JOB NAME	30 Longacre Lane
JOB No.	WA-656
DATE	August 2023

DRAINAGE STRATEGY

CONTENTS

SCHEDULE OF APPENDICES

REVISION	DATE	ISSUE STATUS	PREPARED BY
-	04.08.23	FOR APPROVAL	M.H

1 INTRODUCTION

1.1 This document sets out the proposed drainage strategy for 30 Longacre Lane, Haworth, Bradford, BD22 0TE. This strategy should be read in conjunction with the following appended documentation:

- MADP Existing Site Plan 1040-101
- MADP Proposed Site Plan 1040-201A
- Proposed Drainage Drawings:
  - WA-656-D-01-Proposed Drainage Layout & Impermeable Area
  - WA-656-D-02-Proposed Drainage Details [1 of 2]
  - WA-656-D-03-Proposed Drainage Details [2 of 2]
- Yorkshire Water Sewer Map Records
- BGS Borehole Record Information
- MicroDrainage Surface Water Hydraulic Calculations
- SuDS Maintenance Schedule

2 EXISTING SITE DETAILS & PROPOSED DEVELOPMENT

2.1 The existing site extends over an area of residential, greenfield land adjacent to 30 Longacre Lane, Haworth. The site currently comprises the front garden for plot 30.

Fig 2.1 – Satellite View of Site

2.2 The total area within the site boundary is approx. 0.033 ha.

2.3 Levels within the site fall gradually from south-west to north-east. Levels to the south-west are circa 100.8m falling to circa 99.4m in the north-east.

2.4 The proposed development involves constructing a new 4No bed dwelling and driveway within the garden of plot 30 Longacre Lane.

3 FLOOD RISK STATEMENT

3.1 Considering the Environment Agency Flood Mapping, the site is shown to be located within Flood Zone 1 which is defined in the National Planning Policy Framework (NPPF) Planning Practice Guidance (PPG) as "Land having a less than 1 in 1,000 annual probability of river or sea flooding".

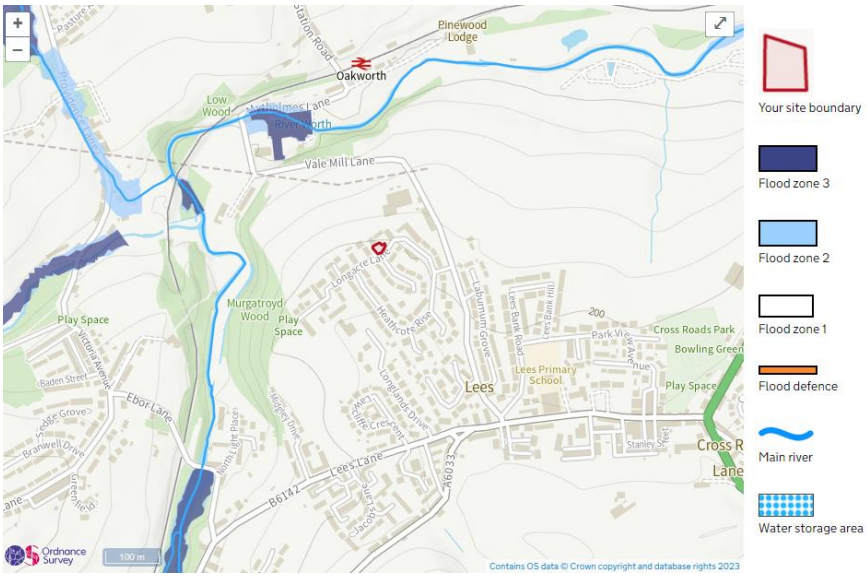


Fig 3.1 – EA Flood Map Data showing site within Flood Zone 1

3.2 In accordance with Environment Agency guidance, a site-specific flood risk assessment is not required as the site is in Flood Zone 1 and the total site area is less than 1 hectare.

3.3 Whilst a site-specific flood risk assessment is not required the flood risk from a variety of sources, including river and sea, surface water, and reservoir flooding does need to be considered:

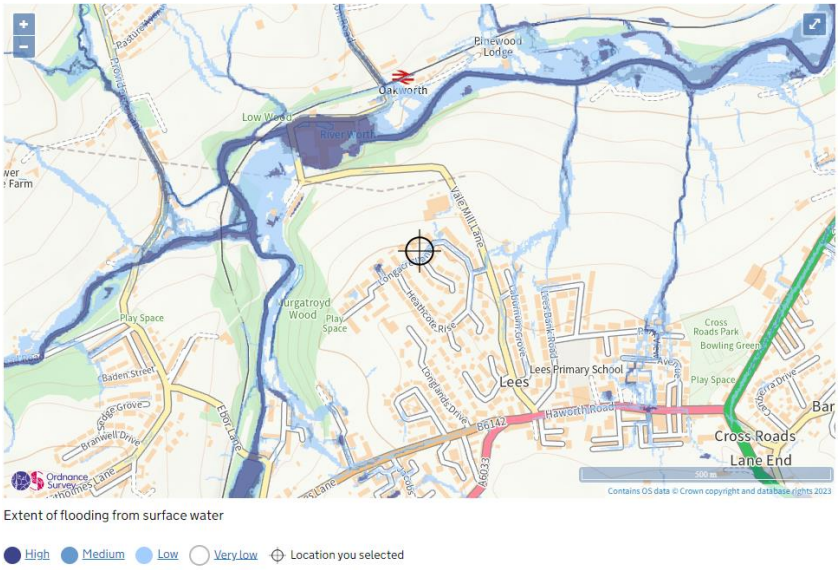


Fig 3.2 – EA Flood Map Data showing extent of flooding from Surface Water

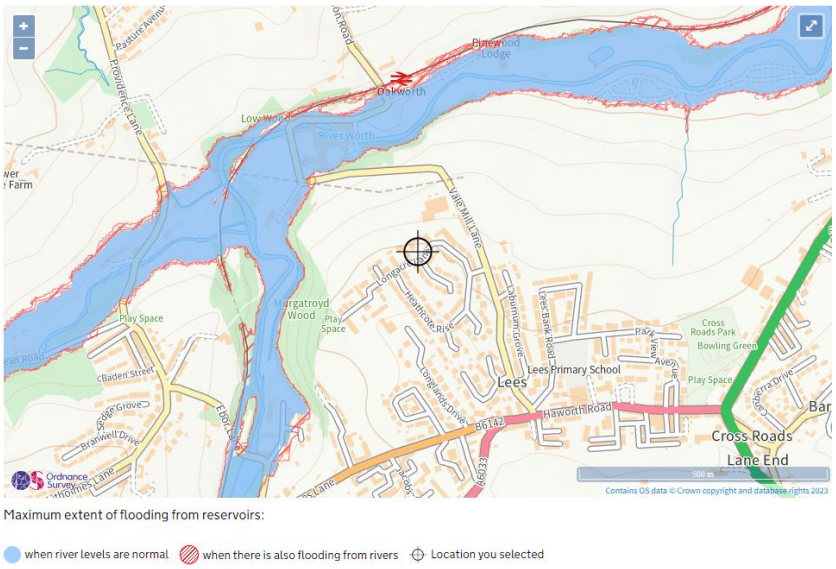


Fig 3.3 – EA Flood Map Data showing extent of flooding from Reservoirs

- The site is in flood zone 1 and has no to very low risk of flooding from rivers or the sea according to EA Flood Map data. As such no further action is required to mitigate flood risk from these sources.
- The site is not at risk of flooding from surface water according to EA Flood Map data however in accordance with best practice guidance and to mitigate against any potential flooding from localised surface water, the building finished floor level will be raised above surrounding ground levels. Furthermore, the attenuation infrastructure and discharge restrictions on site will be designed to ensure that the site closely mimics the existing greenfield condition.
- The site is not at risk of flooding from other sources, such as reservoirs.

4 SURFACE WATER DRAINAGE

EXISTING

4.1 The existing site comprises greenfield (gardens) land.

4.2 Yorkshire Water asset plans show that there is an existing 300mm diameter surface water sewer in Longacre Lane to the east of the site as shown in Fig 4.1 below. The topographical survey has also picked up 2No manhole covers in the access road for plot 30. One of these chambers is assumed to be a private surface water sewer serving plot 30 that connects into the public surface water sewer in Longacre Lane.

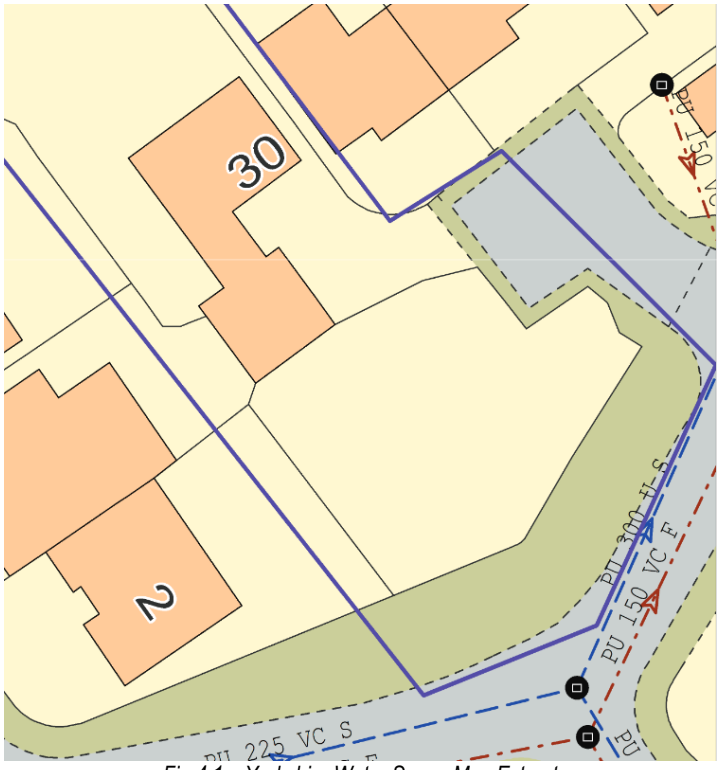


Fig 4.1 – Yorkshire Water Sewer Map Extract

4.3 The nearest watercourse is Brighouse Beck located 250 m to the west of the site boundary.

4.4 The existing greenfield runoff rate has been calculated as 0.1 l/s.

PROPOSED

4.5 The surface water discharge from the proposed development will be made up from the following elements:

- Building Roof Area
- Driveway

4.6 The total proposed impermeable area within the site boundary is approx. 153 m².

Surface Water Discharge Hierarchy

4.7 The recommended surface water discharge hierarchy set out in the CIRIA SuDS Manual is to utilise soakaways, or infiltration as the preferred option, followed by discharging to an appropriate watercourse. If these options are not feasible then the final option is to discharge to an existing surface water sewer, followed by discharge into a combined public sewer.

4.8 In accordance with the surface water discharge hierarchy, soakaways were initially considered for the discharge of surface water from the new development. British Geological Survey borehole data (REF:SE03NW252) from the nearby Lees Primary School development shows that the site is underlain by layers of clay soils, so it is not likely to be suitable for concentrated soakaways (i.e., gravel pits or perforated concrete manholes). The groundwater level within this borehole was measured at 1.2 m below ground level. This is not sufficient to provide at least 1m freeboard between the worst-case groundwater level and the underside of any soakaway structure. Soakaways are not therefore proposed for the discharge of surface water from the site.

4.9 If soakaways are not suitable the next step in the discharge hierarchy is to consider discharge into a watercourse. The closest watercourse is Brighouse Beck located 250 m to the west of the site boundary. Discharging directly into this watercourse is not economical or practical as it would require crossing significant portions of built-up, third-party land. Discharge of surface water into a watercourse is not therefore proposed for this site.

4.10 The next step in the discharge hierarchy is to discharge into a public surface water sewer, followed by discharge to a public combined sewer. Yorkshire Water asset maps show that there is a 300mm diameter surface water sewer in Longacre Lane to the east of the site. It is therefore proposed that surface water from the development will discharge into the Yorkshire Water surface water sewer in Longacre Lane through the existing private surface water sewer in the access road to plot 30. Formal approval to connect into the public drainage network will be agreed with Yorkshire Water through the submission of an S106 application.

SuDS Considerations

4.11 SuDS have been considered when producing this drainage strategy to provide effective surface water treatment and slow down the rate of surface water runoff in accordance with National Planning Policy recommendations and the Bradford MDC guidance. The following sustainable drainage system is proposed:

- Cellular Storage Tanks: Due to the limited space on site an underground tank has been selected as the most efficient method of storing surface water.

Simple Index Approach & Maintenance Schedule

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

4.13 The land usage and pollution hazard levels for the site are shown in Table 4.1.

Table 4.1 Pollution hazard indices for different land use classifications (CIRIA SuDS Manual)

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential roofs	*Very Low*	*0.2*	*0.2*	*0.05*

4.14 Discharge of surface water from residential roofs is deemed have a very low pollution risk and does not therefore require any additional treatment when discharging into a surface water body according to the CIRIA SuDS Manual, however catchpit manholes have been provided within the drainage network to increase the resiliency of the design.

4.15 A suitable maintenance plan for all SuDS features can be found in the Appendix and should be developed and implemented by the operator once the drainage proposals have been finalised to ensure sufficient operation and treatment is maintained throughout the design life of the development.

Design Criteria

4.16 The surface water from the proposed development will discharge into the 300mm diameter Yorkshire Water surface water sewer in Longacre Lane through the existing private drainage network serving plot 30.

4.17 It was initially considered to discharge the site surface water at greenfield runoff rate (Qbar) however this was deemed impractical as Qbar has been calculated to be 0.1l/s. The orifice diameter required to restrict the flow to 0.1l/s would be very small (<5mm) and susceptible to blocking up. Instead, it is proposed that the development surface water discharge rate is limited to a practical minimum rate of 2 l/s for all return periods up to and including the 1 in 100-year event to avoid overloading the existing network.

4.18 A cellular attenuation tank is proposed to accommodate all surface water discharge from the site and will have sufficient capacity to attenuate flows up to and including the 1 in 100-year return period plus a 45% allowance for climate change in accordance with the latest Environment Agency guidance.

4.19 All private surface water drains will be designed and constructed in accordance with BS EN 752:2017 and Building Regulations Approved Document H.

4.20 A 10% increase in impermeable area has been included to account for urban creep (i.e., future extensions & increased hardstanding areas).

5 FOUL WATER DRAINAGE

EXISTING

5.1 Yorkshire Water asset plans show that there is an existing 150mm diameter foul water sewer in Longacre Lane to the east of the site as shown in Fig 4.1. The topographical survey has also picked up 2No manhole covers in the access road for plot 30. One of these chambers is assumed to be a private foul water sewer serving plot 30 that connects into the public foul water sewer in Longacre Lane.

PROPOSED

Discharge Method

5.2 It is proposed that foul water from the development will discharge into the Yorkshire Water foul water sewer in Longacre Lane through the existing private foul water sewer in the access road to plot 30. Formal approval to connect into the public drainage network will be agreed with Yorkshire Water through the submission of an S106 application.

Design Criteria

5.3 New foul drains will be provided to serve all foul producing appliances within the proposed development. All drains will be designed in accordance with BS EN 752:2017 and Building Regulations Approved Document H.

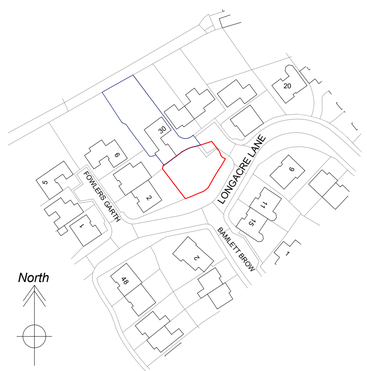
APPENDIX A – ARCHITECTURAL INFORMATION

Key

- Stone Paving - Private paths
- Private grassed area
- Extent of development
- Proposed 1.0m high tanalised hit and miss fence
- Existing high level boundary wall
- Existing - Native hedge planting 2m high approx
- 98.10 Existing - Level

KEY

- Land drain PROPOSED
- Surface water drain PROPOSED
- Foul water drain PROPOSED
- Land drain
- IC Inspection chamber
- Existing combined drain (Dia shown if known)
- Proposed combined drain
- Wastes PROPOSED
- Gully
- Drainage channel
- Floor Joist
- Load bearing structure
- Foundation
- Soakaway (5m Min from Boundary)



Location Plan 1:1250

NOTES
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4. Written dimensions only are to be used from this drawing. If any doubt exist the contractor must ask for clarification. On no account must the contractor scale off this drawing.
5. If no site investigation has been carried out prior to commencement of works, Contractor to make trial holes to test suitability of ground for proposed foundations.
6. All work must be carried out in accordance with the current Building Regulations, Codes of Practice and British Standards. If any doubt exists the contractor must ask for clarification.
7. All references refer to accompanying specification.

Domestic and commercial projects are notifiable to the HSE under CDM 2015 if the construction work on site is scheduled to:
a) Last longer than 30 working days and have more than 20 workers working simultaneously at any point in the project; or
b) Exceed 500 person days

Drawing Title:	A1	SCALE	DATE	JOB NO	DRG NO
Existing - Location Plan and Site Plan		N/a	APR 20	1040	101
Site Address:					
30 Longacre Lane, Haworth, Bradford, BD22 0TE					

11 Woodvale Crescent, Bingley
West Yorkshire, BD16 4AJ
Tel - 01274 317002
e.mail : michael@madp.co.uk
web: madp.co.uk

M A
D P

Site Plan 1:100

Site Plan 1:100

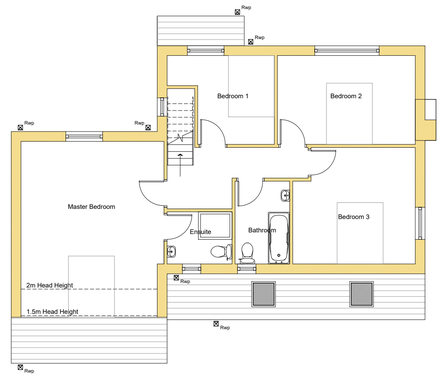
North

Key

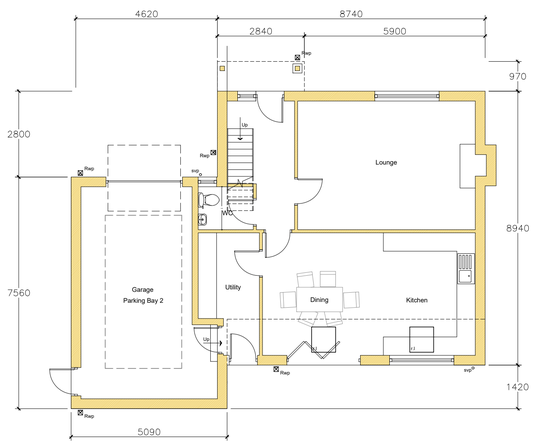
- Stone Paving - Private paths
- Block paving - Individual driveway
- Private grassed area
- Extent of development
- Proposed 1.0m high tanalised hit and miss fence
- Existing high level boundary wall
- Existing - Native hedge planting 2m high approx
- Proposed - Native buffer planting
- 98.10 Existing - Level
- 98.10 Proposed - Level

KEY

- Land drain PROPOSED
- Surface water drain PROPOSED
- Foul water drain PROPOSED
- Land drain
- IC Inspection chamber
- Existing combined drain (Dia shown if known)
- Proposed combined drain
- Wastes PROPOSED
- Gully
- Drainage channel
- Floor Joist
- Load bearing structure
- Soakaway (5m Min from Boundary)



First Floor Plan 1:100



Ground Floor Plan 1:100

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a) Last longer than 30 working days and have more than 20 workers working simultaneously at any point in the project; or
b) Exceed 500 person days

Drawing Title:
Proposed - Site Plan

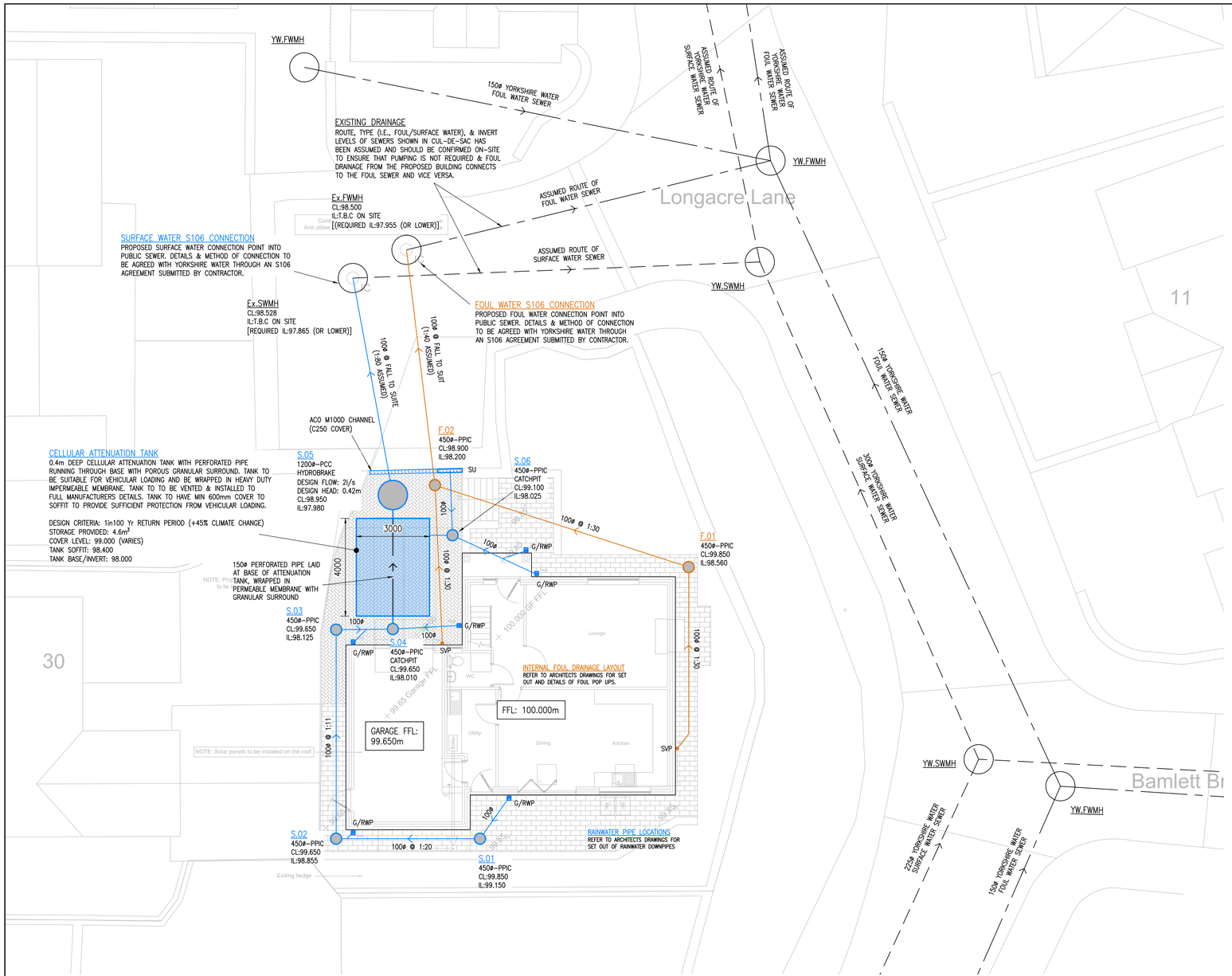
Site Address:
30 Longacre Lane, Haworth, Bradford, BD22 0TE

A1	SCALE	DATE	JOB NO	DRG NO
	N/a	APR 20	1040	201A

11 Woodvale Crescent, Bingley
West Yorkshire, BD16 4AJ
Tel - 01274 317002
e.mail : michael@madp.co.uk
web: madp.co.uk

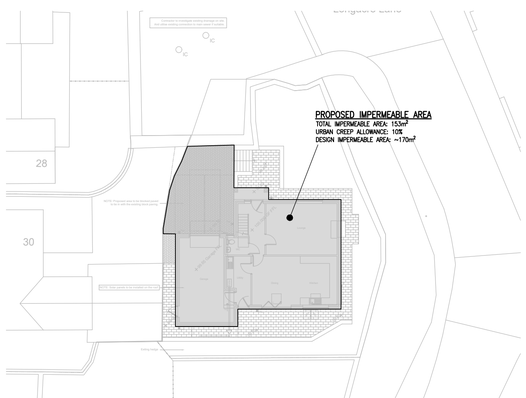
M A
D P

APPENDIX B – DRAINAGE DRAWINGS



PROPOSED DRAINAGE LAYOUT

SCALE: 1:100



PROPOSED IMPERMEABLE AREA

SCALE: 1:250

ADDITIONAL DRAINAGE NOTES:

- LOCATION OF ALL EXISTING DRAINAGE TO BE CONFIRMED ON SITE PRIOR TO COMMENCEMENT OF WORKS AS IT IS APPROXIMATELY TRANSLATED FROM RECORD DRAWINGS.
- ALL DRAINAGE AT MANHOLES/ACCESS CHAMBERS TO CONNECT WITH SOFFITS LEVEL UNLESS OTHERWISE NOTED. MANHOLE INVERT LEVELS SHOWN ON PLAN ARE THAT OF LOWEST OUTGOING PIPE.
- ALL FOUL DRAINAGE TO BE 100mm DIA. UNLESS OTHERWISE NOTED.
- ALL INTERNAL 100mm DIA. SOIL VENT PIPE CONNECTIONS TO BE LAID AT FALLS NOT LESS THAN 1:40 TO SUIT CONNECTION INTO MAIN NETWORK OR 1:80 IF AT LEAST 1 WC IS CONNECTED.
- ALL TOILET/SVP FOUL BRANCH CONNECTIONS TO BE MADE USING OBLIQUE 45° CONNECTION IN THE DIRECTION OF FLOW OF THE MAIN LINE.
- FOR SURFACE WATER DRAINAGE AND INTERNAL FOUL CONNECTIONS WITHOUT A TOILET/SVP WHERE OBLIQUE CONNECTIONS ARE NOT POSSIBLE 87.5° CURVED SQUARE BRANCH CONNECTIONS TO BE USED IN DIRECTION OF FLOW OF MAIN LINE.
- FOUL RODDING POINTS SHOULD BE PROVIDED, ABOVE SPILLOVER LEVEL OF CONNECTED APPLIANCES, IN DISCHARGE STACKS TO GIVE ACCESS TO ANY LENGTH OF PIPE WHICH CANNOT BE REACHED FROM ANY OTHER PART OF THE NETWORK. RODDING ACCESS SHOULD BE PROVIDED AT 3 STOREY INTERVALS OR LESS.
- ALL DRAINAGE WITHIN 300mm OF UNDERSIDE OF STRUCTURAL SLAB TO HAVE FULL GEN 3 CONCRETE BED AND SURROUND.
- ALL PROPOSED SURFACE WATER DRAINAGE TO BE 100mm DIA. LAID AT FALLS NOT LESS THAN 1:100 UNLESS OTHERWISE NOTED.
- ALL RAINWATER DOWNPIPES THAT DO NOT CONNECT DIRECTLY TO AN ACCESS POINT SHALL HAVE A RODDING FACILITY FITTED.
- ALL INTERNAL MANHOLE & INSPECTION CHAMBERS TO HAVE SCREW DOWN DOUBLE SEAL ACCESS COVERS.
- ALL INTERNAL & EXTERNAL FOUL AND SURFACE WATER INSPECTION CHAMBERS SITUATED IN AREAS WITHOUT VEHICULAR ACCESS TO BE TYPE 3 CHAMBERS WITH 150mm DOT TYPE 1 SURROUND UNLESS NOTED OTHERWISE.
- ALL EXTERNAL FOUL AND SURFACE WATER INSPECTION CHAMBERS SITUATED IN AREAS WITH VEHICULAR ACCESS TO BE TYPE 3 CHAMBERS WITH GEN 3 CONCRETE SURROUND UNLESS NOTED OTHERWISE.
- ALL TYPE 3 INSPECTION CHAMBERS WHERE DEPTH TO INVERT OF CHAMBER IS > 1m SHALL HAVE COVER FRAME WITH ACCESS RESTRICTED TO 350mm DIA. OR 300x300mm SQUARE.
- ALL EXTERNAL FOUL AND SURFACE WATER MANHOLES TO BE MIN. 1200mm DIA. WIDE WALL (125mm THICK) TYPE 2 PRECAST CONCRETE CHAMBERS UNLESS NOTED OTHERWISE.
- MANHOLE COVER LEVELS ARE SUBJECT TO CONFIRMATION OF FINAL EXTERNAL & INTERNAL LEVELS.
- EXTERNAL GULLY/CHANNEL POSITIONS SHOWN ARE INDICATIVE AND SUBJECT TO CHANGE FOLLOWING CONFIRMATION OF FINAL EXTERNAL LEVELS.
- FINAL GULLY POSITIONS TO SUIT SITE LOW POINTS WITH SUFFICIENT SURFACE FALLS TO ENSURE SURFACE WATER DRAINS WITHOUT PONDING (MINIMUM SURFACE FALL OF 1:60 IS RECOMMENDED).
- THE LOAD CLASS OF ALL COVERS, GRATINGS, GULLIES, CHANNELS & FRAMES TO CHAMBERS TO SUIT THEIR LOCATION AS FOLLOWS (REFER TO MANHOLE SCHEDULE FOR CONFIRMATION):
  - A15 – INTERNAL LOCATIONS
  - B125 – EXTERNAL WITH PEDESTRIAN ACCESS ONLY
  - C250 – EXTERNAL LIGHTLY TRAFFICKED AREAS
  - D400 – MAIN ROADS/HIGHWAYS
  - E600 – HGV/LOADING BAY AREAS
- GRATINGS IN PEDESTRIAN AREAS TO HAVE HEEL SAFE ANTI-SLIP COVERS.
- THE CONSTRUCTION OF ALL EXISTING GULLIES, MANHOLE CHAMBERS & THEIR COVERS & GRATINGS TO BE 'MADE GOOD' OR REPAIRED/REPLACED TO SUIT REVISED LEVEL/LOCATION.
- REFERENCE SHOULD BE MADE TO ARCHITECT & M&E ENGINEERS DRAWINGS FOR ABOVE GROUND DRAINAGE DETAILS & SET-OUT.

LEGEND.

- EXISTING FOUL SEWERS
- NEW BRANCH FOUL SEWERS
- NEW MAIN FOUL SEWERS
- CONCRETE ENCASED FW SEWER
- FXX NEW FOUL MANHOLE
- EXISTING FOUL RISING MAIN
- FOUL RISING MAIN
- EXISTING COMBINED SEWERS
- NEW COMBINED SEWERS
- FXX NEW COMBINED MANHOLE
- SVP SOIL VENT PIPE (RODDABLE ACCESS)
- g INTERNAL GULLY (TRAPPED & RODDABLE)
- SS STUB STACK
- BD VERTICAL BACK DROP
- DP INTERNAL CHANNEL DRAIN POINT
- RE RODDING EYE
- ABANDONED SEWER TO BE REMOVED
- EXISTING SURFACE WATER SEWERS
- NEW SURFACE WATER SEWERS
- CONCRETE ENCASED SW SEWER
- SXX NEW SURFACE WATER MANHOLE
- EXISTING SURFACE WATER RISING MAIN
- SURFACE WATER RISING MAIN
- NEW LAND DRAINS
- BD VERTICAL BACK DROP
- PETROL INTERCEPTOR
- DRAINAGE CHANNEL
- G YARD GULLY
- TG TRAPPED ROAD GULLY
- SU TRAPPED SUMP UNIT
- RWP RAIN WATER PIPE
- RE RODDING EYE
- DT PERMAVOID 150 DISTRIBUTION TANKS

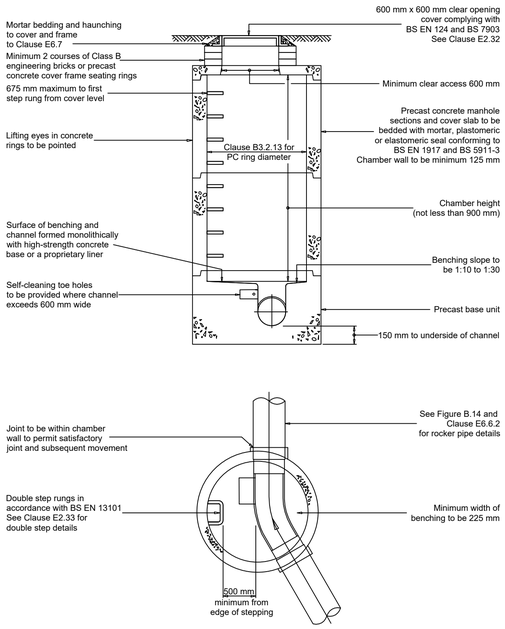
NOTES

1. DO NOT SCALE FROM THIS DRAWING, UTILISE ONLY NUMBERED DIMENSIONS.
2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS, NOTIFY ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.
3. UNLESS NOTED OTHERWISE, THIS DRAWING IS FOR PLANNING APPROVAL.
4. ALL DRAINAGE TO BE TO THE SATISFACTION OF THE LOCAL AUTHORITY BUILDING CONTROL AND MAIN DRAINAGE SECTIONS ON MATTERS INVOLVING PUBLIC SEWERS.
5. ALL PIPEWORK, BENDS AND JUNCTIONS TO BE EXTRA STRENGTH VITRIFIED CLAY TO BS 65:1991, BS EN 295 OR PVCu TO BS EN 1401 TO BE AGREED WITH RELEVANT AUTHORITY.
6. INVERT LEVELS ON EXISTING DRAINS & OUTFALLS TO BE CHECKED PRIOR TO COMMENCEMENT OF WORKS.
7. TRENCH WIDTHS GENERALLY:– AS SMALL AS PRACTICABLE BUT NOT LESS THAN PIPE DIAMETER +300mm OR LARGER IF SPECIFIED. TRENCH SIDES MUST BE VERTICAL FROM BOTTOM UP TO 300mm ABOVE CROWN OF PIPE.
8. WHERE DRAINAGE PIPES HAVE LESS THAN 1.2m COVER IN TRAFFICKED AREAS AND LESS THAN 600mm UNDER LANDSCAPED AREAS PIPES SHALL HAVE A FULL CLASS Z CONCRETE SURROUND. CONCRETE PROTECTION TO BE DISCONTINUED AT EACH PIPE JOINT WITH COMPRESSIBLE MATERIAL. ALL OTHER FLEXIBLE PIPES TO HAVE CLASS S GRANULAR BEDDING DETAIL UNLESS OTHERWISE NOTED. ALL OTHER RIGID PIPES TO HAVE CLASS B GRANULAR BEDDING DETAIL UNLESS OTHERWISE NOTED.
9. GRANULAR BEDDING:
   - 10mm SINGLE SIZED COARSE AGGREGATE SHALL BE USED ON PIPES NOT EXCEEDING 140mm DIAMETER.
   - 2–14mm WELL GRADED COARSE AGGREGATE MAY BE USED ON PIPES EXCEEDING 140mm BUT NOT EXCEEDING 400mm DIAMETER.
   - 4–20mm WELL GRADED COARSE AGGREGATE MAY BE USED ON PIPES EXCEEDING 400mm DIAMETER.
   - THE DEPTH OF GRANULAR BEDDING UNDER THE PIPES SHALL BE X/6 OR 150mm, WHICHEVER IS GREATER, WHERE X=EXTERNAL DIAMETER OF THE PIPE.
8. ADOPTABLE PUBLIC SEWERS TO BE CONSTRUCTED IN ACCORDANCE WITH SEWERS FOR ADOPTION, 7th EDITION, SEPTEMBER 2012.
9. ALL PRIVATE DRAINAGE WORKS SHALL BE IN ACCORDANCE WITH "THE BUILDING REGULATIONS APPROVED DOCUMENT H" AND BRITISH STANDARD BS EN 752.
10. ALL NEW DRAINAGE TO BE TESTED PRIOR TO BACKFILL OF THE TRENCHES & PRIOR TO HANDOVER TO THE SATISFACTION OF THE BUILDING CONTROL INSPECTOR.
11. THE CONTRACTOR MUST LIAISE WITH THE LOCAL AUTHORITY MAIN DRAINAGE SECTION PRIOR TO COMMENCEMENT OF WORK ON PUBLIC DRAINAGE.
12. TRENCH BACKFILL SHALL BE COMPACTED IN LAYERS NOT EXCEEDING 250mm ONCE 300mm COVER HAS BEEN PROVIDED TO THE TOP OF PIPE.
13. THE CONTRACTOR SHALL ALLOW IN HIS RATES FOR MAINTAINING FLOW IN PUBLIC SEWERS AT ALL TIMES DURING DIVERSION WORKS INCLUDING TEMPORARY PUMPING AND ALSO KEEPING EXCAVATIONS FREE FROM GROUNDWATER INCLUDING PUMPING AND FORMATION OF TEMPORARY SUMPS.
14. THE CONTRACTOR SHALL MAKE PROVISIONS FOR AND LIAISE WITH ALL RELEVANT STATUTORY BODIES FOR THE MANAGEMENT OF TRAFFIC WHILE CARRYING OUT WORKS IN THE PUBLIC HIGHWAY.
15. THE CONTRACTOR IS TO SATISFY HIMSELF TO THE POSITION AND AND DEPTH OF THE PUBLIC UTILITIES AND ALLOW FOR TEMPORARY SUPPORT, PROTECTION AND DIVERSION WORKS AS NECESSARY. THE CONTRACTOR SHALL ALSO INCLUDE FOR ANY TRIAL PIT EXCAVATIONS NECESSARY.
16. BACKFILL TO EXCAVATIONS IN PUBLIC HIGHWAYS TO BE WELL COMPACTED GRANULAR TYPE 1 TO CL.803 OF THE DTp SPECIFICATION FOR HIGHWAY WORKS 2009.
17. ALL EXTERNAL GULLIES TO BE 375mm DIA. MINIMUM, PRECAST CONCRETE, HEAVY DUTY, KITE MARKED & ANTI-THEFT.

PROJECT: 30 LONGACRE LANE, HAWORTH, BRADFORD, BD22 0TE				
TITLE: PROPOSED DRAINAGE LAYOUT & IMPERMEABLE AREA				
PROJECT No. WA-656	DRAWING No. D-01	AMENDMENT -	DATE DRAWN AUG '23	DRAWN BY MH
Amendment Note				

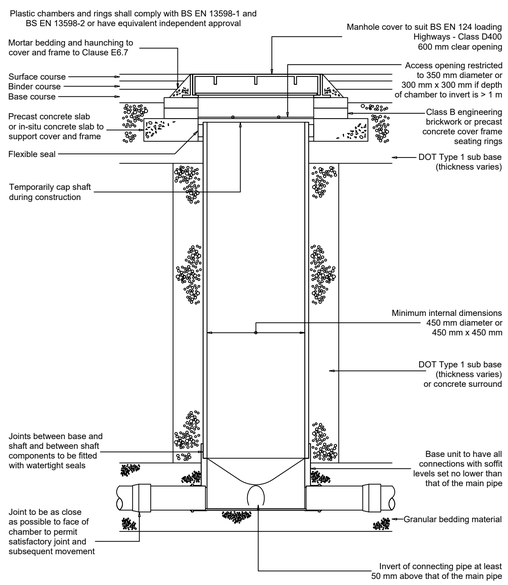
Design Consultants.
49 Savile Park Road
Halifax, Hx1 2ex
info@ wadesignconsultants.co.uk
07888683779

FIGURE B.13
TYPICAL MANHOLE DETAIL - TYPE 2 (Alternative construction detail)
Maximum depth from cover level to soffit of pipe 3.0 m



Not to scale

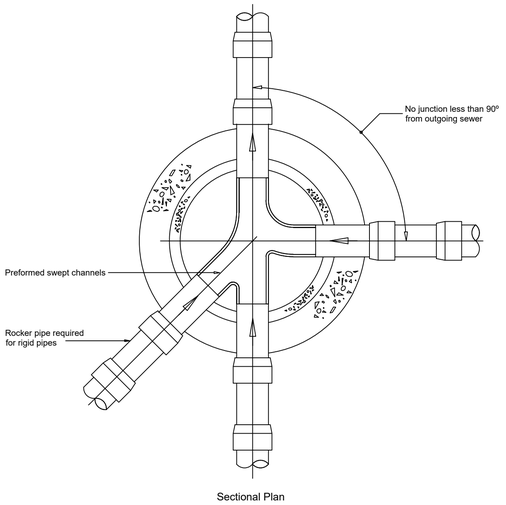
FIGURE B.16
TYPICAL INSPECTION CHAMBER DETAIL - TYPE 3 (Flexible material detail)
Maximum depth from cover level to soffit of pipe
in areas subject to vehicle loading 3 m, non-entry



Note: Where the access chamber is in the highway the Highway Authority can have specific requirements

Not to scale

FIGURE B.14
TYPICAL ARRANGEMENT OF PIPE JUNCTIONS WITHIN MANHOLES



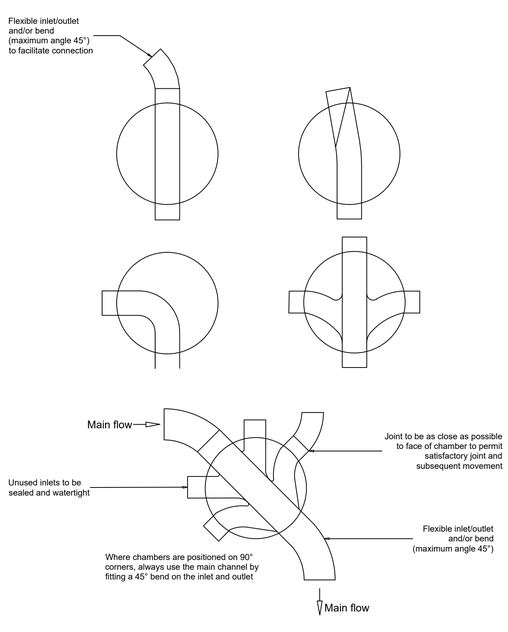
Sectional Plan

Rigid pipes built into manhole should have a flexible joint as close as feasible to the external face of the structure and the length of the next rocker pipe should be as shown.

Nominal diameter (mm)	Maximum effective length (m)
150 - 600	0.6
601 - 750	1.00
over 750	1.25

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

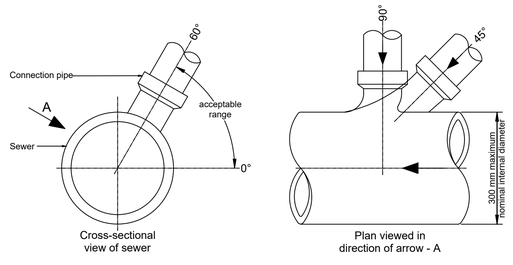
FIGURE B.20
ALTERNATIVE BASE LAYOUTS FOR TYPE 3 CHAMBERS



Note: Where a bend is used immediately outside the manhole, this may be used as the rocker pipe

Not to scale

FIGURE B.24
CONNECTIONS TO SEWER



NOTES

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   - 4–20mm WELL GRADED COARSE AGGREGATE MAY BE USED ON PIPES EXCEEDING 400mm DIAMETER.
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12. TRENCH BACKFILL SHALL BE COMPACTED IN LAYERS NOT EXCEEDING 250mm ONCE 300mm COVER HAS BEEN PROVIDED TO THE TOP OF PIPE.
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17. ALL EXTERNAL GULLIES TO BE 375mm DIA. MINIMUM, PRECAST CONCRETE, HEAVY DUTY, KITE MARKED & ANTI–THEFT.

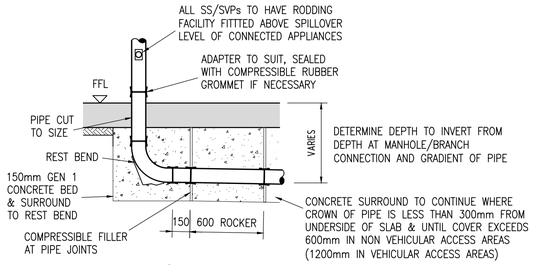
PROJECT
30 LONGACRE LANE, HAWORTH, BRADFORD, BD22 0TE

TITLE
PROPOSED DRAINAGE DETAILS SHEET 1 OF 2

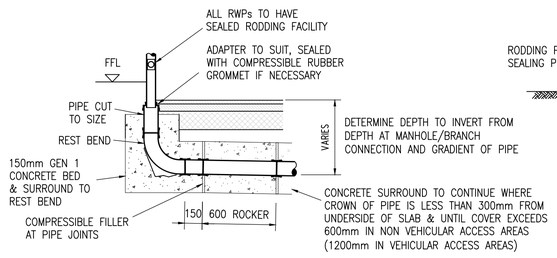
PROJECT No.	DRAWING No.	AMENDMENT	DATE DRAWN	DRAWN BY
WA-656	D-02	-	AUG '23	MH

Amendment Note

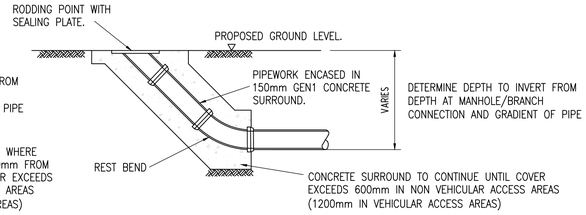
Design Consultants.
49 Savile Park Road
Halifax, Hx1 2ex
info@ wadesignconsultants.co.uk
07888683779



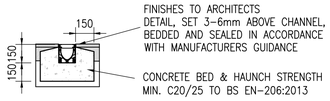
TYPICAL SS/SVP CONNECTION



TYPICAL RWP CONNECTION



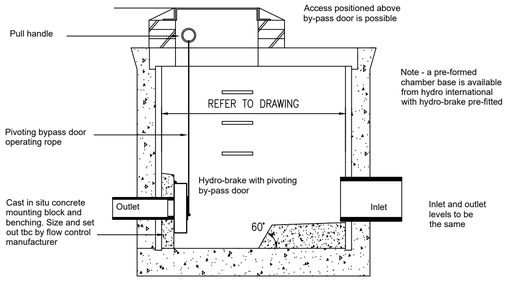
EXTERNAL RODDING EYE DETAIL



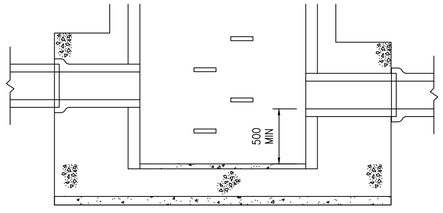
TYPICAL ACO MULTIDRAIN M100D 0.0J DETAIL WITH GRATING TO LOAD CLASS B125/C250.

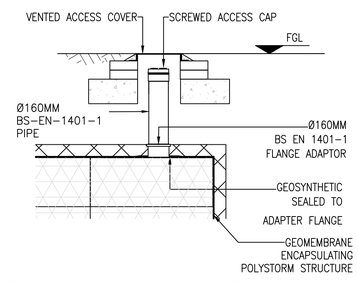
TYPICAL HYDROBRAKE MANHOLE DETAIL

REFER TO HYDRO INTERNATIONAL DRAWINGS FOR SITE SPECIFIC DETAILS

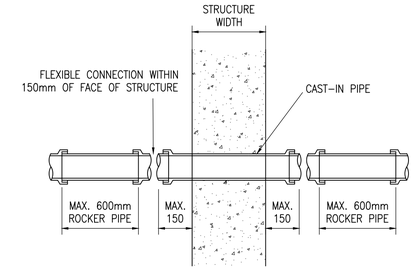


TYPICAL CATCHPIT MANHOLE DETAIL

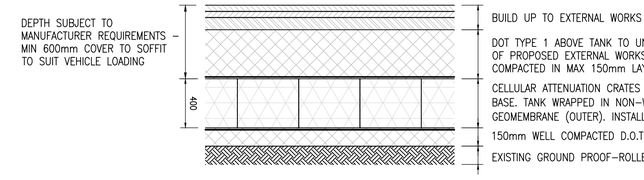




TYPICAL TANK VENTILATION DETAIL

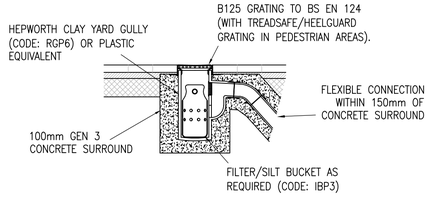


PLAN SHOWING PIPE PENETRATION THROUGH STRUCTURE (ROCKER OPTION)



BUILD UP ABOVE ATTENUATION CRATES

UNDER HARD LANDSCAPING



YARD GULLY DETAIL

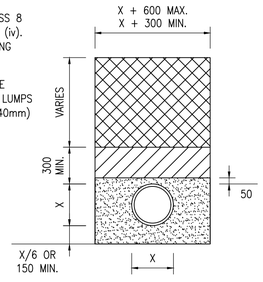
(NO VEHICULAR ACCESS)

- UNDER SOFT LANDSCAPING – CLASS 8 MATERIAL TO S.H.W CLAUSE 503.3 (iv).
- UNDER HARD LANDSCAPING/BUILDING SLAB – DOT TYPE 1.

CLASS 8 MATERIAL TO S.H.W CLAUSE 503.3 (iv). (I.E. BACKFILL WITH NO LUMPS OF CLAY OR STONE LARGER THAN 40mm)

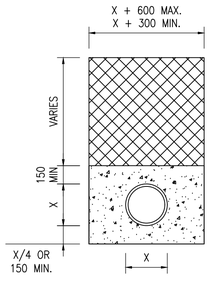
GRANULAR MATERIAL TO S.H.W. CLAUSE 503.3 (i). SEE TABLE 5/3.

GEN 1 OR ST 2 CONCRETE TO S.H.W. CLAUSE 503.3 (iii).



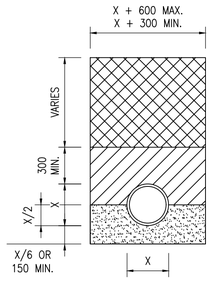
CLASS S BEDDING DETAIL (uPVC/FLEXIBLE PIPES)

FOR USE WHEN COVER TO SOFFIT OF PIPE IS GREATER THAN 600mm IN NON–TRAFFICKED AREAS AND GREATER THAN 1200mm IN AREAS WITH VEHICULAR ACCESS.



CLASS Z BEDDING DETAIL (ALL PIPES)

FOR USE WHEN COVER TO SOFFIT OF PIPE IS LESS THAN 600mm IN NON–TRAFFICKED AREAS AND LESS THAN 1200mm IN AREAS WITH VEHICULAR ACCESS. MIN. 18mm COMPRESSIBLE BOARD AT ALL PIPE JOINTS



CLASS B BEDDING DETAIL (CLAY/CONCRETE ONLY)

FOR USE WHEN COVER TO SOFFIT OF PIPE IS GREATER THAN 600mm IN NON–TRAFFICKED AREAS AND GREATER THAN 1200mm IN AREAS WITH VEHICULAR ACCESS.

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETRES.
- DIMENSION X IS THE EXTERNAL PIPE DIAMETER.
- THE MIN/MAX WIDTH OF TRENCH APPLIES ON & BELOW A LINE 300mm ABOVE THE TOP OF THE PIPE. ABOVE THE 300mm LINE TRENCH BACKFILL MATERIAL SHALL BE AS DESCRIBED IN CLAUSE 505 OF S.H.W.
- CONCRETE SURROUND MAY EXTEND TO SIDES OF TRENCH OR BE OF MINIMUM WIDTH TO PROVIDE 150mm COVER AT EACH SIDE OF THE PIPE.
- UNTIL THERE IS 300mm COVER OVER CROWN OF PIPE, COMPACT GRANULAR & BACKFILL MATERIAL BY HAND IN 100mm THICK LAYERS.

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

CLASS Z COMPRESSIBLE FILLER BOARD DETAILS	
NOMINAL PIPE DIAMETER (mm)	THICKNESS OF COMPRESSIBLE FILLER (mm)
LESS THAN 450	18
450 – 1200	36
GREATER THAN 1200	54

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PROJECT
30 LONGACRE LANE, HAWORTH, BRADFORD, BD22 0TE

TITLE
PROPOSED DRAINAGE DETAILS SHEET 2 OF 2

PROJECT No.	DRAWING No.	AMENDMENT	DATE DRAWN	DRAWN BY
WA-656	D-03	-	AUG '23	MH

Amendment Note

Design Consultants.
49 Savile Park Road
Halifax, Hx1 2ex
info@ wadesignconsultants.co.uk
07888683779

APPENDIX C – BGS BOREHOLE DATA

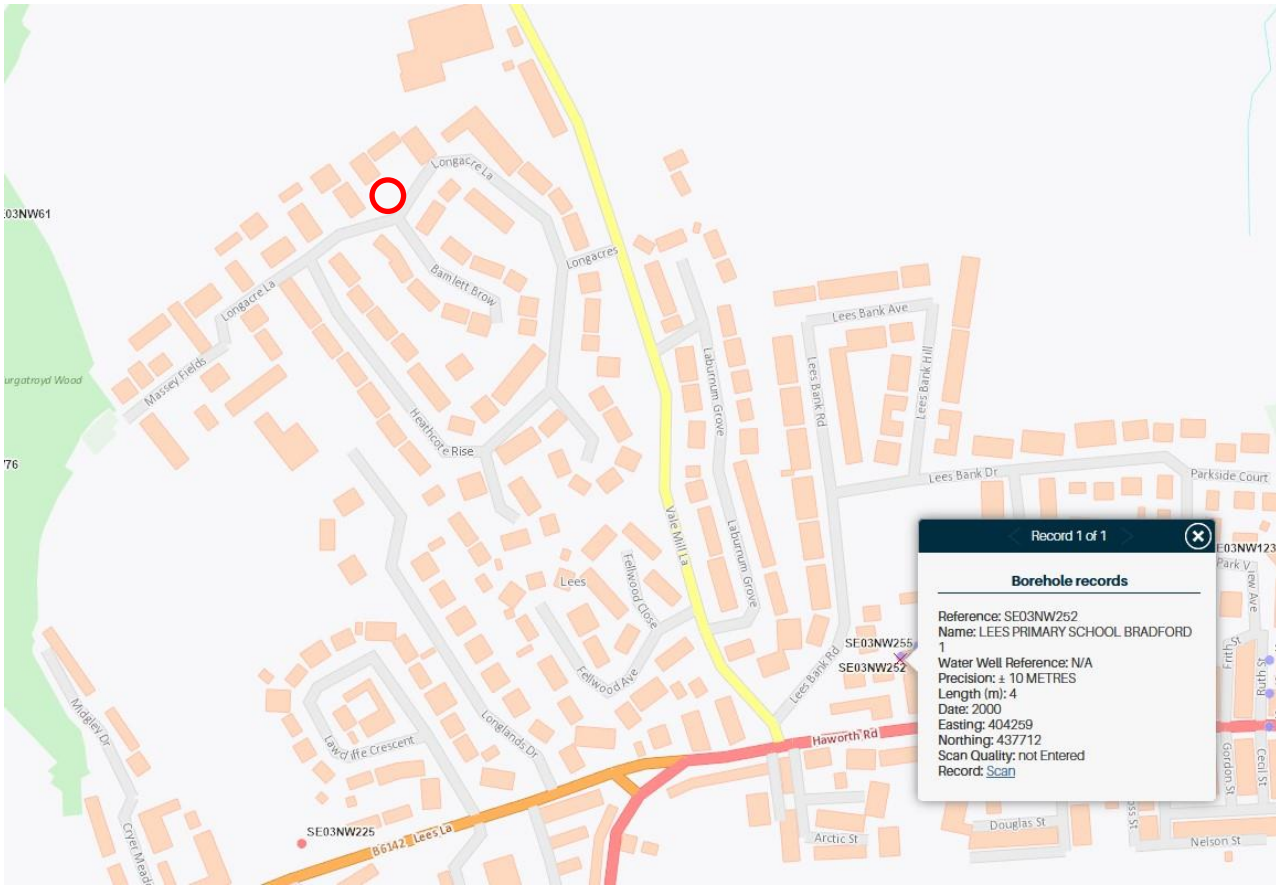


Fig C.1 – British Geological Survey plan showing borehole reference SE03NW252

Dunelm GEOTECHNICAL · ENVIRONMENTAL

Somerville House
St Johns Road, Meadowfield
Co. Durham, DH7 8TZ
TEL: 0191 375 5808
FAX: 0191 378 3762
E-Mail: enquiries@dunelm.co.uk

Job No. : C10619 Equipment: **Dynamic Sampling**

Site Name : Lees Primary School

Record of Borehole BH1

Easting		Start date	10/10/2000
Northing		End date	10/10/2000
Ground level		Backfill date	10/10/2000
Final depth	4.00	Page	1 of 1

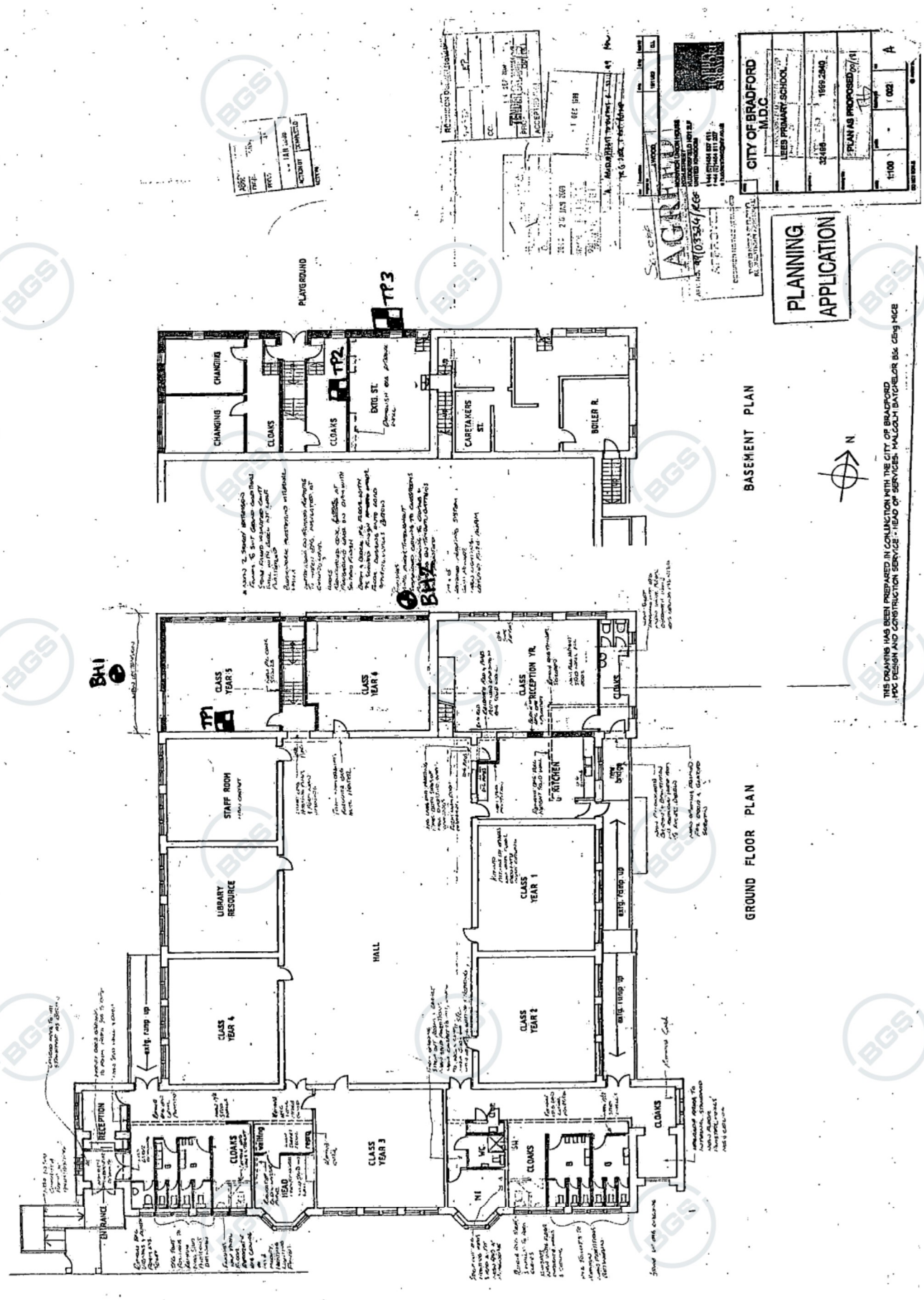
Samples & Testing						Legend	Depth (Thickness)	Strata Descriptions	Level	Inst/ Back fill
Water	Cu kN/m2	SPT 'N'	Depths From	Depths To	Type					
			0.10	0.50	B		(0.15) 0.15	MADE GROUND - 50mm Tarmac overlying black coarse gravel.		
							(0.25) 0.40	MADE GROUND - Light brown sand and sandstone subbase.		
			0.50	1.00	B		(0.30) 0.70	MADE GROUND - Dark brown/dark grey sandy slightly clayey soily.		
	108.0		1.00		V			Stiff olive/grey/medium brown mottled sandy CLAY with fragments of sandstone and occasional bands of sand.		
▽			1.00	2.00	B					
							(1.40)			
▼	100.0		2.00		V					
2.00			2.00	2.50	B		2.10			
								Stiff visually moist dark grey/dark brown very sandy CLAY with fine to coarse gravel and occasional bands of sand.		
	104.0		2.50		V		(0.60)			
			2.50	3.00	B		2.70			
								Stiff becoming very stiff dark brown sandy CLAY with fine to coarse gravel and fragments of sandstone.		
	188.0		3.00		V					
			3.00	3.50	B					
							(1.30)			
	220.0		3.50		V					
			3.50	4.00	B					
	240.0		4.00		V		4.00			
								End of Borehole		

Drilling Details

Date	Depth (m)	Dia (mm)	Casing (m)
10/10	4.00		

General remarks

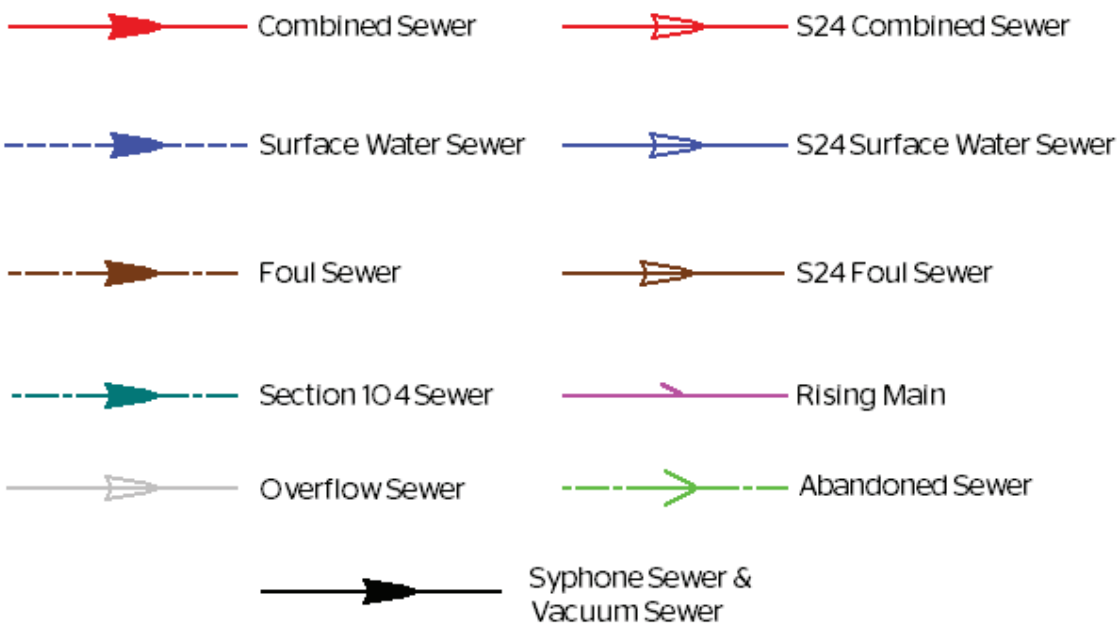
Struck water at 2.00m. Standing level recorded at 1.20m, backfilled to 3.10m.


PLANNING APPLICATION
CITY OF BRADFORD M.D.C
LEEB PRIMARY SCHOOL
PLAN AS PROPOSED
BASEMENT PLAN
GROUND FLOOR PLAN
PLAYGROUND
TP1
TP2
TP3
BH1
BH2
CHANGING
CLOAKS
CARETAKERS ST.
BOILER R.
CLASS YEAR 5
CLASS YEAR 6
CLASS RECEPTION YR.
STAFF ROOM
LIBRARY RESOURCE
KITCHEN
HALL
CLASS YEAR 1
CLASS YEAR 2
CLASS YEAR 3
CLASS YEAR 4
RECEPTION
ENTRANCE
WELLING
N

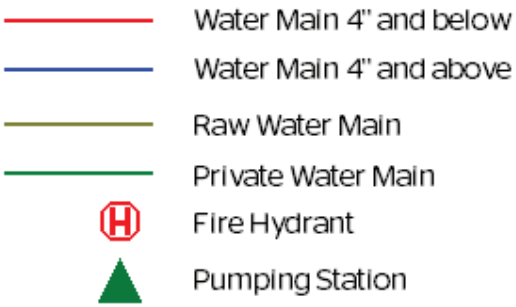
APPENDIX D –YORKSHIRE WATER SEWER MAPS

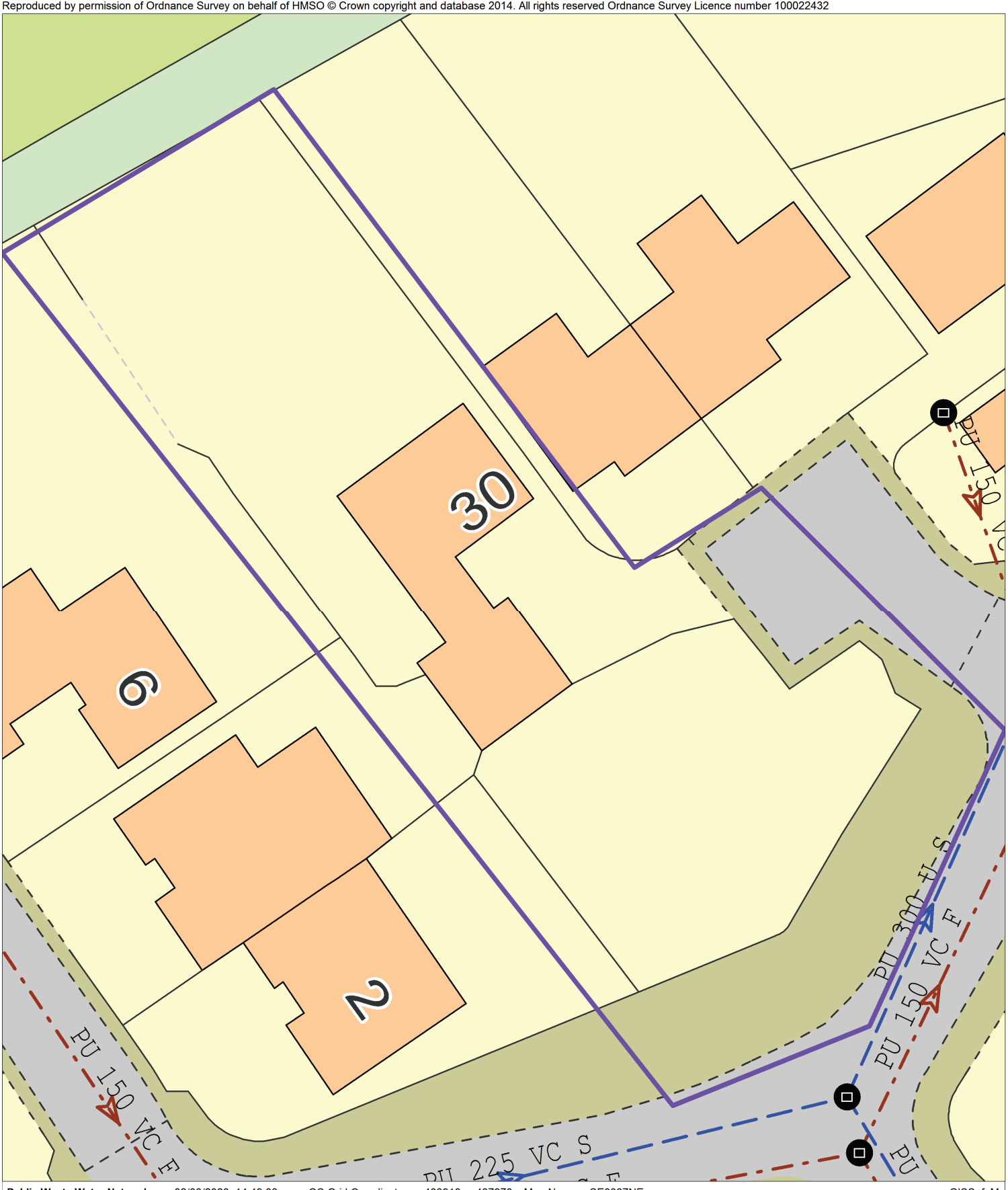
Property Identfier

Sewer Legend



Water Legend





Public Waste Water Network 02/03/2020 14:49:33 OS Grid Coordinates: 403910 : 437970 Map Name : SE0337NE svcGISSafeMo

APPENDIX E – SURFACE WATER CALCULATIONS

GREENFIELD RUNOFF RATE CALCULATION (Qbar)

	GREENFIELD RUNOFF RATE 30 LONGACRE LANE HAWORTH
Date 04/08/2023 File 1IN100 (+45%) [0.017HA]....	Designed by MH Checked by
Micro Drainage	Source Control 2020.1.3

ICP SUDS Mean Annual Flood

Input

Return Period (years) 1 SAAR (mm) 1123 Urban 0.000
Area (ha) 0.017 Soil 0.470 Region Number Region 3

Results l/s

QBAR Rural 0.1
QBAR Urban 0.1

Q1 year 0.1

Q1 year 0.1
Q30 years 0.3
Q100 years 0.3

CELLULAR ATTENUATION TANK CALCULATIONS

	CELLULAR ATTENUATION TANK 30 LONGACRE LANE HAWORTH
Date 04/08/2023 File 1IN100 (+45%) [0.017HA]....	Designed by MH Checked by
Micro Drainage	Source Control 2020.1.3

Summary of Results for 100 year Return Period (+45%)

Half Drain Time : 22 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	98.298	0.298	0.0	2.0	2.0	3.4	O K
30 min Summer	98.365	0.365	0.0	2.0	2.0	4.2	O K
60 min Summer	98.398	0.398	0.0	2.0	2.0	4.5	O K
120 min Summer	98.380	0.380	0.0	2.0	2.0	4.3	O K
180 min Summer	98.337	0.337	0.0	2.0	2.0	3.8	O K
240 min Summer	98.280	0.280	0.0	2.0	2.0	3.2	O K
360 min Summer	98.177	0.177	0.0	2.0	2.0	2.0	O K
480 min Summer	98.118	0.118	0.0	2.0	2.0	1.3	O K
600 min Summer	98.091	0.091	0.0	2.0	2.0	1.0	O K
720 min Summer	98.080	0.080	0.0	1.7	1.7	0.9	O K
960 min Summer	98.067	0.067	0.0	1.4	1.4	0.8	O K
1440 min Summer	98.055	0.055	0.0	1.1	1.1	0.6	O K
2160 min Summer	98.045	0.045	0.0	0.8	0.8	0.5	O K
2880 min Summer	98.040	0.040	0.0	0.7	0.7	0.5	O K
4320 min Summer	98.034	0.034	0.0	0.5	0.5	0.4	O K
5760 min Summer	98.030	0.030	0.0	0.4	0.4	0.3	O K
7200 min Summer	98.028	0.028	0.0	0.3	0.3	0.3	O K
8640 min Summer	98.026	0.026	0.0	0.3	0.3	0.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	108.797	0.0	4.6	16
30 min Summer	76.603	0.0	6.5	25
60 min Summer	51.700	0.0	8.8	42
120 min Summer	33.695	0.0	11.5	78
180 min Summer	25.768	0.0	13.1	110
240 min Summer	21.092	0.0	14.3	144
360 min Summer	15.887	0.0	16.2	200
480 min Summer	12.973	0.0	17.6	254
600 min Summer	11.073	0.0	18.8	308
720 min Summer	9.722	0.0	19.8	368
960 min Summer	7.906	0.0	21.5	490
1440 min Summer	5.891	0.0	24.0	728
2160 min Summer	4.375	0.0	26.8	1100
2880 min Summer	3.535	0.0	28.8	1464
4320 min Summer	2.617	0.0	32.0	2180
5760 min Summer	2.117	0.0	34.5	2872
7200 min Summer	1.797	0.0	36.6	3576
8640 min Summer	1.572	0.0	38.5	4304

	CELLULAR ATTENUATION TANK 30 LONGACRE LANE HAWORTH
Date 04/08/2023	Designed by MH
File 1IN100 (+45%) [0.017HA]....	Checked by
Micro Drainage	Source Control 2020.1.3

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
10080 min Summer	98.024	0.024	0.0	0.3	0.3	0.3	O K
15 min Winter	98.297	0.297	0.0	2.0	2.0	3.4	O K
30 min Winter	98.360	0.360	0.0	2.0	2.0	4.1	O K
60 min Winter	98.380	0.380	0.0	2.0	2.0	4.3	O K
120 min Winter	98.329	0.329	0.0	2.0	2.0	3.7	O K
180 min Winter	98.234	0.234	0.0	2.0	2.0	2.7	O K
240 min Winter	98.152	0.152	0.0	2.0	2.0	1.7	O K
360 min Winter	98.086	0.086	0.0	1.8	1.8	1.0	O K
480 min Winter	98.071	0.071	0.0	1.5	1.5	0.8	O K
600 min Winter	98.062	0.062	0.0	1.3	1.3	0.7	O K
720 min Winter	98.057	0.057	0.0	1.2	1.2	0.6	O K
960 min Winter	98.050	0.050	0.0	0.9	0.9	0.6	O K
1440 min Winter	98.042	0.042	0.0	0.7	0.7	0.5	O K
2160 min Winter	98.035	0.035	0.0	0.5	0.5	0.4	O K
2880 min Winter	98.031	0.031	0.0	0.4	0.4	0.4	O K
4320 min Winter	98.027	0.027	0.0	0.3	0.3	0.3	O K
5760 min Winter	98.024	0.024	0.0	0.3	0.3	0.3	O K
7200 min Winter	98.022	0.022	0.0	0.2	0.2	0.2	O K
8640 min Winter	98.020	0.020	0.0	0.2	0.2	0.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Summer	1.405	0.0	40.1	5088
15 min Winter	108.797	0.0	4.6	16
30 min Winter	76.603	0.0	6.5	26
60 min Winter	51.700	0.0	8.8	46
120 min Winter	33.695	0.0	11.5	82
180 min Winter	25.768	0.0	13.1	114
240 min Winter	21.092	0.0	14.3	142
360 min Winter	15.887	0.0	16.2	190
480 min Winter	12.973	0.0	17.6	250
600 min Winter	11.073	0.0	18.8	308
720 min Winter	9.722	0.0	19.8	370
960 min Winter	7.906	0.0	21.5	488
1440 min Winter	5.891	0.0	24.0	718
2160 min Winter	4.375	0.0	26.8	1084
2880 min Winter	3.535	0.0	28.8	1420
4320 min Winter	2.617	0.0	32.0	2168
5760 min Winter	2.117	0.0	34.5	2960
7200 min Winter	1.797	0.0	36.6	3624
8640 min Winter	1.572	0.0	38.5	4336

	CELLULAR ATTENUATION TANK 30 LONGACRE LANE HAWORTH
Date 04/08/2023	Designed by MH
File 1IN100 (+45%) [0.017HA]....	Checked by
Micro Drainage	Source Control 2020.1.3

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
10080 min Winter	98.019	0.019	0.0	0.2	0.2	0.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Winter	1.405	0.0	40.1	5224

	CELLULAR ATTENUATION TANK 30 LONGACRE LANE HAWORTH
Date 04/08/2023	Designed by MH
File 1IN100 (+45%) [0.017HA]....	Checked by
Micro Drainage	Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	17.700	Shortest Storm (mins)	15
Ratio R	0.269	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+45

Time Area Diagram

Total Area (ha) 0.017

Time (mins) From:	To:	Area (ha)
0	4	0.017

	CELLULAR ATTENUATION TANK 30 LONGACRE LANE HAWORTH
Date 04/08/2023	Designed by MH
File 1IN100 (+45%) [0.017HA]....	Checked by
Micro Drainage	Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 99.000

Cellular Storage Structure

Invert Level (m) 98.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	12.0	0.0	0.401	0.0	0.0
0.400	12.0	0.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0076-2000-0400-2000
Design Head (m)	0.400
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	76
Invert Level (m)	98.000
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.400	2.0	Kick-Flo®	0.286	1.7
Flush-Flo™	0.124	2.0	Mean Flow over Head Range	-	1.7

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)
0.100	2.0	1.200	3.3	3.000	5.1	7.000	7.6
0.200	1.9	1.400	3.5	3.500	5.4	7.500	7.9
0.300	1.8	1.600	3.8	4.000	5.8	8.000	8.2
0.400	2.0	1.800	4.0	4.500	6.1	8.500	8.4
0.500	2.2	2.000	4.2	5.000	6.5	9.000	8.7
0.600	2.4	2.200	4.4	5.500	6.8	9.500	8.9
0.800	2.7	2.400	4.6	6.000	7.1		
1.000	3.0	2.600	4.7	6.500	7.4		

Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	0.420	2.000
Flush-Flo™	0.129	1.997
Kick-Flo®	0.299	1.716
Mean Flow		1.679

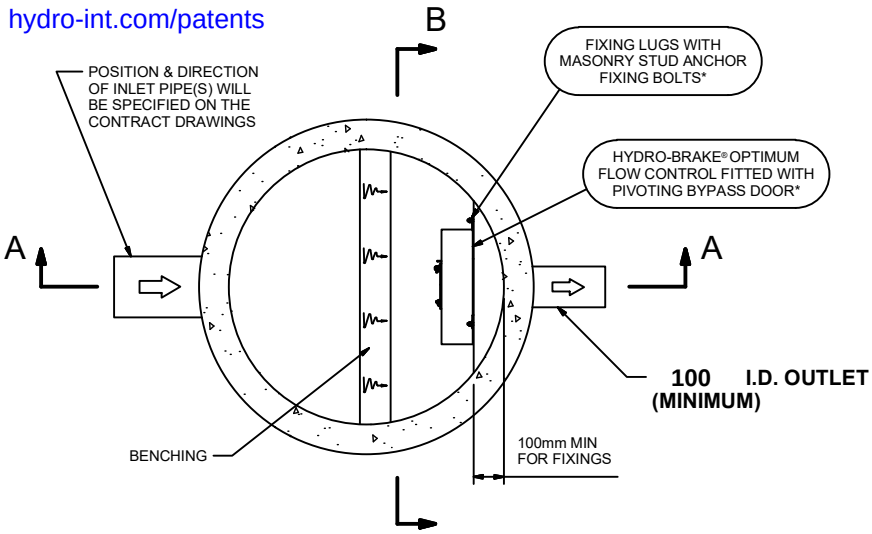
Hydro-Brake® Optimum Flow Control including:

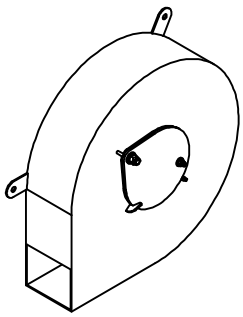
- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet
- Indicative Weight: 0 kg

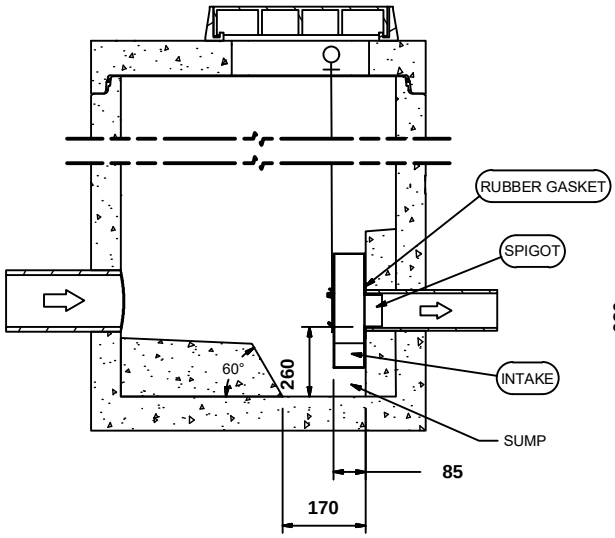
BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE 08/4596

wrc approved PT/503/0422 Valid: 01/04/2022 - 31/03/2027

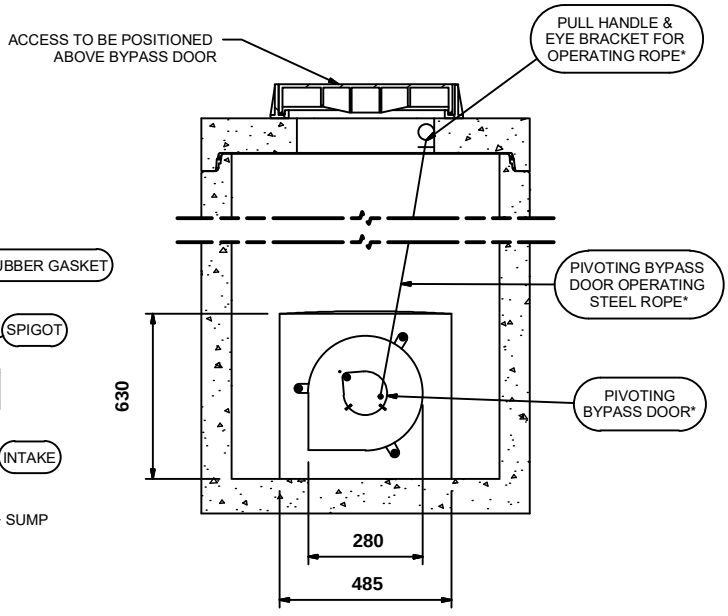
hydro-int.com/patents







SECTION A-A



SECTION B-B

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-0075-2000-0420-2000 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®

DATE	04/08/2023 21:03
SITE	30 Longacre Lane
DESIGNER	Michael Herbert
REF	WA-656

SHE-0075-2000-0420-2000
Hydro-Brake® Optimum

Hydro International Ltd • Unit 2, Rivermead Court • Kenn Business Park • Windmill Road • Kenn • Clevedon • BS21 6FT • Tel: 01275 878371 • www.hydro-int.com • Email: Enquiries@hydro-int.com

m.herbert@furnesspartnership.com

Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	0.420	2.000
Flush-Flo	0.129	1.997
Kick-Flo®	0.299	1.716
Mean Flow		1.679

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE No 08/4596

wrc approved™
PT/503/0422
Valid: 01/04/2022 - 31/03/2027

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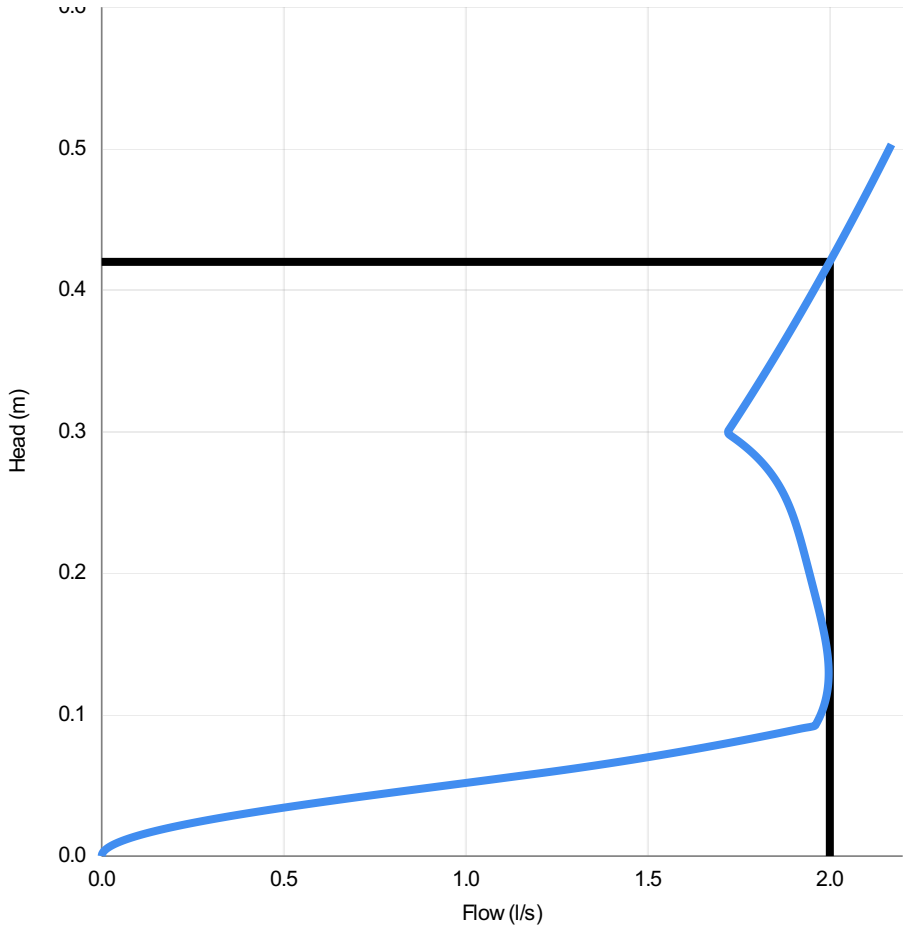

Head (m)	Flow (l/s)
0.000	0.000
0.014	0.100
0.029	0.369
0.043	0.755
0.058	1.185
0.072	1.558
0.087	1.860
0.101	1.977
0.116	1.993
0.130	1.997
0.145	1.993
0.159	1.983
0.174	1.970
0.188	1.956
0.203	1.941
0.217	1.926
0.232	1.910
0.246	1.890
0.261	1.863
0.275	1.824
0.290	1.767
0.304	1.730
0.319	1.766
0.333	1.802
0.348	1.837
0.362	1.871
0.377	1.904
0.391	1.936
0.406	1.968
0.420	2.000

DESIGN ADVICE

The head/flow characteristics of this SHE-0075-2000-0420-2000 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®

DATE	04/08/2023 21:03
Site	30 Longacre Lane
DESIGNER	Michael Herbert
Ref	WA-656

SHE-0075-2000-0420-2000

Hydro-Brake Optimum®

APPENDIX F – SuDS MAINTENANCE SCHEDULE

Project Title:	30 Longacre Lane, Haworth, Bradford, BD22 0TE		
Job Ref:	WA-656	**Date:**	Aug '23

Proposed SuDS Maintenance Schedule

The following maintenance schedule has been produced in line with CIRIA C753 'The SuDS Manual' recommendations for 30 Longacre Lane.

Party Responsible for Implementing Maintenance Schedule: ***Landowner***
Refer to following drawings for details: ***WA-656-D-01, D-02, D-03***

Table 1 – Pipe, Manhole & Gully Maintenance Schedule

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

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

Maintenance Schedule	***Action***	***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 [i.e., leaves]).	Monthly (or as required)
	Remove sediment from pre-treatment structures (i.e., catchpits)	Annually (or as required)
Remedial Actions	Repair/rehabilitate inlets, outlets and vents.	As required
Monitoring	Inspect/check all inlets, outlets and vents to ensure that they are in good condition and operating as designed.	Annually
	Survey inside of tank for sediment build-up and remove if necessary.	Every 5 years (or as required)