR-C-6201		

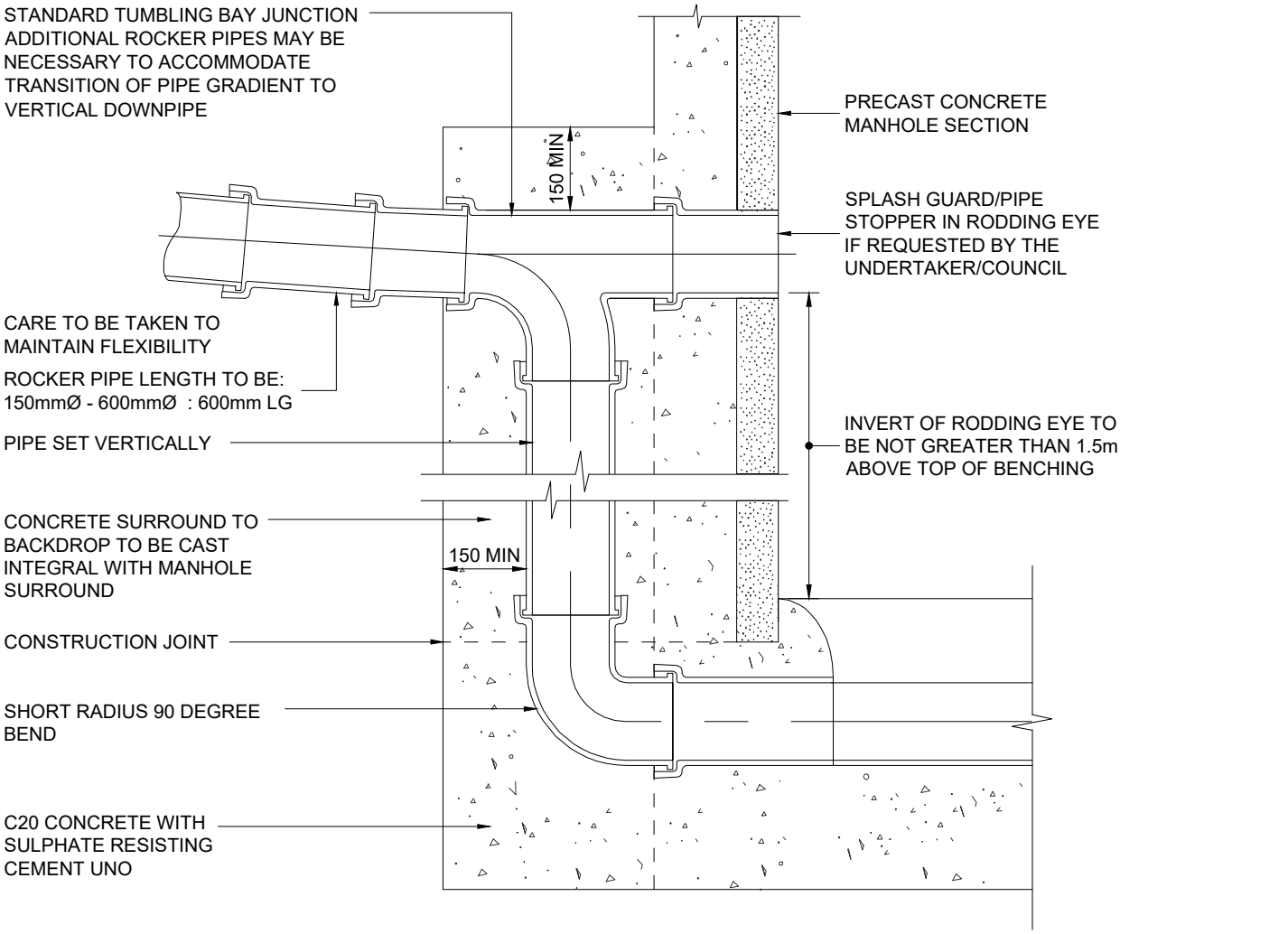


- ALL PENETRATIONS ARE SHOWN INDICATIVELY BASED ON ARCHITECTURAL LAYOUTS.
- WHERE NO PENETRATION IS SHOWN IT IS ASSUMED THAT THE WHB ETC WILL CONNECT ABOVE GROUND TO THE SVP.
- WHERE A SHOWER IS INDICATED ON THE GROUND FLOOR IT IS ASSUMED THAT THERE WILL BE A CONNECT THROUGH THE SLAB.
- WHERE ADDITIONAL PENETRATIONS ARE REQUIRED BUT NOT SHOWN ADDITIONAL PPICS MAY BE REQUIRED.
- ALL SETTING OUT OF PENETRATIONS ARE BY THE ARCHITECT

KEY

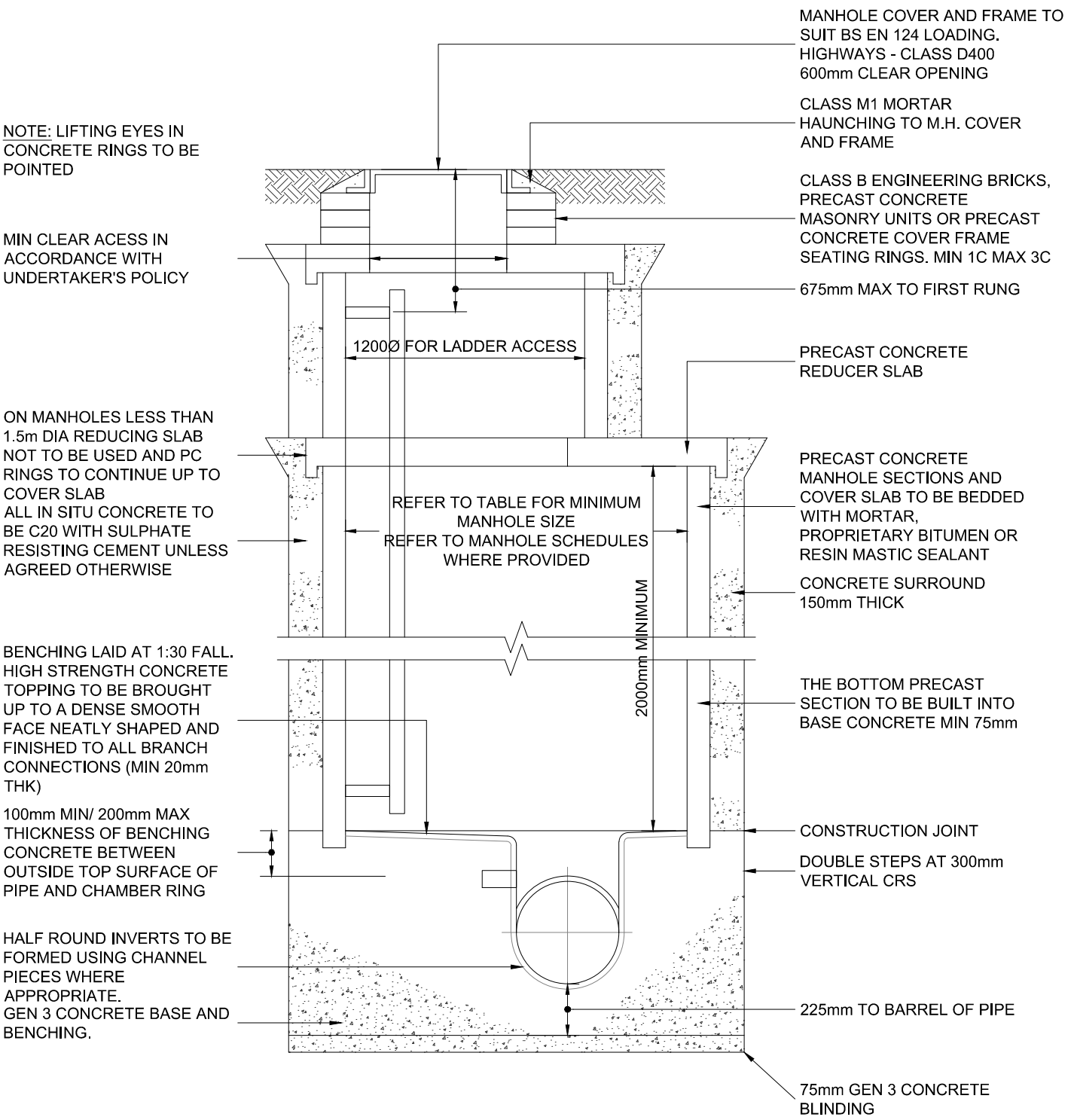
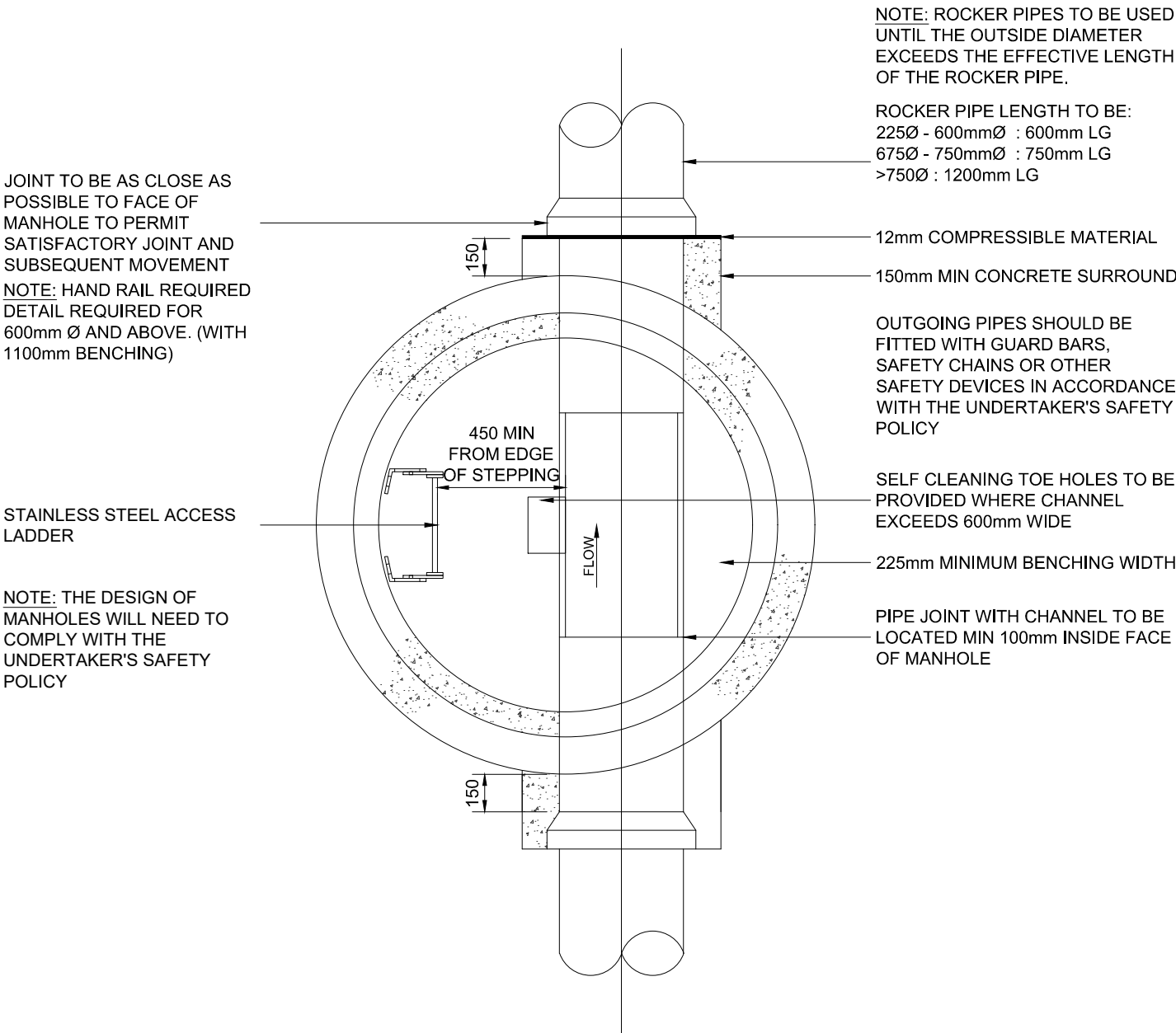
- EXISTING SW SEWERS
- EXISTING FW SEWERS
- EXISTING COMBINED SEWERS
- PROPOSED SW DRAINAGE
- PROPOSED FW DRAINAGE
- PROPOSED COMBINED DRAINAGE
- TYPE C PERMEABLE DRIVEWAY





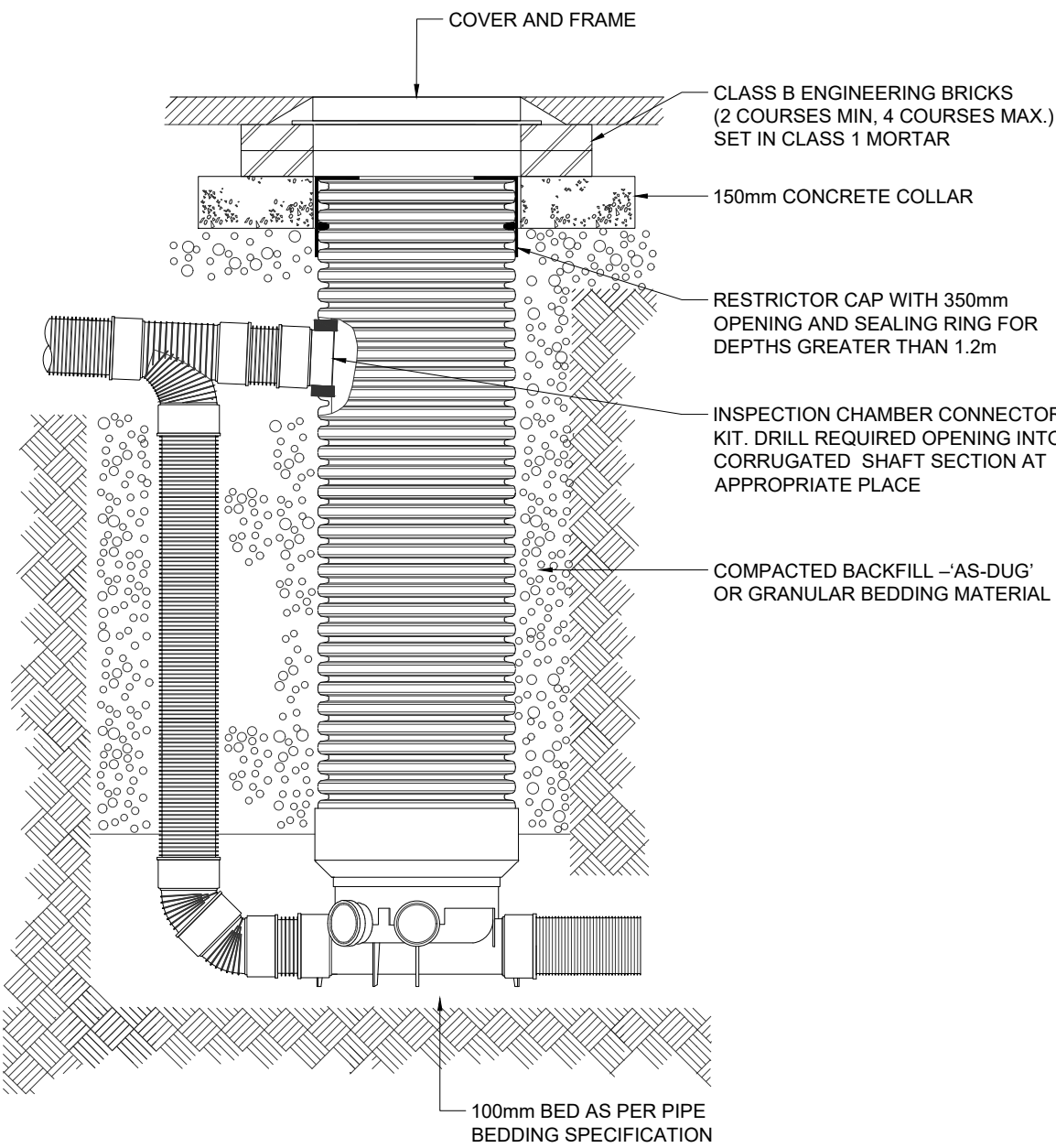
TYPICAL BACKDROP DETAIL

NTS



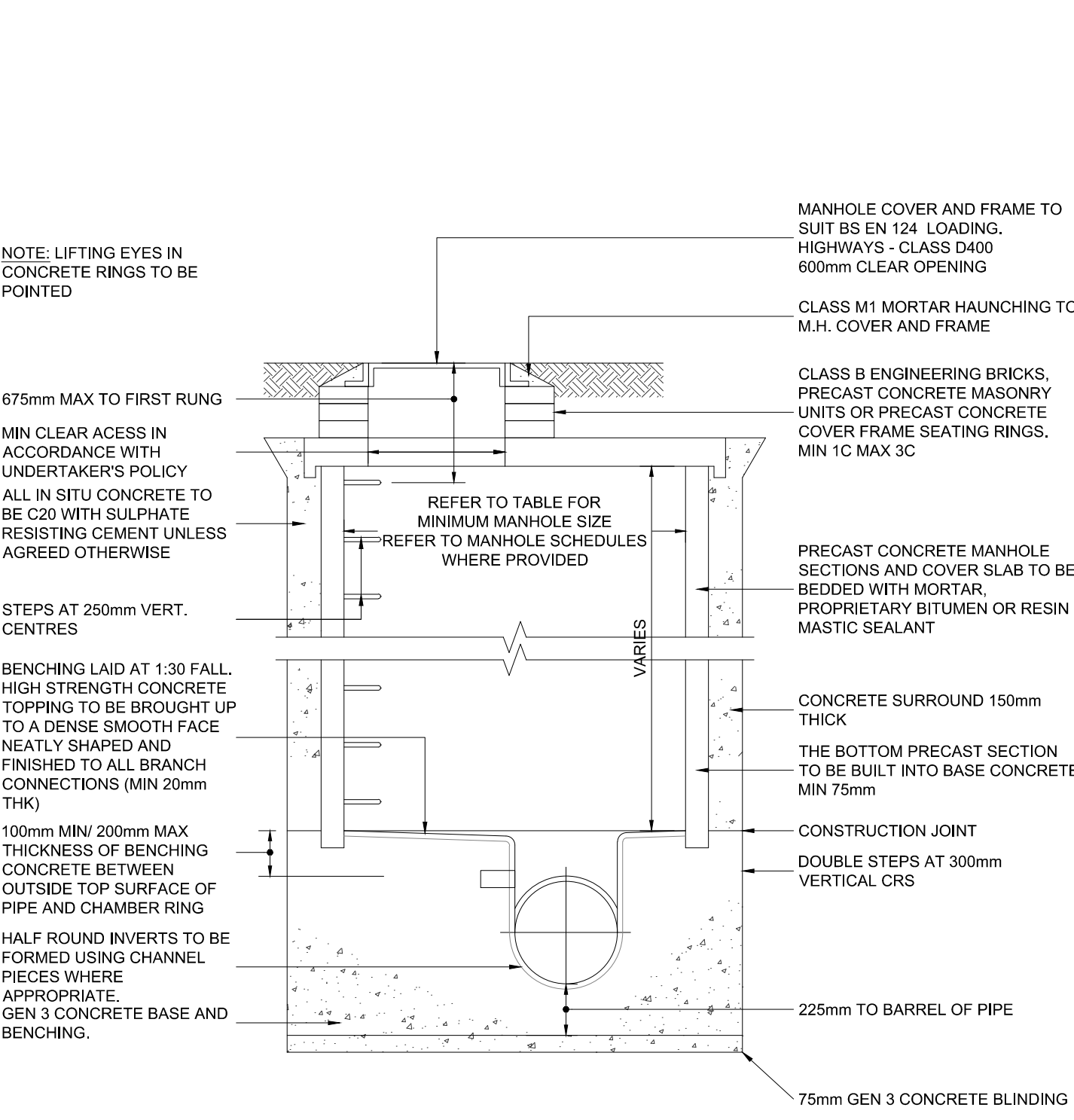
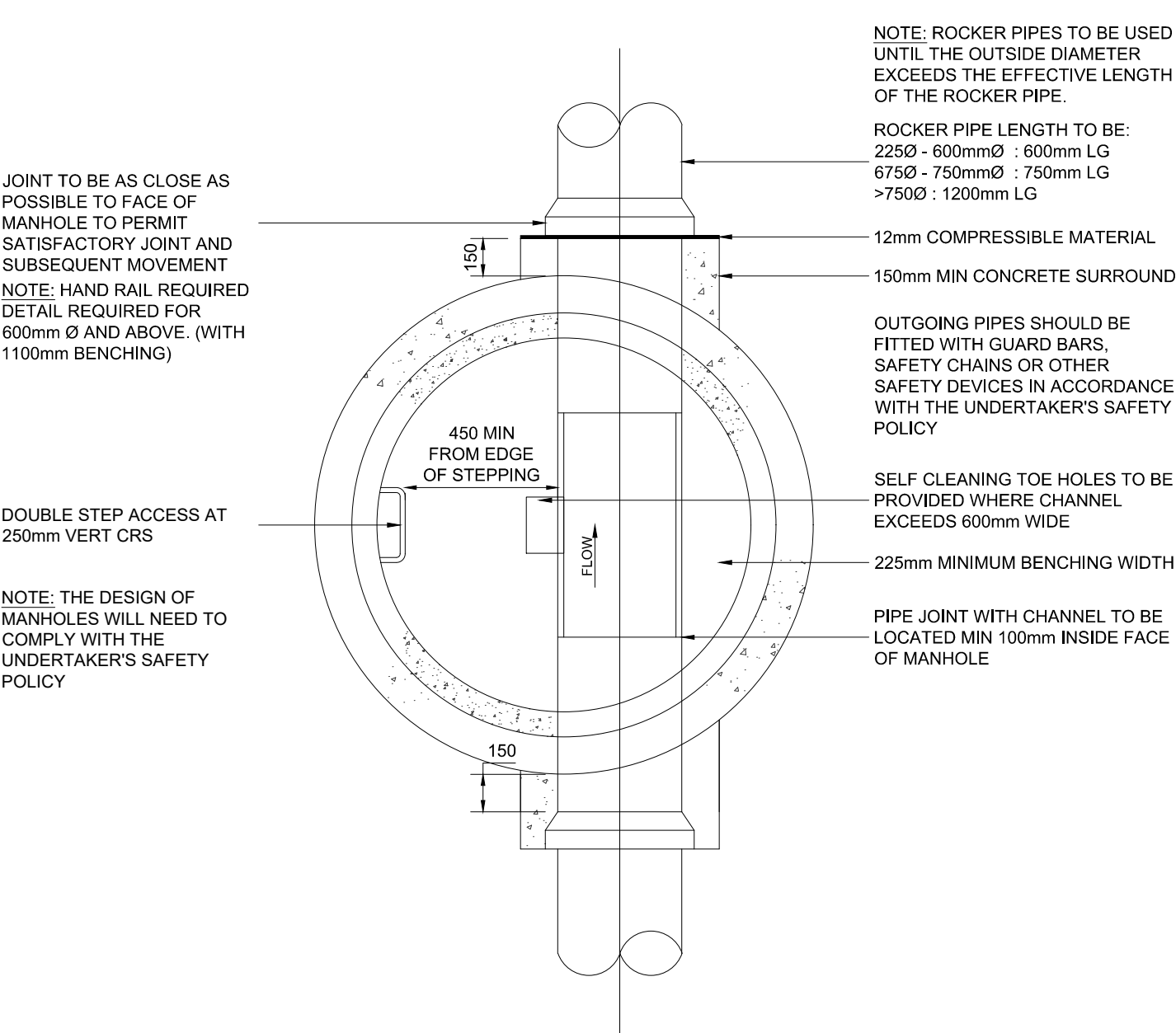
MANHOLE TYPE A DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE 3m TO 6m

NTS



PPIC BACKDROP DETAIL

SCALE 1:20



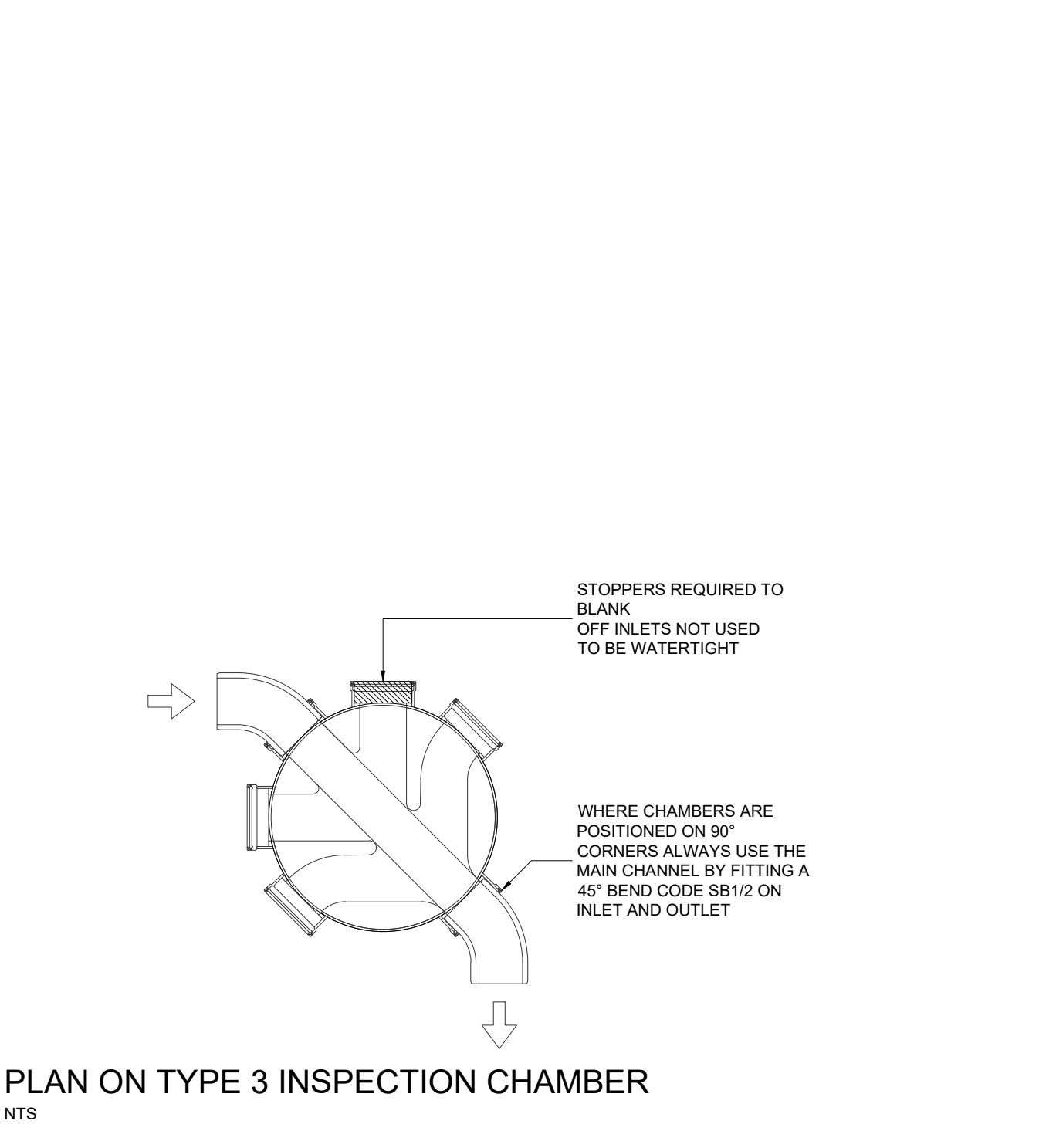
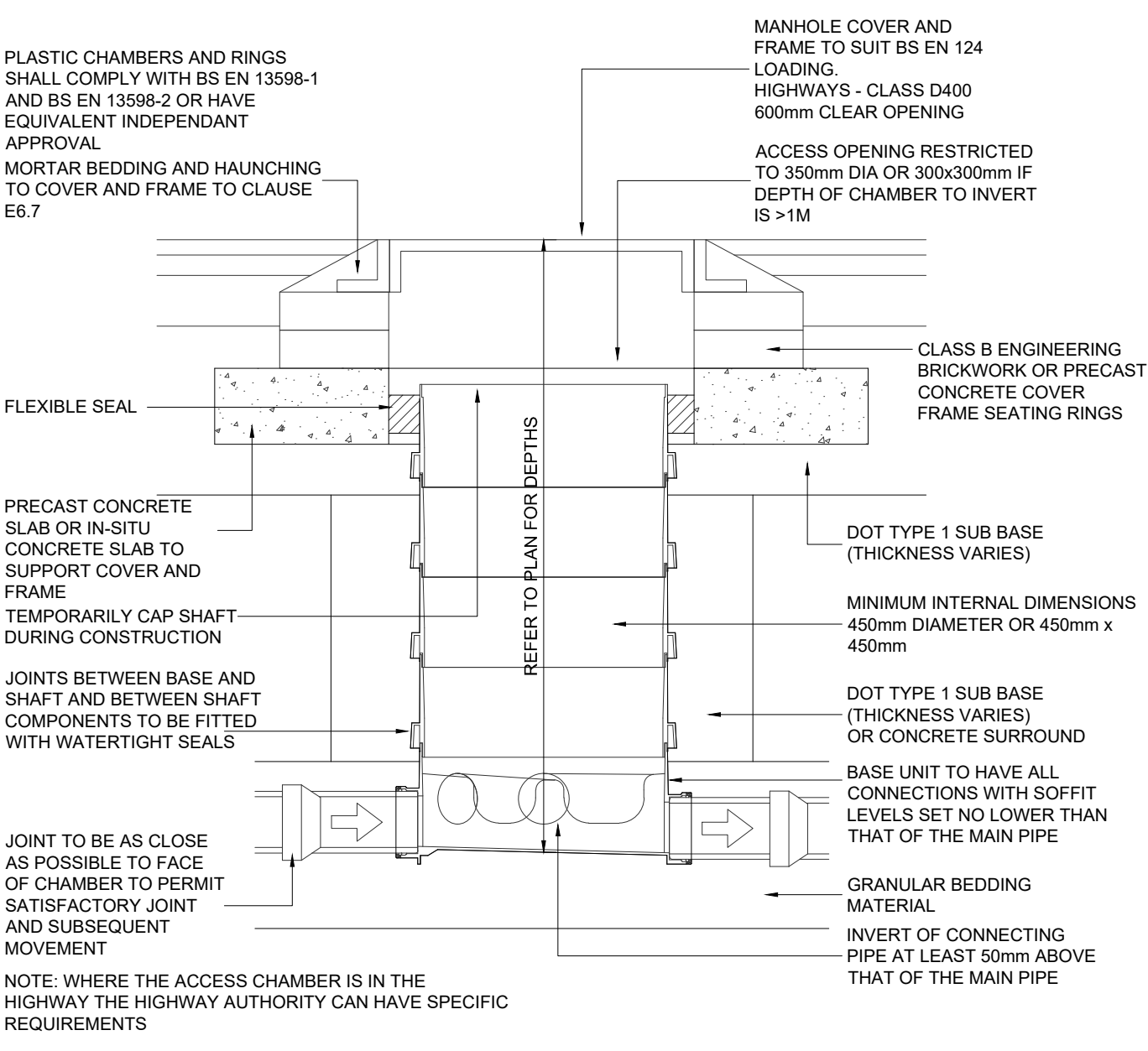
MANHOLE TYPE B MAXIMUM DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE < 3.0m

NTS



SECTION THROUGH TYPE 3 INSPECTION CHAMBER (POLYPROPYLENE INSPECTION CHAMBER)

NTS



SECTION THROUGH TYPE 3 INSPECTION CHAMBER (POLYPROPYLENE INSPECTION CHAMBER)

NTS

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THE CONTRACTOR SHALL CONFIRM THE LOCATION AND LEVEL OF EXISTING DRAINAGE OUTFALLS PRIOR TO COMMENCEMENT OF THE DRAINAGE WORKS.

EXACT LOCATIONS OF PROPOSED MANHOLES AND INSPECTION CHAMBERS TO BE DETERMINED ON SITE

ALL PIPES BUILT INTO THE MANHOLE INVERTS SHALL BE INSTALLED WITH SOFFITS LEVELS UNO.

CONNECTIONS TO ROAD GULLEYS SHALL BE IN 150MM NOMINAL BORE. CONNECTIONS TO OTHER TERMINAL FITTINGS SHALL BE IN 100MM NOMINAL BORE PIPE UNO.

COVER LEVELS SHOWN ARE APPROXIMATE AND SHALL BE ADJUSTED AND CONFIRM ON SITE BY THE CONTRACTOR.

THE CONTRACTOR SHALL PROTECT THE PIPELINE FROM DAMAGE BY SITE TRAFFIC DURING CONSTRUCTION.

PIPEWORK AND FITTINGS SHALL COMPLY WITH THE FOLLOWING REQUIREMENTS EXCEPT WHERE NOTED OTHERWISE:

CLAYWARE PIPES TO BS EN 295

100 AND 150MM DIAMETER, MINIMUM CRUSHING STRENGTH 50KN/M ON CLASS F BEDDING.

TRENCHES IN HIGHWAYS AND CAR PARKING AREAS SHALL BE BACKFILLED WITH TYPE 1 GRANULAR SUB-BASE.

SOFT SPOTS IN THE TRENCH FORMATION SHALL BE REMOVED AND REPLACED WITH GRANULAR BEDDING UNLESS INSTRUCTED OTHERWISE.

ROAD GULLEYS SHALL BE CONSTRUCTED USING A 900MM DEEP X 450MM DIAMETER GULLEY POT, SURROUNDED BY 150MM THICKNESS C20 CONCRETE, WITH RODDING EYE AND CHAINED STOPPER.

GULLEY COVERS SHALL BE GRADE B CAPTIVE HINGED DUCTILE IRON TO BS EN 124 BLACK COATED.

UNLESS NOTED OTHERWISE MANHOLE COVERS SHALL BE DUCTILE IRON TO BS EN 124 BLACK COATED WITH 600 X 600 GRADE A.

CONNECTIONS IN PIPES BETWEEN MANHOLES RUNS SHALL BE FORMED BY USING PURPOSE MADE CLAYWARE. 45° JUNCTION FITTINGS TO BS65. BEND FITTINGS SHALL BE PROVIDED WHERE APPROPRIATE TO DIRECT THE FLOW INTO THE MAIN RUNS.

ALTERNATIVELY MAIN PIPES MAY BE DIAMOND CORED TO TAKE LATERAL CONNECTIONS WITH A SADDLE FITTING TO BS EN 295 AND 150MM C20 CONCRETE SURROUND.

THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL EXISTING STATUTORY UNDERTAKERS APPARATUS AND SERVICE CONNECTIONS BY TRIAL PITS PRIOR TO OPENING UP FOR THE WORKS.

NOTE: ALL DRAINAGE WORKS SHALL BE IN ACCORDANCE WITH THE DCG

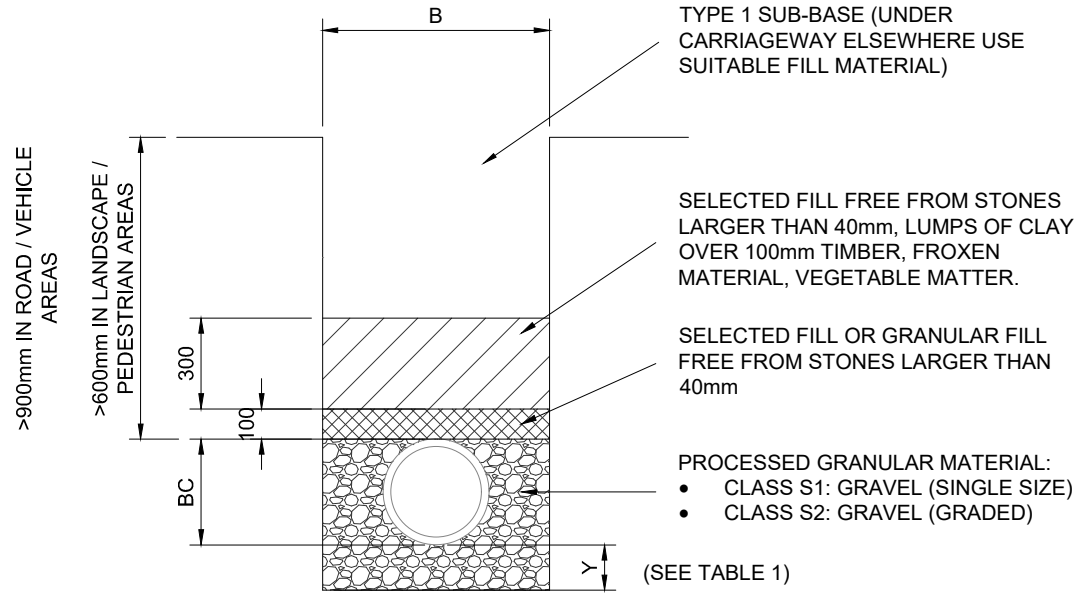
THE PURPOSE OF THIS DRAWING IS FOR TYPICAL CONSTRUCTION DETAILS ONLY. MANHOLES / PIPE DIAMETERS / SUMP DEPTHS ETC WILL VARY ON PLAN.

REFER TO DRAINAGE LAYOUT DRAWING FOR ALL PIPE SIZES, MANHOLE SIZES, PIPE LENGTHS, SUMP DEPTHS, STORAGE TANK CONFIGURATIONS, COVER LEVELS AND INVERT LEVELS

P01	PRELIMINARY DRAWING	05.12.23	CR	SB
Rev	Description	Date	By	Chkd
Drawing Status				
PRELIMINARY DRAWING				
				
Client				
WYTHENSHAW COMMUNITY HOUSING				
Project				
THE ENTERPRISE CENTRE BENCHILL ROAD MANCHESTER				
Drawing Title				
DRAINAGE CONSTRUCTION DETAILS SHEET 1				
Date	05.12.23	Drawn By	CR	Checked By
Scale at A1	NTS	Project Number	33029	Revision
Sheet Number	33029-SUT-ZZ-XX-DR-C-6651	P01		

TABLE 1			
MINIMUM EFFECTIVE EMBEDMENT DIMENSIONS FOR FLEXIBLE			
NOMINAL INT PIPE DIA	DIMENSION Y1 EVEN TRENCH BOTTOM (MIN)	DIMENSION Y2 ROCK OR UNEVEN TRENCH BOTTOM (MIN)	MINIMUM EFFECTIVE TRENCH WIDTH (BD)
100	100	200	BC + 200
150	150	200	BC + 300
225	150	200	BC + 300
300	150	200	BC + 300
375	150	200	BC + 300
450	150	250	BC + 450
525	150	250	BC + 450
600	150	250	BC + 450
675	150	250	BC + 450
750	200	300	BC + 600
825	200	300	BC + 600
900	200	300	BC + 600
975	250	350	BC + 800
1050	250	350	BC + 800
1125	250	350	BC + 800
1200	250	350	BC + 800

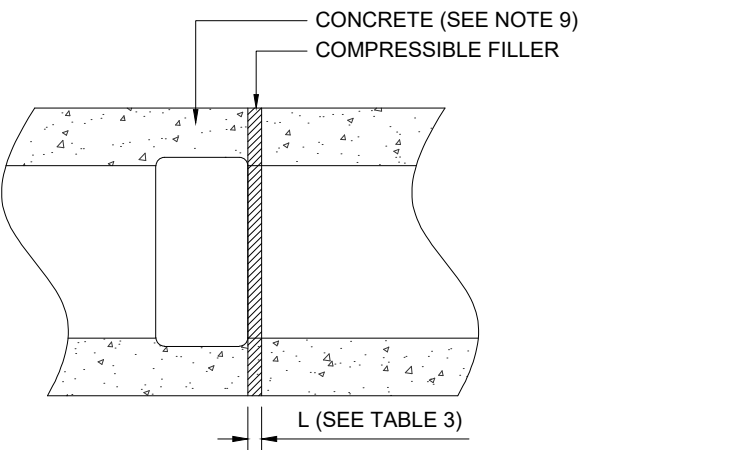
Bc= Outside Diameter of pipe
Bd= Effective trench width



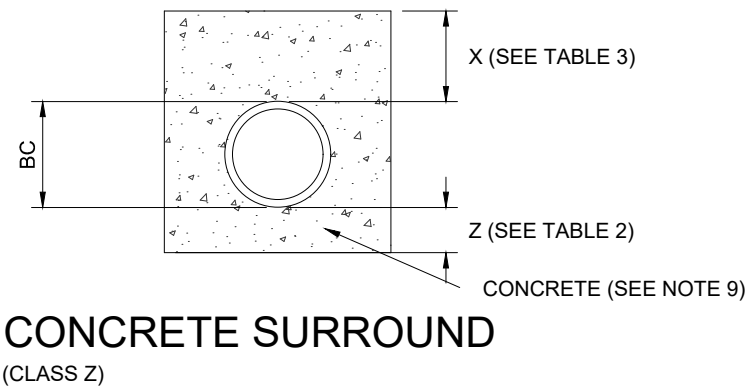
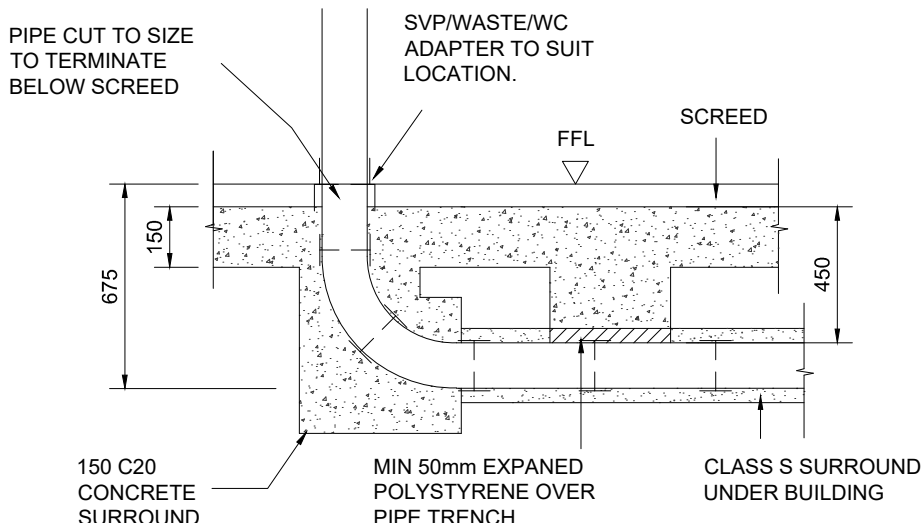
GRANULAR PIPE BEDDING DETAILS FOR FLEXIBLE PIPES
(EMBEDMENT CLASS S1 - S4)

- All dimensions in millimetres
 - The pipe embedments indicate the minimum trench dimensions which should be assumed for initial design purposes; the minimum trench widths shown will usually be sufficient to allow adequate compaction of the embedment material. All pipework should be designed in accordance with BS EN 1295-1
 - For narrow trenching techniques the minimum trench width may be reduced, providing that the design indicates that the reduced embedment width is sufficient to support the pipework
 - Where selected excavated material may migrate into the native soil or vice versa, geotextile membrane shall be provided around the embedment material
 - Embedment dimensions shall be in accordance with Table 2
 - Where pipes with flexible joints are used, concrete protection shall be interrupted over its full cross-section at each pipe joint by a shaped compressible filler.
- PROCESSED GRANULAR MATERIAL:
- Processed granular material shall comply with WIS 4-08-02. The grading of processed granular material shall be as specified
 - Limestone material shall not be used where the native ground or ground water is acidic, ie pH of 6 or less
- CONCRETE EMBEDMENTS & SURROUND:
- Gen 3 concrete shall be used in non aggressive ground. Elsewhere the cement type and mix design should be selected to suit the sulphate content and pH of the ground and groundwater
 - Concrete surround details shall be adopted where cover to pipework is less than 1.2m and where it is necessary to protect the pipework from traffic loading
 - Pipes to be bedded/surrounded with concrete shall be supported on precast concrete setting blocks, the top face of of each block being covered with two layers of compressible packing
 - PVC and PE pipes shall be wrapped with a layer of plastic sheeting complying with UU CESWI 6 class 2.95
 - GRP pipes shall be wrapped with compressible filler material 100mm wide at the end of the end of the concrete surround
 - Compressible filler shall comply with UU CESWI 6 class 2.19

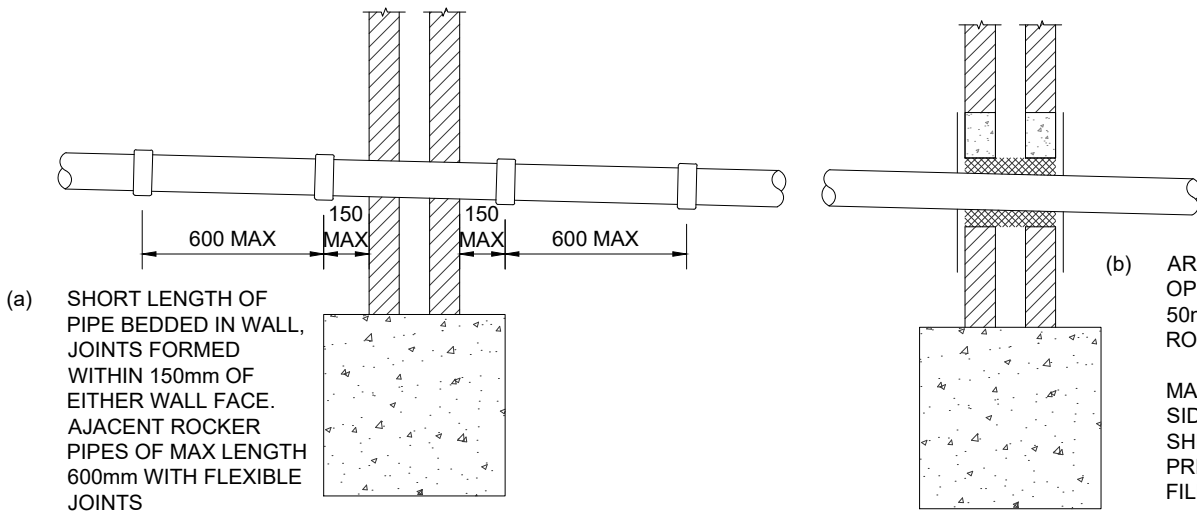
TABLE 3		
Thickness of Compressible Filler (L)		
NOMINAL INTERNAL PIPE DIA	DIM. X mm	COMPRESSIBLE FILLER L mm
<400	160	18
400-700	200	36
725-1200	300	36
>1200	300	54



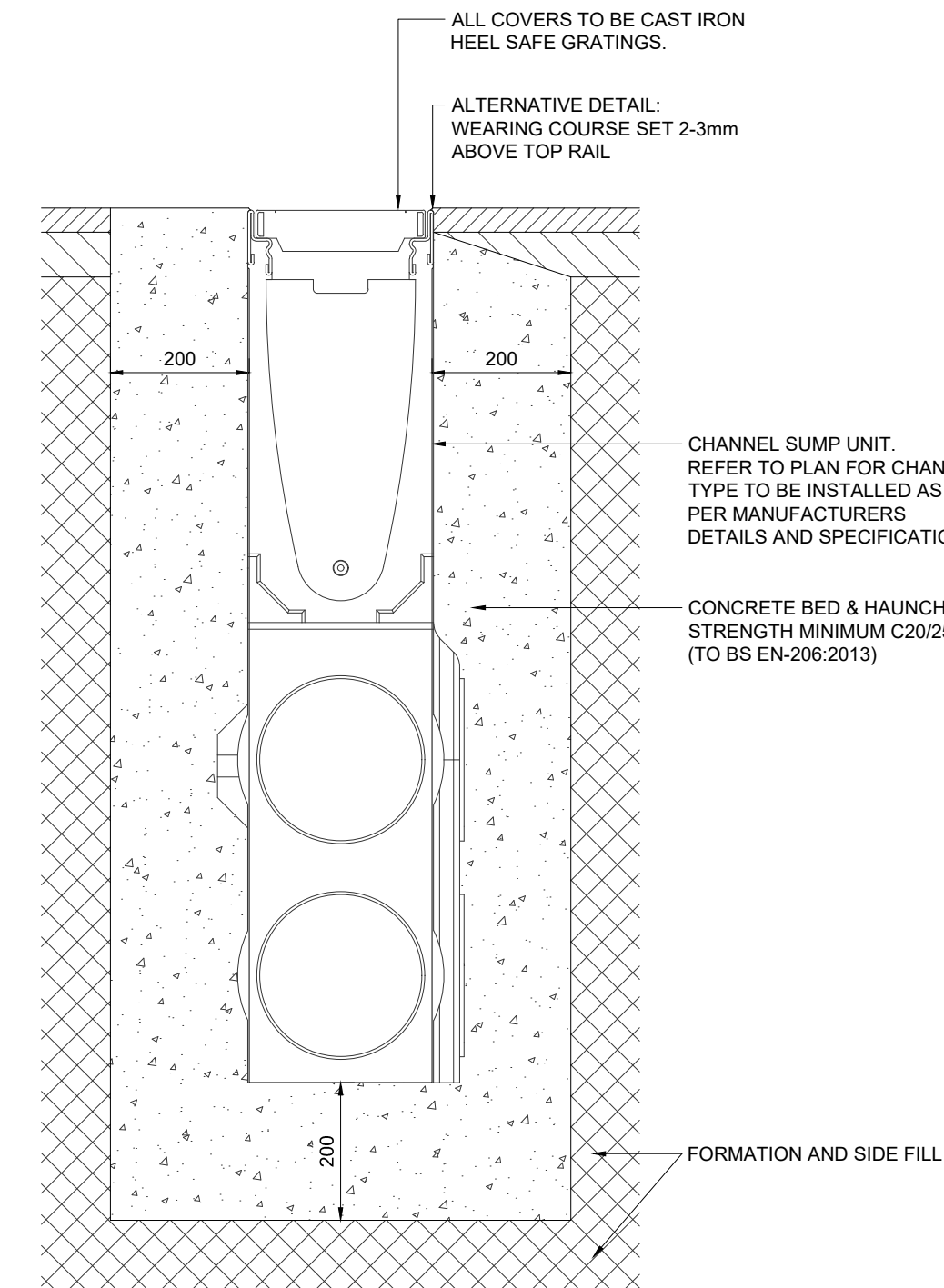
SLEEVE JOINTED TYPE
PLAN ON CONCRETE ENCASED PIPES



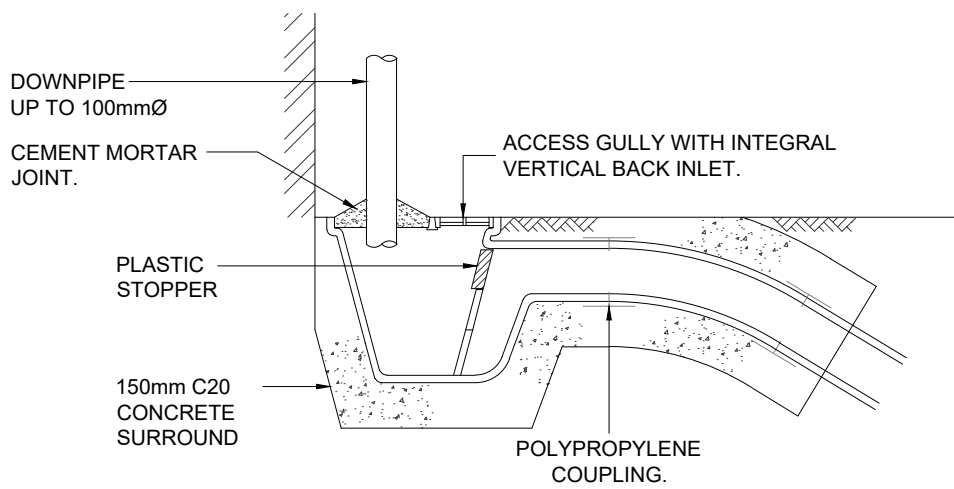
CONNECTION TO R.W./SWP/WASTE INSIDE BUILDING
NTS



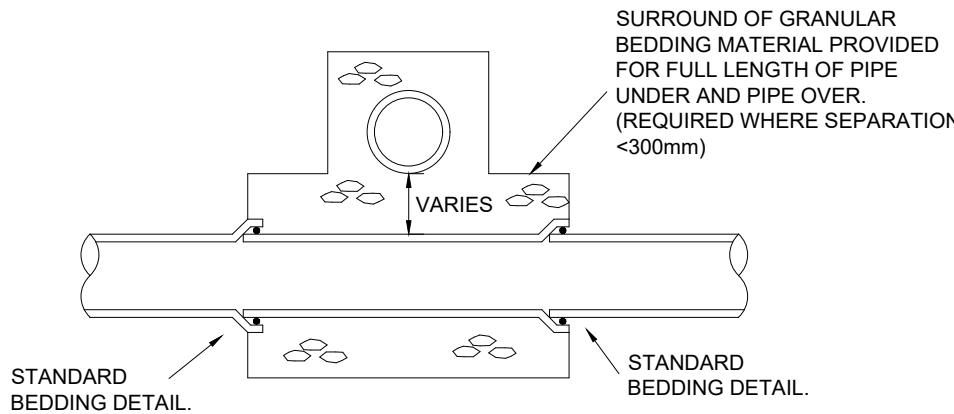
PIPES PENETRATING THROUGH WALLS
NTS



CHANNEL DRAIN SUMP OUTFALL DETAIL
SCALE 1:10



ACCESS GULLY DETAIL
NTS



PIPE CROSS OVER DETAIL
NTS

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ALL DIMENSIONS TO BE CHECKED ON SITE BY THE CONTRACTOR / FABRICATOR PRIOR TO COMMENCEMENT OF WORKS.

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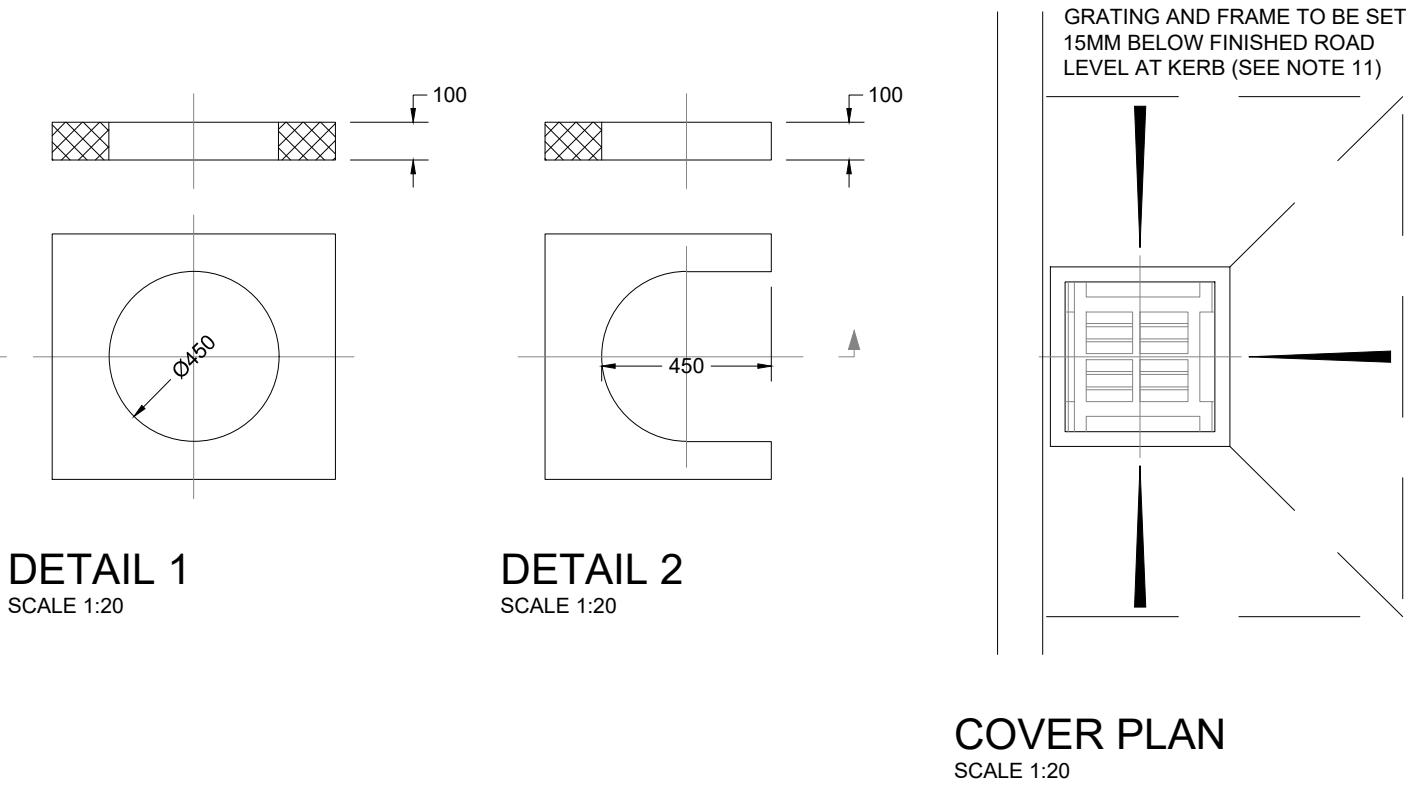
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THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL EXISTING STATUTORY UNDERTAKERS APPARATUS AND SERVICE CONNECTIONS BY TRIAL PITS PRIOR TO OPENING UP FOR THE WORKS.

NOTE: ALL DRAINAGE WORKS
SHALL BE IN ACCORDANCE WITH
THE DCG

THE PURPOSE OF THIS DRAWING
IS FOR TYPICAL CONSTRUCTION
DETAILS ONLY. MANHOLES / PIPE
DIAMETERS / SUMP DEPTHS ETC
WILL VARY ON PLAN.

REFER TO DRAINAGE LAYOUT
DRAWING FOR ALL PIPE SIZES,
MANHOLE SIZES, PIPE LENGTHS,
SUMP DEPTHS, STORAGE TANK
CONFIGURATIONS, COVER LEVELS
AND INVERT LEVELS

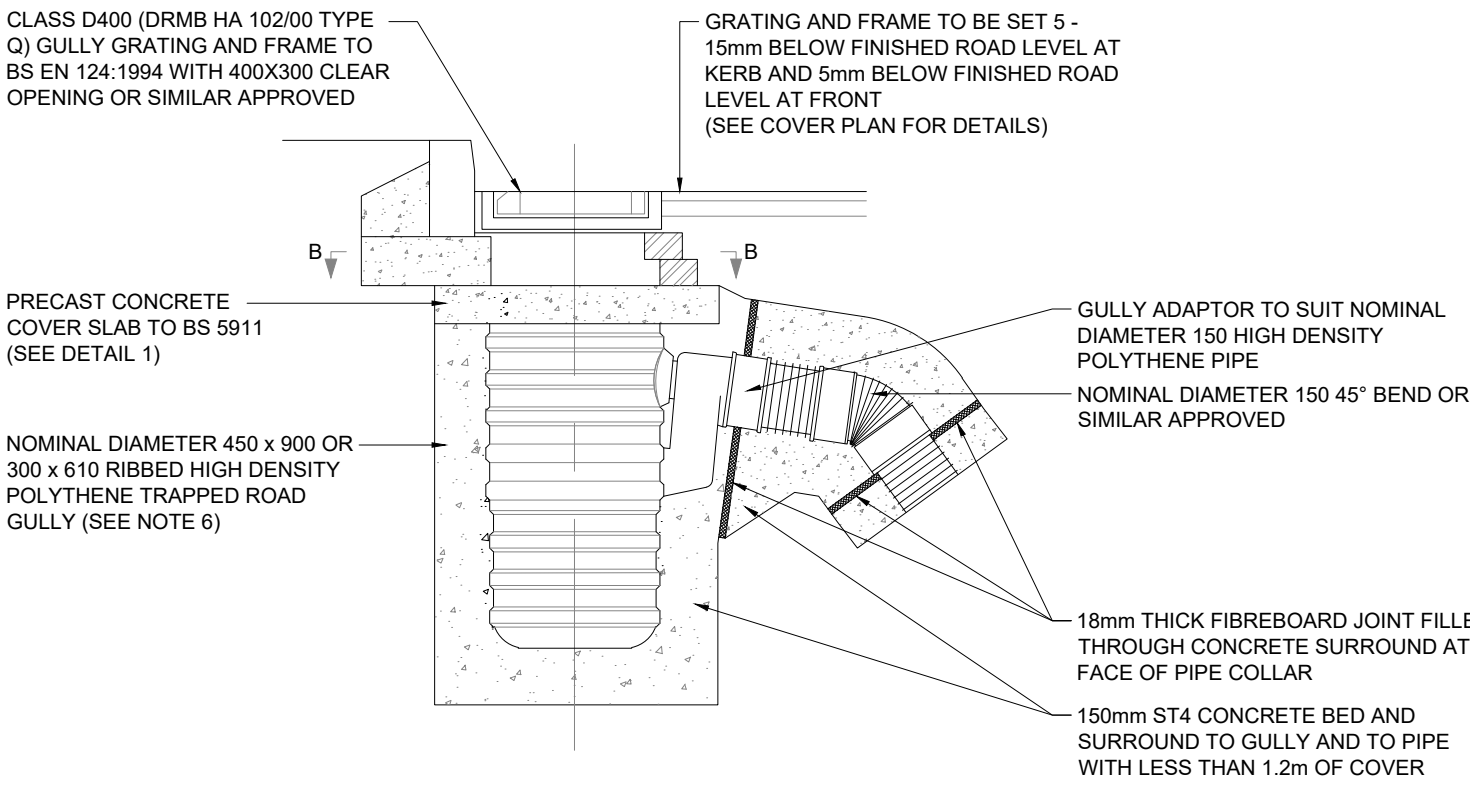


DETAIL 1
SCALE 1:20

DETAIL 2
SCALE 1:20

COVER PLAN
SCALE 1:20

SECTION B-B
SCALE 1:20



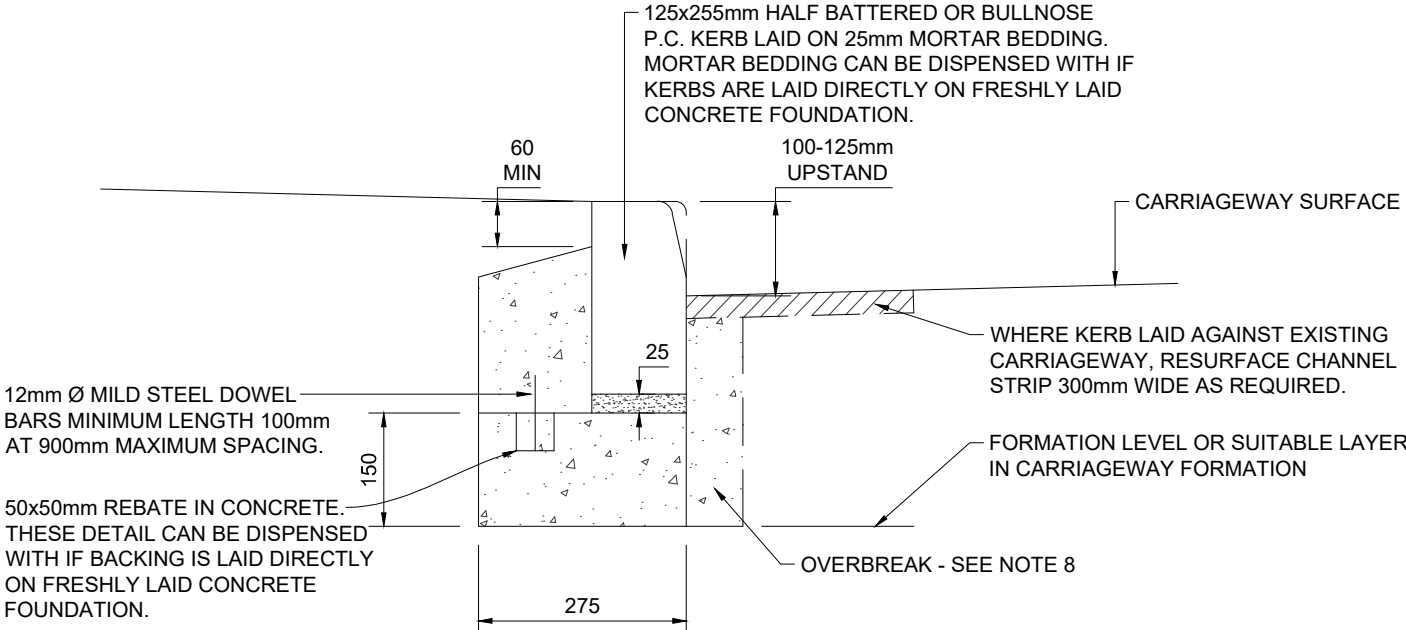
TYPICAL PIPE BEDDING AND GULLY CONNECTION DETAIL
SCALE 1:20

- NOTES:
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH APPENDIX 5/1 OF THE 1. WORKS SPECIFICATION.
 - THE BACKFILL MATERIAL SHALL BE PLACED AND COMPACTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS VOLUME 1-METHOD COMPACTIONS (TABLE 5/4).
 - THE MAXIMUM TRENCH WIDTH SHALL BE APPLIED UP TO A DEPTH OF 300mm ABOVE THE CROWN OF THE PIPE.
 - THE MINIMUM DEPTH FROM THE TOP OF THE GRATING TO THE TOP OF THE GULLY OUTLET IS TO BE 675 TO 525mm WHEN THE CONNECTION PIPE IS UNDER A CARRIAGEWAY OR HARD SHOULDER AND 300 TO 375 ELSEWHERE.
 - GULLY GRATES AND FRAMES TO BE LAID TO THE CROSSFALL OF THE FINISHED SURFACE.
 - THE CONCRETE SURROUND TO GULLIES SHALL FILL THE WHOLE VOID BETWEEN THE GULLY POT AND THE FACE OF EXCAVATION. THE CONCRETE SHOULD BE COMPACTED BY VIBRATING POKER TO REMOVE ALL VOIDS.
 - BRICKWORK TO SHW SERIES 2400 (CATEGORY 1 GROUP 1 SOLID HD CLAY UNITS (75MPa) TO BS EN 771-1:2003 USING M12 SULPHATE RESISTANT MORTAR TO BS EN 998-2:2010). CORBELLING SHALL NOT EXCEED 30mm ON EACH COURSE.
 - THE DEPTH OF MORTAR JOINTS IN BRICKWORK AND UNDER THE IRONWORK SHALL BE BETWEEN 5 AND 15mm. ANY FINE ADJUSTMENT IN LEVE SHOULD BE CARRIED OUT IN SPECIAL CLASS B BRICKS OF REDUCED THICKNESS OR QUARRY TILES. WHERE PROPRIETARY CEMENTITIOUS MATERIALS OR EPOXY RESINS ARE USED THE MORTAR BEDDING DEPTHS SHOULD BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
 - GULLY FRAME TO BE BEDDED ON, AND HAUNCHED WITH MORTAR AS PREVIOUSLY DESCRIBED, AND POSITIONED CENTRALLY OVER GULLY POT AND ABUTTING WITH THE KERB FACE.
 - IN CARRIAGEWAY, GULLY CHAMBER TO BS 5911-6:2004 TO BE 900mm INTERNAL DEPTH AND 450mm INTERNAL DIAMETER. IN FOOTWAY GULLY CHAMBER TO BS 5911-6:2004 TO BE 610mm INTERNAL DEPTH AND 300mm INTERNAL DIAMETER.

CHANNEL DRAIN IN BITUMINOUS CONSTRUCTION
SCALE 1:10

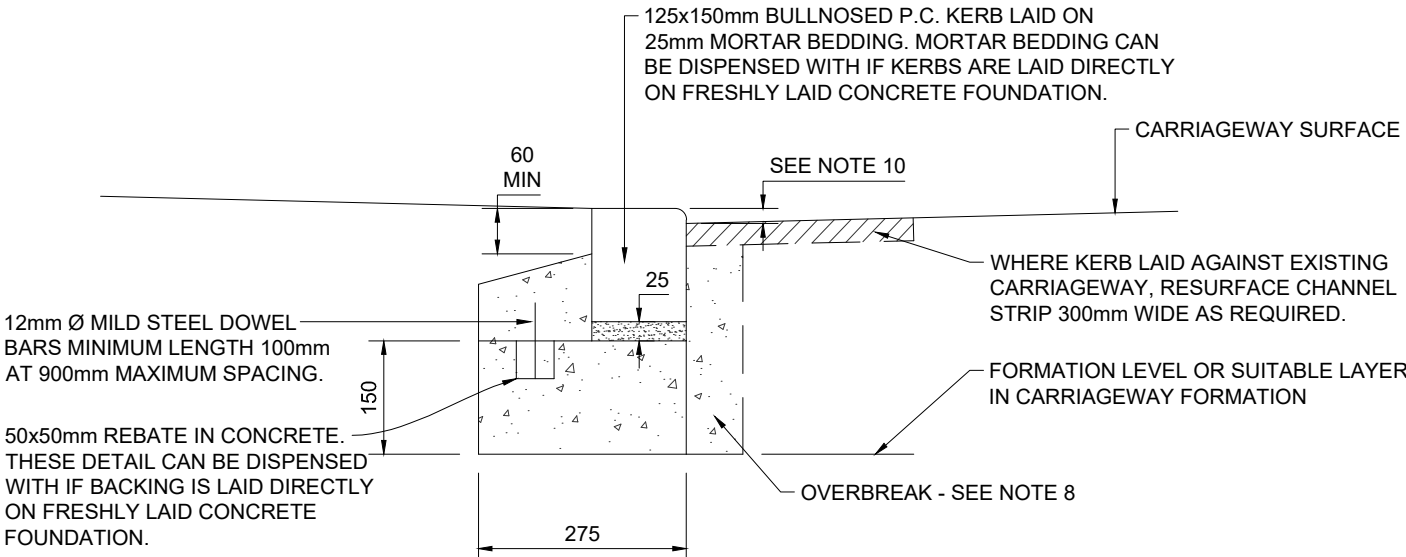
LOADING CLASS:	
A15:	VERY LIGHT DUTY FOR PEDESTRIAN AREAS
B125:	DOMESTIC DRIVEWAYS
C250:	SMALL PRIVATE CAR PARKS
D400:	MAIN ROADS AND PUBLIC CAR PARKS.
E600:	INDUSTRIAL ESTATES, LOADING BAYS & CARGO HANDLING YARDS.
F900:	DOCKS & AIRPORTS. EXTREME HEAVY DUTY OPERATIONS.

P01	PRELIMINARY DRAWING	05.12.23	CR	SB
Rev	Description	Date	By	Chkd
Drawing Status				
PRELIMINARY DRAWING				
				
Client				
WYTHENSHAW COMMUNITY HOUSING				
Project				
THE ENTERPRISE CENTRE BENCHILL ROAD MANCHESTER				
Drawing Title				
DRAINAGE CONSTRUCTION DETAILS SHEET 1				
Date				
05.12.23				
Drawn By				
CR				
Checked By				
SB				
Scale at A1				
NTS				
Project Number				
33029				
Sheet Number				
33029-SUT-ZZ-XX-DR-C-6652				
Revision				
P01				



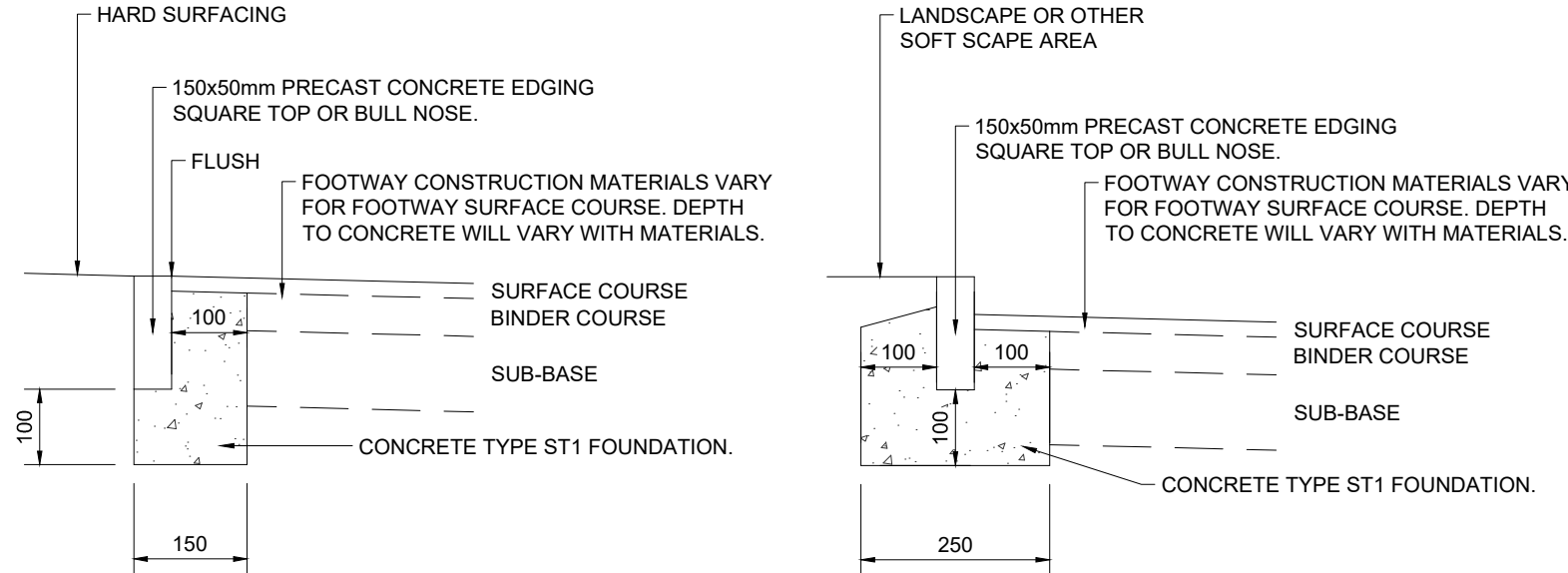
STANDARD KERB TYPE K1

SCALE 1:10



STANDARD KERB TYPE K2

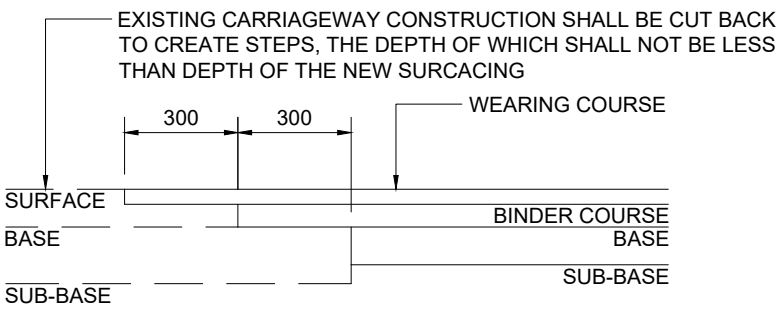
SCALE 1:10



STANDARD KERB TYPE K5

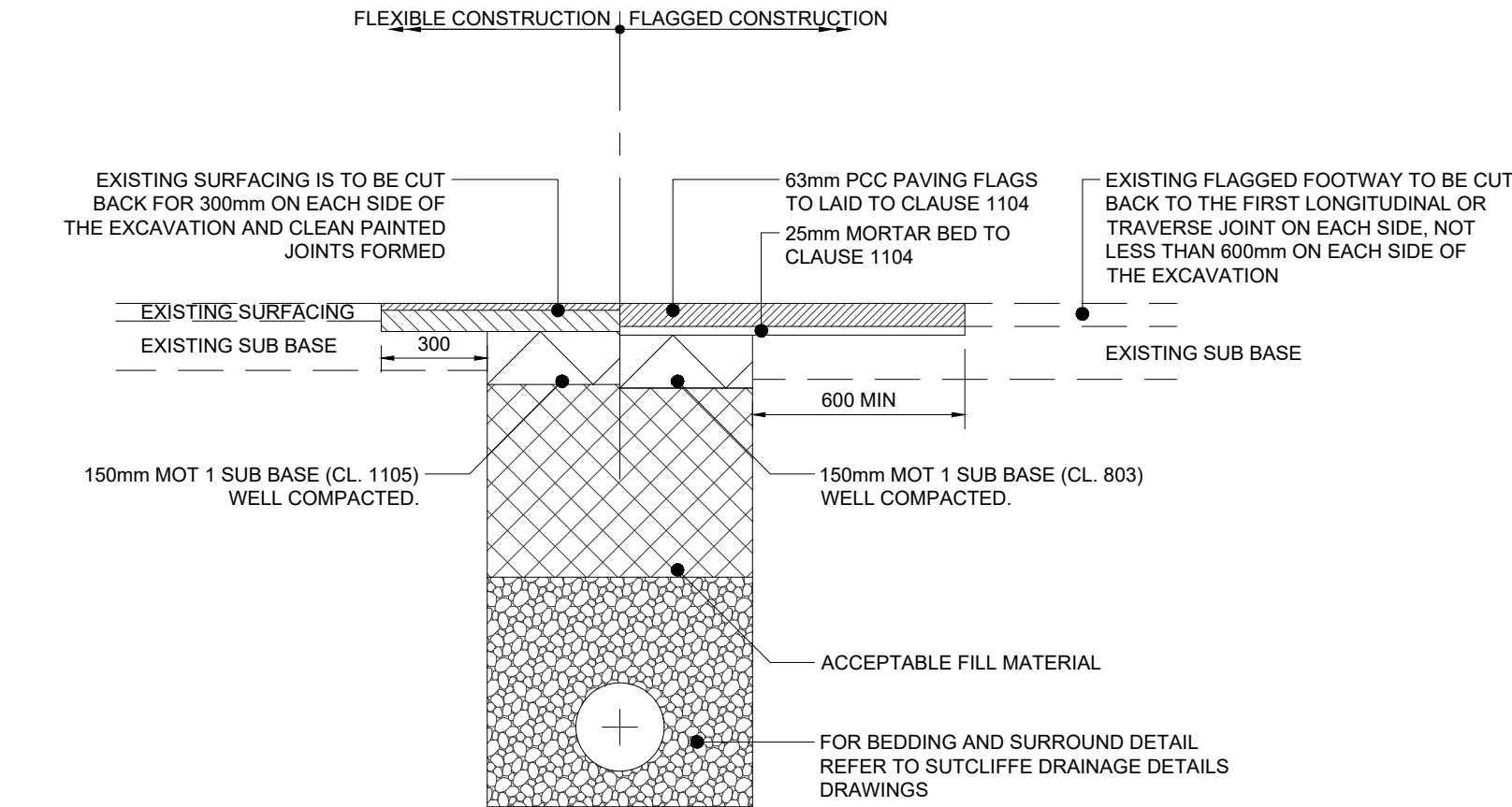
(AGAINST HARD SURFACING)

SCALE 1:10



TRANSITION DETAIL BETWEEN NEW AND EXTG HIGHWAYS

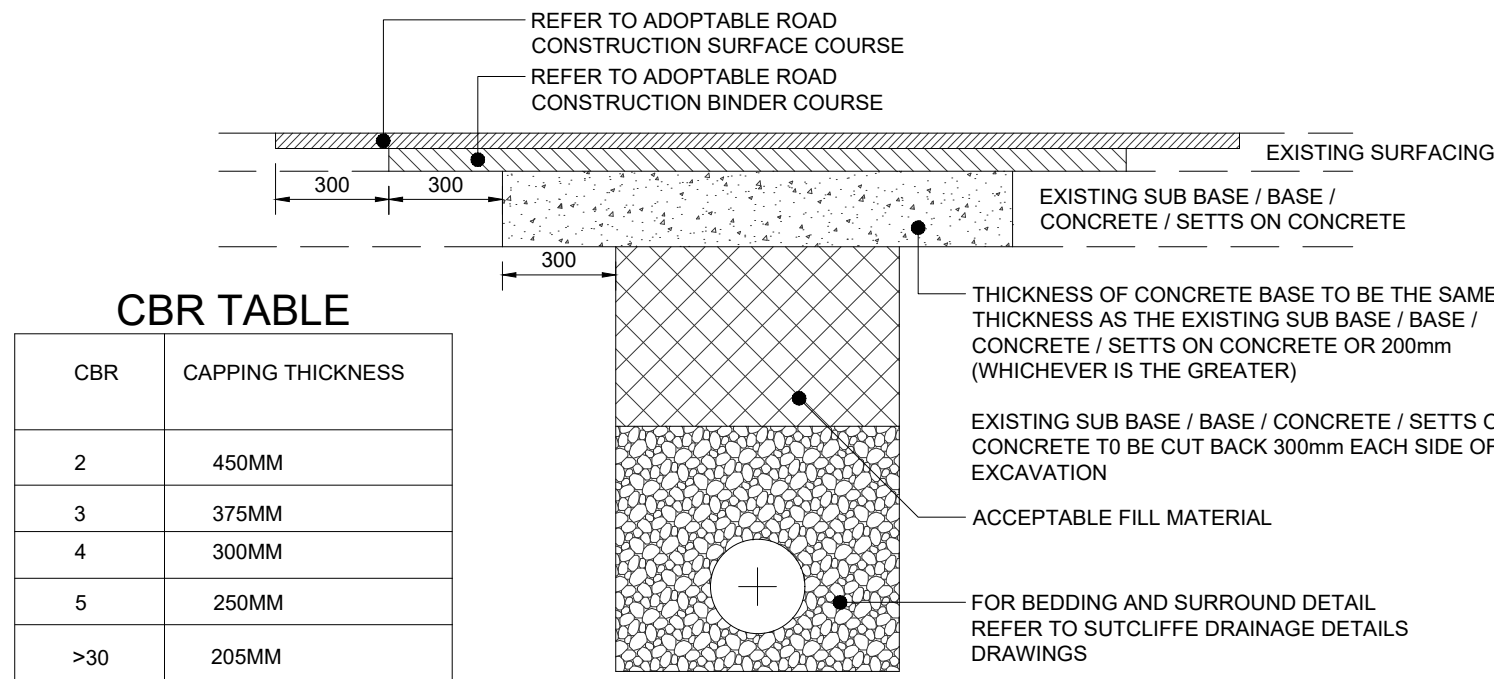
SCALE 1:20



PERMANENT FOOTPATH TRENCH REINSTATEMENT

(BACKFILLING TO TRENCH - PIPES AND DUCTS)

SCALE 1:20

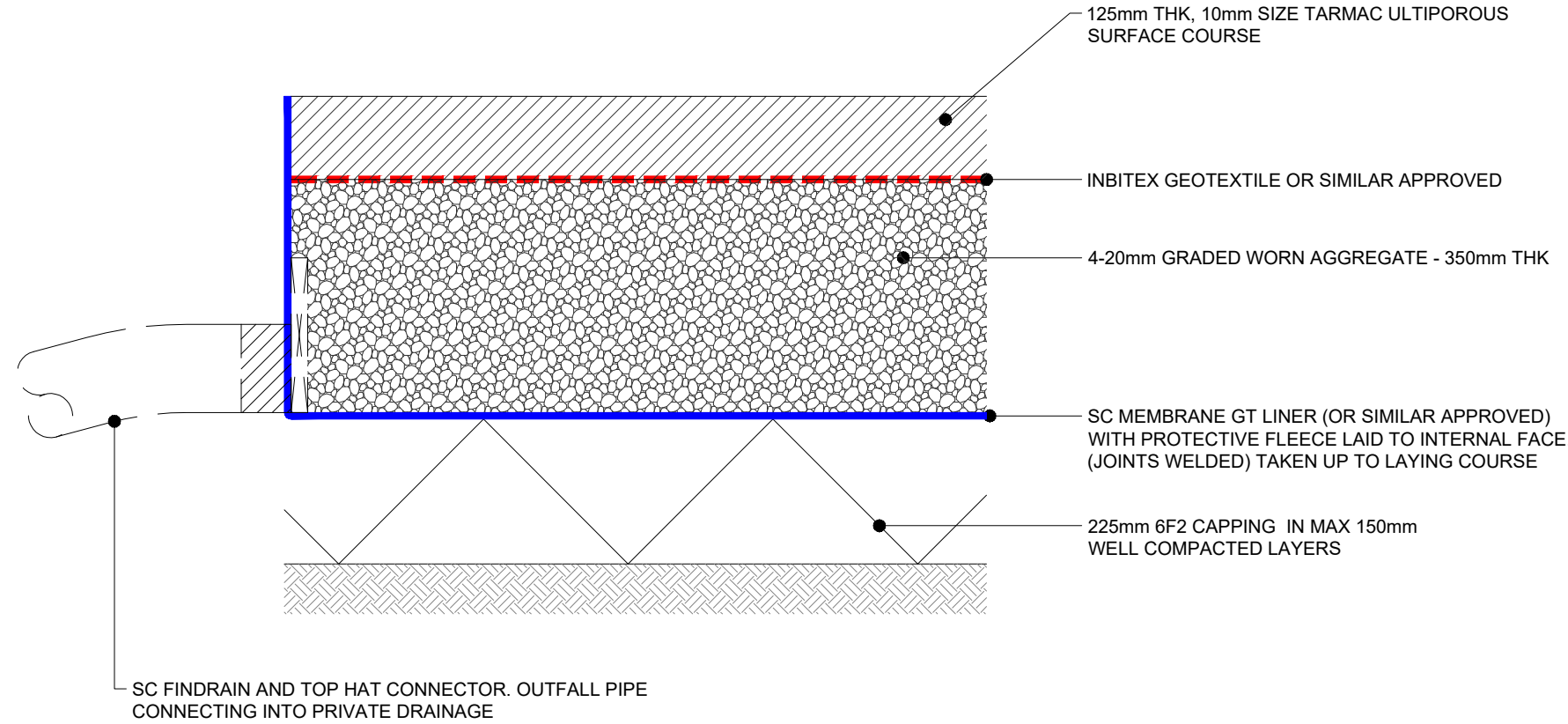


PERMANENT HIGHWAY TRENCH REINSTATEMENT

BACKFILLING TO TRENCH - PIPES AND DUCTS

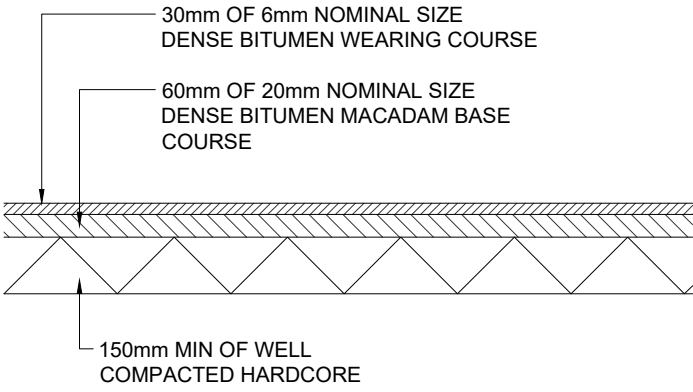
SCALE 1:20

- KERB NOTES:
1. CONCRETE EDGING AND BACKING SHALL BE TYPE ST1 TO CLAUSE 2602 TABLE 26/1
 2. KERBS SHALL COMPLY WITH BS EN 1340
 3. CEMENT SHALL BE ORDINARY PORTLAND CEMENT TO BS EN 197-1
 4. JOINTS TO KERBS SHALL BE POINTED WITH CLASS (iii) MORTAR TO CLAUSE 2404
 5. CUT LENGTHS OF KERB ARE TO BE CUT USING A DISC CUTTER MIN. LENGTH 450mm
 6. IN THE CASE OF NEW CARRIAGEWAY CONSTRUCTION THE SUB BASE LAYER IS EXTENDED 300mm BEYOND THE BACK OF KERB FOUNDATION. THE CONTRACTOR SHALL ALLOW FOR FILLING IN BETWEEN THE ROAD SUB BASE AND THE FOOTWAY FORMATION WITH SUB BASE MATERIAL IN THE RATE FOR KERBING.
 7. RECONSTRUCTION OF EXISTING CARRIAGEWAY CHANNELS WILL BE MEASURED SEPARATELY
 8. KERBS LAID IN EXISTING CARRIAGEWAY FORMATION - RATE TO INCLUDE INFILL OF OVERBREAK IN FRONT OF KERB WITH CONCRETE TYPE ST1 TO BINDER COURSE FINISH LEVEL
 9. FOUNDATION DETAIL FOR TAPER KERBS WILL BE AS FOUNDATION FOR 125x150mm AND 125x255mm KERBS.
 10. KERB UPSTAND FOR KERB TYPE K2 SHALL BE:
 - (i) 0-6mm PEDESTRIAN & CYCLEWAY CROSSINGS
 - (ii) 25mm FOR VEHICULAR CROSSINGS
 11. KERB TYPE K5 - TOP OF EDGING LAID FLUSH WITH FOOTPATH WHERE USED ON A VEHICULAR CROSSING OR AS DETAILED ON THE DRAWING AND/OR IN THE B OF Q.
 11. CLAUSES QUOTED REFER TO THE DEPARTMENT OF TRANSPORT SPECIFICATION FOR HIGHWAY WORKS, AMENDED AS APPROPRIATE
 12. ALL DIMENSIONS IN MILLIMETRES



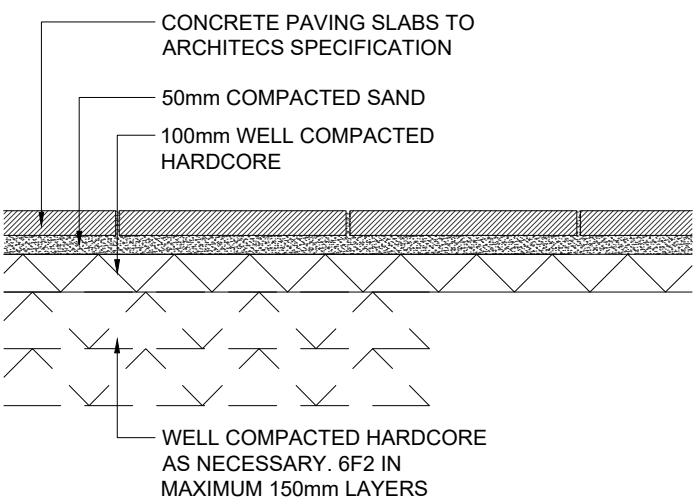
PRIVATE PERMEABLE CAR PARK DETAIL TYPE C

SCALE 1:10



PRIVATE FLEXIBLE FOOTPATH CONSTRUCTION

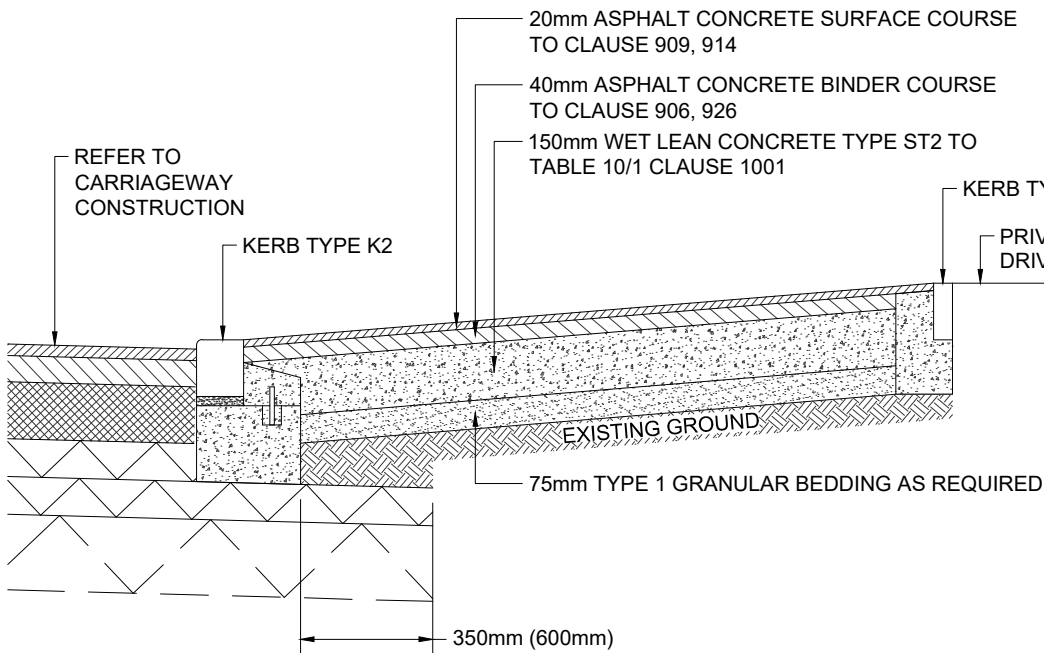
SCALE 1:20



PRIVATE FLAGGED FOOTPATH

SCALE 1:20

NOTE: CLAUSE NUMBERS RELATE TO DEPARTMENT OF TRANSPORT SPECIFICATION FOR HIGHWAY WORKS AMENDED AS APPROPRIATE



DROPPED VEHICULAR CROSSING DETAIL

SCALE 1:20

DO NOT SCALE OFF THIS DRAWING

GENERAL NOTES

THIS DRAWING TO READ IN CONJUNCTION WITH ALL RELEVANT STRUCTURAL AND ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.

ALL DIMENSIONS TO BE CHECKED ON SITE BY THE CONTRACTOR / FABRICATOR PRIOR TO COMMENCEMENT OF WORKS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.

ALL WORKS TO BE CARRIED OUT IN STRICT ACCORDANCE WITH THE ENGINEER'S SPECIFICATIONS. RELEVANT BRITISH STANDARDS AND WHERE APPLICABLE LOCAL AUTHORITIES REQUIREMENTS.

THE DEVELOPER SHALL NOT COMMENCE ANY WORK WHICH AFFECTS THE PUBLIC HIGHWAY UNTIL ALL THE APPROVED TRAFFIC SAFETY AND MANAGEMENT MEASURES NECESSITATED BY THE WORKS ARE IN PLACE.

THE DEVELOPER SHALL MAINTAIN ACCESS TO AND ALONG ALL EXISTING FOOTWAYS, PRIVATE ACCESSES, PUBLIC RIGHTS OF WAY AND PROPOSED CROSSINGS OF THE WORKS THROUGHOUT THE CONSTRUCTION PHASE.

ALL MATERIALS SHALL BE TRANSPORTED & LAID IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE APPROPRIATE CURRENT BRITISH STANDARD FOR THAT MATERIAL

ALL KERBS ARE TO BE TRANSPORTED AND POSITIONED BY MECHANICAL MEANS

ALL CLAUSES ARE FROM THE SPECIFICATION OF HIGHWAY WORKS VOLUME 1

WORKMANSHIP AND MATERIALS TO BE IN ACCORDANCE WITH CLAUSE 1101

ALL ROAD OPENING NOTICES ETC., AS REQUIRED UNDER THE HIGHWAYS ACTS ARE TO BE OBTAINED PRIOR TO COMMENCEMENT OF WORKS ON SITE. ALL WORKS ARE TO BE INSPECTED BY THE LOCAL AUTHORITY, NHBC, OR NWWA AS APPLICABLE.

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Technical Specification

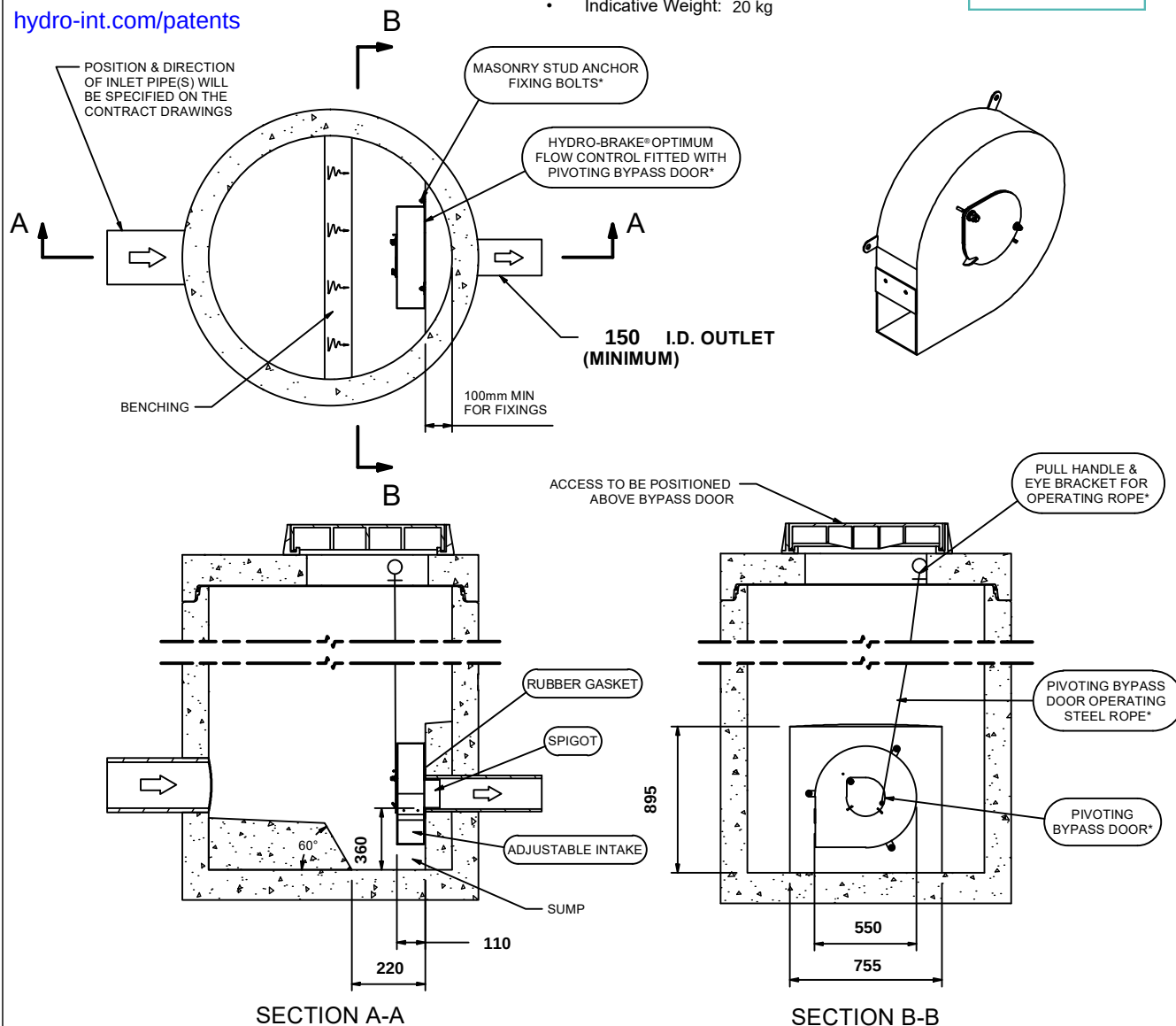
Control Point	Head (m)	Flow (l/s)
Primary Design	1.200	5.000
Flush-Flo™	0.354	4.998
Kick-Flo®	0.745	4.010
Mean Flow		4.368

Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet
- Variable flow rate post installation via adjustable inlet
- Indicative Weight: 20 kg



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IMPORTANT: LIMIT OF HYDRO INTERNATIONAL SUPPLY
 THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
 FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
 ALL CIVIL AND INSTALLATION WORK BY OTHERS
 * WHERE SUPPLIED
 HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW
 CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE



The head/flow characteristics of this SHE-0103-5000-1200-5000 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

**Hydro
International**
 A CRH COMPANY

DATE	25/04/2024 15:14
SITE	Benchill
DESIGNER	Simon Brady
REF	33029

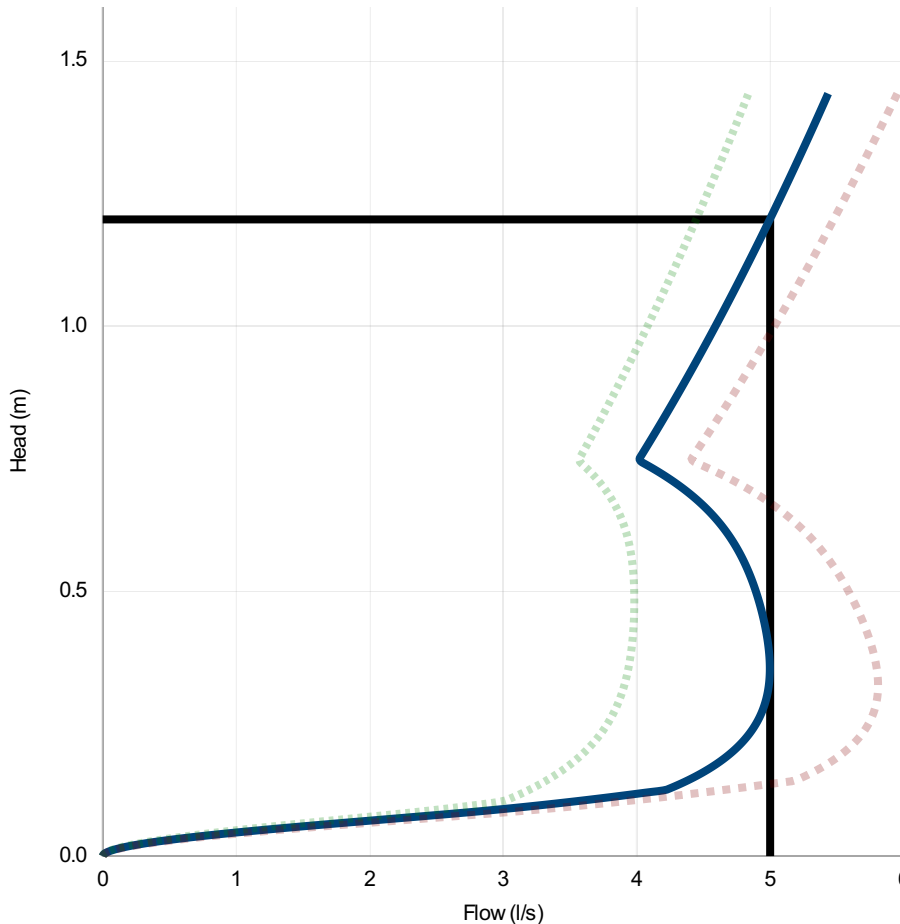
SHE-0103-5000-1200-5000
 Hydro-Brake® Optimum

Technical Specification

	Original Setting		Minimum Setting		Maximum Setting	
Control Point	Head (m)	Flow (l/s)	Head (m)	Flow (l/s)	Head (m)	Flow (l/s)
Primary Design	1.200	5.000	1.200	4.446	1.200	5.476
Flush-Flo™	0.354	4.998	0.482	3.983	0.321	5.808
Kick-Flo®	0.745	4.010	0.744	3.560	0.745	4.400
Mean Flow		4.368		3.670		4.917



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Head (m)	Flow (l/s)
0.000	0.000
0.041	0.876
0.083	2.748
0.124	4.215
0.166	4.548
0.207	4.761
0.248	4.891
0.290	4.963
0.331	4.994
0.372	4.995
0.414	4.976
0.455	4.943
0.497	4.896
0.538	4.835
0.579	4.753
0.621	4.643
0.662	4.493
0.703	4.290
0.745	4.026
0.786	4.110
0.828	4.209
0.869	4.304
0.910	4.398
0.952	4.489
0.993	4.578
1.034	4.665
1.076	4.751
1.117	4.835
1.159	4.917
1.200	4.997

DESIGN ADVICE



The head/flow characteristics of this SHE-0103-5000-1200-5000 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

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International
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DATE 25/04/2024 15:14

Site Benchill

DESIGNER Simon Brady

Ref 33029

SHE-0103-5000-1200-5000

Hydro-Brake® Optimum

Appendix B – As-Built Drawings