



**ARCH
ASSOCIATES**

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY REPORT

81C LONDON ROAD
WATERLOOVILLE
PO7 7EL



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**FLOOD RISK ASSESSMENT
& DRAINAGE STRATEGY REPORT**
for

81C LONDON ROAD
WATERLOOVILLE
PO7 7EL

Client:

Pink Rock

ISSUE		A	B	C
Issued By	B Baker			
Date	25.05.2023			
Purpose	Planning			
Approved By	CH			

Project No. AAL319



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1.0 Executive Summary

Arch Associates has been appointed by Pink Rock to prepare a Flood Risk Assessment and Drainage Strategy Report for the proposed demolition of the existing building, with construction of 2 No. Class E units and 13 No. flats, across two buildings at 81C London Road, Waterloooville.

The 0.053 hectare site currently comprises of a two-storey Class E building with rear courtyard and single storey garage. The building can be accessed via the main entrance off London Road as well as via a rear entrance from Swiss Road into the rear courtyard.

For the front building situated on London Road, it is proposed to retain the retail usage on the ground floor of the existing building, replacing with two Class E units. This building is proposed to be five-storey with a mixture of one and two bed dwellings from first floor up.

The rear building is proposed to be four-storey with a mixture of one and two bed dwellings. A vehicular access route is proposed to be included in the ground floor level configuration of this building.

The proposed surface water strategy consists of a gravity drainage system which will connect to an existing 300mm Southern Water public surface water sewer. The surface water run-off from the development will be restricted to a flow rate of 4.2 l/s and attenuated up to the 1:100+40% storm return period. The proposed surface water strategy is discussed in more detail in Section 5.2.

The proposed foul water drainage strategy is designed to connect to an existing 150mm Southern Water public foul water sewer. The proposed foul water drainage strategy is discussed in more detail in Section 5.3 of this report.



2.0 Site Description

The 0.053 hectare site is located on London Road, Waterloooville, and currently comprises of a two-storey Class E building with rear courtyard, a small area of landscaping and single storey garage. The building can be accessed via the main entrance from London Road as well as a rear entrance from Swiss Road into the rear courtyard area.

2.1 Site Location and Surrounding Area

The application site is located at British National Grid reference SU 68139 09278.

The site is located in the centre of Waterloooville, 5.3km northwest of Havant town centre. There are ground floor retail units neighbouring the existing building on both sides. The north boundary is Swiss Road, the south boundary is London Road. See figures 2.1.1 to 2.1.4.



Figure 2.1.1 Site Location



Figure 2.1.2 Site Location



Figure 2.1.3 Aerial Image of Site Location

2.2 Geology

British Geological Survey maps indicate that the bedrock geology beneath the site is London Clay Formation – Clay, Silt and Sand, there is no superficial geology in this area. See figure 2.2.1.

London Clay Formation mainly comprises bioturbated or poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay. It commonly contains thin courses of carbonate concretions ('cementstone nodules') and disseminated pyrite. It also includes a few thin beds of shells and fine sand partings or pockets of sand, which commonly increase towards the base and towards the top of the formation.

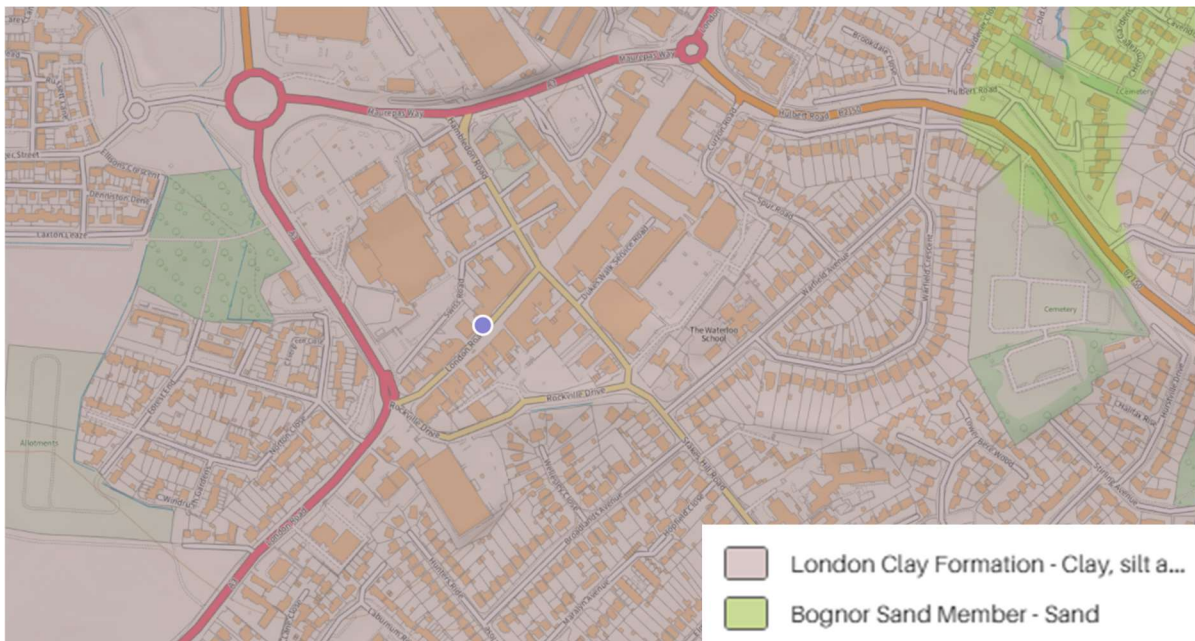


Figure 2.2.1 British Geological Survey Map

Historic borehole records from British Geology data, located in an area of land 80m north of the site, Reference: SU60NE288, show clay findings at depths from 1.1m to at least 18.5m. Groundwater seepage occurred at a depth of 4m.

2.3 Topography

A Topographical Survey was carried out on the application site in October 2014 by P Stubbington Land Surveys Ltd.

Site levels are relatively flat with levels varying by 0.43m. The highest level on site is 48.77mAOD situated in the rear courtyard and the lowest is 48.34mAOD also situated in the rear courtyard area, see Appendix A.

The ground floor levels of the existing buildings range from 49.03mAOD from the building fronting London Road to 48.55mAOD from the building located on Swiss Road.

3.0 Potential Sources of External Flooding

3.1 Tidal

The site is located 10km north of the nearest coastline therefore, not at any risk of tidal flooding.

3.2 Fluvial

The Environment Agency (EA) produces floodplain maps for the UK which show the areas at risk of fluvial and tidal flooding. The magnitudes of the flooding events considered are defined in terms of their return period. Generally, when determining the impact of any development within the floodplain of a fluvial reach, the design standard, against which the EA will consider the feasibility of any scheme, is typically the 1% annual probability flood (1 in 100 year return period flood) for sites within the floodplain, or the effects of a 1 in 100 year storm if outside the floodplain.



The EA flood zone maps identify undefended floodplain, giving the horizontal extent of low (Zone 1), medium (Zone 2) and high-risk flood zones (Zones 3a and 3b) depending on the severity of the flood event.

The site falls under flood zone 1 as indicated on the Environment Agency's Risk of Flood Zone Map. See Figure 3.2.

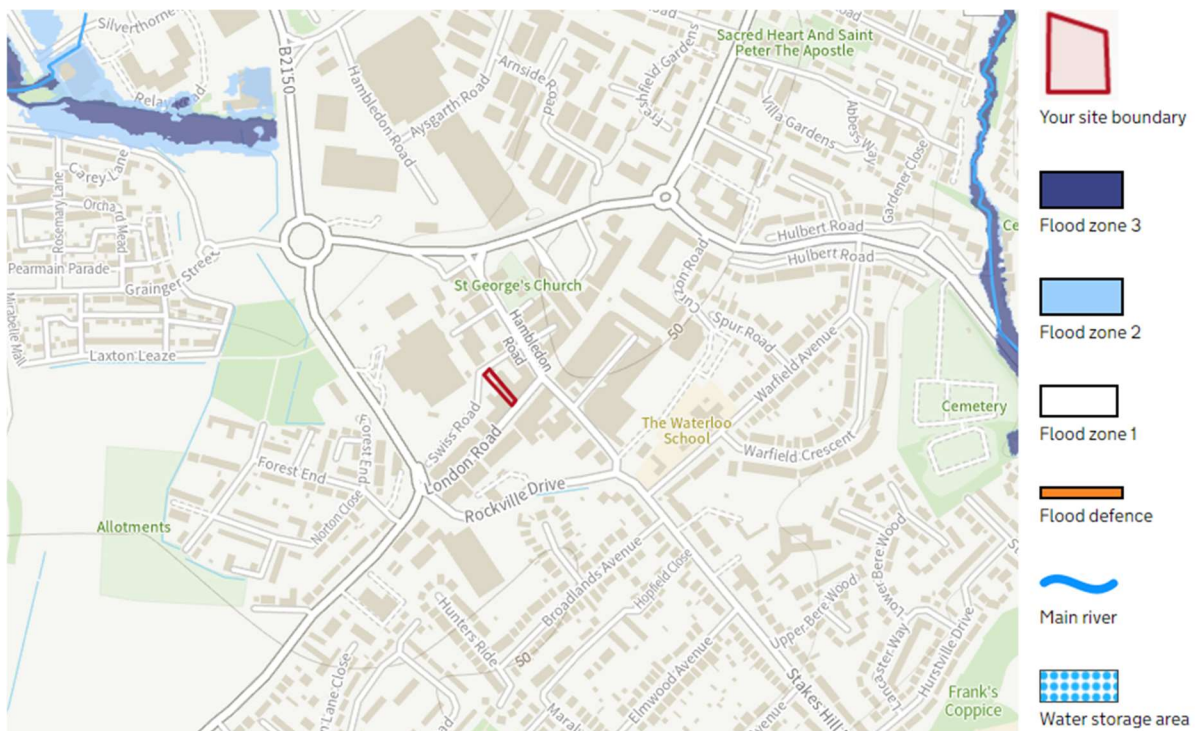


Figure 3.2 Environment Agency Flood Zone Map

3.3 Pluvial

The Environment Agency also produce maps which highlight the risk of flooding from surface water flows. These illustrate when the capacity of existing surface water drainage networks and channels are exceeded in extreme rainfall events.

The Environment Agency's risk of flooding from surface water map, Figure 3.3, indicates the site has a very low pluvial flood risk,

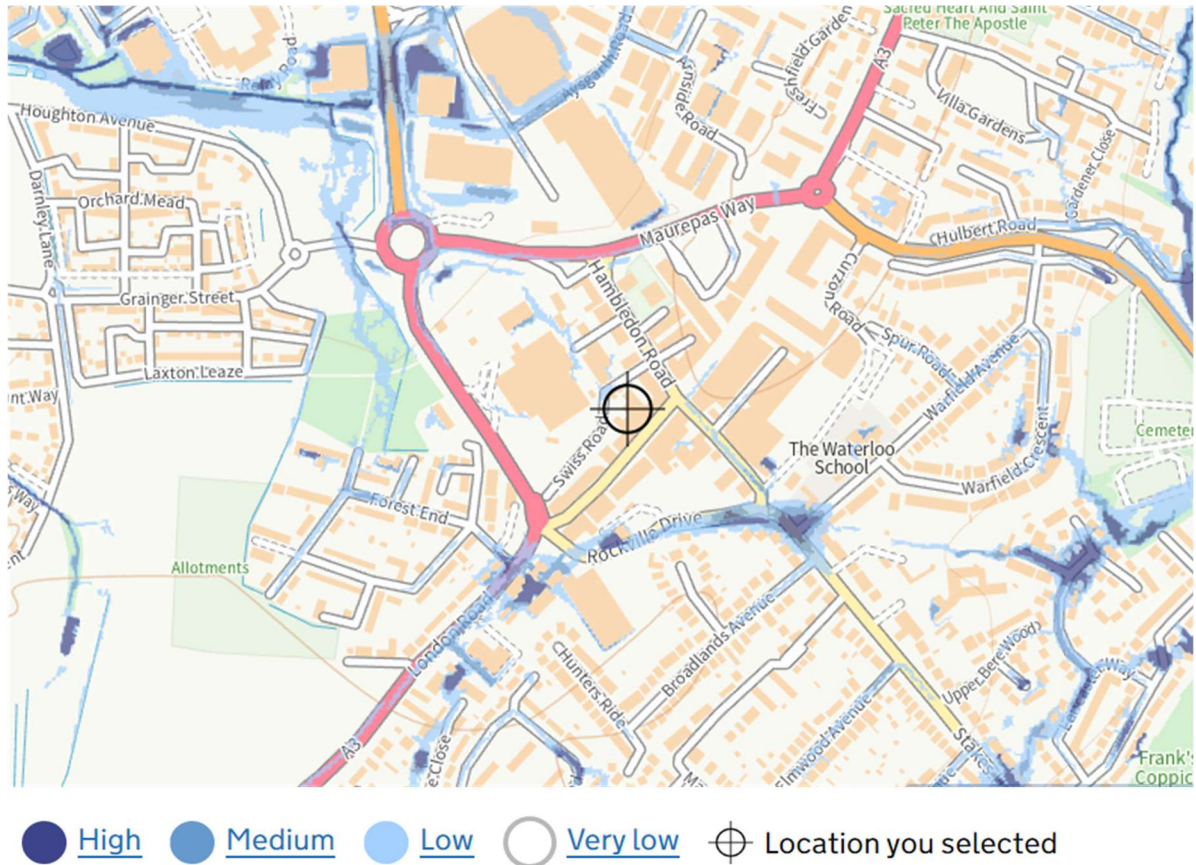


Figure 3.3 Environment Agency Pluvial Flood Risk Map

3.4 Foul and Surface Water Sewers

There have been no historic reported incidents of sewer flooding within the area.

3.5 Groundwater

According to the Environment Agency (EA) Source Protection Maps the application site falls within the 'Zone I – Subsurface Activity' source protection zone. See Figure 3.5.

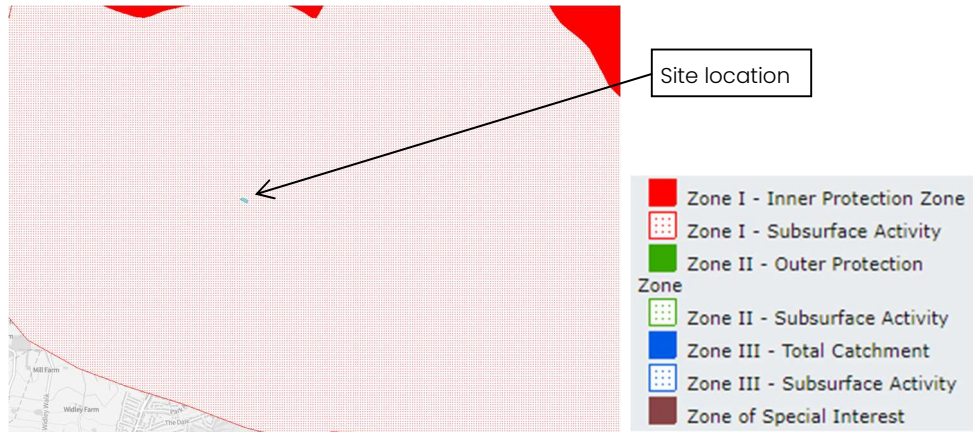


Figure 3.5 DEFRA Source Protection Zones Map

The site does not fall into a Drinking Water protected area or Drinking Water safeguard zones for surface water or groundwater.

3.6 Reservoirs, Canals, and Other Artificial Sources

There is no risk of flooding to the site from reservoirs, canals, or other artificial sources when there is also flooding from rivers.

4.0 Strategic Flood Risk Assessment

Partnership for Urban South Hampshire (PUSH) commissioned a Strategic Flood Risk Assessment (SFRA) which was inclusive of the District in November 2007, with an update released in 2016. The assessment is to inform the preparation of the Core Strategy, to identify those parts of the district that are most at risk from flooding. The SFRA identified areas within Waterlooville which may be prone to possible flood risk from tidal, fluvial, pluvial, groundwater and sewer flooding.

The SFRA indicates the site location is not in an area with historic fluvial and pluvial flooding. The area has had no Groundwater flood incidents recorded either.

5.0 Development Proposals

The existing site consists of a two-storey building, hard paved courtyard, and single storey garage.

The proposal is for demolition of the existing building and garage to enable the construction of 13 dwellings on the site, split across two buildings.

It is proposed, in the building fronting London Road, retain the retail usage on the ground floor with two Class E units. Access to the residential portion of the new build would be from London Road between the retail units. This access would also lead to the rear courtyard.

Access to the rear block is from the side within the vehicle access way. As shown on the plans, it is proposed that the rear building be an independent structure. It will include a vehicular passage beneath its first floor, refer to Appendix B for development proposals.

5.1 Existing Site Drainage

Surface Water

It is assumed that surface water run-off from the site discharges to the north to an existing surface water sewer, running north easterly in direction, along Swiss Road which then redirects northerly along the boundary of the Police Station. Refer to Appendix C for Southern Water sewer records.

The existing brownfield run off rates, for the 530m² site, has been calculated as follows:

1:1	28.755mm/hr	4.2l/s
1:30	70.449mm/hr	10.37l/s
1:100	91.184mm/hr	13.42l/s

Foul Water

It is assumed that foul water from the site discharges to the north where there is an existing foul water sewer running, in a westerly direction, along Swiss Road for the full length of the northern boundary. Refer to Appendix C for Southern Water sewer records.

5.2 Proposed Site Surface Water Drainage Strategy

Proposed Runoff Rates

The proposed brownfield runoff rates, prior to mitigation, based on 527m² of proposed roof and hard paved surface, have been calculated as follows:

1:1	28.755mm/hr	4.2l/s
1:30	70.449mm/hr	10.37l/s
1:100+40%cc	127.657mm/hr	18.68l/s

SuDS Hierarchy of Systems and Justification of Usage

We have reviewed and taken into consideration the Environment Agency SuDS Hierarchy for SuDS systems which are noted below in order of preference:

1. Living Roofs
2. Basins and Ponds
3. Filter Strips and Swales
4. Infiltration Devices
5. Permeable Surfaces and Filter Drains
6. Tanked Systems

Following is the response to these systems identifying the most suitable system for the scheme and why the more favourable are unsuitable.

1. Living and green roofs impose a large load on the roof structure and require relatively flat roofs to ensure water retention, the existing structure will not be able to cater for the large loads of a green roof system.
2. Attenuation basins will be unfeasible due to the compact nature of the site.
3. Impermeable and permeable Filter strips and swales will be unfeasible due to the compact nature of the site and poor infiltration.
4. Infiltration devices will be unfeasible due to poor infiltration characteristics of the substrata.
5. Permeable surfaces are unfeasible due to the proposed layout of the site and poor infiltration characteristics of the substrata.
6. A positive surface water storage tank system with restricted connection to a drainage ditch, sewer or watercourse is feasible, as a surface water sewer is located on the eastern boundary of the site.

It is proposed to restrict run-off rates to the existing 1:1 year storm return period and for the purpose of the drainage strategy a design flow rate of 4.2l/s is to be used for the 1:1 up to the 1:100+40 storm return periods.

Surface water run-off from the proposed building and hard paved areas will be discharged to a new attenuation tank with connection to the surface water sewer.

The attenuation tank will be designed for the 1:100+40% storm return period, refer to Appendix D for a drainage strategy layout and calculations.

Water Quality

Water quality management of surface water should be carried out in accordance with the SuDS Manual (Ciria C753, November 2015).

C753 Part E Chapter 26 describes risks posed by surface water runoff to the receiving environment as a function of:

- The pollution hazard at a particular site (i.e. the pollution source).
- The effectiveness of SuDS treatment components in reducing levels of pollutants the environmentally acceptable levels.
- The sensitivity of the receiving environment.

The recommended approaches for water quality risk management are given in the SuDS Manual Table 26.1.

TABLE 26.1 Approaches to water quality risk management			
Design method	Hazard characterisation	Risk reduction	
		For surface water	For groundwater
Simple index approach	Simple pollution hazard indices based on land use (eg Table 26.2 or equivalent)	Simple SuDS hazard mitigation indices (eg Table 26.3 or equivalent)	Simple SuDS hazard mitigation indices (eg Table 26.4 or equivalent)
Risk screening ¹	Factors characterising traffic density and extent of infiltration likely to occur (eg Table 26.5 or equivalent)	N/A	Factors characterising unsaturated soil depth and type, and predominant flow type through the soils (eg Table 26.5 or equivalent)
Detailed risk assessment	Site specific information used to define likely pollutants and their significance	More detailed, component specific performance information used to demonstrate that the proposed SuDS components reduce the hazard to acceptable levels	
Process-based treatment modelling	Time series rainfall used with generic pollution characteristics to determine statistical distributions of likely concentrations and loadings in the runoff	Models that represent the treatment processes in the proposed SuDS components give estimates of reductions in event mean discharge concentrations and total annual load reductions delivered by the system	

Note

¹ Risk assessment may be required as a result of the risk screening process.

As per Table 26.1 the Simple Index approach will be used as a design method for this site. Table 26.2 provides hazard classification of different land uses. The land uses for the surface water drainage for this site are:

- Roofs -impermeable surface.

To deliver adequate treatment, 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. Therefore, the following will have to be achieved for the surface running off the site.

$$\text{Total SuDS mitigation index} \geq \text{pollution hazard index}$$

Pollution Hazard Indices are given for different land uses in Table 26.2 of the SuDS manual:

TABLE 26.2 Pollution hazard indices for different land use classifications				
Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

From Table 26.2 the following information is tabulated in Table 1.

Land Use	Destination of Runoff	Pollution Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
Roofs	Surface water	Very Low	0.2	0.2	0.05
Car parks	Surface water	Low	0.5	0.4	0.4
TOTALS			0.7	0.6	0.45

Table 1: Pollution hazard index and destination of runoff for the proposed site

The SuDS mitigation index will be obtained from Table 26.3 (for discharges to surface waters) of the SuDS manual.

TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters

Type of SuDS component	Mitigation indices ¹		
	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4 ²	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond ⁴	0.7 ³	0.7	0.5
Wetland	0.8 ³	0.8	0.8
Proprietary treatment systems ^{5,6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

To provide the required mitigation is proposed to use a proprietary treatment system.

SuDS mitigation indexes are tabulated in Table 2 as follows:

			Mitigation Indices			
Runoff Source	Destination of Runoff	Mitigation Index Source	Type of SuDS Component	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Roofs	Surface water	Table 26.4	Proprietary treatment system.	0.8	0.8	0.8
TOTALS				0.8	0.8	0.8

Table 2: SuDS mitigation index

In summary, the SuDS component mitigation indices (Table 2) are greater than pollution hazard indices (Table 1) and therefore deliver adequate treatment.

Storm Design Exceedance

It is difficult to completely guard against flooding since extreme events greater than the design standard event are always possible, however, it is practicable to minimise the risk by careful design of the layout of the development such that internal flooding is avoided. Areas of hard standing will be laid to falls away from the building to direct surface water runoff to areas where damage and disruption to operations will be minimised, Appendix E.

Urban Creep

Urban creep is the conversion of permeable surfaces to impermeable over time e.g. surfacing of front gardens to provide additional parking spaces, extensions to existing buildings, creation of large patio areas. Much research has been carried out into the effect of urban creep and its effect on the drainage systems which cater for urban areas. It has been shown that, over the lifetime of a development, urban creep can increase impermeable areas by as much as 10%.

Due to the nature of the development, It is proposed to hard pave/roof to 99.5% of the site with only 3m² remaining as soft landscape therefore we will take 100% of the site for design purposes, therefore applying urban creep is deemed unsuitable.

5.3 Proposed Site Foul Water Drainage Strategy

The foul water drainage for the site will be discharged to the foul water sewer located to the north of the site, along Swiss Road. This will be subject to a Southern Water capacity check and Section 106 connection agreement.

5.4 Future Maintenance of the System

The owner of the property will be responsible the maintenance of the system and a preliminary maintenance document for the system is within Appendix F.



6.0 Summary and Conclusion

The proposed development is sited within Flood Zone 1.

The proposals are considered to be fully appropriate for the location as it will not be subject to any significant flood risks i.e. tidal, fluvial, ground water or sewer.

Surface water drainage will be dealt with in a sustainable way by discharging runoff to a Surface Water Sewer at the existing brownfield run-off rate of 4.2l/s, with attenuation designed to cater for the 1% (1:100 year storm) with 40% additional storage to allow for climate change.

The drainage system will be designed to comply with the SuDS Manual water quality criteria.

The owner of the property will be responsible for the maintenance of the system.

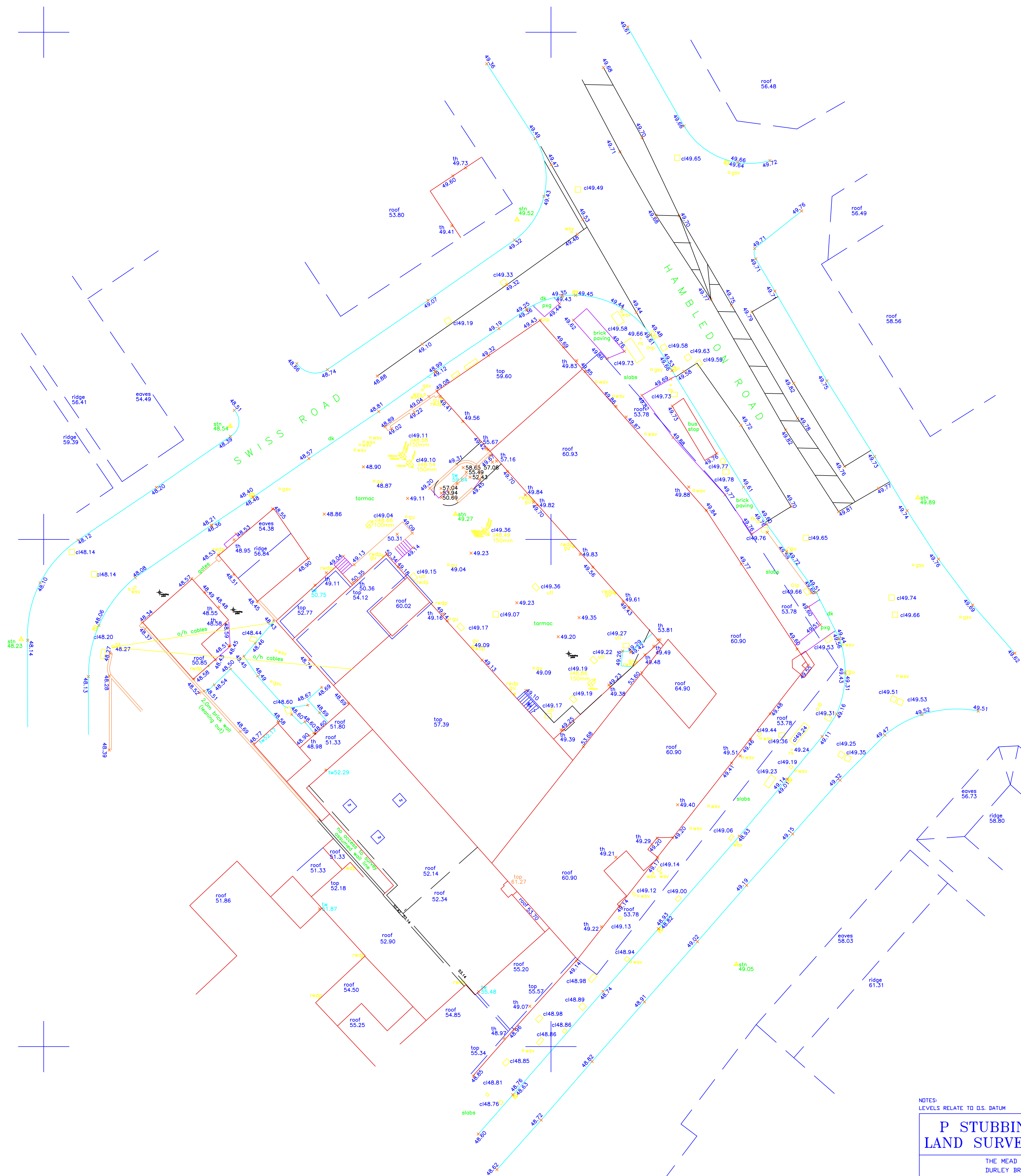
This Flood Risk Assessment has been prepared in accordance with Communities & Local Government, National Planning Policy Framework (NPPF), Planning Practice Guidance (PPG) and the requirement of the Lead Local Flood Authority (LLFA).



Appendix A – Topographical Survey



- | | |
|------|------------------|
| KEY: | |
| bt | British Telecom |
| cb | Control Box |
| cl | Cover Level |
| ctv | Cable Television |
| dk | Drop Kerb |
| ep | Electric Pole |
| fh | Fire Hydrant |
| gu | Gully |
| gsv | Gas Stop Valve |
| ic | Height |
| ic | Inspection Cover |
| il | Invert Level |
| lp | Lamp Post |
| mkr | Marker |
| o/h | Overhead |
| pb | Post Box |
| pxg | Pran Crossing |
| ns | None |
| rp | Road Sign |
| sv | Stop Valve |
| tb | Telephone Box |
| tt | Traffic Light |
| tt | Top of Tree |
| th | Threshold |
| tw | Top of Wall |
| utl | Unable to Lift |
| vp | Vent Pipe |
| vw | Water Valve |
| wsv | Water Stop Valve |



NOTES:
LEVELS RELATE TO D.S. DATUM

P STUBBINGTON
LAND SURVEYS LTD

THE MEAD
DURLEY BROOK ROAD
DURLEY
SOUTHAMPTON
HAMPSHIRE
SO32 2AR
TEL : 023 8060 1876

MOBILE: -
07973 348165

EMAIL: -
PAUL@PSLANDSURVEYS.COM

CONTRACT: - THE CLOCK HOUSE
WATERLOOVILLE

TITLE: - EXISTING SURVEY

SCALE: - 1: 200 @A1

DRAWING NO. 4750/01

DATE: - OCTOBER 2014

SURVEYOR: - SI

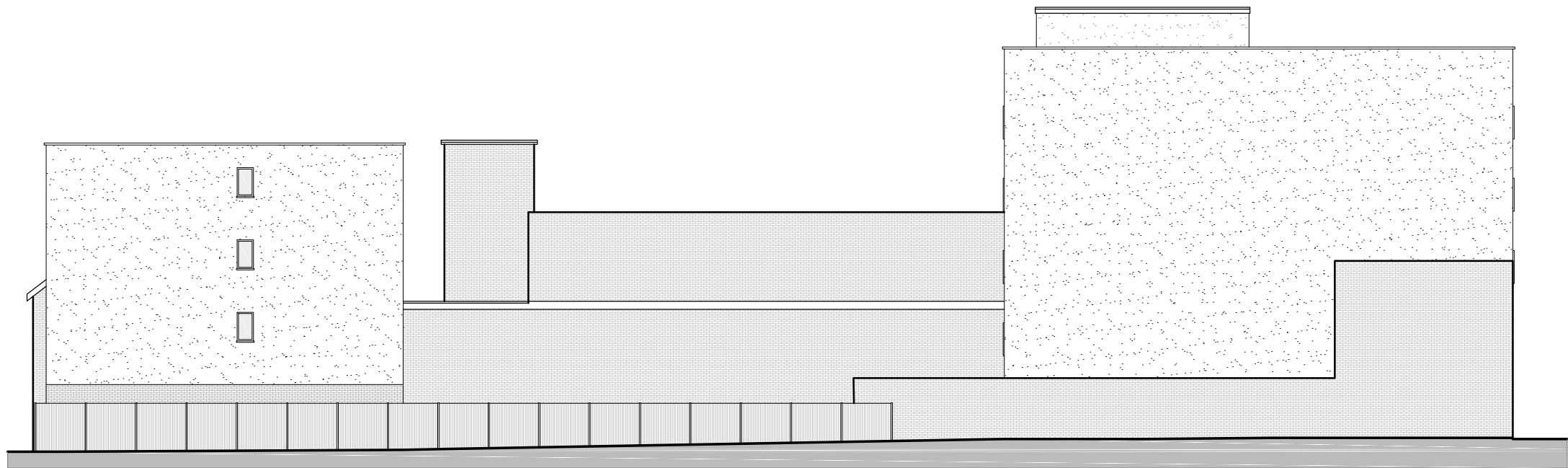
Appendix B – Development Proposals



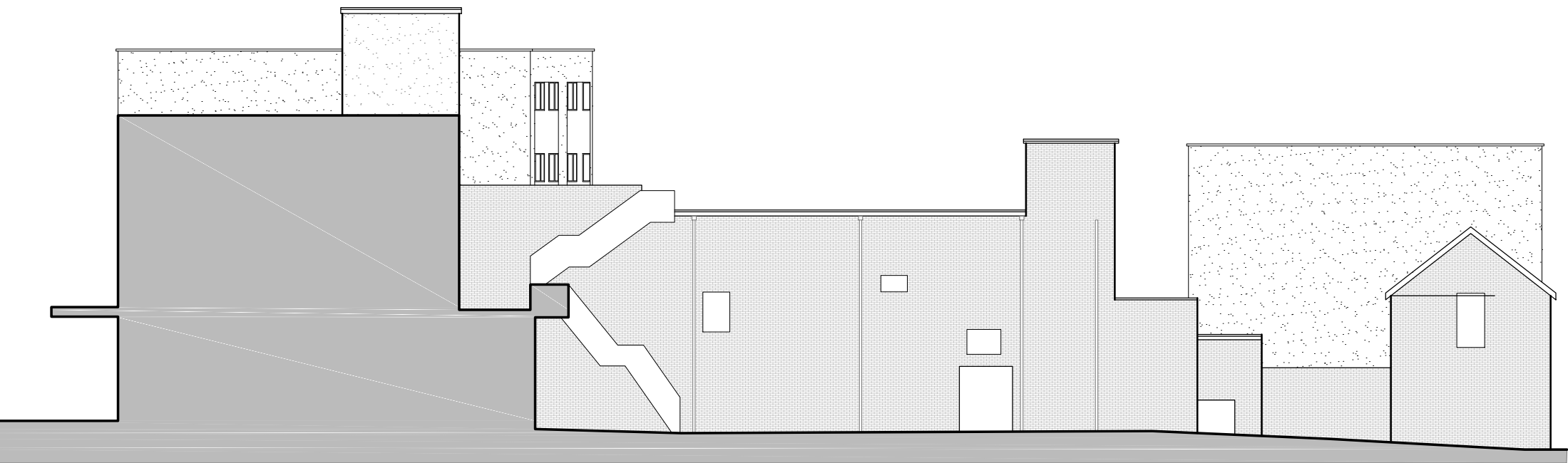
Proposed Front Elevation - 1:200



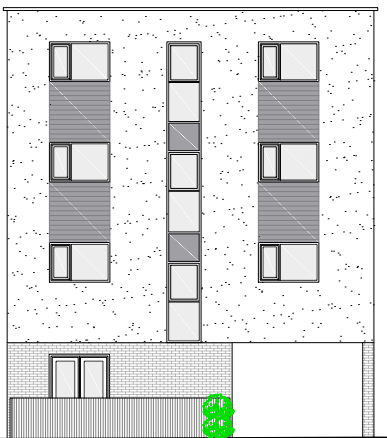
Proposed Rear Elevation - 1:200



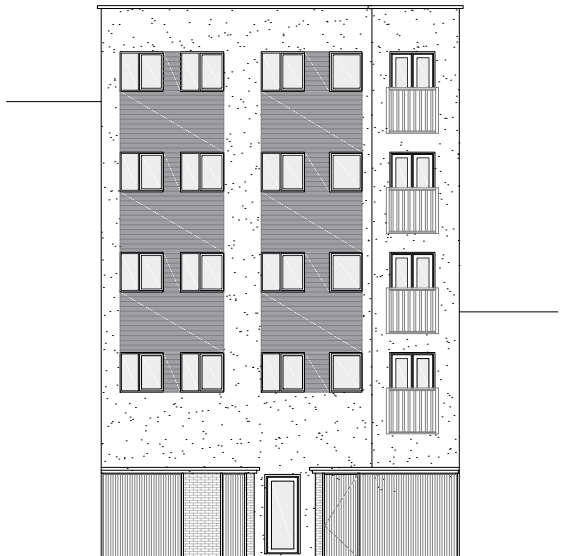
Proposed West Side Elevation - 1:200



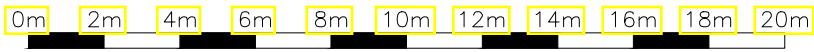
Proposed East Side Elevation - 1:200



Proposed Rear Elevation of
Rear Building- 1:200



Proposed Rear Elevation of
Front Building- 1:200



Rev	Revision	By	Date

KNIGHT
ADRCHITECTURAL
DESIGN

K.A.D. Ltd.
First Floor Unit 7
The Quarterdeck
Port Solent
PO6 4TP
T: 01489 660194
E: admin@k-a-d.co.uk
W: www.k-a-d.co.uk

Client

PINK ROCK LTD

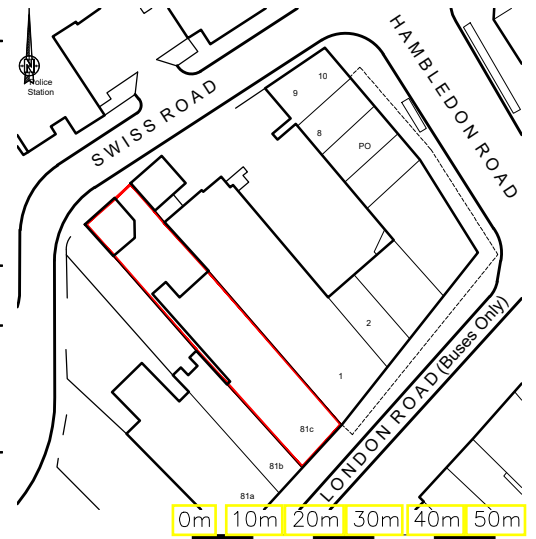
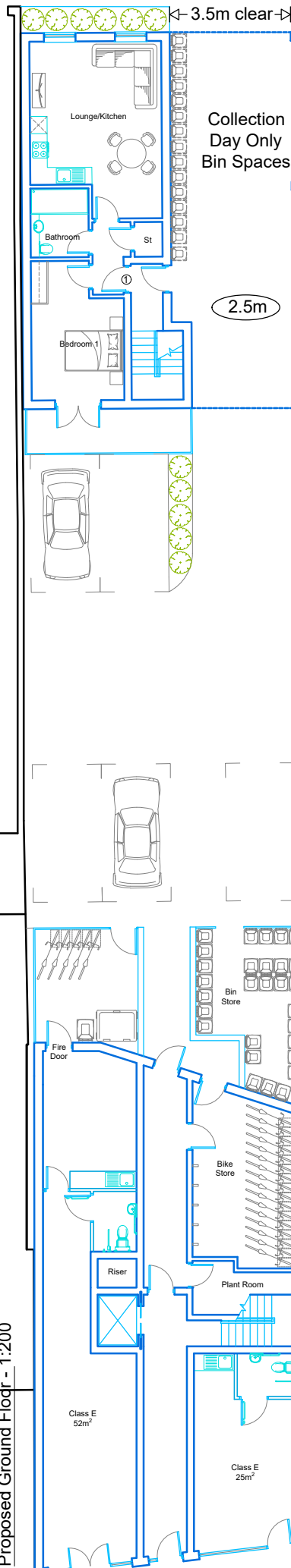
Project

81C LONDON ROAD
WATERLOOVILLE
PO7 7EL

Drawing

PROPOSED ELEVATIONS

Scale	1:200@A2	Date	OCT 2022	
Project no.	Sequential	Bldg/Floor	Detail	Rev
KAD	09	A	PP	B



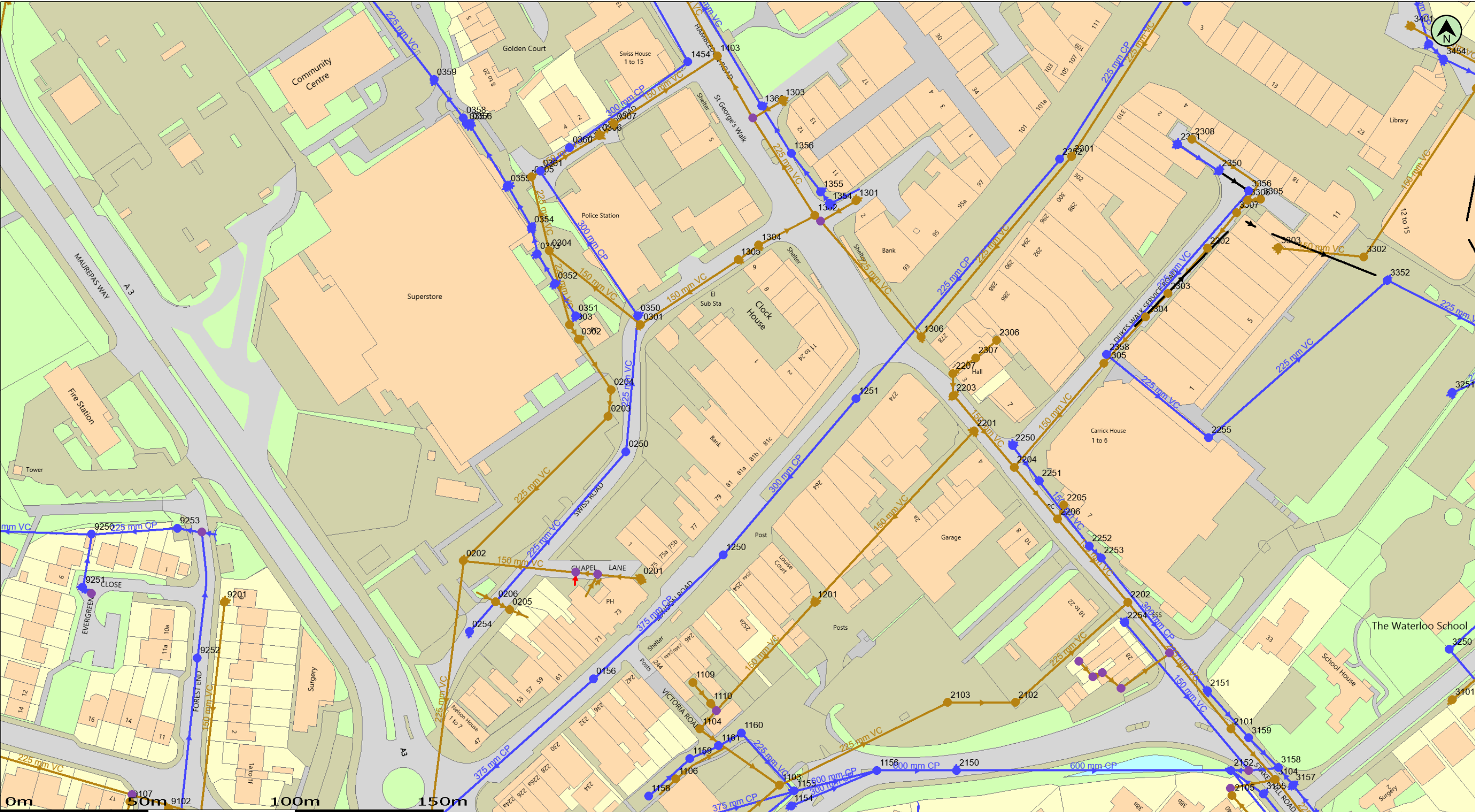
Areas:
Flat 1 - 1B/2P - 50m² (GF)

Commercial
Class E - 52m²
Class E - 25m²

Rev	Revision	By	Date	
KNIGHT AARCHITECTURAL DDESIGN K.A.D. Ltd. First Floor Unit 7 The Quarterdeck Port Solent PO6 4TP T: 01489 660194 E: admin@k-a-d.co.uk W: www.k-a-d.co.uk				
Client PINK ROCK LTD				
Project 81C LONDON ROAD WATERLOOVILLE PO7 7EL				
Drawing PROPOSED GROUND FLOOR				
Scale 1:200@A4		Date SEP 2022		
Project no.	Sequential	Bldg/Floor	Detail	Rev
KAD	01	A	PP	B



Appendix C – Southern Water Sewer Records



(c) Crown copyright and database rights 2023 Ordnance Survey 100031673

Date: 19/05/23

Scale: 1:1250

Map Centre: 468132,109286

Data updated: 05/05/23

Our Ref: 1181009 - 1

Wastewater Plan A3

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2023 Ordnance Survey 100031673. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

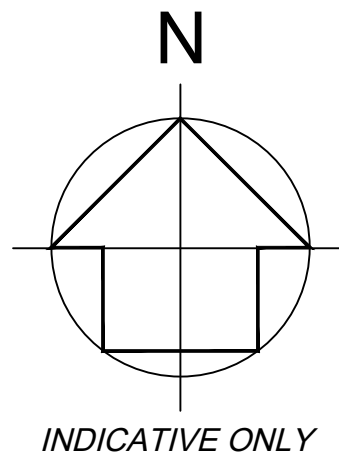
Foul Gravity Sewer	Combined Gravity Sewer	Culverted Water Course or Treated Effluent	Surface Water Gravity Sewer
Rising Main, Vacuum or Syphon	Combined Outfall	Foul Outfall	Surface Water Outfall
Surface Water Inlet	Combined Pumping Station	Surface Water Pumping Station	Foul Pumping Station
Water Treatment Works	Section 104 Area	Building Over Agreement Area	Foul Manhole
Side Entry Manhole, Decarcation Chamber, Dummy Manhole or Surface Water Soakaway	Combined Manhole	Surface Water Manhole	

enquiries@baker-associatesltd.co.uk

81 C London Road



Appendix D - Drainage Design and Calculations



DRAINAGE LEGEND

EXISTING FEATURES

- EXISTING SURFACE WATER SEWER AND MANHOLE TO BE RETAINED
- EXISTING FOUL WATER SEWER AND MANHOLE TO BE RETAINED

PROPOSED FEATURES

- SURFACE WATER DRAIN
- RAINWATER PIPE - REFER TO PUBLIC HEALTH ENGINEERS/ARCHITECTS DRAWINGS FOR DETAILS
- CHANNEL DRAIN SYSTEM WITH SUMP UNIT
- STORM WATER MANHOLE TYPE D
INTERNAL DIMENSIONS 450mm MINIMUM
DEPTH FROM COVER TO SOFFIT OF PIPE UP TO 3m
RESTRICT ACCESS TO Ø350 IF DEPTH FROM COVER TO SOFFIT OF PIPE IS LESS THAN 1m
(MAX PIPE DIAMETER 150mm 4500/4750)
(MAX PIPE DIAMETER 225mm 6000)
- STORM WATER FLOW CONTROL MANHOLE
- STORM WATER SOAKAWAY / ATTENUATION TANK
GL = GROUND LEVEL
TOTL = TOP OF TANK LEVEL
BOTL = BOTTOM OF TANK LEVEL
- SURFACE WATER ABOVE GROUND EXCEEDANCE ROUTE

Ø100 SWD 3.48m 1:100 PIPE DETAIL: Ø, LENGTH, GRADIENT,

MANHOLE REFERENCE:
COVER LEVEL,
INVERT LEVEL,
SUMP INVERT LEVEL,
MH TYPE,
CATCHPIT MANHOLE (IF REQUIRED),
COVER GRADE

- FOUL WATER DRAIN
- ABOVE GROUND FOUL WATER CONNECTION - REFER TO PUBLIC HEALTH ENGINEERS/ARCHITECTS DRAWINGS FOR DETAILS
- TRAPPED GULLY

FOUL WATER MANHOLE TYPE D
INTERNAL DIMENSIONS 450mm MINIMUM
DEPTH FROM COVER TO SOFFIT OF PIPE UP TO 3m
RESTRICT ACCESS TO Ø350 IF DEPTH FROM COVER TO SOFFIT OF PIPE IS LESS THAN 1m
(MAX PIPE DIAMETER 150mm)

Ø100 FWD 3.48m 1:80 PIPE DETAIL: Ø, LENGTH, GRADIENT,

MANHOLE REFERENCE:
COVER LEVEL,
INVERT LEVEL,
MH TYPE,
COVER GRADE

MISCELLANEOUS LEGEND

FFL: XX.XXX ARCHITECTURAL FINISHED FLOOR LEVEL



IMPORTANT NOTE: CAUTION

ALL INFORMATION SHOWN ON THIS DRAWING FOR UNDERGROUND SERVICES/STATUTORY UNDERTAKERS' PLANT IS APPROXIMATE AND IS PROVIDED FOR THE CONTRACTORS INFORMATION ONLY. IT SHOULD NOT BE RELIED ON FOR EXCAVATION OR ANY OTHER WORKS PURPOSES AND CONTRACTORS MUST SATISFY THEMSELVES OF THEIR LOCATIONS PRIOR TO THE COMMENCEMENT OF WORKS.

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- THE CONTRACTOR IS TO ENSURE THE STABILITY AND STRUCTURAL INTEGRITY OF THE EXISTING PROPERTY AT ALL TIMES DURING WORKS AND IS TO BE RESPONSIBLE FOR ALL PROPPING AND SHORING AS REQUIRED.
- MAIN CONTRACTOR TO PROVIDE AND FIX SUITABLE BRACING AND PROPPING FOR ALL ELEMENTS IN THE TEMPORARY CONDITION DURING CONSTRUCTION STAGE, SUCH AS TO ENSURE STRUCTURE STABILITY AT ALL TIMES.
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DRAINAGE NOTES

- ALL PIPES TO BE ADOPTED, OR CONNECTING TO ADOPTED SEWERS, AND/OR SITUATED UNDER HIGHWAY TO BE VITRIFIED CLAY TO BS EN 295 & BS65 (SWS ONLY), OR CONCRETE PIPES TO BE EN 1916, 1, OR THERMOPLASTIC STRUCTURED WALL SEWER PIPES TO WIS 4-35-01 (CLASS 8KN/SOM) AND BE CAPABLE OF WITHSTANDING 4000 PSI JETTING PRESSURE. PRIVATE PIPES MAY BE VC OR PLASTIC.
- FOR CONSTRUCTION DETAILS REFER TO THE RELEVANT ARCH ASSOCIATES DRAWING NUMBERS LISTED ON THE DRAWING ISSUE SHEET.
- ADAPTABLE HIGHWAY WORKS ARE TO BE IN ACCORDANCE WITH LOCAL AUTHORITY DESIGN GUIDANCE.
- ANY WORKS ASSOCIATED WITH THE HIGHWAY/EXTERNAL WORKS INCLUDING HIGHWAY DRAINAGE, SHALL BE IN ACCORDANCE WITH THE HIGHWAYS AGENCY 'MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS, VOL 1' (MCHW), UNLESS OTHERWISE SPECIFIED.
- ALL ADOPTABLE SEWERS WITH LESS THAN 1.20m OF COVER WHEN LAID BENEATH THE ROADS, OR 0.90m OF COVER IN OTHER AREAS, SHALL HAVE CONCRETE PROTECTION IN ACCORDANCE WITH EITHER OF THE DETAILS SHOWN ON THE STANDARD DRAWING PROVIDED.
- ALL DRAINAGE WORKS SHOULD COMMENCE AT THE PROPOSED DOWNSTREAM CONNECTION POINT, THE WORKS CONTINUING UPSTREAM FOLLOWING CONFIRMATION OF THE TIE-IN INVERT LEVELS TO THE ENGINEER. CONNECTIONS TO MANHOLES OR LARGER SIZED PIPES ETC. SHOULD BE SOFFIT TO SOFFIT UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER, IF THIS IS NOT POSSIBLE INFORM THE ENGINEER IMMEDIATELY.
- COVER LEVELS SHOWN ARE APPROXIMATE. COVERS AND FRAMES SHALL BE SET TO FINISHED GROUND LEVELS AND FALLS.
- ROAD GULLY PIPES ARE TO BE 150mm DIA. WITH CONCRETE SURROUND AND FLEXIBLE JOINTS, ALL OTHER UN-REFERENCED PIPES ARE ASSUMED TO BE 100mm DIA.
- FW MIN GRADIENT - 1 IN 40 (100 DIA) NO WC'S CONNECTED
- FW MIN GRADIENT - 1 IN 80 (100 DIA) MIN 1 WC CONNECTED
- FW MIN GRADIENT - 1 IN 150 (150 DIA) MIN 5 WC'S CONNECTED
- SW MIN GRADIENT - 1 IN 100 (100 DIA)
- SW MIN GRADIENT - 1 IN 150 (150 DIA)
- ALL GULLIES SHALL BE FITTED WITH GRADE D400 GRATINGS AND FRAMES TO BS EN124, UNLESS OTHERWISE STATED.
- IN ORDER TO MAINTAIN THE SATISFACTORY FUNCTIONING OF SURFACE WATER SEWERS, ALL ROAD AND YARD GULLIES ARE TO BE "TRAPPED".
- ALL NON ADOPTABLE LATERALS BENEATH THE HIGHWAY SHALL BE BACK FILLED WITH A TYPE 1 GRANULAR MATERIAL AS CL.803 (MCHW) APPROVED BY THE ENGINEER.
- ALL PRIVATE DRAINAGE TO BE IN ACCORDANCE WITH THE BUILDING REGULATIONS APPROVED DOCUMENT PART-H, AND TO THE SATISFACTION OF THE BUILDING CONTROL INSPECTOR.
- WHERE DRAINS PASS THROUGH FOUNDATIONS OR CONNECT TO MANHOLES, A FLEXIBLE PIPE JOINT SHOULD BE PROVIDED TO FORM A ROCKER PIPE IN ACCORDANCE WITH THE STANDARD DETAIL PROVIDED.

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- SHALLOW PRIVATE DRAINS MAY REQUIRE PROTECTION USING CLASS 'Z' CONCRETE SURROUND OR PAVING SLABS BRIDGING THE TRENCH SUBJECT TO THE NHBC INSPECTOR'S REQUIREMENTS.
 - WHERE DRAINAGE RUNS PASS CLOSE TO BUILDINGS OR THEIR INVERT LEVELS ARE BELOW FOUNDATION LEVEL, THEN THE TRENCHES ARE TO BE BACK FILLED IN ACCORDANCE WITH THE STANDARD DETAIL PROVIDED.
 - REFERENCE SHOULD BE MADE TO THE STRUCTURAL ENGINEERS DETAILS FOR ALL ASPECTS OF FOUNDATION DESIGN AND CONSTRUCTION.
 - THE CONTRACTOR IS TO KEEP A RECORD OF ANY VARIATIONS MADE ON SITE, INCLUDING THE RELOCATION OF SEWERS OR DRAINS, SO THAT AN AS CONSTRUCTED DRAWING CAN BE PREPARED UPON COMPLETION OF THE PROJECT.
 - THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE. NO DIMENSIONS ARE TO BE SCALED FROM THESE DRAWINGS.
 - IT IS THE CONTRACTORS/SUBCONTRACTORS RESPONSIBILITY TO ENSURE COMPLIANCE WITH THE CURRENT BUILDING REGULATIONS AND CODES OF PRACTICE.
 - STUB CONNECTIONS TO ADOPTABLE MANHOLES SHALL BE MADE FROM VITRIFIED CLAY AND CONSIST OF TWO ROCKER PIPES LAID AT THE SAME GRADIENT AS THE UP OR DOWNSTREAM PIPE.
 - ALL DOWNPIPES ARE TO BE SEALED, IE CONNECTED DIRECTLY TO THE STORMWATER DRAIN. ACCESS POINTS TO BE PROVIDED 1m ABOVE GROUND LEVEL FOR EXTERNAL RWP'S AND 1m ABOVE FFL FOR INTERNAL RWP'S.
 - GULLY AND CHANNEL DRAIN POSITIONS ARE LIABLE TO AMENDMENT WHEN THE DESIGN LEVELS HAVE BEEN DETERMINED.
 - MODULAR GEOCELLULAR STORAGE/SOAKAWAY SYSTEM TO CONFORM TO CIRIA C793 THE SUDS MANUAL, C680 STRUCTURAL DESIGN OF MODULAR GEOCELLULAR DRAINAGE TANKS & C698 SITE HANDBOOK FOR THE CONSTRUCTION OF SUDS. THE MANUFACTURER SHOULD PROVIDE A COMPLETE SET OF INDEPENDENT TEST RESULTS FOR A PROPOSED SYSTEM INCLUDING, AS A MINIMUM, STRESS/STRAIN CURVES FOR VERTICAL AND LATERAL COMPRESSION, AND CREEP TESTS UNDER SUSTAINED LONG-TERM LOADS. A BBA CERTIFICATE IS NOT INDEPENDENT TEST DATA.
 - ALL REDUNDANT DRAINAGE TO BE ABANDONED ONCE THE CONTRACTOR HAS SATISFIED HIMSELF THAT NO CONNECTIONS REMAIN LIVE. REDUNDANT DRAINAGE TO BE GRUBBED OUT.
 - ALL BELOW GROUND CONCRETE TO ACCORD WITH BS5328:1997/SULPHATE CLASS TBA.
 - IF ANY SUB SOIL DRAINAGE SYSTEMS ARE UNCOVERED DURING THE WORKS CONTACT THE ENGINEER FOR INSTRUCTIONS. GENERALLY SUB SOIL DRAINS AFFECTED ARE TO BE DIVERTED AROUND NEW WORKS AND CONNECTED INTO THE SURFACE WATER DRAINAGE SYSTEM. PIPE DIAMETERS AND GRADIENTS ARE TO BE MAINTAINED.
 - BEFORE COMMENCING CONSTRUCTION THE CONTRACTOR MUST CHECK THE INVERT LEVELS OF EXISTING SEWERS TO WHICH CONNECTIONS ARE MADE. IN ADDITION THE CONTRACTOR MUST LOCATE AND DETERMINE INVERT LEVELS OF THE EXISTING SPURS TO WHICH CONNECTIONS ARE PROPOSED. ADDITIONAL SPUR/MANHOLE CONNECTIONS ARE TO BE AGREED WITH THE RELEVANT ADOPTING AUTHORITY. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER IMMEDIATELY, PRIOR TO CONSTRUCTION.
 - ROAD REINSTATEMENTS ARE TO BE TO THE HIGHWAY AUTHORITY APPROVAL.
 - NO PRIVATE AREAS ARE TO DRAIN ONTO ADOPTABLE AREAS AND VICE VERSA.

KEY TO HEALTH AND SAFETY SYMBOLS

THESE NOTES ARE BASED ON THE USE OF EXPERIENCED AND COMPETENT CONTRACTORS CARRYING OUT THE WORK USING AN APPROVED SAFE METHOD OF WORKING

- INDICATES A RESIDUAL RISK REQUIRING A COMPULSORY ACTION
- INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION
- INDICATES A RESIDUAL RISK AS A WARNING
- INDICATES A RESIDUAL RISK FOR INFORMATION

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Client
PINK ROCK

Architect
KNIGHT ARCHITECTURAL DESIGN

Project title
81C LONDON ROAD,
WATERLOOVILLE,
HAMPSHIRE.

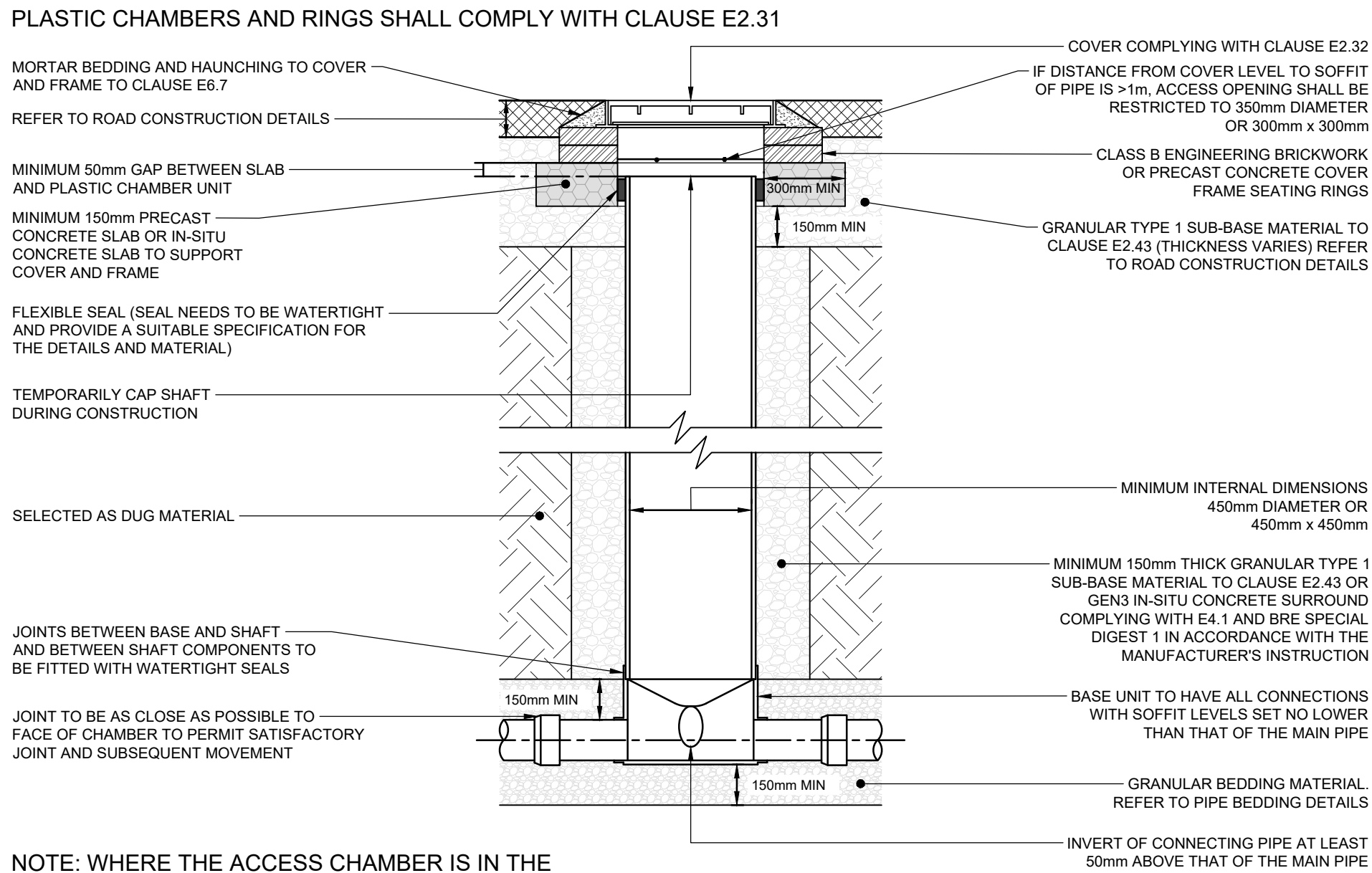
Drawing title
DRAINAGE STRATEGY PLAN

Scale	Paper size	Date	Drawn by	Checked by	Status
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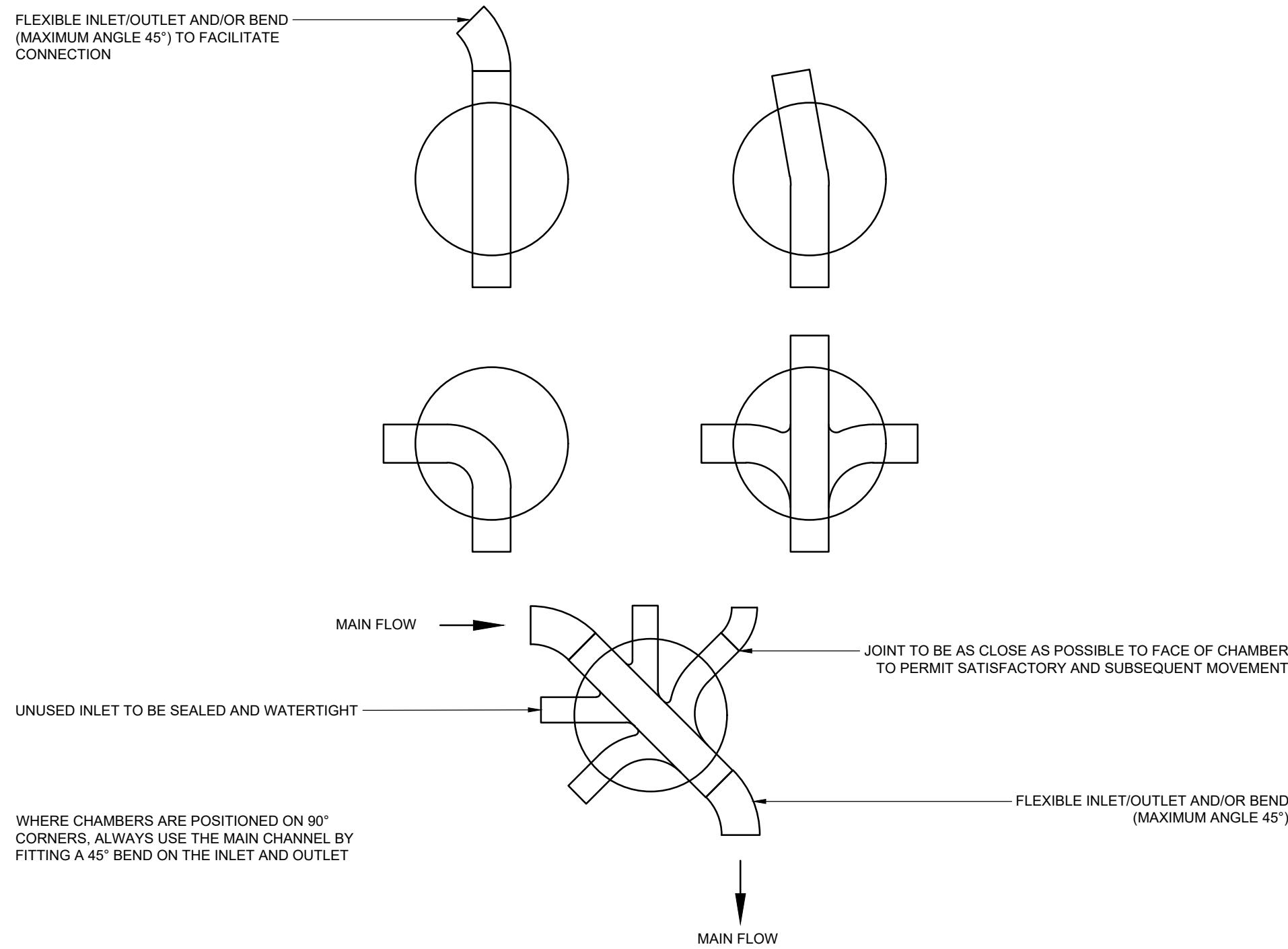
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TYPE D - TYPICAL INSPECTION CHAMBER DETAIL
FIGURE B 18 SEWERAGE SECTOR GUIDANCE APPENDIX C - 'THE CODE'
DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE UP TO 3m
FLEXIBLE MATERIAL CONSTRUCTION FOR USE IN AREAS SUBJECT TO VEHICLE LOADING



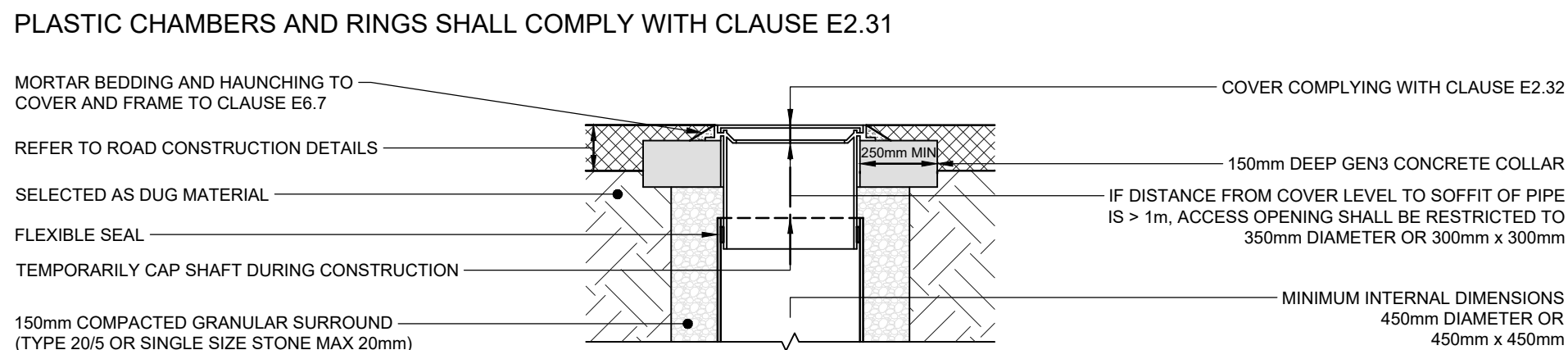
NOTE: WHERE THE ACCESS CHAMBER IS IN THE HIGHWAY (INCLUDING ANY FOOTWAY), THE HIGHWAY AUTHORITY CAN HAVE SPECIFIC REQUIREMENTS.

TYPICAL BASE LAYOUTS FOR TYPE D CHAMBERS
FIGURE B 22 SEWERAGE SECTOR GUIDANCE APPENDIX C - 'THE CODE'

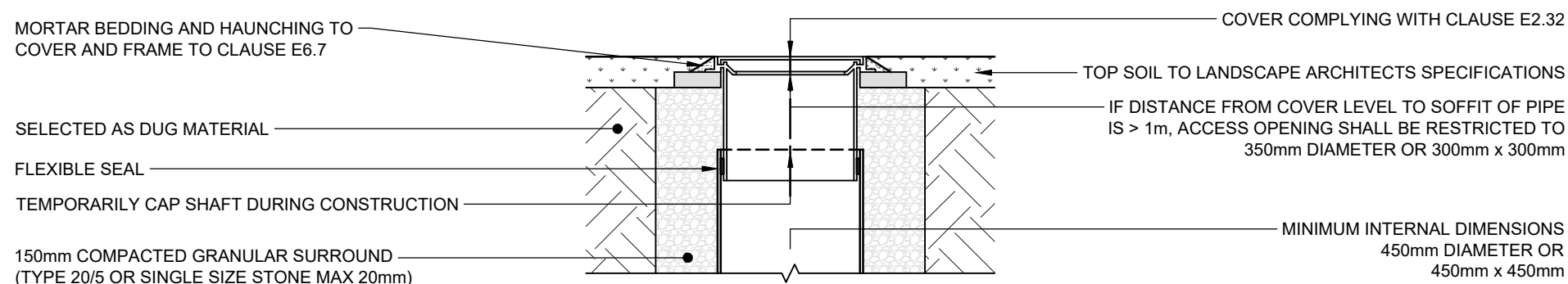


NOTE: WHERE A BEND IS USED IMMEDIATELY OUTSIDE THE MANHOLE, THIS MAY BE USED AS THE ROCKER PIPE

TYPE D - TYPICAL INSPECTION CHAMBER DETAIL
FIGURE B 19 SEWERAGE SECTOR GUIDANCE APPENDIX C - 'THE CODE'
FLEXIBLE MATERIAL CONSTRUCTION ALTERNATIVE TOP DETAILS FOR USE IN AREAS OF LIGHT VEHICLE LOADING OR LANDSCAPED AREAS



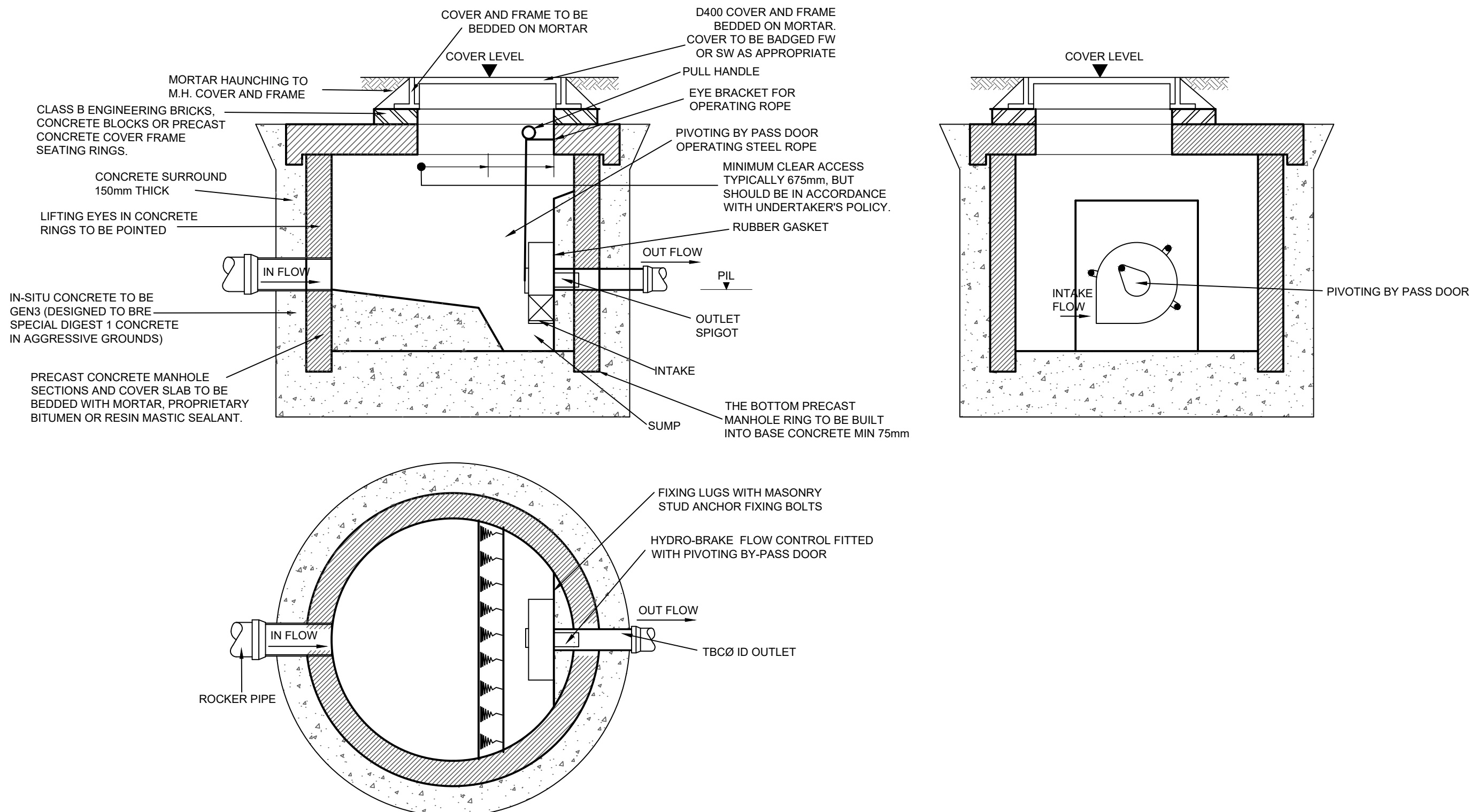
SITED IN DOMESTIC DRIVEWAYS/FOOTWAYS



SITED IN DOMESTIC GARDENS

NOTE: WHERE THE ACCESS CHAMBER IS IN THE HIGHWAY (INCLUDING ANY FOOTWAY), THE HIGHWAY AUTHORITY CAN HAVE SPECIFIC REQUIREMENTS.

TYPICAL FLOW CONTROL MANHOLE
REFER TO MANUFACTURERS SPECIFICATION FOR FLOW CONTROL SIZING, INSTALLATION AND SUMP INFORMATION



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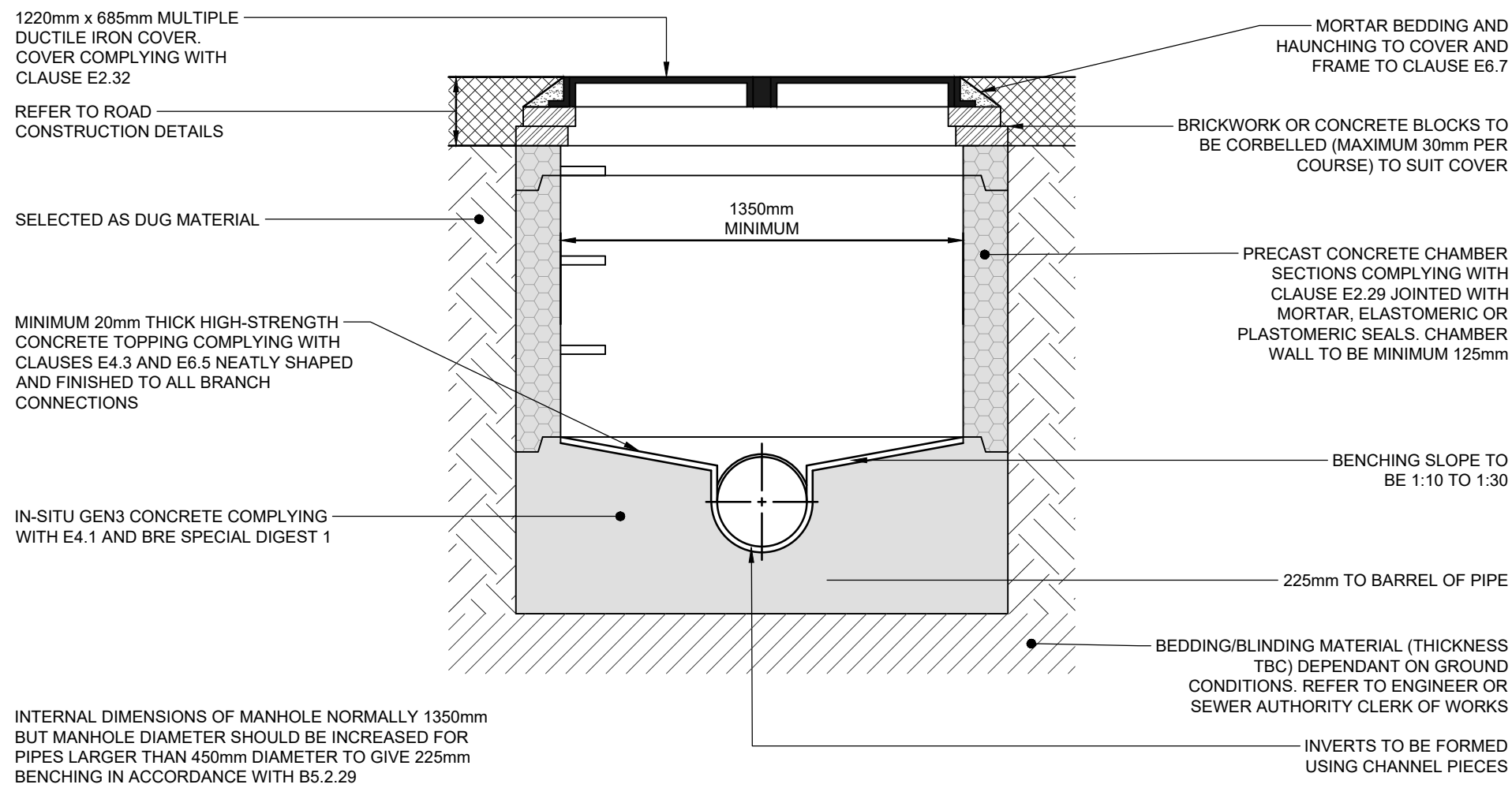
Client
PINK ROCK
Architect
KNIGHT ARCHITECTURAL DESIGN
Project title
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WATERLOOVILLE,
HAMPSHIRE.

Drawing title
DRAINAGE DETAILS
SHEET 1 OF 3

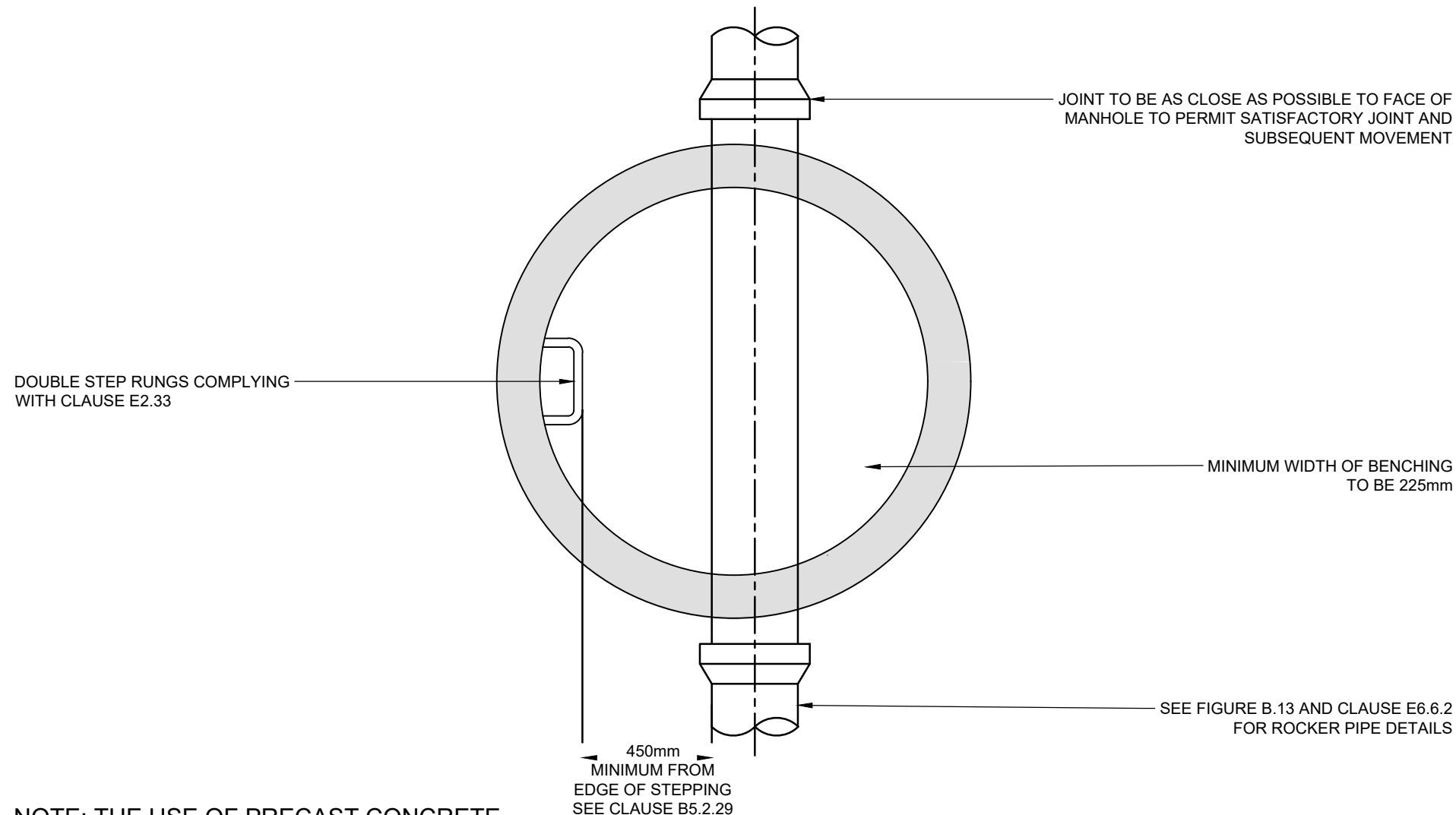
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TYPE C - TYPICAL MANHOLE DETAIL
FIGURE B 15 SEWERAGE SECTOR GUIDANCE APPENDIX C - 'THE CODE'
DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE LESS THAN 1.5m
MAXIMUM PIPE SIZE 450 mm DIAMETER
RIGID MATERIAL CONSTRUCTION

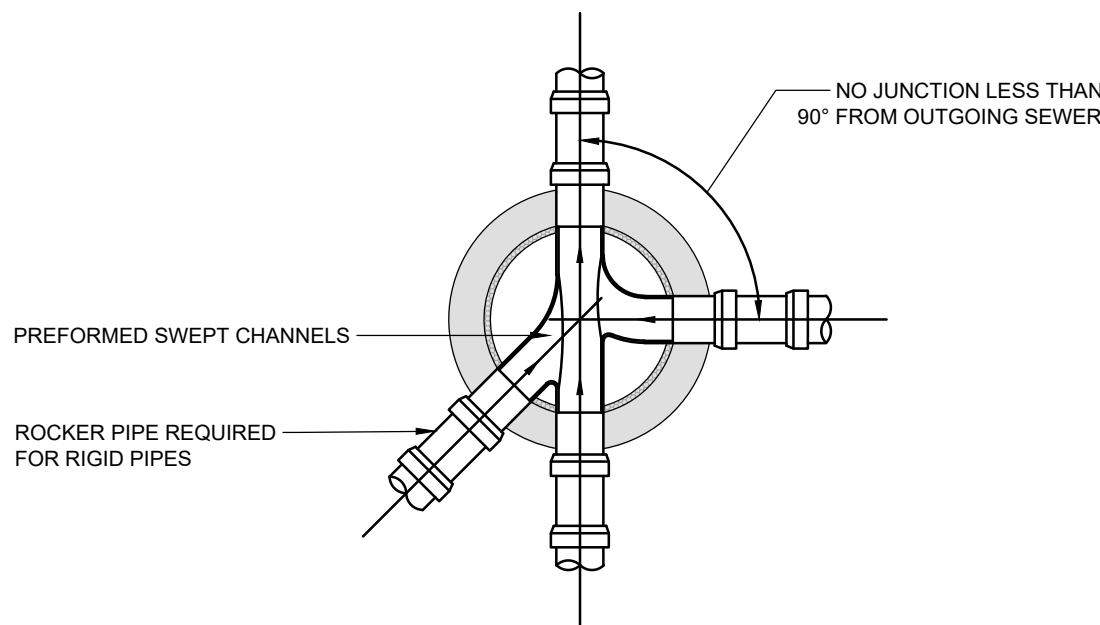


INTERNAL DIMENSIONS OF MANHOLE NORMALLY 1350mm BUT MANHOLE DIAMETER SHOULD BE INCREASED FOR PIPES LARGER THAN 450mm DIAMETER TO GIVE 225mm BENCHING IN ACCORDANCE WITH B5.2.29



NOTE: THE USE OF PRECAST CONCRETE CHAMBER UNITS TO E2.29 WITH 150mm GEN3 IN-SITU CONCRETE COMPLYING WITH E4.1 AND BRE SPECIAL DIGEST 1 ARE PERMITTED IN PLACE OF THE ABOVE CONSTRUCTION METHOD.

TYPICAL ARRANGEMENT OF PIPE JUNCTIONS WITHIN MANHOLES
FIGURE B 13 SEWERAGE SECTOR GUIDANCE APPENDIX C - 'THE CODE'



SECTIONAL PLAN

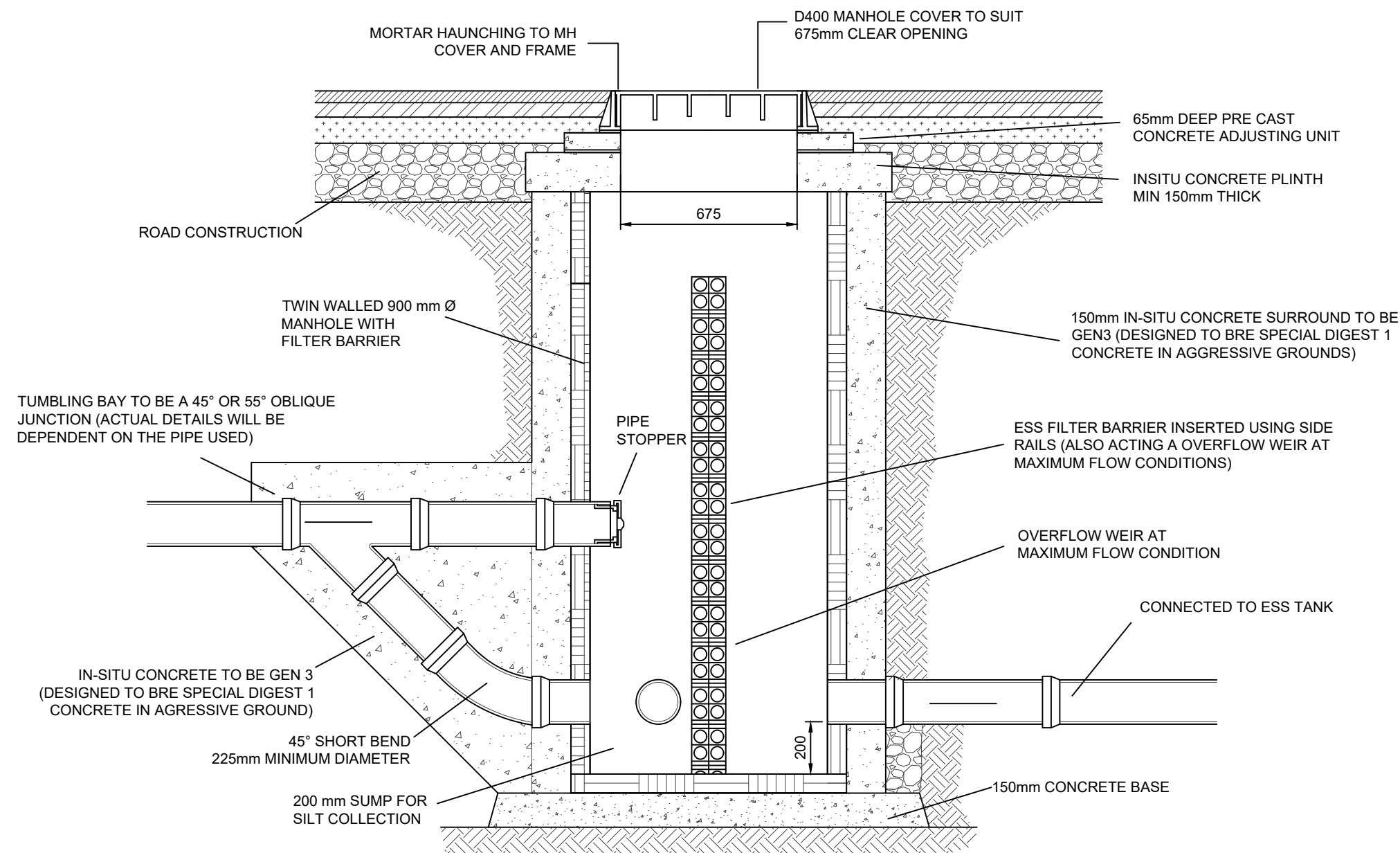
RIGID PIPES BUILT INTO MANHOLE SHOULD HAVE A FLEXIBLE JOINT AS CLOSE AS FEASIBLE TO THE EXTERNAL FACE OF THE STRUCTURE AND THE LENGTH OF THE NEXT ROCKER PIPE SHOULD BE AS SHOWN

NOMINAL DIAMETER (mm)	MAXIMUM EFFECTIVE LENGTH (m)
150 - 600	0.60
601 - 750	1.00
OVER 750	1.25

ALL PIPES ENTERING THE BOTTOM OF THE MANHOLES TO HAVE SOFFITS LEVEL

MANHOLE DIAMETERS	
NOMINAL INTERNAL DIAMETER OF LARGEST PIPE IN MANHOLE (mm)	MINIMUM NOMINAL INTERNAL DIAMETER OF MANHOLE (mm)
< 375	1200
375 - 450	1350
500 - 700	1500
750 - 900	1800
> 900	CONSULT UNDERTAKER

TYPICAL DETAILS OF ESS FILTER PIT / MANHOLE



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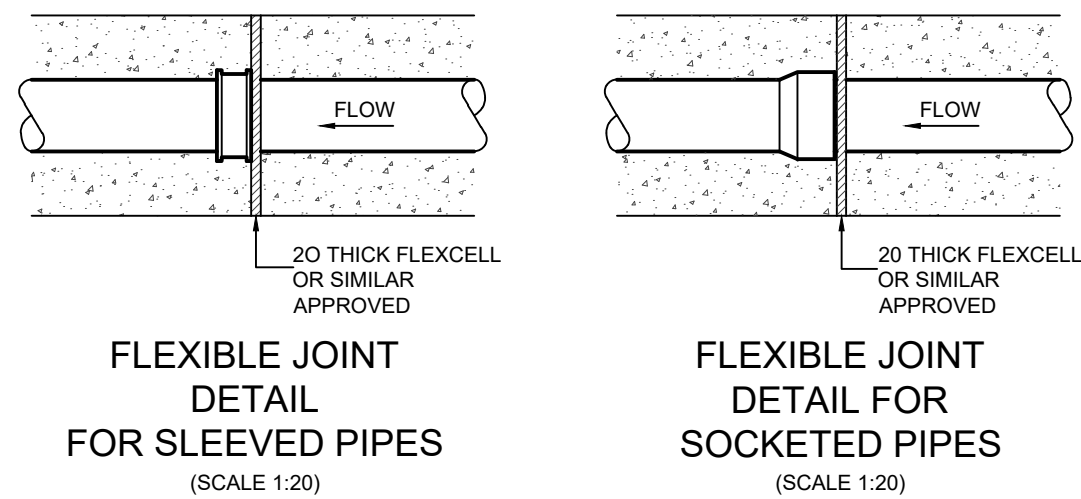
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DRAINAGE DETAILS
SHEET 2 OF 3

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Drawing title
DRAINAGE DETAILS
SHEET 3 OF 3

Name
Project code / No. | Originator | Zone | Level | Type | Role | Number | Revision
AAL319 - AAL-XX-XX-DE-C-0552-P01



Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	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	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)
EX SW REF 0350			48.140	600	600	502.780	142.780	1.640
SW MH 01.00			48.500	1200		516.420	139.610	1.375
SW MH 02.00			48.500	475		524.540	130.810	1.255
SA 01.00	0.053	5.00	47.675	50		526.510	128.610	0.400

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.002	SW MH 01.00	EX SW REF 0350	14.004	0.600	47.125	46.500	0.625	22.4	150	5.43	50.0
1.001	SW MH 02.00	SW MH 01.00	11.974	0.600	47.245	47.125	0.120	99.8	100	5.32	50.0
1.000	SA 01.00	SW MH 02.00	2.953	0.600	47.275	47.245	0.030	98.4	100	5.06	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.002	2.136	37.8	7.2	1.225	1.490	0.053	0.0	44	1.650
1.001	0.770	6.0	7.2	1.155	1.275	0.053	0.0	100	0.790
1.000	0.775	6.1	7.2	0.300	1.155	0.053	0.0	100	0.796

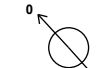
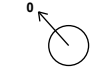
Pipeline Schedule

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)
1.002	14.004	22.4	150	Circular	48.500	47.125	1.225	48.140	46.500	1.490
1.001	11.974	99.8	100	Circular	48.500	47.245	1.155	48.500	47.125	1.275
1.000	2.953	98.4	100	Circular	47.675	47.275	0.300	48.500	47.245	1.155

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Width (mm)	Node Type	MH Type
1.002	SW MH 01.00	1200	Manhole	Adoptable	EX SW REF 0350	600	600	Manhole	Adoptable
1.001	SW MH 02.00	475	Manhole	Adoptable	SW MH 01.00	1200		Manhole	Adoptable
1.000	SA 01.00	50	Manhole	Adoptable	SW MH 02.00	475		Manhole	Adoptable



Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)	
EX SW REF 0350	502.780	142.780	48.140	1.640	600	600		1	1.002	46.500	150
SW MH 01.00	516.420	139.610	48.500	1.375	1200			1	1.001	47.125	100
								0	1.002	47.125	150
SW MH 02.00	524.540	130.810	48.500	1.255	475			1	1.000	47.245	100
								0	1.001	47.245	100
SA 01.00	526.510	128.610	47.675	0.400	50						
								0	1.000	47.275	100

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m ³ /ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	40	0	0

Node SW MH 01.00 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	47.125	Product Number	CTL-SHE-0104-4200-0540-4200
Design Depth (m)	0.540	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	4.2	Min Node Diameter (mm)	1200

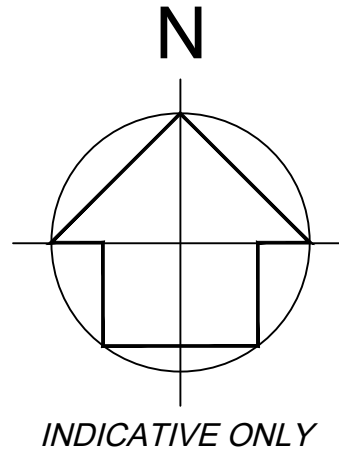
Node SA 01.00 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	1.5	Invert Level (m)	47.275
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	38.5	0.0	0.400	38.5	0.0	0.401	0.0	0.0

Appendix E – Exceedance Routing



DRAINAGE LEGEND

EXISTING FEATURES

- EXISTING SURFACE WATER SEWER AND MANHOLE TO BE RETAINED
- EXISTING FOUL WATER SEWER AND MANHOLE TO BE RETAINED

PROPOSED FEATURES

- SURFACE WATER DRAIN
- RAINWATER PIPE - REFER TO PUBLIC HEALTH ENGINEERS/ARCHITECTS DRAWINGS FOR DETAILS
- CHANNEL DRAIN SYSTEM WITH SUMP UNIT
- STORM WATER MANHOLE TYPE D
INTERNAL DIMENSIONS 450mm MINIMUM
DEPTH FROM COVER TO SOFFIT OF PIPE UP TO 3m
RESTRICT ACCESS TO Ø350 IF DEPTH FROM COVER TO SOFFIT OF PIPE IS LESS THAN 1m
(MAX PIPE DIAMETER 150mm 4500/4750)
(MAX PIPE DIAMETER 225mm 6000)
- STORM WATER FLOW CONTROL MANHOLE
- STORM WATER SOAKAWAY / ATTENUATION TANK
GL = GROUND LEVEL
TOTL = TOP OF TANK LEVEL
BOTL = BOTTOM OF TANK LEVEL
- SURFACE WATER ABOVE GROUND EXCEEDANCE ROUTE

Ø100 SWD 3.48m 1:100 PIPE DETAIL: Ø, LENGTH, GRADIENT,

MANHOLE REFERENCE:
COVER LEVEL
INVERT LEVEL
SUMP INVERT LEVEL
MH TYPE
CATCHPIT MANHOLE (IF REQUIRED)
COVER GRADE

- FOUL WATER DRAIN
- ABOVE GROUND FOUL WATER CONNECTION - REFER TO PUBLIC HEALTH ENGINEERS/ARCHITECTS DRAWINGS FOR DETAILS
- TRAPPED GULLY

FOUL WATER MANHOLE TYPE D
INTERNAL DIMENSIONS 450mm MINIMUM
DEPTH FROM COVER TO SOFFIT OF PIPE UP TO 3m
RESTRICT ACCESS TO Ø350 IF DEPTH FROM COVER TO SOFFIT OF PIPE IS LESS THAN 1m
(MAX PIPE DIAMETER 150mm)

Ø100 FWD 3.48m 1:80 PIPE DETAIL: Ø, LENGTH, GRADIENT,

MANHOLE REFERENCE:
COVER LEVEL
INVERT LEVEL
MH TYPE
D400

MISCELLANEOUS LEGEND

FFL: XX.XXX ARCHITECTURAL FINISHED FLOOR LEVEL

GENERAL NOTES

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND DETAILS.
- ALL FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO SCALED DIMENSIONS.
- ANY DISCREPANCIES BETWEEN THIS DRAWING AND OTHER INFORMATION IS TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF THE WORKS ON SITE.
- THE MAIN CONTRACTOR SHALL BE RESPONSIBLE FOR THE SETTING OUT AND ACCURACY OF ALL DIMENSIONS.
- THE CONTRACTOR IS TO ENSURE THE STABILITY AND STRUCTURAL INTEGRITY OF THE EXISTING PROPERTY AT ALL TIMES DURING WORKS AND IS TO BE RESPONSIBLE FOR ALL PROPPING AND SHORING AS REQUIRED.
- MAIN CONTRACTOR TO PROVIDE AND FIX SUITABLE BRACING AND PROPPING FOR ALL ELEMENTS IN THE TEMPORARY CONDITION DURING CONSTRUCTION STAGE, SUCH AS TO ENSURE STRUCTURE STABILITY AT ALL TIMES.
- IT IS THE CONTRACTORS SOLE RESPONSIBILITY FOR ASCERTAINING SAFE DISPOSAL OF ANY OFF-SITE EXCAVATED SPOIL. NO CLAIM RESULTING FROM ABNORMAL TIP REQUIREMENTS WILL BE ENTERTAINED.

DRAINAGE NOTES

- ALL PIPES TO BE ADOPTED, OR CONNECTING TO ADOPTED SEWERS, AND/OR SITUATED UNDER HIGHWAY TO BE VITRIFIED CLAY TO BS EN 295 & BS65 (SWS ONLY), OR CONCRETE PIPES TO BE EN 1916 & BS EN 1916 PART 1, OR THERMOPLASTIC STRUCTURED WALL SEWER PIPES TO WIS 4-35-01 (CLASS 8kN/SOM) AND BE CAPABLE OF WITHSTANDING 4000 PSI JETTING PRESSURE. PRIVATE PIPES MAY BE VC OR PLASTIC.
- FOR CONSTRUCTION DETAILS REFER TO THE RELEVANT ARCH ASSOCIATES DRAWING NUMBERS LISTED ON THE DRAWING ISSUE SHEET.
- ADOPTABLE HIGHWAY WORKS ARE TO BE IN ACCORDANCE WITH LOCAL AUTHORITY DESIGN GUIDANCE.
- ANY WORKS ASSOCIATED WITH THE HIGHWAY/EXTERNAL WORKS INCLUDING HIGHWAY DRAINAGE, SHALL BE IN ACCORDANCE WITH THE HIGHWAYS AGENCY 'MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS, VOL 1' (MCHW), UNLESS OTHERWISE SPECIFIED.
- ALL ADOPTABLE SEWERS WITH LESS THAN 1.20m OF COVER WHEN LAID BENEATH THE ROADS, OR 0.90m OF COVER IN OTHER AREAS, SHALL HAVE CONCRETE PROTECTION IN ACCORDANCE WITH EITHER OF THE DETAILS SHOWN ON THE STANDARD DRAWING PROVIDED.
- ALL DRAINAGE WORKS SHOULD COMMENCE AT THE PROPOSED DOWNSTREAM CONNECTION POINT, THE WORKS CONTINUING UPSTREAM FOLLOWING CONFIRMATION OF THE TIE-IN INVERT LEVELS TO THE ENGINEER. CONNECTIONS TO MANHOLES OR LARGER SIZED PIPES ETC. SHOULD BE SOFFIT TO SOFFIT UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER, IF THIS IS NOT POSSIBLE INFORM THE ENGINEER IMMEDIATELY.
- COVER LEVELS SHOWN ARE APPROXIMATE. COVERS AND FRAMES SHALL BE SET TO FINISHED GROUND LEVELS AND FALLS.
- ROAD GULLY PIPES ARE TO BE 150mm DIA. WITH CONCRETE SURROUND AND FLEXIBLE JOINTS, ALL OTHER UN-REFERENCED PIPES ARE ASSUMED TO BE 100mm DIA.
- FW MIN GRADIENT - 1 IN 40 (100 DIA) NO WC'S CONNECTED
- FW MIN GRADIENT - 1 IN 150 (150 DIA) MIN 5 WC'S CONNECTED
- SW MIN GRADIENT - 1 IN 100 (100 DIA)
- SW MIN GRADIENT - 1 IN 150 (150 DIA)
- ALL GULLIES SHALL BE FITTED WITH GRADE D400 GRATINGS AND FRAMES TO BS EN124, UNLESS OTHERWISE STATED.
- IN ORDER TO MAINTAIN THE SATISFACTORY FUNCTIONING OF SURFACE WATER SEWERS, ALL ROAD AND YARD GULLIES ARE TO BE "TRAPPED".
- ALL NON ADOPTABLE LATERALS BENEATH THE HIGHWAY SHALL BE BACK FILLED WITH A TYPE 1 GRANULAR MATERIAL AS CL.803 (MCHW) APPROVED BY THE ENGINEER.
- ALL PRIVATE DRAINAGE TO BE IN ACCORDANCE WITH THE BUILDING REGULATIONS APPROVED DOCUMENT PART-H, AND TO THE SATISFACTION OF THE BUILDING CONTROL INSPECTOR.
- WHERE DRAINS PASS THROUGH FOUNDATIONS OR CONNECT TO MANHOLES, A FLEXIBLE PIPE JOINT SHOULD BE PROVIDED TO FORM A ROCKER PIPE IN ACCORDANCE WITH THE STANDARD DETAIL PROVIDED..

NOTES

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- SHALLOW PRIVATE DRAINS MAY REQUIRE PROTECTION USING CLASS 'Z' CONCRETE SURROUND OR PAVING SLABS BRIDGING THE TRENCH SUBJECT TO THE NHBC INSPECTOR'S REQUIREMENTS.
 - WHERE DRAINAGE RUNS PASS CLOSE TO BUILDINGS OR THEIR INVERT LEVELS ARE BELOW FOUNDATION LEVEL, THEN THE TRENCHES ARE TO BE BACK FILLED IN ACCORDANCE WITH THE STANDARD DETAIL PROVIDED.
 - REFERENCE SHOULD BE MADE TO THE STRUCTURAL ENGINEERS DETAILS FOR ALL ASPECTS OF FOUNDATION DESIGN AND CONSTRUCTION.
 - THE CONTRACTOR IS TO KEEP A RECORD OF ANY VARIATIONS MADE ON SITE, INCLUDING THE RELOCATION OF SEWERS OR DRAINS, SO THAT AN AS CONSTRUCTED DRAWING CAN BE PREPARED UPON COMPLETION OF THE PROJECT.
 - THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE. NO DIMENSIONS ARE TO BE SCALED FROM THESE DRAWINGS.
 - IT IS THE CONTRACTORS/SUBCONTRACTORS RESPONSIBILITY TO ENSURE COMPLIANCE WITH THE CURRENT BUILDING REGULATIONS AND CODES OF PRACTICE.
 - STUB CONNECTIONS TO ADOPTABLE MANHOLES SHALL BE MADE FROM VITRIFIED CLAY AND CONSIST OF TWO ROCKER PIPES LAID AT THE SAME GRADIENT AS THE UP OR DOWNSTREAM PIPE.
 - ALL DOWNPIPES ARE TO BE SEALED, IE CONNECTED DIRECTLY TO THE STORMWATER DRAIN. ACCESS POINTS TO BE PROVIDED 1m ABOVE GROUND LEVEL FOR EXTERNAL RWP'S AND 1m ABOVE FFL FOR INTERNAL RWP'S.
 - GULLY AND CHANNEL DRAIN POSITIONS ARE LIABLE TO AMENDMENT WHEN THE DESIGN LEVELS HAVE BEEN DETERMINED.
 - MODULAR GEOCELLULAR STORAGE/SOAKAWAY SYSTEM TO CONFORM TO CIRIA C793 THE SUDS MANUAL, C680 STRUCTURAL DESIGN OF MODULAR GEOCELLULAR DRAINAGE TANKS & C698 SITE HANDBOOK FOR THE CONSTRUCTION OF SUDS. THE MANUFACTURER SHOULD PROVIDE A COMPLETE SET OF INDEPENDENT TEST RESULTS FOR A PROPOSED SYSTEM INCLUDING, AS A MINIMUM, STRESS/STRAIN CURVES FOR VERTICAL AND LATERAL COMPRESSION, AND CREEP TESTS UNDER SUSTAINED LONG-TERM LOADS. A BBA CERTIFICATE IS NOT INDEPENDENT TEST DATA.
 - ALL REDUNDANT DRAINAGE TO BE ABANDONED ONCE THE CONTRACTOR HAS SATISFIED HIMSELF THAT NO CONNECTIONS REMAIN LIVE. REDUNDANT DRAINAGE TO BE GRUBBED OUT.
 - ALL BELOW GROUND CONCRETE TO ACCORD WITH BS5328:1997/SULPHATE CLASS TBA.
 - IF ANY SUB SOIL DRAINAGE SYSTEMS ARE UNCOVERED DURING THE WORKS CONTACT THE ENGINEER FOR INSTRUCTIONS. GENERALLY SUB SOIL DRAINS AFFECTED ARE TO BE DIVERTED AROUND NEW WORKS AND CONNECTED INTO THE SURFACE WATER DRAINAGE SYSTEM. PIPE DIAMETERS AND GRADIENTS ARE TO BE MAINTAINED.
 - BEFORE COMMENCING CONSTRUCTION THE CONTRACTOR MUST CHECK THE INVERT LEVELS OF EXISTING SEWERS TO WHICH CONNECTIONS ARE MADE. IN ADDITION THE CONTRACTOR MUST LOCATE AND DETERMINE INVERT LEVELS OF THE EXISTING SPURS TO WHICH CONNECTIONS ARE PROPOSED. ADDITIONAL SPUR/MANHOLE CONNECTIONS ARE TO BE AGREED WITH THE RELEVANT ADOPTING AUTHORITY. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER IMMEDIATELY, PRIOR TO CONSTRUCTION.
 - ROAD REINSTATEMENTS ARE TO BE TO THE HIGHWAY AUTHORITY APPROVAL.
 - NO PRIVATE AREAS ARE TO DRAIN ONTO ADOPTABLE AREAS AND VICE VERSA.

KEY TO HEALTH AND SAFETY SYMBOLS

THESE NOTES ARE BASED ON THE USE OF EXPERIENCED AND COMPETENT CONTRACTORS CARRYING OUT THE WORK USING AN APPROVED SAFE METHOD OF WORKING

- INDICATES A RESIDUAL RISK REQUIRING A COMPULSORY ACTION
- INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION
- INDICATES A RESIDUAL RISK AS A WARNING
- INDICATES A RESIDUAL RISK FOR INFORMATION

P01	24.05.23	PRELIMINARY ISSUE FOR COMMENT	BLB
Rev.	Date	Description	By



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Client
PINK ROCK
Architect
KNIGHT ARCHITECTURAL DESIGN

Project title
81C LONDON ROAD,
WATERLOOVILLE,
HAMPSHIRE.

Drawing title
EXCEEDANCE ROUTING PLAN

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**ARCH
ASSOCIATES**

Appendix F – Maintenance Requirements



**ARCH
ASSOCIATES**

DRAINAGE MAINTENANCE PLAN



81C LONDON ROAD
WATERLOOVILLE
PO7 7EL



**ARCH
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DRAINAGE MAINTENANCE PLAN

for

81C LONDON ROAD
WATERLOOVILLE
PO7 7EL

Client:

Pink Rock

ISSUE		A	B	C
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1.0 Executive Summary

Arch Associates has been appointed by Pink Rock to prepare the detailed foul and surface water drainage design for the proposed development of 13 No. flats, across two buildings at 81C London Road, Waterloooville.

The 0.053 hectare site currently comprises of a two-storey Class E building with rear courtyard and single storey garage. The building can be accessed via the main entrance off London Road as well as via a rear entrance from Swiss Road into the rear courtyard.

For the front building situated on London Road, it is proposed to retain the retail usage on the ground floor of the existing building, replacing with two Class E units. This building is proposed to be five-storey with a mixture of one and two bed dwellings from first floor up.

The rear building is proposed to be four-storey with a mixture of one and two bed dwellings. A vehicular access route is proposed to be included in the ground floor level configuration of this building.

The proposed surface water strategy consists of a gravity drainage system which will connect to an existing 300mm Southern Water public surface water sewer. The surface water run-off from the development will be restricted to a flow rate of 4.2 l/s and attenuated up to the 1:100+40% storm return period. The proposed surface water strategy is discussed in more detail in Section 5.2.

The proposed foul water drainage strategy is designed to connect to an existing 150mm Southern Water public foul water sewer. The proposed foul water drainage strategy is discussed in more detail in Section 5.3 of this report.

2.0 An introduction to sustainable drainage systems or SuDS

SuDS are an environmentally friendly approach to managing rainfall that uses landscape features to deal with surface water. SuDS aim to:

- Control the flow, volume and frequency of water leaving a development area
- Prevent pollution by intercepting silt and cleaning runoff from hard surfaces
- Provide attractive surroundings for the community
- Create opportunities for wildlife

3.0 SuDS on Site

SuDS at this development have been designed to prevent flooding of both the proposed properties, neighbouring properties, and external hard landscaping.

Surface water run-off from the proposed building and hard paved areas will be discharged to a new attenuation tank with a gravity connection to the surface water sewer.

4.0 SuDS Maintenance Schedule

General Maintenance

In addition to the maintenance of specific SuDS features, such as attenuation tanks, the following table outlines general maintenance requirement of the surface water system.

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Remove sediment & debris from pre-treatment devices & floor of inspection chambers	Annually
	Cleaning of any gutters & any filters on downpipes	Annually



	Trimming and roots that may be causing blockages	Annually (or as required)
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually

Attenuation Tank

Maintenance Schedule	Required 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)	Monthly
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial Actions	Repair/rehabilitate inlets, outlets, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good conditions and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Road Gullies & Channel Drains

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Remove sediment & debris from grating and empty silt trap.	Monthly in the first year and then as required based on inspections
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Inspect for evidence of poor operation	Six monthly

5.0 SuDS Maintenance Responsibility

The maintenance of the SuDS features, and drainage generally will be funded by the management company. The management company will formally appoint a drainage company (under a service agreement) to inspect and maintain the apparatus at the required frequency.

6.0 Foul Drainage on Site

Foul water drainage refers to grey water and sewage and potentially wash-down water from plant rooms and bin stores or waste storage areas.

The foul drainage system on site comprises a piped network that discharges by gravity into the existing public foul sewer located along the northern boundary of the site.

7.0 Foul Drainage Maintenance

The foul drainage system has been designed in accordance with the relevant codes of practice and should achieve self-cleansing velocity with the anticipated foul water flows. Maintenance of the system should therefore be minimal, but blockages may occur with

improper use, such as inappropriate objects being flushed down toilets, in which case rodding or jetting may be required. This work should be carried out on an ad hoc basis by a specialist contractor.