

JDL Consultants Limited Civil and Structural Consulting Engineers

27A Osprey Court, Hawkfield Way,
Hawkfield Business Park, Bristol, BS14 0BB

T 01275 372154
E jdj@jdlconsultants.co.uk

SUDS STRATEGY

*MELKSHAM COMMUNITY HOSPITAL, SPA ROAD,
MELKSHAM, SN12 7NZ*



16th January 2026

Contents

	Page
1. Introduction	3
1.1. Planning comments	
2. Site Description	4
2.1. Site location & description	
2.2. Geology & Hydrogeology	
3. Site Constraints	4
3.1. Flood Risk	
3.2. Adjacent Development	
3.3. Conclusion	
4. SuDs Strategy	5
4.1. Background	
4.2. Proposed surface water drainage	
4.3. Exceedance	
4.4. Water Quality	
4.5. Maintenance	
4.6. Construction Stage	
5. Foul	10
6. Conclusions	10

Appendices:

Appendix A: Topographical Survey

Appendix B: Drawings

Appendix C: CCTV Survey

Appendix D: Calculations

1. Introduction

JDL have been appointed to undertake a SuDS design for the proposed redevelopment of the entrance hardstandings and car park for Melksham Hospital. The appended drainage layout drawings have been submitted for planning without this reporting or calculations and therefore this report is intended to give the background and detail, and respond to the comment noted below which were provided by Wiltshire on the plans only submission.

1.1. Planning comments

The planning conditions related to the SuDS drainage are as follows:

No objection subject to the following conditions:

It is noted the applicant has provided a Drainage Layout drawing, however the applicant must provide further details related to the drainage strategy:

- *Existing brownfield runoff rates for the site (National Standards for SuDS: Standard 1: runoff destinations).*
- *Post development runoff rates. These must also be in accordance with Wiltshire Council's betterment policy update, which can be found here. (National Standards for SuDS: Standard 1: runoff destinations).*
- *The strategy mimics the existing drainage characteristics of the site by retaining and utilising any existing drainage features (National Standards for SuDS: Standard 1: runoff destinations).*
- *SuDS source control measures to manage water quantity and maintain water quality will be implemented wherever possible, and throughout the management train, so the development is not reliant upon large attenuation features close to the points of discharge (National Standards for SuDS: Standard 2: interception).*
- *Exceedance routes that minimise the risks to people and property (National Standards for SuDS: Standard 3: management of extreme rainfall and flooding).*
- *If attenuation tanks are proposed that an allowance for reduced attenuation volume due to silt ingress (as per Section 21.9.9 of the SuDS Manual CIRIA C753 & Standard 3: management of extreme rainfall and flooding).*
- *Calculations which demonstrate that the proposed drainage design provides a sufficient level of water treatment (National Standards for SuDS: Standard 4: water quality).*
- *A clearly labelled drainage layout plan showing the pipe networks and any attenuation ponds. The plan should show any pipe node numbers referred to within the drainage calculations (National Standards for SuDS: Standard 7: design of drainage for construction, operation, maintenance, decommissioning and structural integrity).*
- *The applicant must provide the hydraulic model which relates to the Drainage Layout drawing.*
- *The applicant must submit clear arrangements for the ownership and ongoing maintenance of the proposed drainage system (including SuDS features) over the lifetime of the development (National Standards for SuDS: Standard 7: design of drainage for construction, operation, maintenance, decommissioning and structural integrity).*

- *The applicant must submit a construction management plan to demonstrate how flood risk to people & property, and pollution to groundwater, will be mitigated throughout construction (National Standards for SuDS: Standard 7: design of drainage for construction, operation, maintenance, decommissioning and structural integrity).*

2. Site Description

2.1. Site location & description

The site is located to the south east of Melksham, accessed from Spa Road. The area of the site subject to this application is the roundabout style turning area and parking in the centre of the community hospital.

The buildings are an older style hospital, generally single storey, with the access road formed around a general circular green space with planting beds and a flag pole, and parking spaces on the outside of the circle in marked in a semi-radial style.

2.2. Geology & Hydrogeology

BGS geological mapping indicates that the site is located on an area of head deposits of clay and silt, over bedrock of mudstone – Oxford clay formation.

The Red Rock Geoscience broadly confirms this with findings of topsoil and made-ground (depending on the location tested) over Oxford clay mudstone. Quoting from section 5.3:

“Three in-situ percolation tests were attempted, however due to high levels of perched water in two of the monitoring well, only 1 test was able to be completed. Testing in WS04 showed a drainage rate of 7.06e-8. In view of the relatively slow rate of percolation, soakaways are unlikely to form an effective method for surface water drainage for this site.”

3. Site Constraints

3.1. Flood Risk

The Gov.uk website contains mapping showing flood risk from various sources. This notes that the site is in Flood Zone 1 with areas of Zone 2 and 3 to the only to the south away from the current built up areas of the hospital. Looking at climate change (2070 to 2125) the flooding extents get larger, but the site is still within Flood Zone 1.

Surface water flood risk does show some areas of low chance flood risk around the existing hospital site, but this mapping would not take into consideration existing formalised drainage which exists.

Groundwater and reservoir flood risk are also both noted as unlikely in this area.

3.2. Adjacent development

There are no know adjacent developments which need to be taken into account with the proposed development.

3.3. Conclusion

There are considerations of the existing drainage network to ensure there is suitable drainage, but this is covered by the SuDs strategy below. This will also need to consider the areas of the site outside of the direct development which may be affected by the proposals.

Otherwise there are no additional considerations to take into account in the proposals.

4. SuDs Strategy

4.1. Existing drainage

As the proposed development is a reconfiguration of the hardstanding and parking only this report will only comment on the existing surface water. Whilst there is existing foul drainage present this is taken to be a constraint on the proposed design and not to be altered where possible to minimise disruption to the hospital.

A CCTV has been undertaken of the drainage in the local area of the hospital, and does not cover the full site. This shows separate systems of foul and surface water drainage, with the surface water over the location of the site generally runs from north east to south west with lines branching in from the north west and south east. This run continues to the south west under the existing building and the ultimate outfall has not been confirmed.

There are other areas of surface water drainage present such as the courtyard to the north east, and RWPs along the eastern edge of the development boundary with other outfalls to the east which have not been confirmed.

As the existing drainage network is likely to be taking areas outside of the survey extents the capacity of the existing drainage has not been modelled as this would be unlikely to represent the current functioning without surveying the whole campus. Therefore, the existing area of drained hardstanding which overlaps with the proposals has been calculated as 1,086m² and is shown in Appendix B.

The potential catchment generation of this area has been calculated using the Rational Method with an assumed 1 in 2 year peak rainfall intensity of 50mm\hr. This would give a peak discharge rate of 15.2\l/s.

Taking consideration of Wiltshire's design standards, the greenfield discharge rates for the equivalent drained area of 0.136ha has been determined using FEH22 rainfall parameters with the rates as follows:

- Q1 = 0.5 l/s
- Qbar = 0.7 l/s
- Q30 = 1.3 l/s
- Q100 = 1.6 l/s

These calculations are included in the Causeway Flow results in Appendix D.

4.2. Proposed surface water drainage

In accordance with best practice, the proposed drainage system will not increase the likelihood of flooding to the site and surrounding area over its pre-development condition.

Due to the nature of the development there are limited options for the proposed drainage. As noted in the intrusive geotechnical investigations the potential for soakaways has been ruled out as not viable. As the area is surrounded by existing buildings and hardstandings there is no reasonably practicable option for a connection to a watercourse. Therefore, re-using the existing surface water drain is the most suitable option for an outfall.

For the discharge rate there is a desire within the Wiltshire Council's betterment policy to discharge as close to Greenfield rates as possible across the full range of storms up to, and including, the 1 in 100 year event. However, where this cannot be achieved there should be a betterment of at least 30%.

Climate change has been included based on the Avon Bristol and North Somerset Streams Management Catchment peak rainfall allowances which are 35% for the 1 in 30, and 40% for the 1 in 100 based on the Upper end allowance for the 2050s epoch. The 2070s epoch has been included in the calculations for completeness, and partially to demonstrate the impacts of exceedance. The shorter design life for this development is appropriate based on hardstandings only having a maximum design life of 20-25 years, and on the age of the adjacent existing buildings which the hardstanding serves.

A significant constraint on the new design is the depth of the existing surface water outfall which is not deep enough to accommodate traditional geocellular units, and there is not sufficient space for surface storage features as the development is in the middle of an existing development. Therefore, the maximum volume which can be provided is in a combination of permeable subbases and subbase replacement (specialist units with the structural properties for being located in shallow areas of construction) geocellular storage tanks.

Due to the regular access by ambulances which are typically high axle loading vehicles the aisles will be impermeable, but the car parking bays will be fully permeable. With the impermeable ground these have been included in the contributing area as they will be drained through the proposed SuDs network. Again, due to vehicle loading the subbase replacement tanks will also be limited to the car parking bays only.

The existing surface water 'spine' is through the middle of the proposed development and again due to the relatively shallow depth the proposed surface water needs to be split into two networks with an eastern and western component. Therefore, each side will need its own flow control which will be an orifice plate with proprietary leaf/debris filter to mitigate the risk of blockage from small openings.

Through iterating different flow combinations the maximum restriction in discharge rates which can be achieved is 1.6 l/s from the east and 0.4 l/s from the west giving a total discharge rate from the site of 2.0 l/s for the 1 in 100 year climate change event. The use of orifice plates also means there is a range of discharge rates from 1.0 l/s for the 1 in 1 year event up to the 1 in 100 year event as shown in the calculations in Appendix D. Whilst this discharge rate is higher than the equivalent Greenfield rate it is significantly lower than the 1 in 2 year brownfield rate.

Whilst silt ingress is noted in the Wiltshire standards for the dilapidation of attenuation tanks the form of connectivity used are filter drains, and as such there is no open direct connection to

the tanks whereby silt could enter and reduce the available storage. As such no dilapidation needs to be considered.

Filter drains have also been noted to underdrain the hardstandings, and as a means of hydraulic connectivity to the attenuation tanks, to provide water quality to the runoff.

The proposed drainage layout is shown in Appendix B, and the proposed calculations in Appendix D.

All new surface water drainage connections will be designed and constructed in accordance with Building Regulations Part H.

4.3. Exceedance

The proposed development attenuates all flows below ground up to, and including, the 1 in 100 year plus climate change event. Any exceedance of the below ground network would surcharge out of the lowest level of the site which is away from the surrounding buildings. Where an exceedance event occurs, overland flows will follow the fall arrows as shown on the proposed levels drawing within Appendix B.

There is not an existing overland flow route away from the area of the development in the existing case, and the surrounding buildings prevent the creation of the new route. Therefore, the car parking and hardstanding has been designed as a 'bowl' with low points around the parking spaces 19 and 23 in the centre of the site. This would allow for the storage of water above ground in shallow ponding without flows which adversely affect buildings or the access and egress to the buildings.

4.4. Water Quality

The water quality from the site needs to be taken into consideration with the nature of the proposed redevelopment. This is not a full new build project, it is a reconfiguration of an existing hardstanding and parking area at the front of an existing hospital where there are significant constraints on the outfall based on the existing geometry.

Therefore, the existing hardstandings are for vehicular use with a discharge without any water quality features to the surface water drain. The development proposals do not increase the number of vehicular movements, but are a reconfiguration of the existing space and use. Therefore, there are some gullies which have been moved due to realignment of kerb lines, and these now flow through filter drains prior to outfalling. Assessing the layout using the Simple Index Approach from the SuDs Manual (C753) whilst the development is on a hospital site it is a small community hospital with no minor injuries unit or A&E and therefore vehicle movements are more akin to non-residential parking with infrequent change. For the occasional gully connections the provision of filter drains only are sufficient on metals and hydrocarbons, but very slightly under on the TSS provision. Generally the areas drain through permeable paving and these are more than sufficient as a single feature even though they additionally drain through filter drains as a secondary treatment stage.

Whilst some small areas are getting a lower than desired TSS treatment the provision of water quality is significantly better than the existing provision, and this is a reconfiguration of an existing space, no increase in use, and the existing shallow depth of the drainage excludes the inclusion of any proprietary water quality features such as an interceptor. Therefore whilst it would be preferable to provide additional features it is not reasonably practicable given the site constraints and nature of the development.

4.5. Maintenance

All proposed surface water drainage within the development are the responsibility of the NHS trust\landowner.

The SuDs attenuation features will be designed to store water and attenuate it over a long period of time, however if the attenuation is still full, or partly full, 48 hours after the end of a rainfall event this should be investigated immediately as it may indicate a failure, or partial failure, within the network.

Action	Frequency	Responsibility
As Built. Once construction of drainage network has been completed a CCTV survey should be undertaken to detect and defects which should be rectified to the original design.	Once	Main contractor
Pipe and chambers. Visual inspection of chambers, and clearance of any deleterious materials. Inspection of inlet and outlet. If any blockages are detected an inspection of the connecting pipework should be undertaken to determine potential causes.	Annually (or directly following an extreme storm event) Remedial action	Building owner
Flow Control (orifice). Visual inspection of the chamber. Check operation and condition of filter\bypass. Cleansing of sump and removal of silt to be undertaken as required.	Quarterly (or directly following an extreme storm event)	Building owner
Permeable subbase. Visual inspection of connecting chamber (only need to inspect one per extent of permeable subbase), cleansing of sump and removal of silt to be undertaken as required.	Biannually (or directly following an extreme storm event) Remedial action	Building owner

Inspection of inlets\outlets to ensure no debris build-up and removal of any deleterious materials. Where the subbase is not functioning correctly this may indicate an issue with the connecting filter drain which should then be replaced. Ponding on surface without high water in chambers may indicate upper geotextile is clogged and needs to be replaced.	Remedial action	
Attenuation Tank. Visual inspection of upstream silt trap\catchpit chamber, cleansing of sump and removal of silt to be undertaken as required. Where the tank is not functioning correctly this may indicate an issue with the connecting rainwater diffuser units which should then be replaced.	Quarterly (or directly following an extreme storm event) Remedial action	Management company

4.6. Construction Stage

The proposed development is the re-working of existing hardstanding where existing drainage is present. The locations of the existing surface water and foul drainage should be clearly communicated during the groundworks to avoid accidental damage potentially causing flooding issues.

The new drainage should be constructed from the downstream end upstream to ensure the connectivity, with the attenuation tanks installed as soon as possible during the works noting the trafficking requirements of the tanks from the specific supplier. The flow control chambers can be installed early in the process by the actual orifice controls only installed once the attenuation is fully constructed, again to avoid flooding.

Where there is ponding or the generation of silty water during the works this should be treated via a 'silt-buster' or similar water quality plant prior to discharging to the existing surface water drainage, as there is limited space within the site to provide a stilling basin.

Spill kits should be available at all times during the works for any escape of fuels, with the Environment Agency notified if any spills occur.

5. Foul

There are no additional foul flows from the development, and no impact on the existing foul network.

6. Conclusions

The site is noted as being wholly within Flood Zone 1, with no noted increase in risk from the future climate.

Surface water mapping indicates the site does have some areas flagged as low flood risk, but this is from modelling which does not consider the existing formalised drainage which exists across the site. Additionally, the redevelopment includes a SuDs scheme to manage storm events including climate change and therefore as there are no overland flow routes into the areas there are no additional considerations from this element.

The existing drainage consists of separate private foul and surface water systems. There is a main private spine running from the north east to the south west under the existing building, and this has some branch connections, but this is not the only surface water drainage onsite with additional areas from RWPs draining separately to the east with unconfirmed outfalls. As the full network cannot be modelled the Rational Method was used with a 50mm\hr 1 in 2 year equivalent rainfall which gives an existing discharge rate of 15.2\ls.

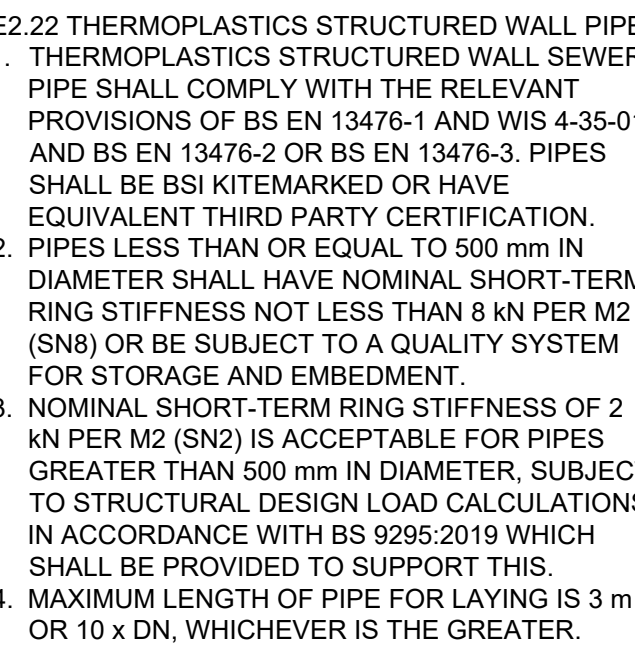
A proposed SuDs scheme has been included which reduces the discharge rate to a flow of 2.0\ls for all events including the 1 in 100 year plus 40% climate change event for the Avon Bristol and North Somerset Streams Management Catchment peak rainfall allowances for the 2050s epoch. Whilst this is higher than the equivalent greenfield runoff rates this is the best rate which can be achieved given the depth of the existing outfall limiting options for attenuation.

Water quality has been approached through the use of permeable hardstandings and filter drains in accordance with the Simple Index Approach (SIA). Whilst there are a few gully connections which do not quite achieve the TSS control this should be taken into context that this is a redevelopment of a constrained existing hardstanding with no intensification of use and is therefore a significant benefit on the existing case, and again limited with potential options due to the shallow nature of the existing outfall.

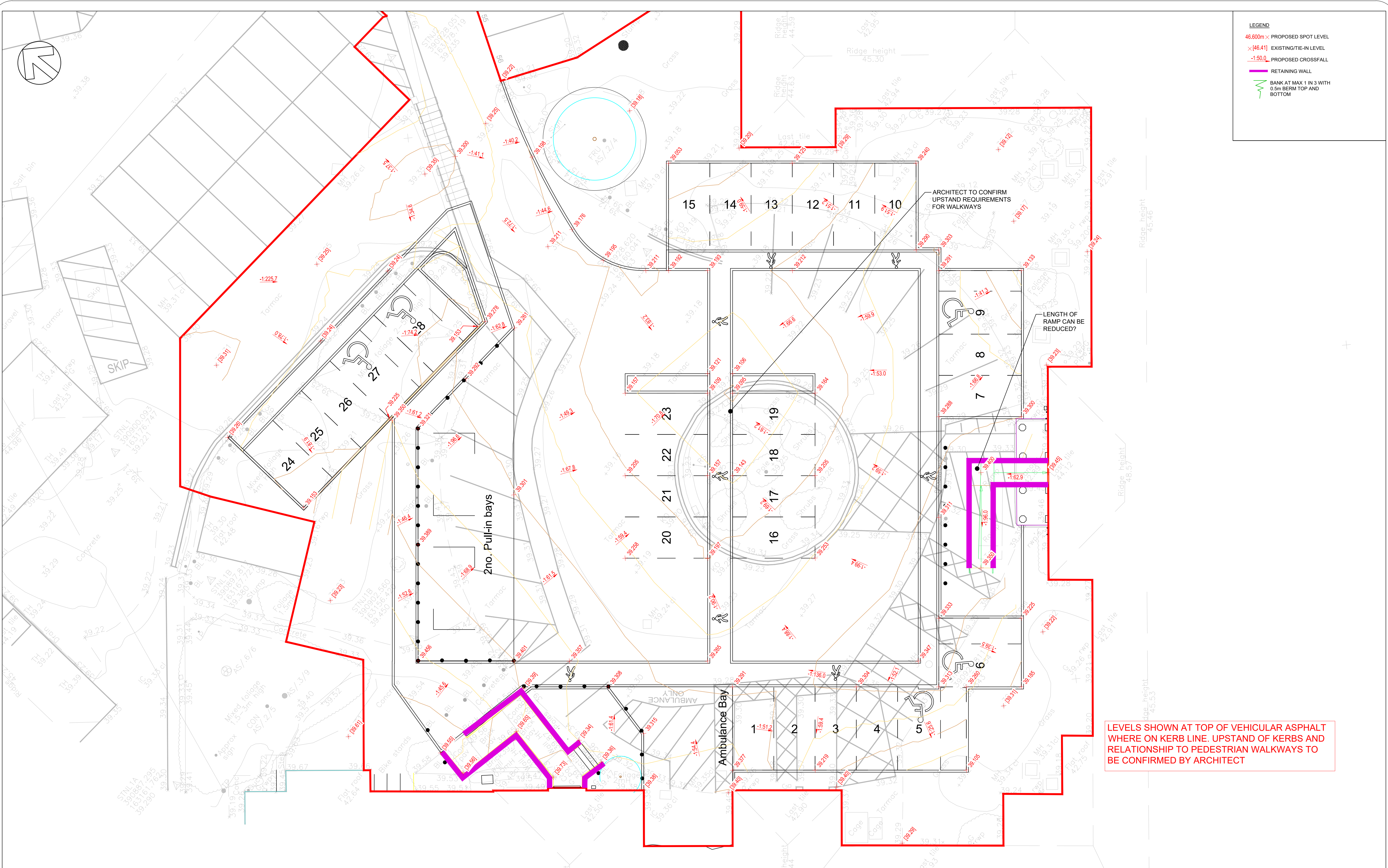
There is no foul generation from the site and no effect on the existing foul network.

Appendix A:
Topographical Survey

Appendix B:
Drawings



Drawn By N	Checked By DL	Approved By DL	Date Drawn 13/10/25		Project No 24390		Scale 1 : 100	
Project 4390-	Originator JDL	Volume XX	Level XX	Type DR	Role E	Number 01	Rev T0	



- LEGEND
- 46.600m × PROPOSED SPOT LEVEL
 - ×[46.41] EXISTING/TIE-IN LEVEL
 - 1.50.0 PROPOSED CROSSFALL
 - RETAINING WALL
 - BANK AT MAX 1 IN 3 WITH 0.5m BERM TOP AND BOTTOM

LEVELS SHOWN AT TOP OF VEHICULAR ASPHALT WHERE ON KERB LINE. UPSTAND OF KERBS AND RELATIONSHIP TO PEDESTRIAN WALKWAYS TO BE CONFIRMED BY ARCHITECT

- General Notes
- TO BE READ WITH ALL OTHER JDL CONSULTANTS LTD DRAWINGS AND SPECIFICATIONS.
 - DO NOT SCALE THIS DRAWING.
 - CONTRACTOR TO VERIFY LOCATION OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT.
 - ALL WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH JDL SPECIFICATION.

Rev	Date	Revision Description	By	Chk
T01	13.10.25	FIRST ISSUE	TN	NB

Rev	Date	Revision Description	By	Chk
T01	13.10.25	FIRST ISSUE	TN	NB

JDL CONSULTANTS LTD
CIVIL AND STRUCTURAL CONSULTING ENGINEERS

27A Osprey Court, Hawkfield Way, Hawkfield Business Park, Bristol, BS14 0BB. Tel - 01275 372154
E-mail - jdl@jdlconsultants.co.uk

1st Floor, 200 Tower Bridge Road, London. SE1 2UN.
Tel - 0203 7275 380 E-mail - jdl@jdlconsultants.co.uk

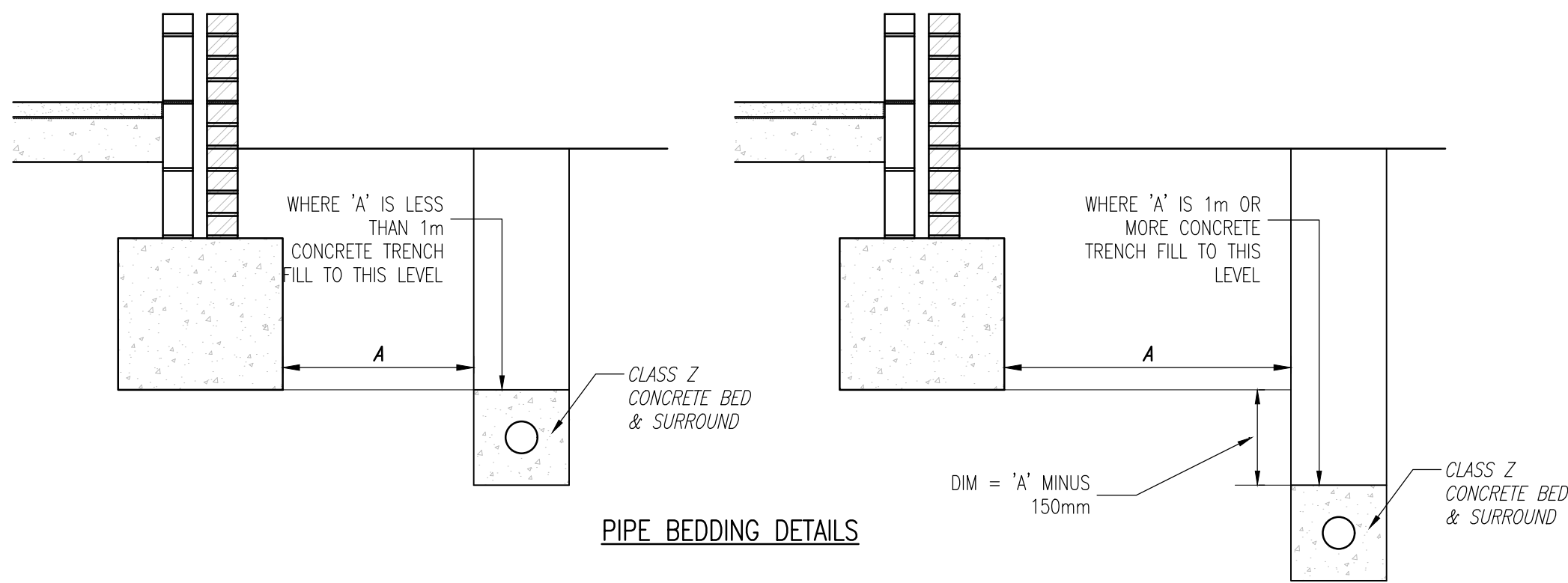
Drawing Title
Proposed Levels

Architect
Kendall Kingscott Ltd

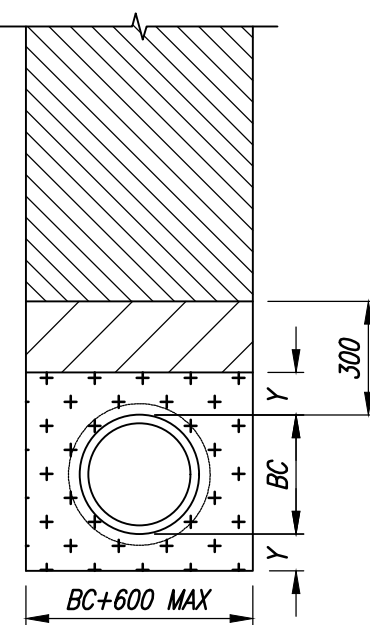
Project
Melksham Hospital Site Entrance Reconfiguration

Drawn By TN	Checked By NB	Approved By NB	Date Drawn 13/10/25	Project No. 24390	Scale 1 : 100
Printed 24390	Original JDL	Value XX	Level XX	Type DR	Rev E - 20
					Rev T01

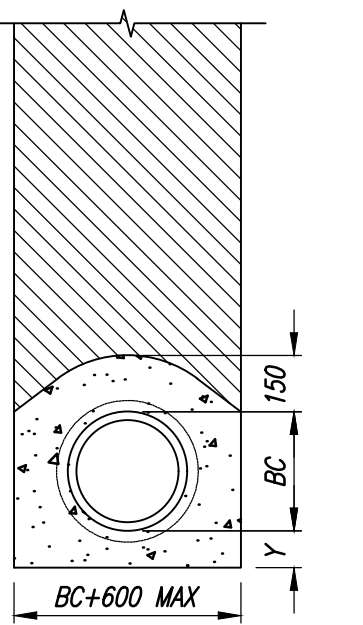
PIPE RUNS NEAR BUILDINGS



PIPE BEDDING DETAIL 1
GRANULAR BED AND SURROUND CLASS 'S'



PIPE BEDDING DETAIL 2
CONCRETE BED AND SURROUND CLASS 'Z'



KEY

- SUITABLE BACKFILL MATERIAL.
- SELECTED SIDEFILL AND SURROUND.
- GRANULAR BEDDING MATERIAL.
- GEN3 CONCRETE

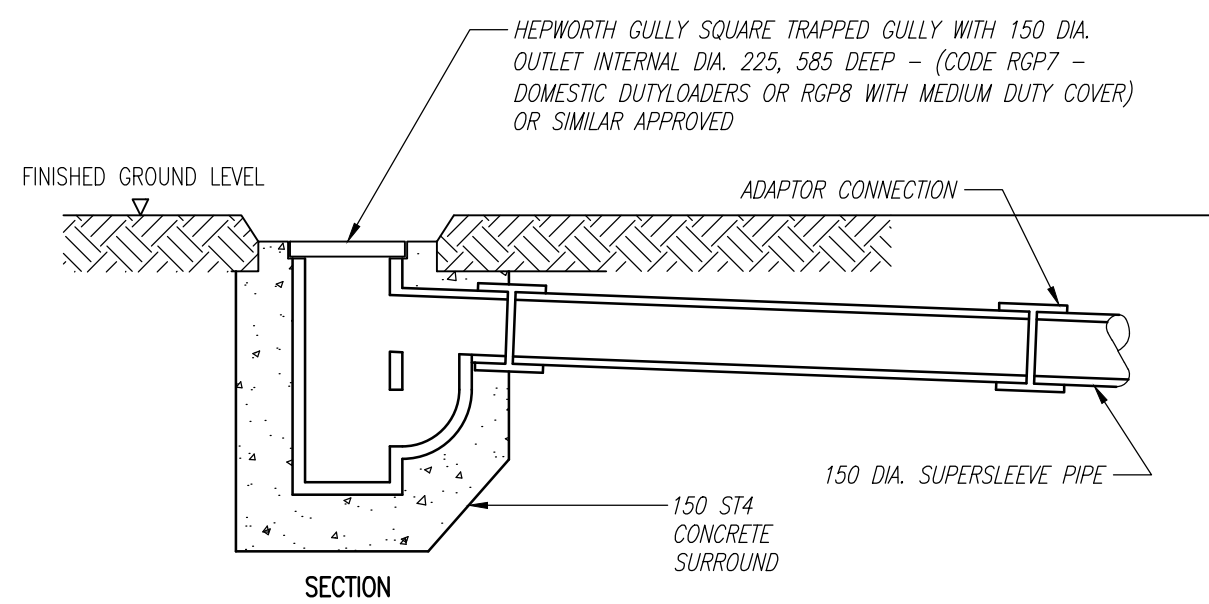
DN = NOMINAL INTERNAL DIAMETER OF PIPE.
BC = OUTSIDE DIAMETER OF PIPE.

DIMENSION Y

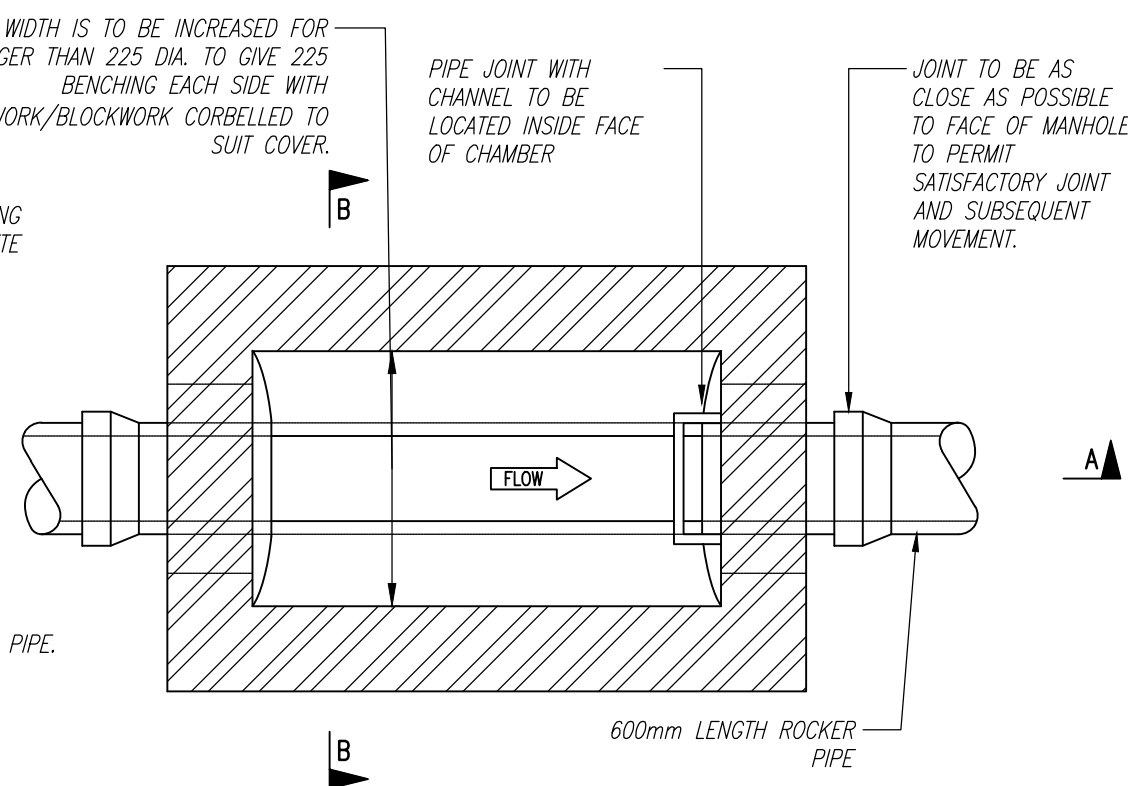
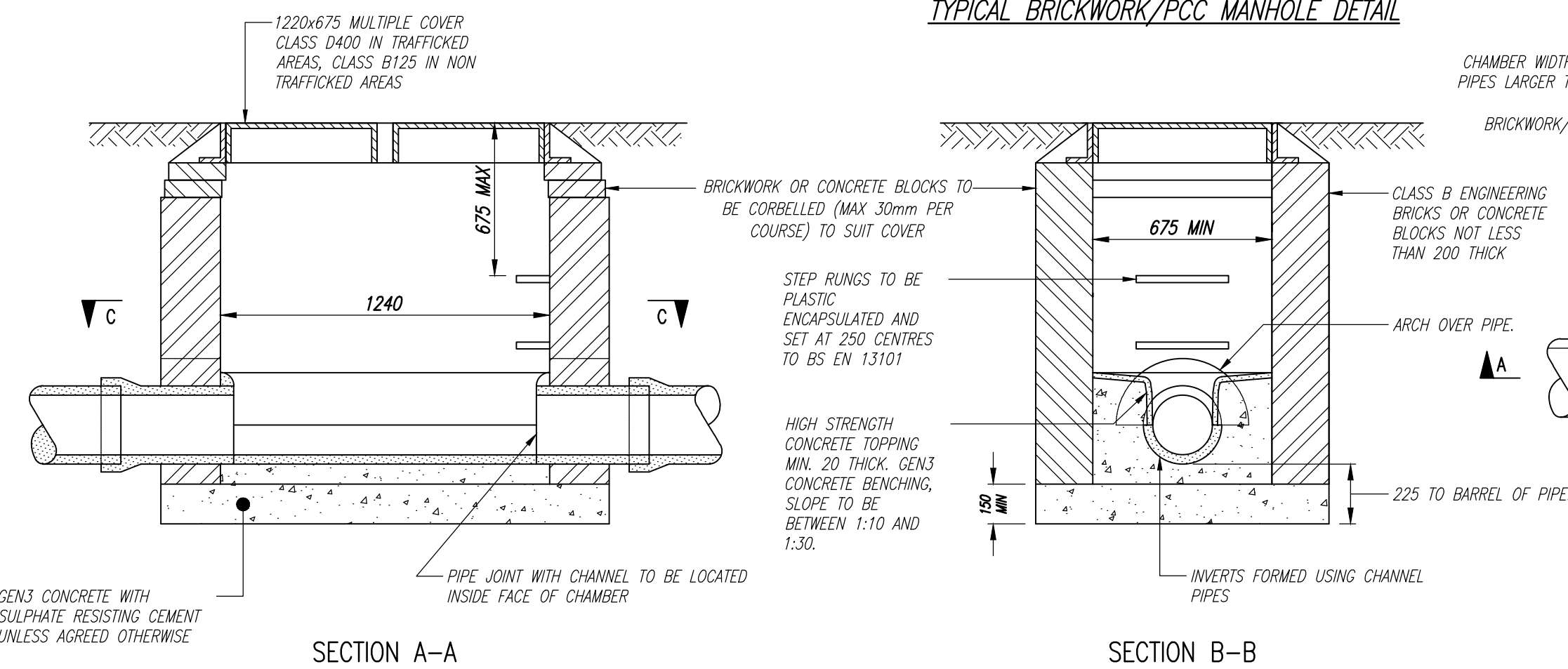
CLASS	MACHINE DUG UNIFORM SOIL	ROCK OR MIXED SOILS
S & Z	NOTE (i)	NOTE (ii)

(i) $Y = BC/6$, WITH MIN 100 UNDER BARRELS (50 FOR SLEEVE JOINTED) AND MIN 50 UNDER SOCKETS, WHICHEVER IS THE GREATER, WITH MAX OF 400.

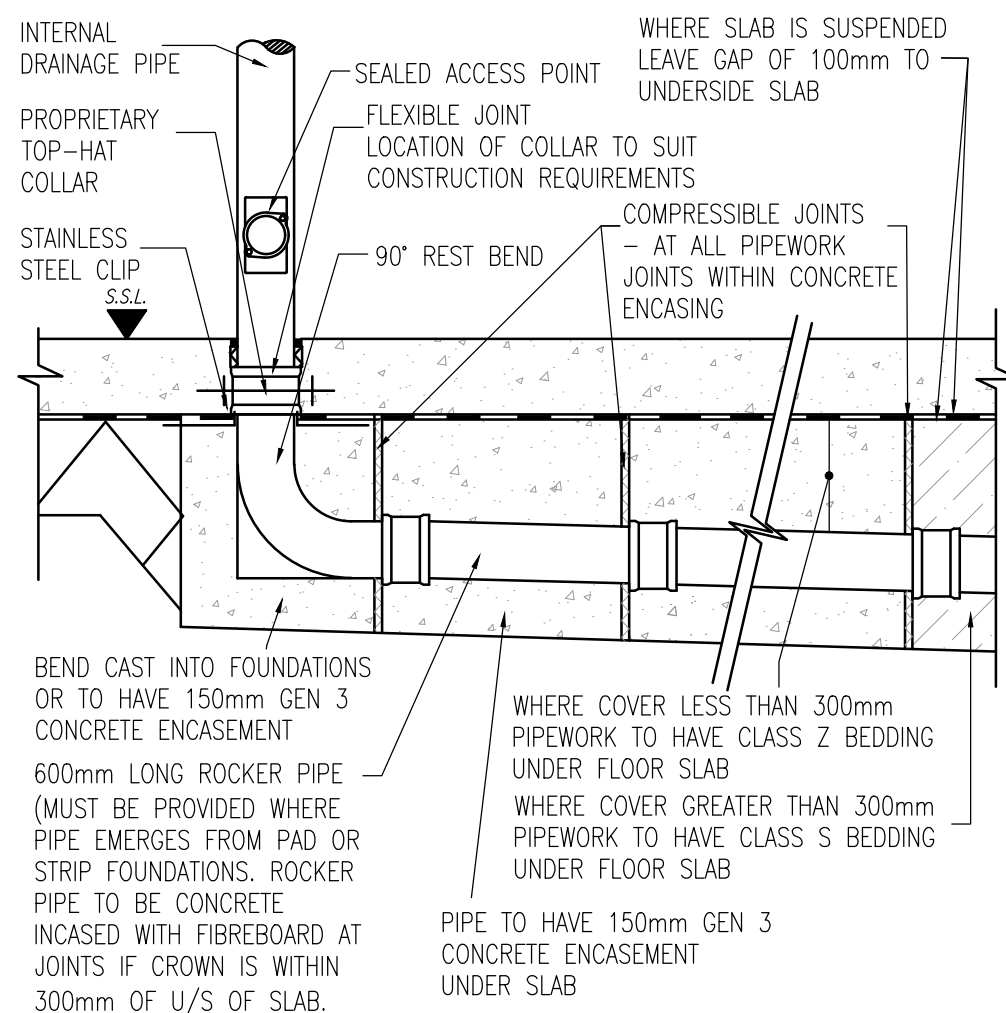
YARD GULLY DETAIL



TYPICAL BRICKWORK/PCC MANHOLE DETAIL



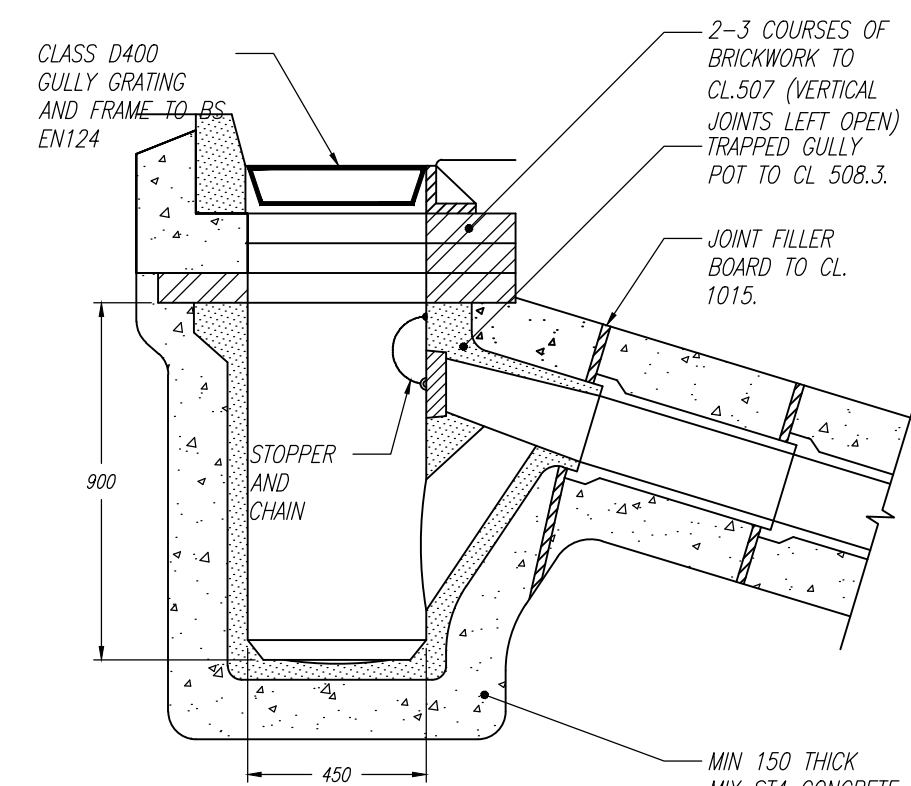
PLAN ON C-C



DRAINAGE UNDER BUILDINGS

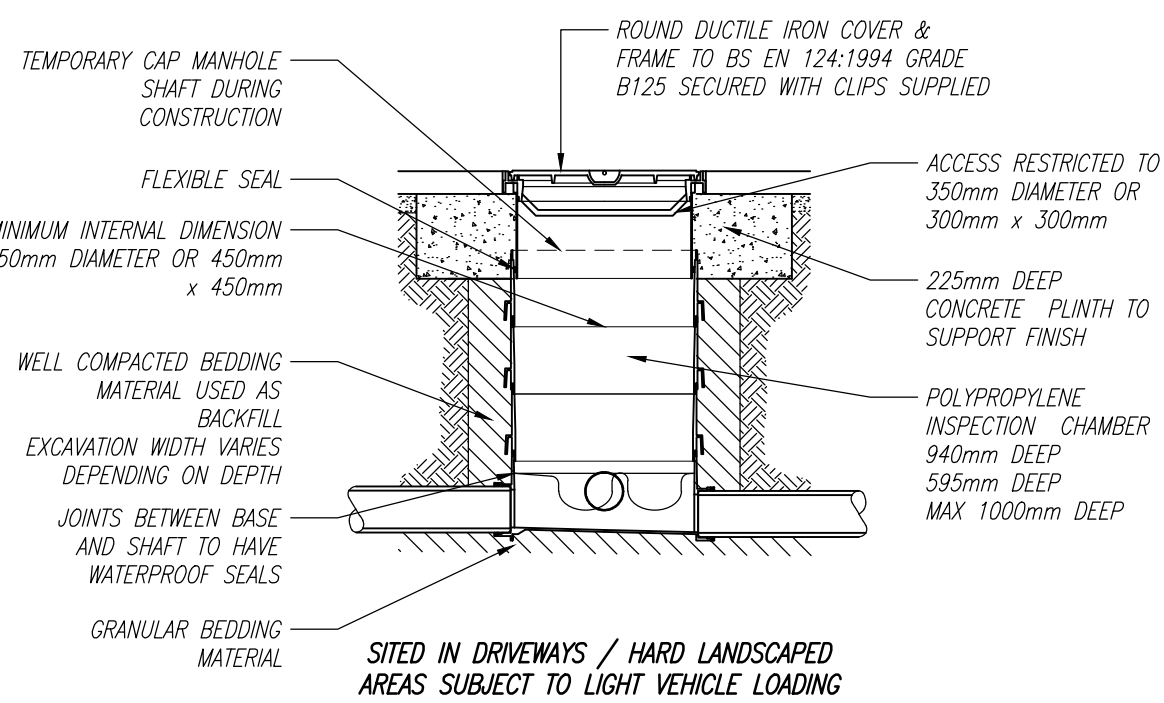
(SCALE 1:20)

TRAPPED GULLY WITH SPIGOT OUTLET



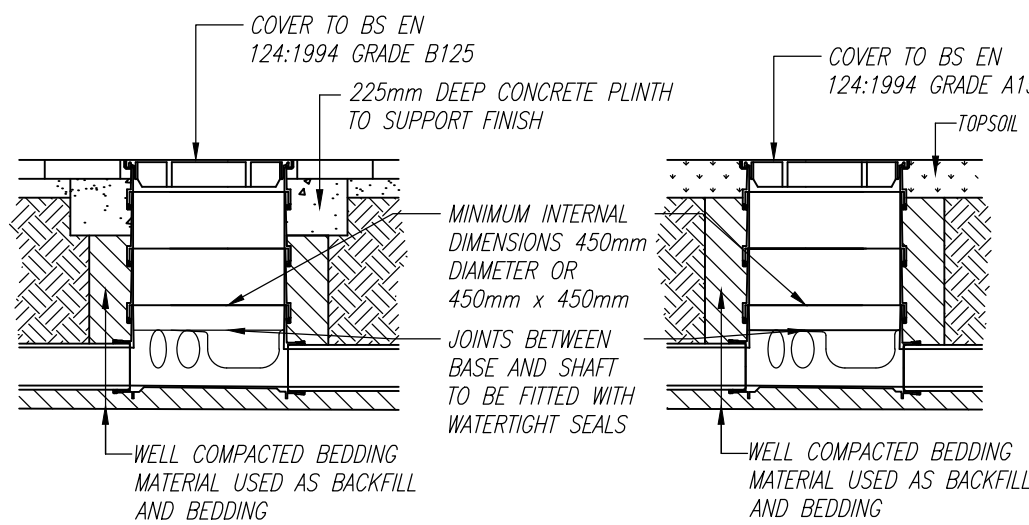
TYPICAL ACCESS CHAMBER TYPE 4

MAX 2.0m DEEP (NON ENTRY)

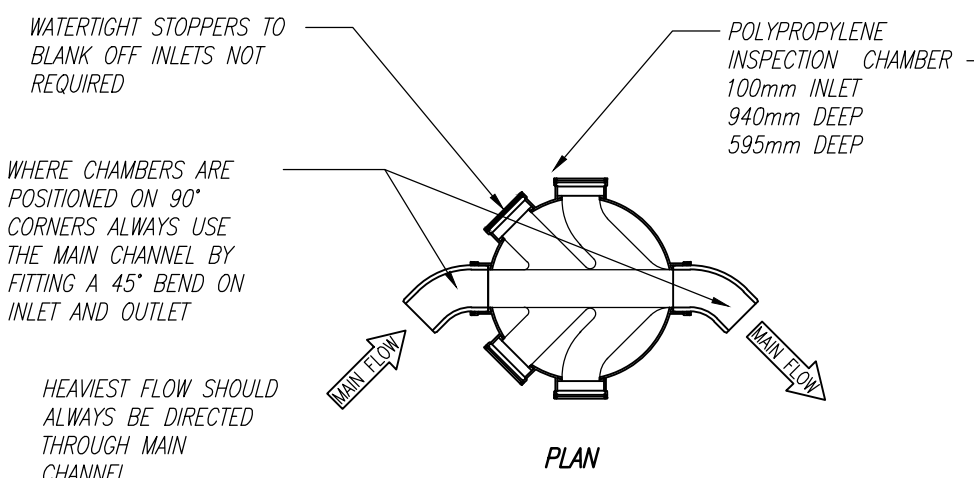


TYPICAL ACCESS CHAMBER TYPE 5

MAX 1000mm DEEP (NON ENTRY)

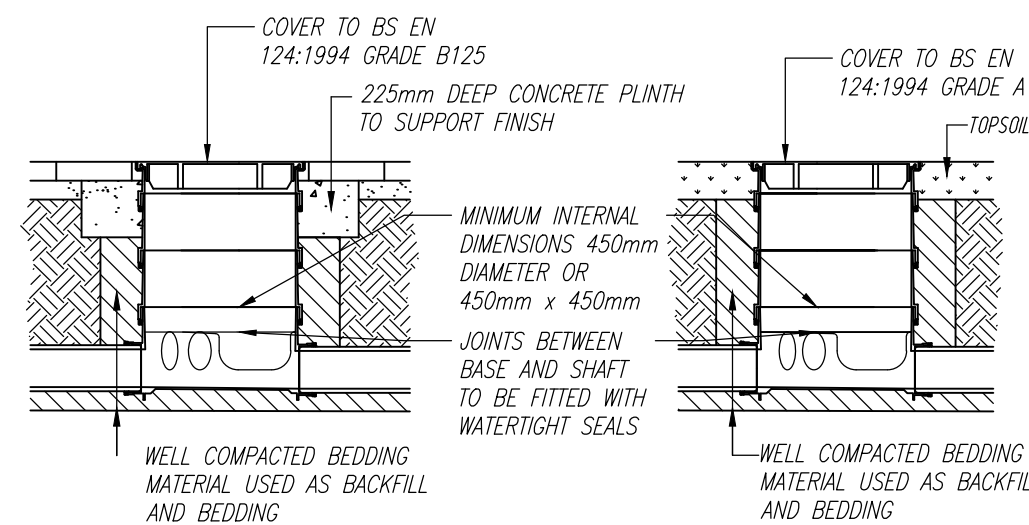


TYPICAL ACCESS CHAMBER BASE UNIT PLAN DETAIL

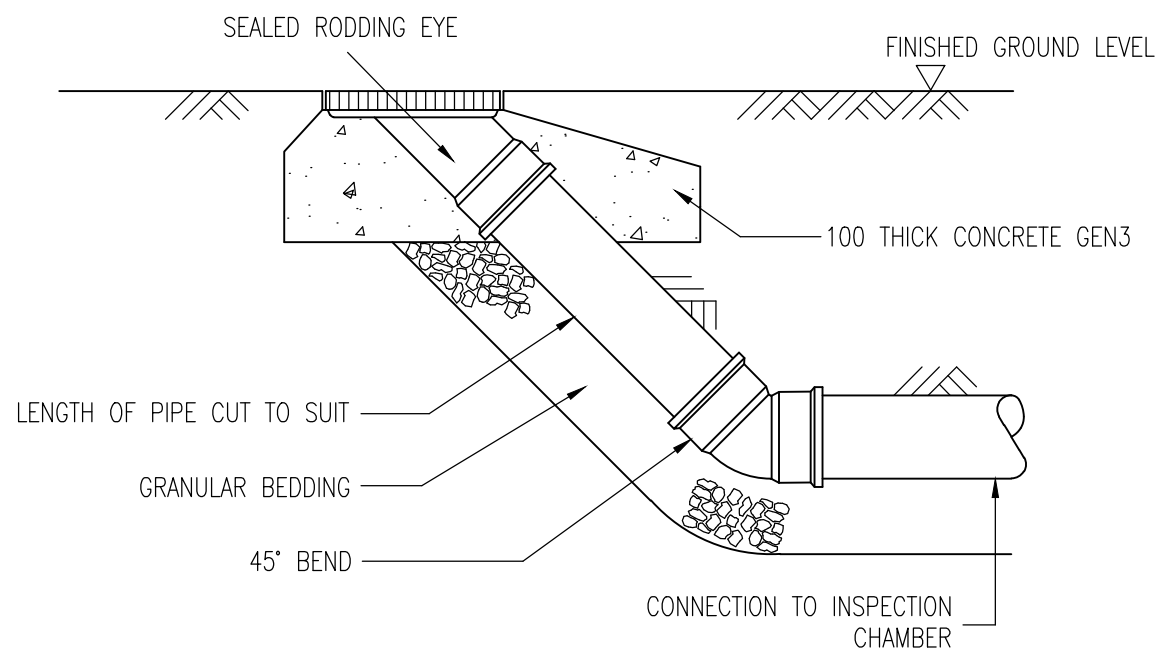


TYPICAL ACCESS CHAMBER TYPE 5

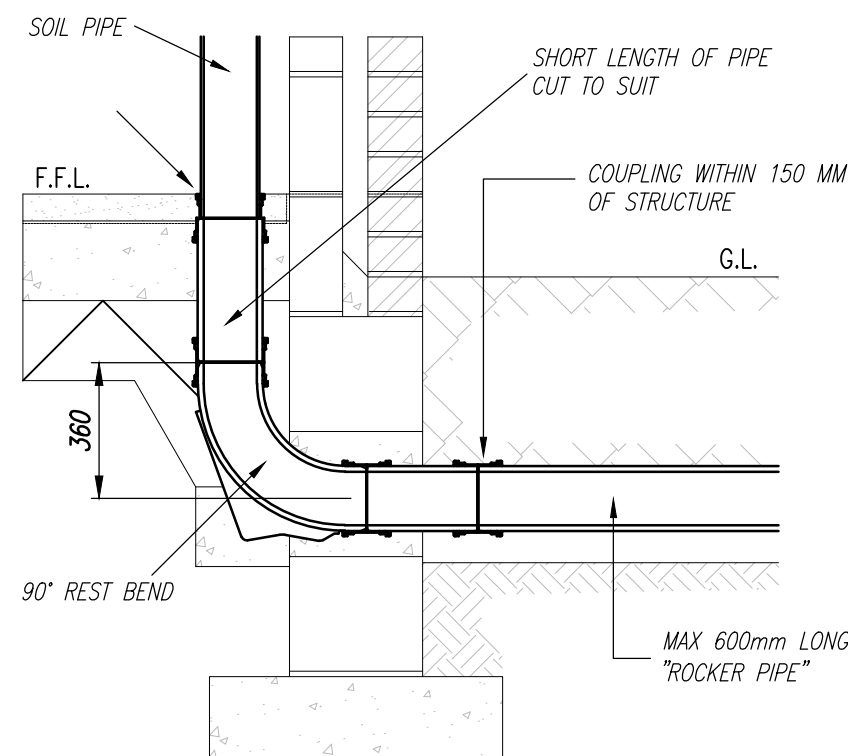
MAX 1000mm DEEP (NON ENTRY)



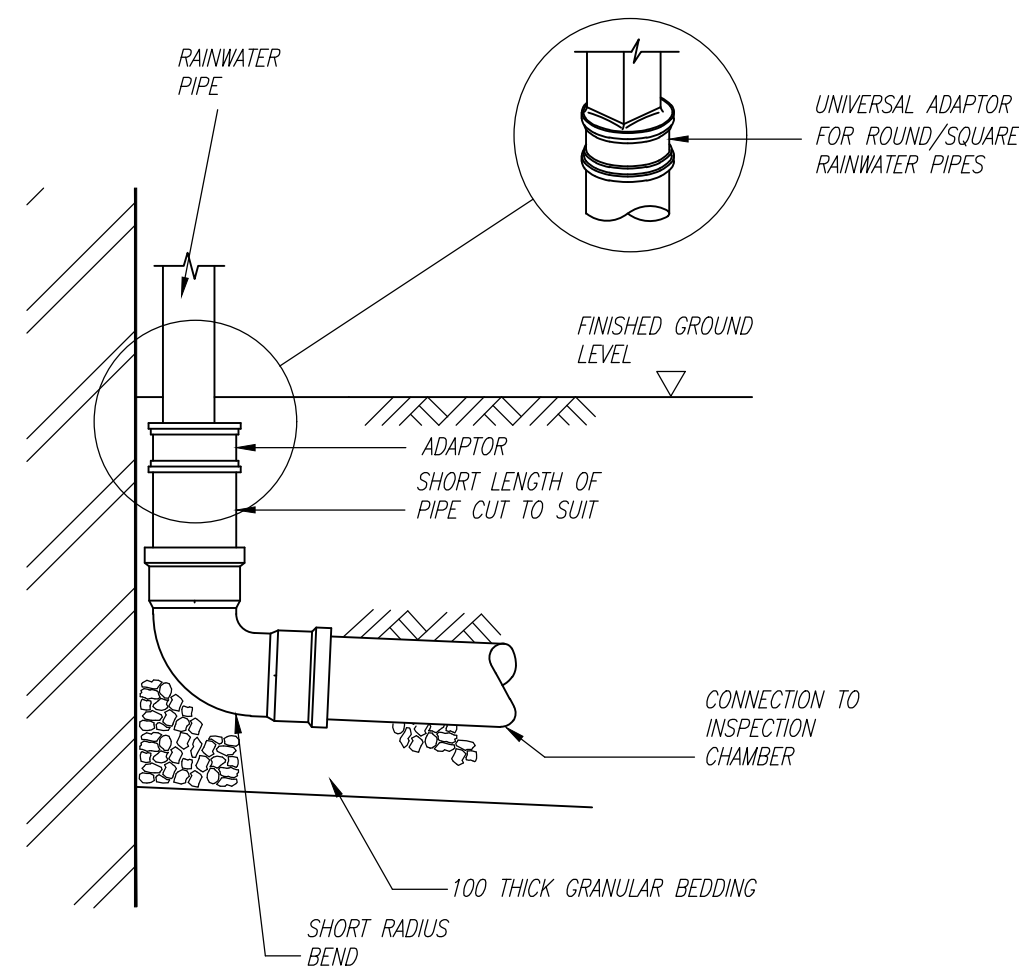
SEALED RODDING EYE



SOIL & VENT PIPE CONNECTION DETAIL



RAINWATER PIPE CONNECTION



- General Notes
- TO BE READ WITH ALL OTHER JDL CONSULTANTS LTD DRAWINGS AND SPECIFICATIONS.
 - DO NOT SCALE THIS DRAWING.
 - ALL BEDDING MATERIAL IS TO BE WELL COMPACTED.
 - ALL DIMENSIONS IN MILLIMETRES UNLESS INDICATED OTHERWISE.
 - REFERENCE TO PROPRIETARY GOODS SHALL NOT EXCLUDE OTHERS OF SIMILAR APPROVED QUALITY AND WHICH COMPLY WITH RELEVANT BRITISH STANDARDS.
 - FLEXIBILITY IN DRAINS TO BE OBTAINED AT ALL MANHOLES AND CHAMBERS BY PROVIDING 1' N° 600 LONG PIPE LENGTH IMMEDIATELY OUTSIDE THE MANHOLE OR CHAMBER AT ALL PIPE JOINTS.
 - ALL PCC SEWER PIPES TO BE EXTRA STRENGTH QUALITY.
 - BRANCH CONNECTIONS TO BE VIA A 45° OBlique JUNCTIONS BRANCH WHERE POSSIBLE.
 - WHERE THE DISTANCE TO A DRAIN TRENCH FROM THE OUTSIDE FACE OF A FOUNDATION OR EXTERNAL WALL IS LESS

- THAN 1 METRE AND THE DRAIN INVERT LEVEL IS BELOW FOUNDATION LEVEL, TRENCH FILL SHALL BE OF CONCRETE TO A LEVEL EQUAL TO THAT OF THE UNDERSIDE OF THE FOUNDATION, WHERE THE DISTANCE IS GREATER THAN 1000, THE CONCRETE TRENCH SHALL BE TO A LEVEL AT LEAST 150 BELOW THE UNDERSIDE OF THE FOUNDATION.
- ALL WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH JDL SPECIFICATION.
- ALL PIPE CONNECTIONS TO CHAMBERS TO BE INVERT TO INVERT DUE TO SHALLOW COVER.
- THE FIRST 300mm OF FILL ABOVE THE CROWN OF THE PIPE IS TO BE LIGHTLY TAMPED BY HAND. MECHANICAL COMPACTION MAY BE USED ONLY ABOVE THIS LEVEL.
- PIPES LAID IN FIELDS AND FOOTPATHS (INACCESSIBLE BY VEHICLES) AT COVER 0.6 - 3m TO BE CONSTRUCTED PIPE BEDDING DETAIL 1 (CLASS S); COVER LESS THAN 0.6m TO BE PIPE BEDDING DETAIL 2 (CONCRETE PROTECTION).
- PIPES LAID IN ROADS AT MIN. 1.2m COVER TO BE AS PIPE BEDDING DETAIL 1 (CLASS S) AND PIPES CONSTRUCTED ABOVE 1.2m TO BE AS PIPE BEDDING DETAIL 2 (CONCRETE PROTECTION).

Rev	Date	Revision Description	By	Chk
-----	------	----------------------	----	-----

Rev	Date	Revision Description	By	Chk
-----	------	----------------------	----	-----

JDL CONSULTANTS LTD
CIVIL AND STRUCTURAL CONSULTING ENGINEERS

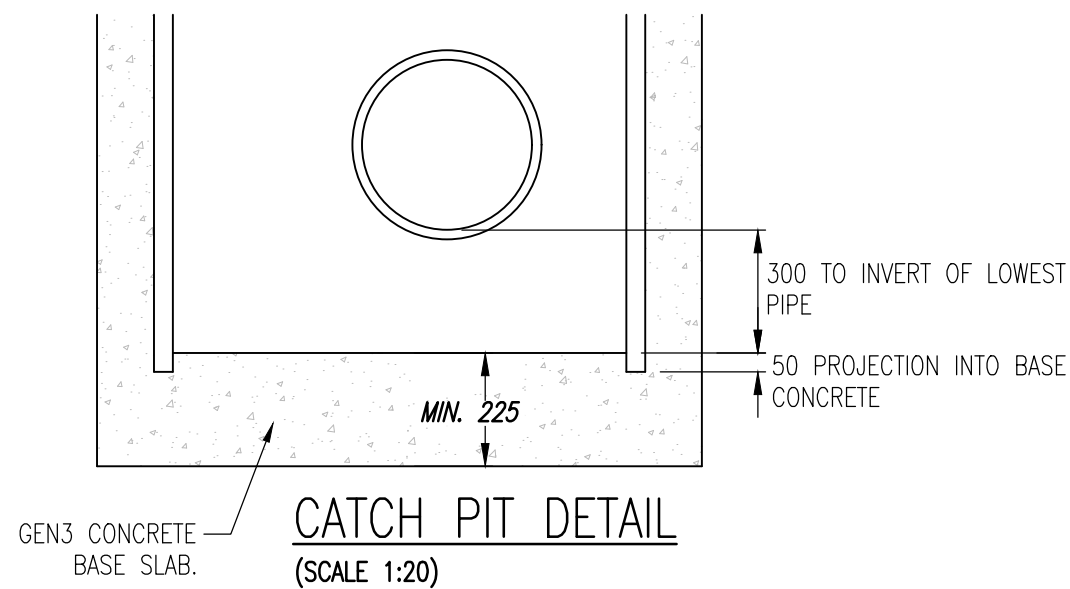
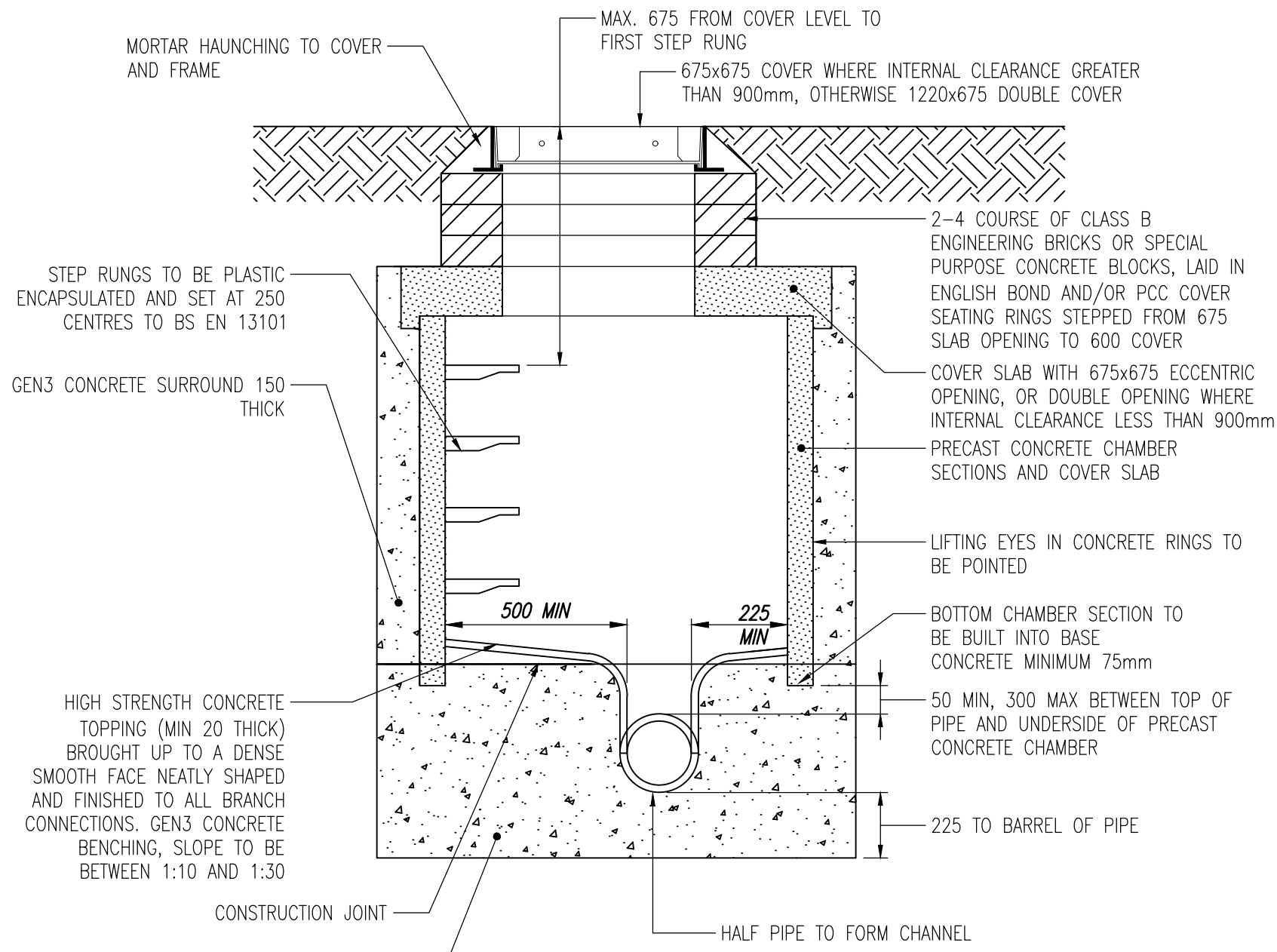
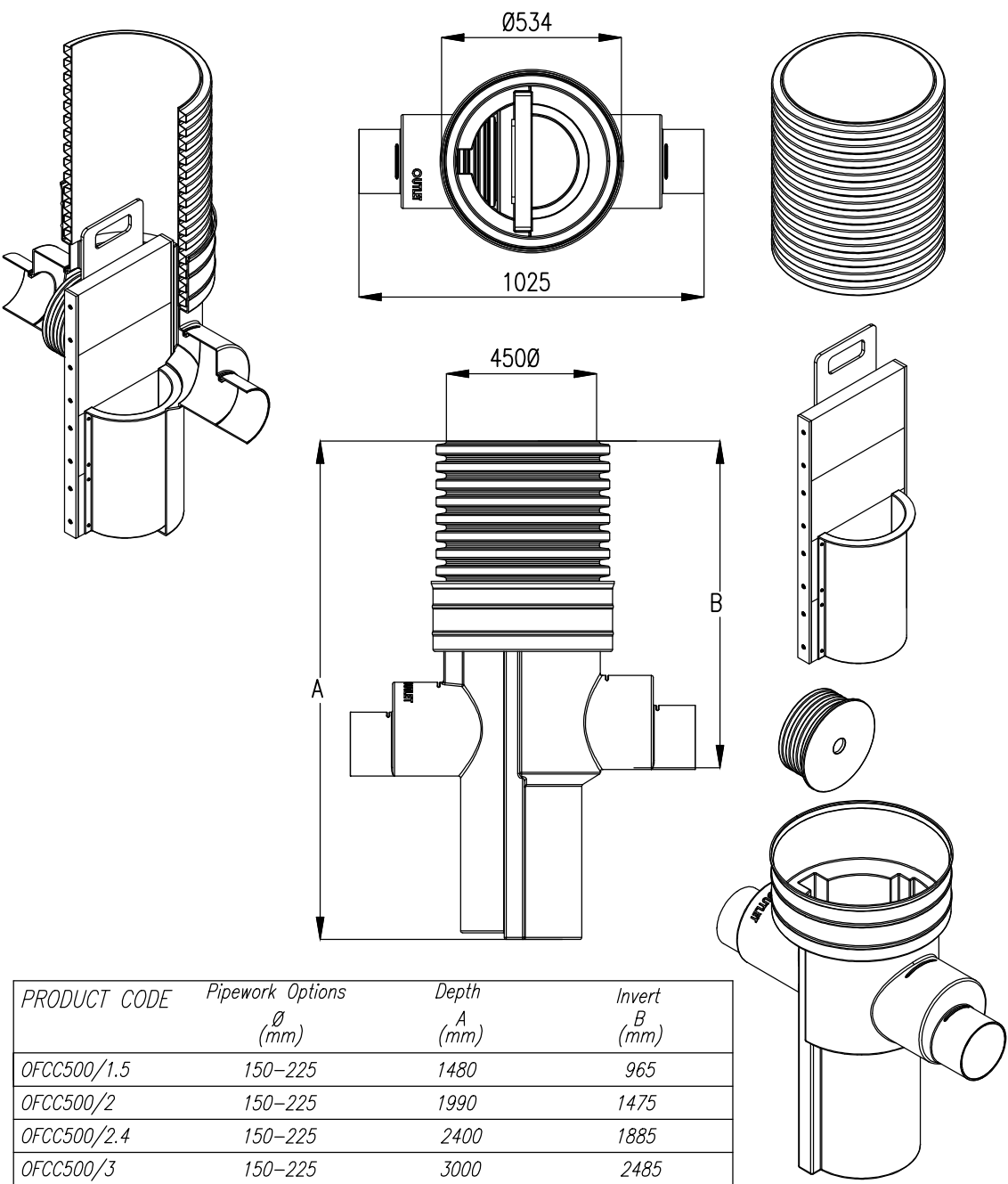
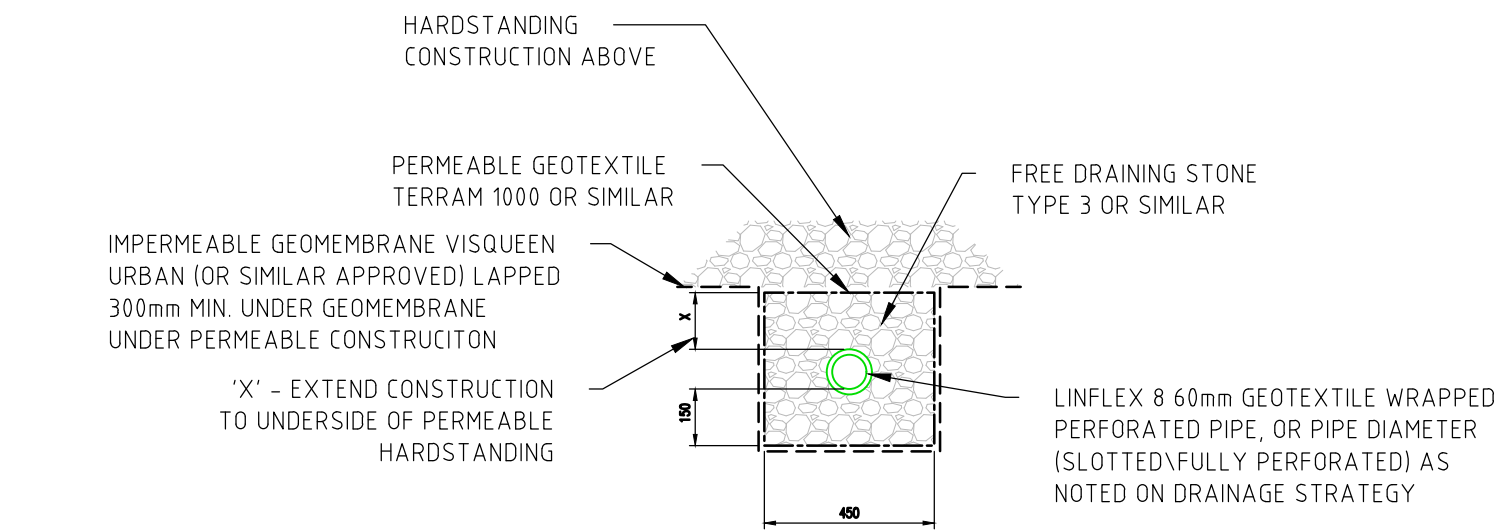
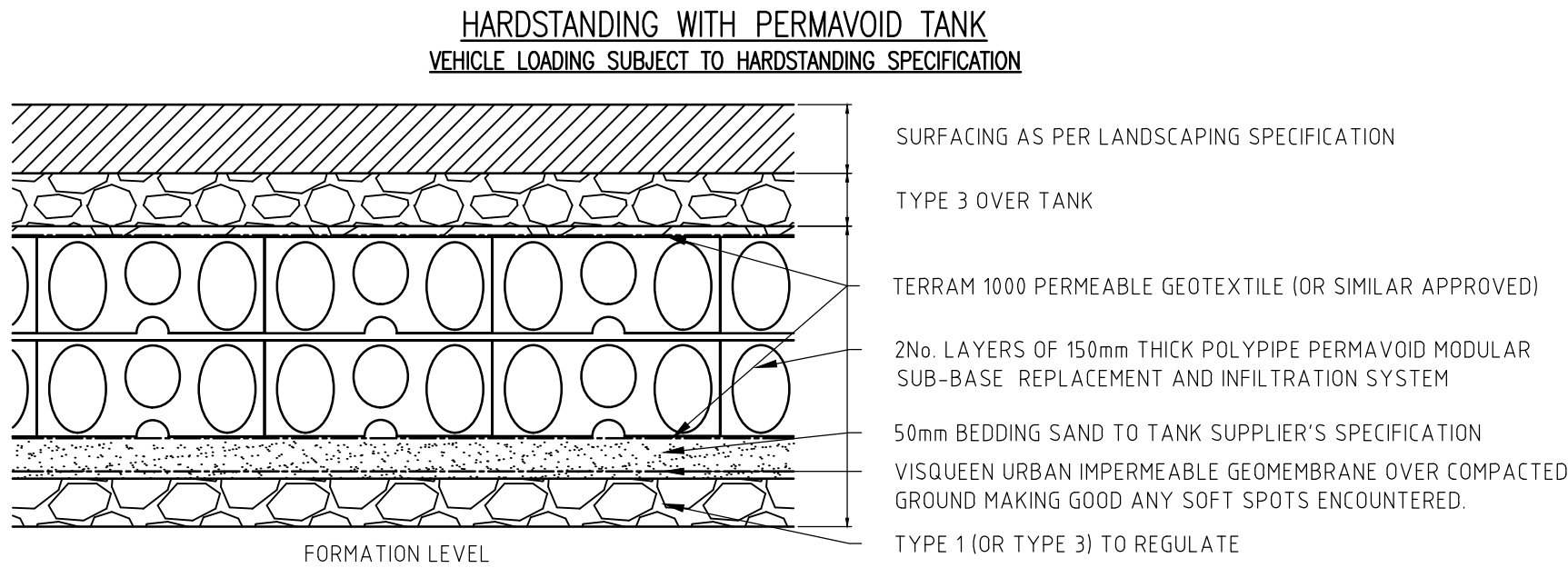
27A Osprey Court, Hawkfield Way, Hawkfield Business Park, Bristol, BS14 0BB. Tel - 01275 372154
E-mail - jdl@jdlconsultants.co.uk

1st Floor, 200 Tower Bridge Road, London, SE1 2UN.
Tel - 0203 7275 380 E-mail - jdl@jdlconsultants.co.uk

Drawing Title
Proposed Drainage Details (Sheet 1 of 2)

Architect
Kendall Kingscott Ltd

Drawn By	Checked By	Approved By	Date Drawn	Project No.	Scale
TN	NB	NB	13/10/25	24390	NTS
Project	Originator	Volume	Level	Type	Rev
24390	JDL	XX	XX	DR	E
					05
					TO1



- General Notes**
1. TO BE READ WITH ALL OTHER JDL CONSULTANTS LTD DRAWINGS AND SPECIFICATIONS.
 2. DO NOT SCALE THIS DRAWING.
 3. ALL BEDDING MATERIAL IS TO BE WELL COMPACTED.
 4. ALL DIMENSIONS IN MILLIMETRES UNLESS INDICATED OTHERWISE.
 5. REFERENCE TO PROPRIETARY GOODS SHALL NOT EXCLUDE OTHERS OF SIMILAR APPROVED QUALITY AND WHICH COMPLY WITH RELEVANT BRITISH STANDARDS.
 6. FLEXIBILITY IN DRAINS TO BE OBTAINED AT ALL MANHOLES AND CHAMBERS BY PROVIDING 1 N° 600 LONG PIPE LENGTH IMMEDIATELY OUTSIDE THE MANHOLE OR CHAMBER AT ALL PIPE JUNCTIONS.
 7. ALL PCC SEWER PIPES TO BE EXTRA STRENGTH QUALITY.
 8. BRANCH CONNECTIONS TO BE VIA A 45° OBLIQUE JUNCTIONS BRANCH WHERE POSSIBLE.
 9. WHERE THE DISTANCE TO A DRAIN TRENCH FROM THE OUTSIDE FACE OF A FOUNDATION OR EXTERNAL WALL IS LESS

10. ALL WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH JDL SPECIFICATION.
11. ALL PIPE CONNECTIONS TO CHAMBERS TO BE INVERT TO INVERT DUE TO SHALLOW COVER.
12. THE FIRST 300mm OF FILL ABOVE THE CROWN OF THE PIPE IS TO BE LIGHTLY TAMPED BY HAND. MECHANICAL COMPACTION MAY BE USED ONLY ABOVE THIS LEVEL.
13. PIPES LAID IN FIELDS AND FOOTPATHS (INACCESSIBLE BY VEHICLES) AT COVER 0.6 - 3m TO BE CONSTRUCTED PIPE BEDDING DETAIL 1 (CLASS S); COVER LESS THAN 0.6m TO BE PIPE BEDDING DETAIL 2 (CONCRETE PROTECTION).
14. PIPES LAID IN ROADS AT MIN. 1.2m COVER TO BE AS PIPE BEDDING DETAIL 1 (CLASS S) AND PIPES CONSTRUCTED ABOVE 1.2m TO BE AS PIPE BEDDING DETAIL 2 (CONCRETE PROTECTION).

Rev	Date	Revision Description	By	Chk
-----	------	----------------------	----	-----

Rev	Date	Revision Description	By	Chk
-----	------	----------------------	----	-----

JDL CONSULTANTS LTD
CIVIL AND STRUCTURAL CONSULTING ENGINEERS

27A Osprey Court, Hawkfield Way, Hawkfield Business Park, Bristol, BS14 0BB. Tel - 01275 372154
E-mail - jdl@jdiconsultants.co.uk

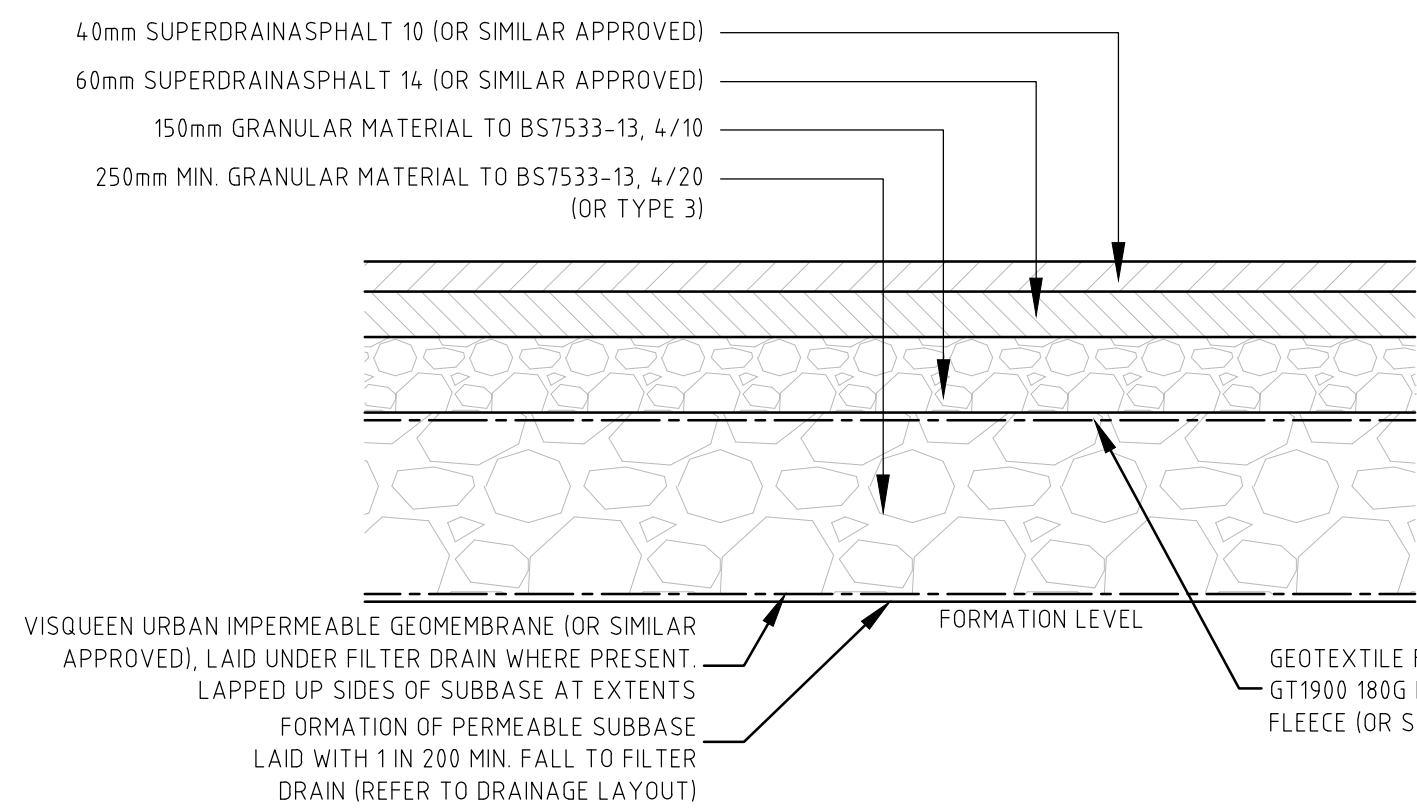
1st Floor, 200 Tower Bridge Road, London. SE1 2UN.
Tel - 0203 7275 380 E-mail - jdl@jdiconsultants.co.uk

Proposed Drainage Details
(Sheet 2 of 2)

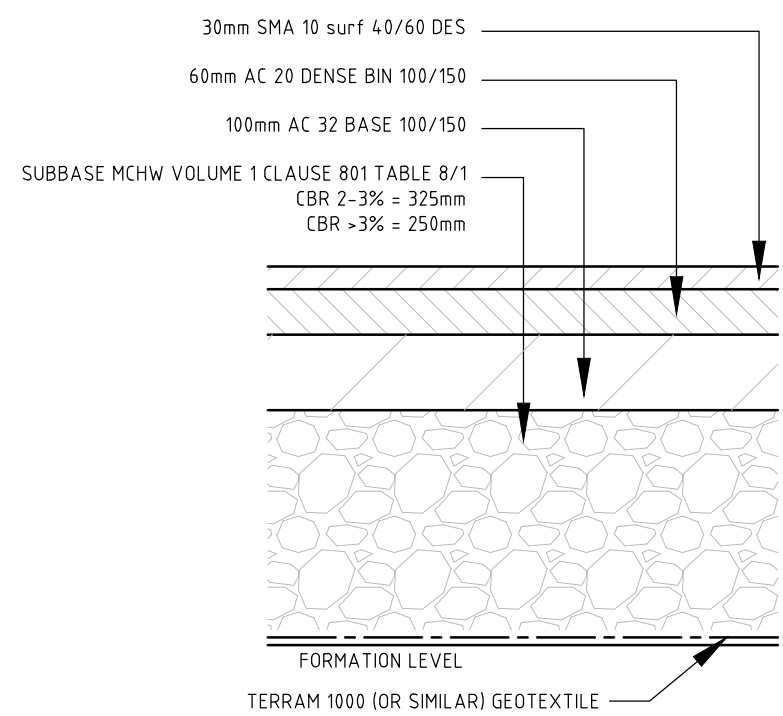
Kendall Kingscott Ltd

Melksham Hospital Site Entrance Reconfiguration

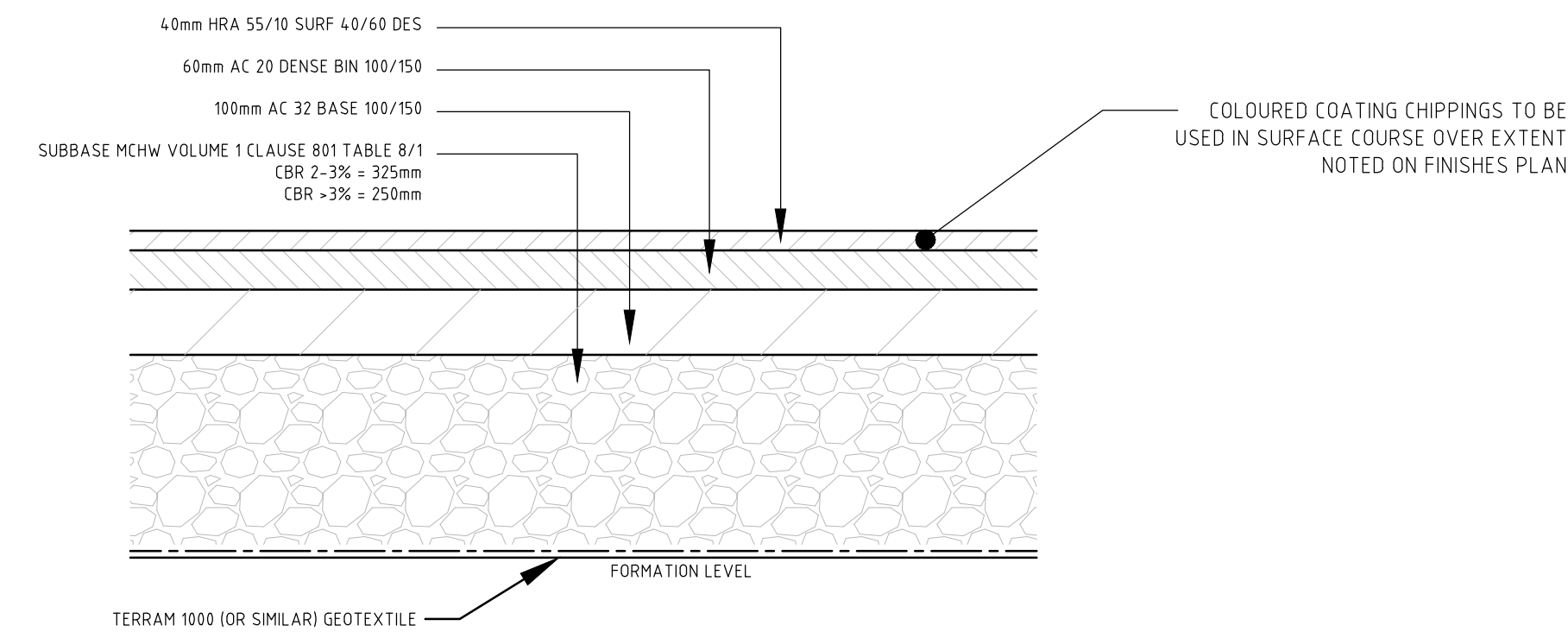
Drawn By	Checked By	Approved By	Date Drawn	Project No.	Scale
TN	NB	NB	13/10/25	24390	NTS
Project	Originator	Volume	Level	Type	Rev
24390	JDL	XX	XX	DR	E
					06
					T01



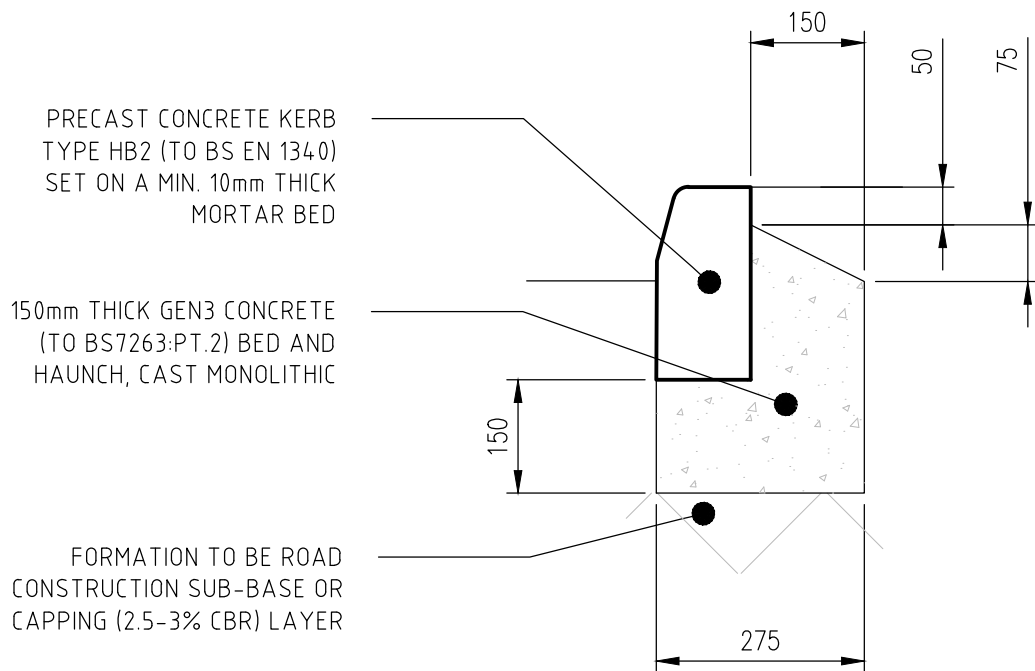
PERMEABLE ASPHALT SURFACING
(PERMEABLE CONSTRUCTION SYSTEM 2.0% CBR)
LIGHT VEHICLE PARKING ONLY



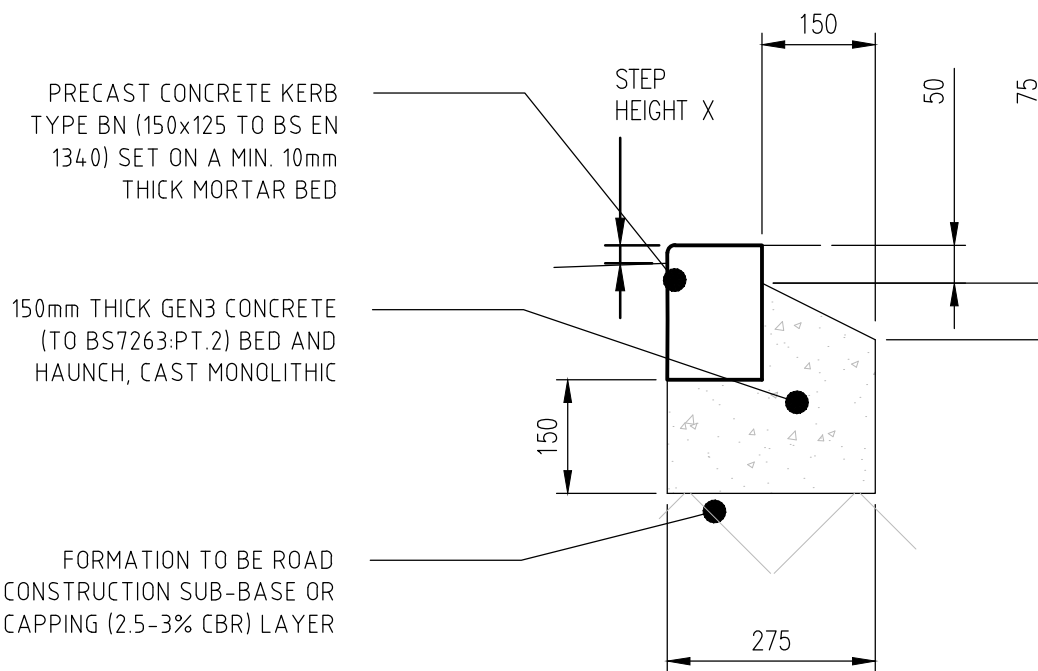
IMPERMEABLE VEHICULAR ASPHALT AREAS



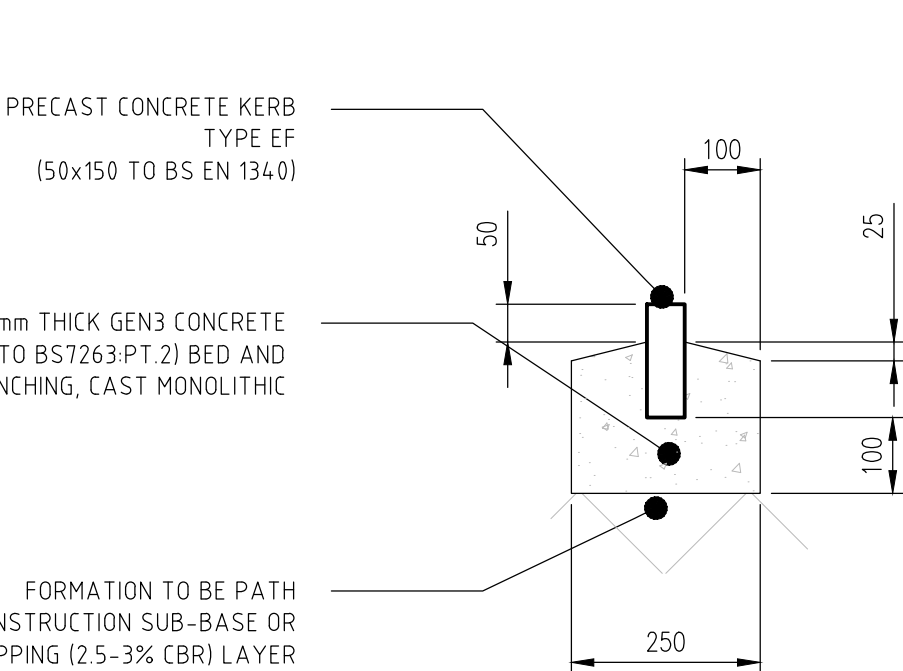
IMPERMEABLE VEHICULAR ASPHALT AREAS
HGV ROUTES



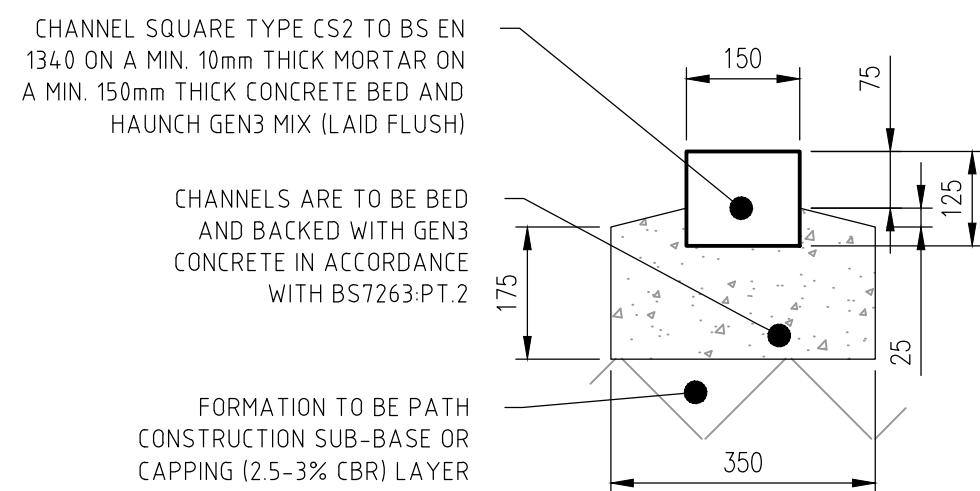
STANDARD KERB (HB2) DETAIL
(GENERALLY 125mm UPSTAND UNLESS NOTED OTHERWISE ON LAYOUTS)



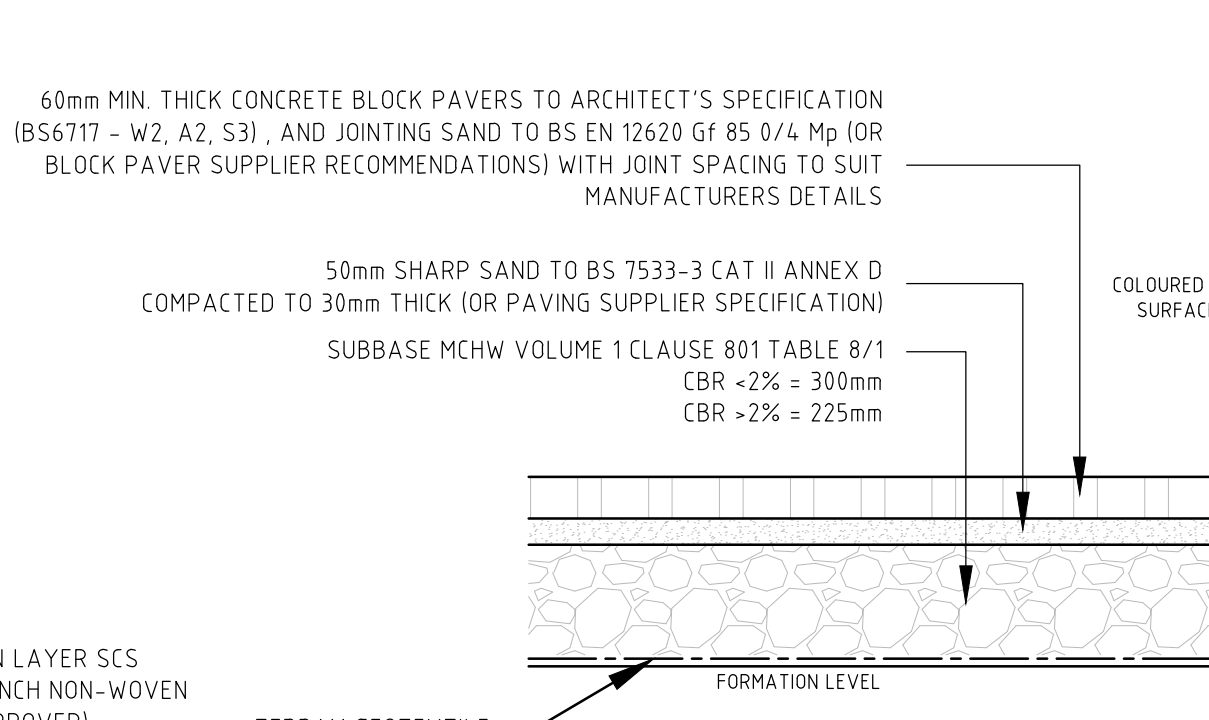
BULL NOSE KERB (BNx) DETAIL
(X EQUALS STEP HEIGHT, OTHERWISE FLUSH)



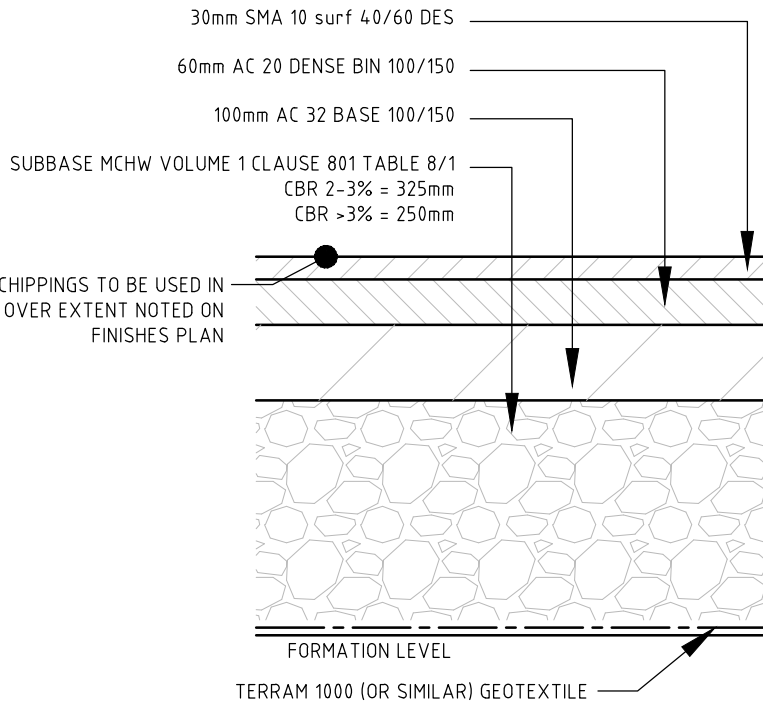
EDGING KERB (EF) DETAIL
TO BE LAID FLUSH



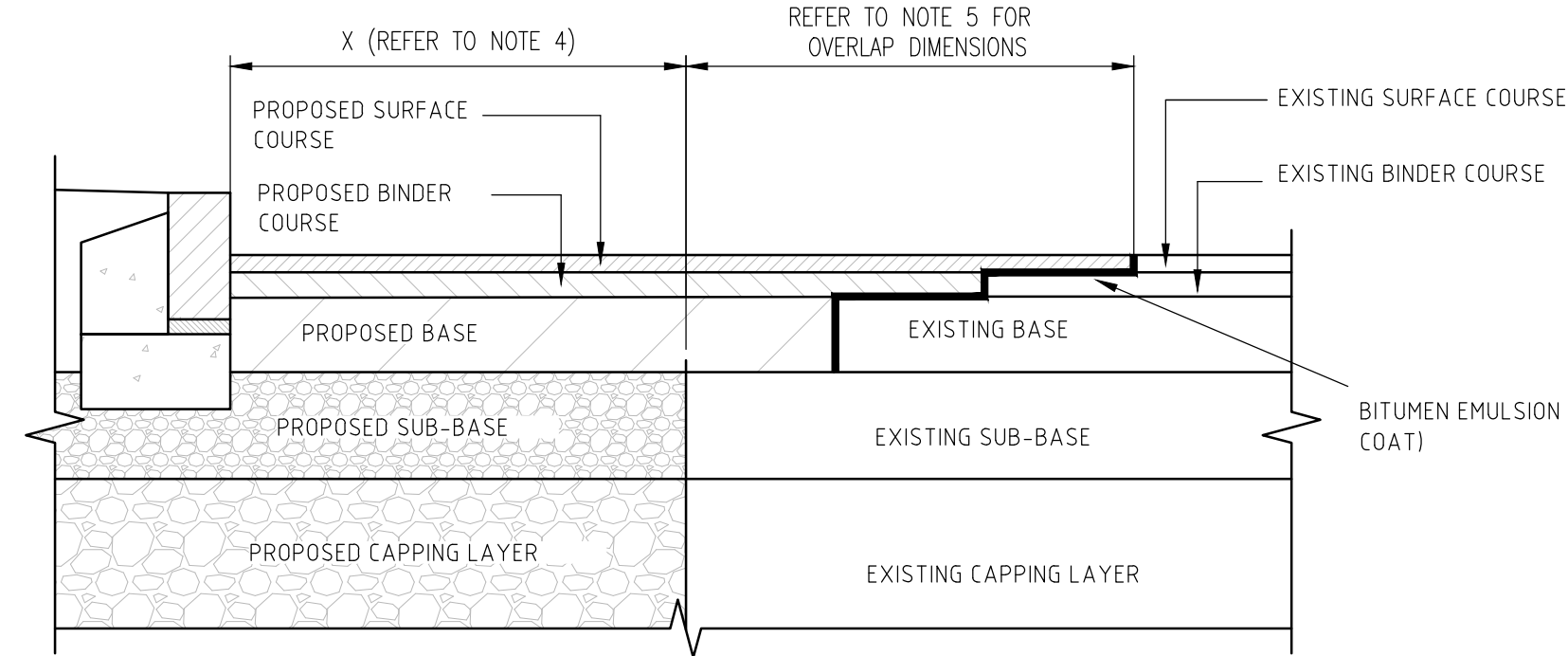
SQUARE CHANNEL (CS) DETAIL
TO BE LAID FLUSH



BLOCK PAVE FOOTWAY
SUBJECT TO PEDESTRIAN LOADING ONLY



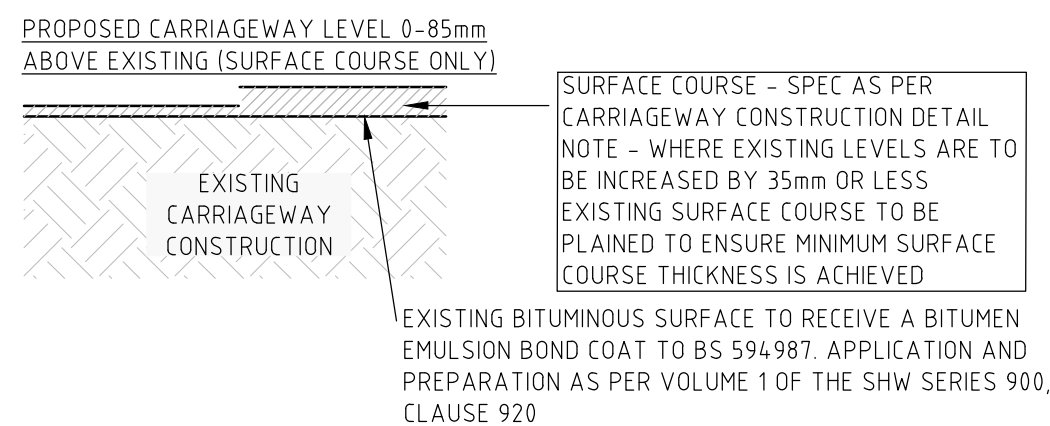
IMPERMEABLE VEHICULAR ASPHALT AREAS - AMBULANCE BAY



ASPHALT WIDENING/LONGITUNDINAL JOINT DETAIL

- NOTES:
- VERTICAL FACES OF EXISTING BITUMINOUS MATERIALS TO BE PRIMED WITH BITUMEN. HORIZONTAL OF INCLINED EXISTING SURFACES TO ACCEPT BITUMINOUS MATERIALS TO BE SPRAYED WITH BITUMINOUS BOND COAT TO BS 434 (INCLUDED IN SURFACING ITEMS).
 - ALL JOINTS TO BE SAW CUT AND PAINTED WITH A BITUMEN EMULSION TO CL. 920.3.
 - JOINTS TO BE FORMED IN ACCORDANCE WITH CL. 90122 (III), ALL SURFACE COURSE JOINTS WILL BE LOCATED UNDER WHITE LINING WHERE POSSIBLE.
 - WHERE WIDENING (X) IS LESS THAN 1.0m NEW CONSTRUCTION TO BE INCREASED IN WIDTH TO ACHIEVE 1.0m MINIMUM.
 - WHERE JOINT WILL BE BETWEEN NEWLY LAID CARRIAGEWAY LAYERS OVERLAP IS TO BE 150mm. WHERE JOINT TO BE BETWEEN EXISTING AND NEW CARRIAGEWAY, OVERLAP TO BE 300mm

PLANE AND OVERLAY DETAIL



- NOTES:
- DETAILS OF EXISTING ROAD ALIGNMENTS, LEVELS AND CONSTRUCTION SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORKS.
 - THE CONTRACTOR IS TO CHECK THE SETTING OUT OF THE ALL NEW ROADS TO ENSURE FIT WITH AND WITHIN THE SITE BOUNDARY BEFORE CONSTRUCTION COMMENCES.
 - THE CONTRACTOR SHALL ASCERTAIN THE DEPTHS, SIZES AND LOCATIONS OF ALL SERVICES WITHIN ROADWAYS BEFORE EXCAVATION COMMENCES ANY CONFLICTS WITH THE SPECIFIED PAVEMENTS ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.
 - PAVEMENT DESIGN IS BASED ON A SUBGRADE WITH A MIN. 2.5% CBR VALUE
 - LOCALISED SOFT SPOTS IN THE SUB-GRADE DETERMINED DURING THE INITIAL WORKS ARE TO BE REMOVED, WHERE POSSIBLE, AND MADE UP BY LOCAL REGULATING MATERIAL AS NOTED ON THE DETAILS
 - ALL MATERIALS AND WORKMANSHIP ARE TO BE IN ACCORDANCE WITH THE HIGHWAYS AGENCY MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAYS WORKS.
 - ALL KERBS ARE TO BE MANUFACTURED AND TESTED IN ACCORDANCE WITH BS 7263 PART 1:1990. WHERE NECESSARY A CHASE SHALL BE MADE IN THE SUB-BASE TO ALLOW FOR A MINIMUM 150mm DEEP KERB BED.
 - KERBS MAY BE LAID DIRECTLY ONTO THE CONCRETE KERB BED WHILST IT IS STILL IN THE PLASTIC CONDITION SUBJECT TO THE APPROVAL OF THE ENGINEER, OTHERWISE A 25mm THICK MORTAR BED AND SHEAR KEY TO THE BACKING SHALL BE PROVIDED.
 - WHERE VISIBILITY SPLAYS ARE SHOWN NO PLANTING WITH A MATURE HEIGHT IN EXCESS OF 600mm OR OBSTRUCTIONS ARE TO BE INTRODUCED.
 - ALL CONCRETE IS TO HAVE SULPHATE RESISTANCE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE SITE INVESTIGATION.

TOLERANCES:

HORIZONTAL ALIGNMENTS
EDGE OF PAVEMENTS AND ALL OTHER PARALLEL ALIGNMENTS: +25mm TO -25mm
KERBS, CHANNEL BLOCKS, CHANNEL DRAINS AND EDGE LINES: +13mm TO -13mm

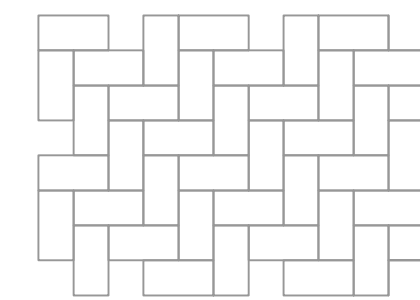
SURFACE LEVELS OF PAVEMENT COURSES
THE TOLERANCES IN SURFACE LEVELS FROM THAT STATED ON THE CONTRACT DRAWINGS ARE:
SURFACE COURSES: +6mm TO -6mm (BLOCK PAVES UPSTANDS TO SUPPLIERS DETAILS)
BINDER COURSES: +6mm TO -6mm
BASE COURSES: +15mm TO -15mm
SUB-BASE: +10mm TO -30mm
SUB-BASE UNDER CONCRETE PAVEMENT: +10mm TO -10mm
THE COMBINATION OF TOLERANCES SHALL NOT RESULT IN A REDUCTION IN THE THICKNESS OF THE PAVEMENT, EXCLUDING SUBBASE, BY MORE THAN 15mm FROM THE SPECIFIED THICKNESS NOR A REDUCTION OF THE BITUMINOUS SURFACE COURSE BY MORE THAN 5mm FROM THAT SPECIFIED.

SURFACE REGULARITY
THIS REQUIREMENT IS IN ADDITION TO THE LEVEL TOLERANCES AND IS INDEPENDENT OF THEM.
A STRAIGHT EDGE 3m LONG IS LAID BOTH LONGITUDINALLY AND TRANSVERSELY, THE MAXIMUM ALLOWABLE DIFFERENCE BETWEEN THE SURFACE AND THE UNDERSIDE OF THE STRAIGHT EDGE SHALL BE FOR:
SURFACE COURSES: 3mm
BINDER COURSES: 6mm
BASE COURSES: 6mm
SUB-BASE: 10mm
SURFACE GRADIENTS
1. TO CONFORM TO THE BRITISH STANDARDS THE MINIMUM FALL TO LINE DRAINAGE SYSTEMS OR KERBS IS 1:60 WHILST THE MINIMUM LONGITUDINAL FALL ALONG KERBS IS 1:150.
2. IF THE RESULTANT GRADIENT ON A WEARING COURSE IS LESS THAN 1:67 SOME PONDING MAY OCCUR ON A SURFACE WHICH IS WITHIN THE SURFACE REGULARITY SPECIFICATION.

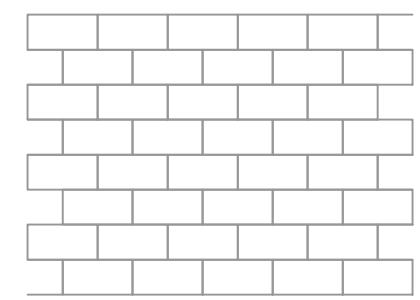
MATERIAL TESTING REGIME
THE EVALUATION AND CONFORMITY OF ASPHALT MIXTURES WITH THE REQUIREMENTS OF THE EUROPEAN ASPHALT STANDARDS IS COVERED BY TWO STANDARDS IN THE EN 13108 SERIES:
• BS EN 13108 - 20 - TYPE TESTING
• BS EN 13108 - 21 - FACTORY PRODUCTION
THE MANUFACTURER AND SUPPLIER OF THE AS SPECIFIED ASPHALT MIXTURES AS NOTED ON THIS DRAWING SHALL CONFIRM AND SUPPLY RELEVANT CERTIFICATION THAT THEY HAVE SUPPLIED SAID ASPHALT MIXTURES WHICH HAVE BEEN TESTED IN LINE WITH THESE RELEVANT STANDARDS.

LAYING PATTERNS

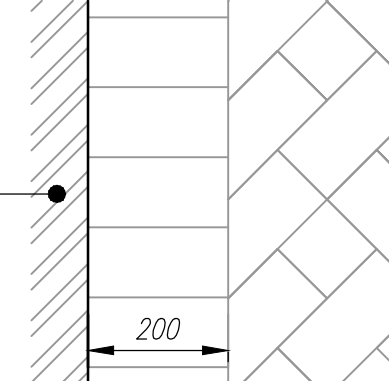
NOT TO SCALE



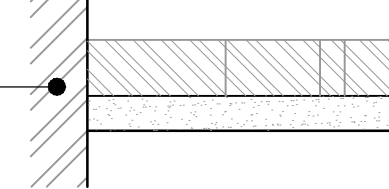
HERRINGBONE BOND
THE RECOMMENDED PATTERN FOR VEHICULAR TRAFFIC.



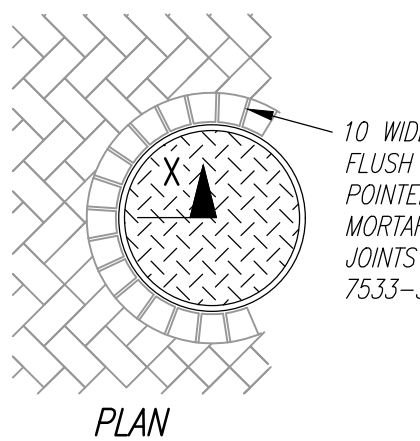
STRETCHER OR RUNNING BOND
DIRECTION OF BOND TO BE PERPENDICULAR TO MAIN TRAFFIC FLOW



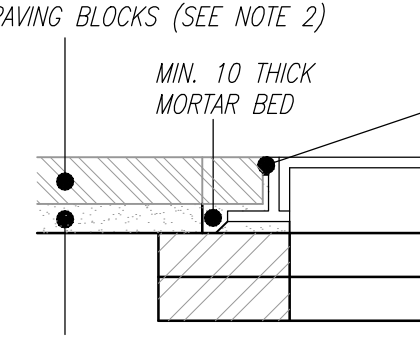
EDGE TRIM AT BUILDING FACADE



EDGE TRIM AT KERB



PAVING BLOCKS (SEE NOTE 2)



PAVING BLOCKS (SEE NOTE 2)

SECTION XX

SECTION YY

SECTION ZZ

EDGE TRIMS TO ACCESS COVERS

LAYING PATTERNS NOTES:

- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED
- PAVING BLOCKS ARE AVAILABLE IN VARIOUS THICKNESSES. MIN PAVES THICKNESS TO BE 80mm
- CONCRETE BLOCKS ARE TO COMPLY WITH THE REQUIREMENTS OF BS EN 1338: 2003
- BLOCKS SHOULD BE LAID IN ACCORDANCE WITH BS 7533-3
- WHERE THE TRIMMING OF BLOCKS IS NECESSARY, PORTIONS OF LESS THAN ONE THIRD OF AN ENTIRE BLOCK SHALL NOT BE LAID. INSTEAD THE PATTERN SHOULD BE ALTERED TO ENABLE LARGER PIECES OF BLOCK TO BE USED
- BLOCKS BEDDED ON EPOXY MORTAR SHOULD HAVE THE TOP 30mm OF THEIR VERTICAL JOINTS RAKED OUT AND RE-POINTED WITH 40 N/mm² JOINTING MORTAR TO BS 7533-7 TABLE C5 (3mm MAX. AGG.)
- ALL CLAUSE NUMBERS REFER TO SPECIFICATION FOR HIGHWAY WORKS AND BS 7533, LATEST EDITION.

- General Notes
- TO BE READ WITH ALL OTHER JDL CONSULTANTS LTD DRAWINGS AND SPECIFICATIONS.
 - DO NOT SCALE THIS DRAWING.

Rev	Date	Revision Description	By	Chk
T02	13.10.25	NOTE ON PERM REVISED	TN	NB
T01	25.09.25	FIRST ISSUE	TN	NB

JDL CONSULTANTS LTD
CIVIL AND STRUCTURAL CONSULTING ENGINEERS

27A Osprey Court, Hawkfield Way, Hawkfield Business Park, Bristol, BS14 0BB. Tel - 01275 372154
E-mail - jdl@jdlconsultants.co.uk

1st Floor, 200 Tower Bridge Road, London. SE1 2UN.
Tel - 0203 7275 380 E-mail - jdl@jdlconsultants.co.uk

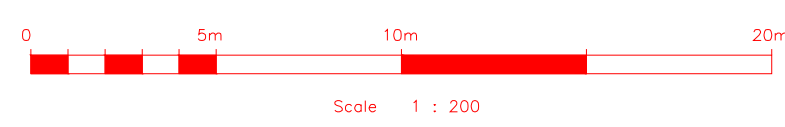
Drawing Title
Hardstanding Details

Author:
Kendall Kingscott Ltd

Project
Melksham Hospital Site Entrance Reconfiguration

Drawn By TN	Checked By NB	Approved By NB	Date Drawn 25/09/25	Project No. 24390	Scale NTS
Printed 24390	Original JDL	Volume XX	Level XX	Room DR	Number E
					Rev 25
					Rev T02

Appendix C:
CCTV Survey



Appendix D:
Calculations

**Design Settings**

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	1.000
CV	0.750	Preferred Cover Depth (m)	0.600
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
EX SW 10		5.00	39.359	900	600	390942.041	163189.007	0.749	38.610
EX SW 13		5.00	39.262	900	600	390920.999	163177.044	0.872	38.390
EX SW 11		5.00	39.280	900	600	390943.278	163173.889	0.700	38.580
EX SW 14			39.190	900	600	390930.886	163163.093	0.770	38.420
SW01	0.009	5.00	39.273	450		390918.768	163125.497	0.771	38.502
SW02			39.316	450		390909.809	163136.560	0.842	38.474
SW03	0.004	5.00	39.288	450		390934.782	163137.976	0.607	38.681
SW04	0.009	5.00	39.113	450		390936.197	163157.928	0.513	38.600
SW05	0.039	5.00	39.122	450		390925.738	163149.459	0.587	38.535
SW06			39.215	450		390919.148	163144.122	0.765	38.450
SW07	0.035	5.00	39.128	450		390923.177	163152.621	0.634	38.494
SW08FC			39.210	600		390916.587	163147.284	0.801	38.409
SW10		5.00	39.177	450		390917.886	163165.681	0.552	38.625
SW11	0.040	5.00	39.277	450		390917.540	163161.584	0.693	38.584
SW12FC			39.385	600		390906.464	163152.562	0.944	38.441
EX SW 15			39.279	900	600	390911.778	163146.387	0.919	38.360
OUT			39.360			390902.299	163137.990	1.074	38.286

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)
1.000	EX SW 10	EX SW 14	28.213	0.600	38.610	38.420	0.190	148.5	150	5.57	48.3
2.000	EX SW 13	EX SW 14	17.099	0.600	38.390	38.420	-0.030	-570.0	150	30.00	49.3
3.000	EX SW 11	EX SW 14	16.435	0.600	38.580	38.420	0.160	102.7	150	5.28	49.4
1.001	EX SW 14	EX SW 15	25.381	0.600	38.420	38.360	0.060	423.0	225	30.00	45.1
4.000	SW01	SW02	14.236	0.600	38.502	38.474	0.028	500.0	100	5.70	47.8
4.001	SW02	SW06	12.017	0.600	38.474	38.450	0.024	500.7	100	6.30	45.6
5.000	SW03	SW05	14.617	0.600	38.681	38.535	0.146	100.0	150	5.24	49.5
6.000	SW04	SW05	13.458	0.600	38.600	38.535	0.065	207.0	150	5.32	49.6

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)
1.000	0.822	14.5	0.0	0.599	0.620	0.000	0.0	0	0.000
2.000	0.007	0.1	0.0	0.722	0.620	0.000	0.0	0	0.000
3.000	0.991	17.5	0.0	0.550	0.620	0.000	0.0	0	0.000
1.001	0.629	25.0	0.0	0.545	0.694	0.000	0.0	0	0.000
4.000	0.337	2.7	1.2	0.671	0.742	0.009	0.0	46	0.327
4.001	0.337	2.6	1.1	0.742	0.665	0.009	0.0	46	0.324
5.000	1.005	17.8	0.6	0.457	0.437	0.004	0.0	19	0.465
6.000	0.694	12.3	1.3	0.363	0.437	0.009	0.0	33	0.448

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)
5.001	SW05	SW06	8.480	0.600	38.535	38.450	0.085	99.8	150	5.46	48.7
4.002	SW06	SW08FC	4.069	0.600	38.450	38.409	0.041	100.0	150	6.36	45.4
7.000	SW07	SW08FC	8.480	0.600	38.494	38.409	0.085	100.0	150	5.14	49.9
4.003	SW08FC	EX SW 15	4.892	0.600	38.409	38.360	0.049	100.0	150	6.45	45.1
8.000	SW10	SW11	4.112	0.600	38.625	38.584	0.041	100.0	150	5.07	50.0
8.001	SW11	SW12FC	14.285	0.600	38.584	38.441	0.143	99.9	150	5.31	49.3
8.002	SW12FC	EX SW 15	8.147	0.600	38.441	38.360	0.081	100.0	150	5.44	48.7
1.002	EX SW 15	OUT	12.663	0.600	38.360	38.286	0.074	171.1	225	30.00	44.4

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)
5.001	1.006	17.8	6.9	0.437	0.615	0.052	0.0	65	0.942
4.002	1.005	17.8	7.6	0.615	0.651	0.062	0.0	68	0.964
7.000	1.005	17.8	4.7	0.484	0.651	0.035	0.0	52	0.848
4.003	1.005	17.8	11.8	0.651	0.769	0.096	0.0	89	1.073
8.000	1.005	17.8	0.0	0.402	0.543	0.000	0.0	0	0.000
8.001	1.005	17.8	5.3	0.543	0.794	0.040	0.0	56	0.877
8.002	1.005	17.8	5.3	0.794	0.769	0.040	0.0	56	0.877
1.002	0.996	39.6	16.4	0.694	0.849	0.136	0.0	101	0.950

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	28.213	148.5	150	Circular	39.359	38.610	0.599	39.190	38.420	0.620
2.000	17.099	-570.0	150	Circular	39.262	38.390	0.722	39.190	38.420	0.620
3.000	16.435	102.7	150	Circular	39.280	38.580	0.550	39.190	38.420	0.620
1.001	25.381	423.0	225	Circular	39.190	38.420	0.545	39.279	38.360	0.694
4.000	14.236	500.0	100	Circular	39.273	38.502	0.671	39.316	38.474	0.742
4.001	12.017	500.7	100	Circular	39.316	38.474	0.742	39.215	38.450	0.665
5.000	14.617	100.0	150	Circular	39.288	38.681	0.457	39.122	38.535	0.437
6.000	13.458	207.0	150	Circular	39.113	38.600	0.363	39.122	38.535	0.437
5.001	8.480	99.8	150	Circular	39.122	38.535	0.437	39.215	38.450	0.615
4.002	4.069	100.0	150	Circular	39.215	38.450	0.615	39.210	38.409	0.651
7.000	8.480	100.0	150	Circular	39.128	38.494	0.484	39.210	38.409	0.651
4.003	4.892	100.0	150	Circular	39.210	38.409	0.651	39.279	38.360	0.769

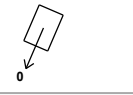
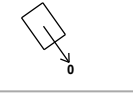
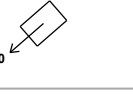
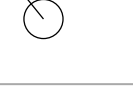
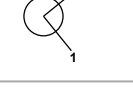
Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Width (mm)	Node Type	MH Type
1.000	EX SW 10	900	600	Manhole	Manhole	EX SW 14	900	600	Manhole	Manhole
2.000	EX SW 13	900	600	Manhole	Manhole	EX SW 14	900	600	Manhole	Manhole
3.000	EX SW 11	900	600	Manhole	Manhole	EX SW 14	900	600	Manhole	Manhole
1.001	EX SW 14	900	600	Manhole	Manhole	EX SW 15	900	600	Manhole	Manhole
4.000	SW01	450		Manhole	Manhole	SW02	450		Manhole	Manhole
4.001	SW02	450		Manhole	Manhole	SW06	450		Manhole	Manhole
5.000	SW03	450		Manhole	Manhole	SW05	450		Manhole	Manhole
6.000	SW04	450		Manhole	Manhole	SW05	450		Manhole	Manhole
5.001	SW05	450		Manhole	Manhole	SW06	450		Manhole	Manhole
4.002	SW06	450		Manhole	Manhole	SW08FC	600		Manhole	Manhole
7.000	SW07	450		Manhole	Manhole	SW08FC	600		Manhole	Manhole
4.003	SW08FC	600		Manhole	Manhole	EX SW 15	900	600	Manhole	Manhole

**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)
8.000	4.112	100.0	150	Circular	39.177	38.625	0.402	39.277	38.584	0.543
8.001	14.285	99.9	150	Circular	39.277	38.584	0.543	39.385	38.441	0.794
8.002	8.147	100.0	150	Circular	39.385	38.441	0.794	39.279	38.360	0.769
1.002	12.663	171.1	225	Circular	39.279	38.360	0.694	39.360	38.286	0.849

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Width (mm)	Node Type	MH Type
8.000	SW10	450		Manhole	Manhole	SW11	450		Manhole	Manhole
8.001	SW11	450		Manhole	Manhole	SW12FC	600		Manhole	Manhole
8.002	SW12FC	600		Manhole	Manhole	EX SW 15	900	600	Manhole	Manhole
1.002	EX SW 15	900	600	Manhole	Manhole	OUT			Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
EX SW 10	390942.041	163189.007	39.359	0.749	900	600	 0	1.000	38.610	150
EX SW 13	390920.999	163177.044	39.262	0.872	900	600	 0	2.000	38.390	150
EX SW 11	390943.278	163173.889	39.280	0.700	900	600	 0	3.000	38.580	150
EX SW 14	390930.886	163163.093	39.190	0.770	900	600	 1 2 3 0	3.000 2.000 1.000 1.001	38.420 38.420 38.420 38.420	150 150 150 225
SW01	390918.768	163125.497	39.273	0.771	450		 0	4.000	38.502	100
SW02	390909.809	163136.560	39.316	0.842	450		 1 0	4.000 4.001	38.474 38.474	100 100
SW03	390934.782	163137.976	39.288	0.607	450		 0	5.000	38.681	150
SW04	390936.197	163157.928	39.113	0.513	450		 0	6.000	38.600	150
SW05	390925.738	163149.459	39.122	0.587	450		 1 2 0	6.000 5.000 5.001	38.535 38.535 38.535	150 150 150

**Manhole Schedule**

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)	
SW06	390919.148	163144.122	39.215	0.765	450			1 2 0	5.001 4.001 4.002	38.450 38.450 38.450	150 100 150
SW07	390923.177	163152.621	39.128	0.634	450			0	7.000	38.494	150
SW08FC	390916.587	163147.284	39.210	0.801	600			1 2 0	7.000 4.002 4.003	38.409 38.409 38.409	150 150 150
SW10	390917.886	163165.681	39.177	0.552	450			0	8.000	38.625	150
SW11	390917.540	163161.584	39.277	0.693	450			1 0	8.000 8.001	38.584 38.584	150 150
SW12FC	390906.464	163152.562	39.385	0.944	600			1 0	8.001 8.002	38.441 38.441	150 150
EX SW 15	390911.778	163146.387	39.279	0.919	900	600		1 2 3 0	8.002 4.003 1.001 1.002	38.360 38.360 38.360 38.360	150 150 225 225
OUT	390902.299	163137.990	39.360	1.074				1	1.002	38.286	225

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	1 year (l/s)	0.5
Rainfall Events	Singular	Drain Down Time (mins)	240	30 year (l/s)	1.3
Summer CV	0.750	Additional Storage (m³/ha)	0.0	100 year (l/s)	1.6
Winter CV	0.840	Starting Level (m)		Check Discharge Volume	x
Analysis Speed	Detailed	Check Discharge Rate(s)	✓		

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
2	0	0	0
5	0	0	0
10	0	0	0
30	0	0	0



Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
30	35	0	0
30	40	0	0
100	0	0	0
100	40	0	0
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.98
Greenfield Method	FEH	Growth Factor 100 year	2.42
Positively Drained Area (ha)	0.136	Betterment (%)	0
SAAR (mm)	697	QMed	0.6
Host	22	QBar	0.7
BFIHost	0.320	Q 1 year (l/s)	0.5
Region	8	Q 30 year (l/s)	1.3
QBar/QMed conversion factor	1.075	Q 100 year (l/s)	1.6
Growth Factor 1 year	0.78		

Node SW12FC Online Orifice Control

Flap Valve	x	Design Depth (m)	0.900	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	0.5		
Invert Level (m)	38.441	Diameter (m)	0.015		

Node SW08FC Online Orifice Control

Flap Valve	x	Design Depth (m)	0.800	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	1.8		
Invert Level (m)	38.409	Diameter (m)	0.031		

Node SW03 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	38.683
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	136

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	25.0	0.0	0.300	25.0	0.0	0.301	0.0	0.0

Node SW04 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	38.603
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	46.6	0.0	0.300	46.6	0.0	0.301	0.0	0.0

Node SW10 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	38.730	Slope (1:X)	80.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.350
Safety Factor	2.0	Width (m)	14.600	Inf Depth (m)	
Porosity	0.30	Length (m)	4.800		

**Node SW12FC Depth/Area Storage Structure**

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	38.701
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	66.2	0.0	0.300	66.2	0.0	0.301	0.0	0.0

Node SW02 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	38.545
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	40.1	0.0	0.300	40.1	0.0	0.301	0.0	0.0

Node SW08FC Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	38.535
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	38.2	0.0	0.300	38.2	0.0	0.301	0.0	0.0

Node SW06 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	38.535
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	24.0	0.0	0.300	24.0	0.0	0.301	0.0	0.0

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	62.198	17.600
1 year 15 minute winter	43.648	17.600
1 year 30 minute summer	40.288	11.400
1 year 30 minute winter	28.272	11.400
1 year 60 minute summer	26.488	7.000
1 year 60 minute winter	17.598	7.000
1 year 120 minute summer	20.623	5.450
1 year 120 minute winter	13.701	5.450
1 year 180 minute summer	17.417	4.482
1 year 180 minute winter	11.322	4.482
1 year 240 minute summer	14.528	3.839
1 year 240 minute winter	9.652	3.839
1 year 360 minute summer	11.760	3.026
1 year 360 minute winter	7.644	3.026
1 year 480 minute summer	9.537	2.520
1 year 480 minute winter	6.336	2.520

**Rainfall**

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 600 minute summer	7.946	2.173
1 year 600 minute winter	5.429	2.173
1 year 720 minute summer	7.160	1.919
1 year 720 minute winter	4.812	1.919
1 year 960 minute summer	5.954	1.568
1 year 960 minute winter	3.944	1.568
1 year 1440 minute summer	4.378	1.173
1 year 1440 minute winter	2.942	1.173
1 year 2160 minute summer	3.177	0.878
1 year 2160 minute winter	2.189	0.878
1 year 2880 minute summer	2.683	0.719
1 year 2880 minute winter	1.803	0.719
1 year 4320 minute summer	2.118	0.554
1 year 4320 minute winter	1.395	0.554
1 year 5760 minute summer	1.823	0.467
1 year 5760 minute winter	1.180	0.467
1 year 7200 minute summer	1.619	0.413
1 year 7200 minute winter	1.045	0.413
1 year 8640 minute summer	1.476	0.376
1 year 8640 minute winter	0.952	0.376
1 year 10080 minute summer	1.372	0.350
1 year 10080 minute winter	0.885	0.350
2 year 15 minute summer	98.952	28.000
2 year 15 minute winter	69.440	28.000
2 year 30 minute summer	62.905	17.800
2 year 30 minute winter	44.144	17.800
2 year 60 minute summer	41.624	11.000
2 year 60 minute winter	27.654	11.000
2 year 120 minute summer	29.392	7.767
2 year 120 minute winter	19.527	7.767
2 year 180 minute summer	23.976	6.170
2 year 180 minute winter	15.585	6.170
2 year 240 minute summer	19.628	5.187
2 year 240 minute winter	13.040	5.187
2 year 360 minute summer	15.567	4.006
2 year 360 minute winter	10.119	4.006
2 year 480 minute summer	12.446	3.289
2 year 480 minute winter	8.269	3.289
2 year 600 minute summer	10.266	2.808
2 year 600 minute winter	7.014	2.808
2 year 720 minute summer	9.181	2.461
2 year 720 minute winter	6.170	2.461
2 year 960 minute summer	7.561	1.991
2 year 960 minute winter	5.009	1.991
2 year 1440 minute summer	5.482	1.469
2 year 1440 minute winter	3.684	1.469
2 year 2160 minute summer	3.930	1.086
2 year 2160 minute winter	2.708	1.086
2 year 2880 minute summer	3.290	0.882
2 year 2880 minute winter	2.211	0.882
2 year 4320 minute summer	2.554	0.668
2 year 4320 minute winter	1.682	0.668

**Rainfall**

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 5760 minute summer	2.170	0.555
2 year 5760 minute winter	1.404	0.555
2 year 7200 minute summer	1.908	0.487
2 year 7200 minute winter	1.231	0.487
2 year 8640 minute summer	1.724	0.440
2 year 8640 minute winter	1.113	0.440
2 year 10080 minute summer	1.591	0.406
2 year 10080 minute winter	1.027	0.406
5 year 15 minute summer	159.666	45.180
5 year 15 minute winter	112.047	45.180
5 year 30 minute summer	102.382	28.971
5 year 30 minute winter	71.847	28.971
5 year 60 minute summer	67.546	17.851
5 year 60 minute winter	44.876	17.851
5 year 120 minute summer	44.129	11.662
5 year 120 minute winter	29.318	11.662
5 year 180 minute summer	34.846	8.967
5 year 180 minute winter	22.651	8.967
5 year 240 minute summer	27.967	7.391
5 year 240 minute winter	18.580	7.391
5 year 360 minute summer	21.621	5.564
5 year 360 minute winter	14.054	5.564
5 year 480 minute summer	17.094	4.517
5 year 480 minute winter	11.357	4.517
5 year 600 minute summer	14.005	3.831
5 year 600 minute winter	9.569	3.831
5 year 720 minute summer	12.467	3.341
5 year 720 minute winter	8.379	3.341
5 year 960 minute summer	10.199	2.686
5 year 960 minute winter	6.756	2.686
5 year 1440 minute summer	7.308	1.958
5 year 1440 minute winter	4.911	1.958
5 year 2160 minute summer	5.161	1.426
5 year 2160 minute winter	3.556	1.426
5 year 2880 minute summer	4.268	1.144
5 year 2880 minute winter	2.868	1.144
5 year 4320 minute summer	3.248	0.849
5 year 4320 minute winter	2.139	0.849
5 year 5760 minute summer	2.716	0.695
5 year 5760 minute winter	1.758	0.695
5 year 7200 minute summer	2.357	0.601
5 year 7200 minute winter	1.521	0.601
5 year 8640 minute summer	2.107	0.537
5 year 8640 minute winter	1.360	0.537
5 year 10080 minute summer	1.926	0.491
5 year 10080 minute winter	1.243	0.491
10 year 15 minute summer	203.558	57.600
10 year 15 minute winter	142.848	57.600
10 year 30 minute summer	131.306	37.155
10 year 30 minute winter	92.144	37.155
10 year 60 minute summer	86.568	22.878
10 year 60 minute winter	57.514	22.878

**Rainfall**

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
10 year 120 minute summer	54.488	14.399
10 year 120 minute winter	36.200	14.399
10 year 180 minute summer	42.401	10.911
10 year 180 minute winter	27.562	10.911
10 year 240 minute summer	33.792	8.930
10 year 240 minute winter	22.451	8.930
10 year 360 minute summer	26.002	6.691
10 year 360 minute winter	16.902	6.691
10 year 480 minute summer	20.524	5.424
10 year 480 minute winter	13.636	5.424
10 year 600 minute summer	16.797	4.594
10 year 600 minute winter	11.477	4.594
10 year 720 minute summer	14.939	4.004
10 year 720 minute winter	10.040	4.004
10 year 960 minute summer	12.193	3.211
10 year 960 minute winter	8.077	3.211
10 year 1440 minute summer	8.702	2.332
10 year 1440 minute winter	5.848	2.332
10 year 2160 minute summer	6.116	1.690
10 year 2160 minute winter	4.214	1.690
10 year 2880 minute summer	5.032	1.349
10 year 2880 minute winter	3.382	1.349
10 year 4320 minute summer	3.774	0.987
10 year 4320 minute winter	2.485	0.987
10 year 5760 minute summer	3.114	0.797
10 year 5760 minute winter	2.015	0.797
10 year 7200 minute summer	2.676	0.683
10 year 7200 minute winter	1.727	0.683
10 year 8640 minute summer	2.372	0.605
10 year 8640 minute winter	1.531	0.605
10 year 10080 minute summer	2.153	0.549
10 year 10080 minute winter	1.389	0.549
30 year 15 minute summer	271.852	76.925
30 year 15 minute winter	190.773	76.925
30 year 30 minute summer	177.051	50.099
30 year 30 minute winter	124.246	50.099
30 year 60 minute summer	116.947	30.906
30 year 60 minute winter	77.697	30.906
30 year 120 minute summer	71.496	18.894
30 year 120 minute winter	47.500	18.894
30 year 180 minute summer	54.982	14.149
30 year 180 minute winter	35.740	14.149
30 year 240 minute summer	43.587	11.519
30 year 240 minute winter	28.958	11.519
30 year 360 minute summer	33.479	8.615
30 year 360 minute winter	21.762	8.615
30 year 480 minute summer	26.489	7.000
30 year 480 minute winter	17.599	7.000
30 year 600 minute summer	21.741	5.947
30 year 600 minute winter	14.855	5.947
30 year 720 minute summer	19.387	5.196
30 year 720 minute winter	13.029	5.196

**Rainfall**

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year 960 minute summer	15.881	4.182
30 year 960 minute winter	10.520	4.182
30 year 1440 minute summer	11.382	3.051
30 year 1440 minute winter	7.650	3.051
30 year 2160 minute summer	7.964	2.201
30 year 2160 minute winter	5.487	2.201
30 year 2880 minute summer	6.490	1.739
30 year 2880 minute winter	4.362	1.739
30 year 4320 minute summer	4.747	1.241
30 year 4320 minute winter	3.126	1.241
30 year 5760 minute summer	3.830	0.980
30 year 5760 minute winter	2.479	0.980
30 year 7200 minute summer	3.230	0.824
30 year 7200 minute winter	2.085	0.824
30 year 8640 minute summer	2.819	0.719
30 year 8640 minute winter	1.819	0.719
30 year 10080 minute summer	2.523	0.644
30 year 10080 minute winter	1.629	0.644
30 year +35% CC 15 minute summer	367.000	103.848
30 year +35% CC 15 minute winter	257.544	103.848
30 year +35% CC 30 minute summer	239.018	67.634
30 year +35% CC 30 minute winter	167.732	67.634
30 year +35% CC 60 minute summer	157.879	41.723
30 year +35% CC 60 minute winter	104.891	41.723
30 year +35% CC 120 minute summer	96.520	25.507
30 year +35% CC 120 minute winter	64.126	25.507
30 year +35% CC 180 minute summer	74.226	19.101
30 year +35% CC 180 minute winter	48.249	19.101
30 year +35% CC 240 minute summer	58.843	15.550
30 year +35% CC 240 minute winter	39.094	15.550
30 year +35% CC 360 minute summer	45.197	11.631
30 year +35% CC 360 minute winter	29.379	11.631
30 year +35% CC 480 minute summer	35.760	9.450
30 year +35% CC 480 minute winter	23.758	9.450
30 year +35% CC 600 minute summer	29.350	8.028
30 year +35% CC 600 minute winter	20.054	8.028
30 year +35% CC 720 minute summer	26.173	7.015
30 year +35% CC 720 minute winter	17.590	7.015
30 year +35% CC 960 minute summer	21.440	5.646
30 year +35% CC 960 minute winter	14.202	5.646
30 year +35% CC 1440 minute summer	15.366	4.118
30 year +35% CC 1440 minute winter	10.327	4.118
30 year +35% CC 2160 minute summer	10.751	2.971
30 year +35% CC 2160 minute winter	7.408	2.971
30 year +35% CC 2880 minute summer	8.761	2.348
30 year +35% CC 2880 minute winter	5.888	2.348
30 year +35% CC 4320 minute summer	6.408	1.675
30 year +35% CC 4320 minute winter	4.220	1.675
30 year +35% CC 5760 minute summer	5.170	1.323
30 year +35% CC 5760 minute winter	3.346	1.323
30 year +35% CC 7200 minute summer	4.361	1.113
30 year +35% CC 7200 minute winter	2.815	1.113

**Rainfall**

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year +35% CC 8640 minute summer	3.805	0.971
30 year +35% CC 8640 minute winter	2.456	0.971
30 year +35% CC 10080 minute summer	3.406	0.869
30 year +35% CC 10080 minute winter	2.199	0.869
30 year +40% CC 15 minute summer	380.593	107.695
30 year +40% CC 15 minute winter	267.083	107.695
30 year +40% CC 30 minute summer	247.871	70.139
30 year +40% CC 30 minute winter	173.945	70.139
30 year +40% CC 60 minute summer	163.726	43.268
30 year +40% CC 60 minute winter	108.776	43.268
30 year +40% CC 120 minute summer	100.095	26.452
30 year +40% CC 120 minute winter	66.501	26.452
30 year +40% CC 180 minute summer	76.975	19.808
30 year +40% CC 180 minute winter	50.036	19.808
30 year +40% CC 240 minute summer	61.022	16.126
30 year +40% CC 240 minute winter	40.542	16.126
30 year +40% CC 360 minute summer	46.871	12.062
30 year +40% CC 360 minute winter	30.467	12.062
30 year +40% CC 480 minute summer	37.085	9.800
30 year +40% CC 480 minute winter	24.638	9.800
30 year +40% CC 600 minute summer	30.437	8.325
30 year +40% CC 600 minute winter	20.796	8.325
30 year +40% CC 720 minute summer	27.142	7.274
30 year +40% CC 720 minute winter	18.241	7.274
30 year +40% CC 960 minute summer	22.234	5.855
30 year +40% CC 960 minute winter	14.728	5.855
30 year +40% CC 1440 minute summer	15.935	4.271
30 year +40% CC 1440 minute winter	10.709	4.271
30 year +40% CC 2160 minute summer	11.149	3.081
30 year +40% CC 2160 minute winter	7.682	3.081
30 year +40% CC 2880 minute summer	9.086	2.435
30 year +40% CC 2880 minute winter	6.106	2.435
30 year +40% CC 4320 minute summer	6.646	1.738
30 year +40% CC 4320 minute winter	4.376	1.738
30 year +40% CC 5760 minute summer	5.362	1.373
30 year +40% CC 5760 minute winter	3.470	1.373
30 year +40% CC 7200 minute summer	4.523	1.154
30 year +40% CC 7200 minute winter	2.919	1.154
30 year +40% CC 8640 minute summer	3.946	1.007
30 year +40% CC 8640 minute winter	2.547	1.007
30 year +40% CC 10080 minute summer	3.533	0.901
30 year +40% CC 10080 minute winter	2.280	0.901
100 year 15 minute summer	349.937	99.020
100 year 15 minute winter	245.570	99.020
100 year 30 minute summer	228.844	64.755
100 year 30 minute winter	160.592	64.755
100 year 60 minute summer	152.325	40.255
100 year 60 minute winter	101.201	40.255
100 year 120 minute summer	91.692	24.232
100 year 120 minute winter	60.918	24.232
100 year 180 minute summer	70.500	18.142
100 year 180 minute winter	45.827	18.142

**Rainfall**

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year 240 minute summer	56.093	14.824
100 year 240 minute winter	37.267	14.824
100 year 360 minute summer	43.514	11.198
100 year 360 minute winter	28.285	11.198
100 year 480 minute summer	34.679	9.165
100 year 480 minute winter	23.040	9.165
100 year 600 minute summer	28.614	7.827
100 year 600 minute winter	19.551	7.827
100 year 720 minute summer	25.621	6.867
100 year 720 minute winter	17.219	6.867
100 year 960 minute summer	21.113	5.560
100 year 960 minute winter	13.986	5.560
100 year 1440 minute summer	15.169	4.066
100 year 1440 minute winter	10.195	4.066
100 year 2160 minute summer	10.558	2.918
100 year 2160 minute winter	7.275	2.918
100 year 2880 minute summer	8.521	2.284
100 year 2880 minute winter	5.727	2.284
100 year 4320 minute summer	6.096	1.594
100 year 4320 minute winter	4.015	1.594
100 year 5760 minute summer	4.821	1.234
100 year 5760 minute winter	3.120	1.234
100 year 7200 minute summer	3.982	1.016
100 year 7200 minute winter	2.570	1.016
100 year 8640 minute summer	3.406	0.869
100 year 8640 minute winter	2.198	0.869
100 year 10080 minute summer	2.993	0.764
100 year 10080 minute winter	1.932	0.764
100 year +40% CC 15 minute summer	489.912	138.628
100 year +40% CC 15 minute winter	343.798	138.628
100 year +40% CC 30 minute summer	320.382	90.657
100 year +40% CC 30 minute winter	224.829	90.657
100 year +40% CC 60 minute summer	213.255	56.357
100 year +40% CC 60 minute winter	141.682	56.357
100 year +40% CC 120 minute summer	128.369	33.924
100 year +40% CC 120 minute winter	85.285	33.924
100 year +40% CC 180 minute summer	98.700	25.399
100 year +40% CC 180 minute winter	64.158	25.399
100 year +40% CC 240 minute summer	78.530	20.753
100 year +40% CC 240 minute winter	52.173	20.753
100 year +40% CC 360 minute summer	60.920	15.677
100 year +40% CC 360 minute winter	39.599	15.677
100 year +40% CC 480 minute summer	48.550	12.830
100 year +40% CC 480 minute winter	32.256	12.830
100 year +40% CC 600 minute summer	40.060	10.957
100 year +40% CC 600 minute winter	27.371	10.957
100 year +40% CC 720 minute summer	35.869	9.613
100 year +40% CC 720 minute winter	24.107	9.613
100 year +40% CC 960 minute summer	29.558	7.783
100 year +40% CC 960 minute winter	19.580	7.783
100 year +40% CC 1440 minute summer	21.237	5.692
100 year +40% CC 1440 minute winter	14.273	5.692

**Rainfall**

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +40% CC 2160 minute summer	14.781	4.085
100 year +40% CC 2160 minute winter	10.185	4.085
100 year +40% CC 2880 minute summer	11.929	3.197
100 year +40% CC 2880 minute winter	8.017	3.197
100 year +40% CC 4320 minute summer	8.534	2.231
100 year +40% CC 4320 minute winter	5.620	2.231
100 year +40% CC 5760 minute summer	6.750	1.728
100 year +40% CC 5760 minute winter	4.369	1.728
100 year +40% CC 7200 minute summer	5.574	1.422
100 year +40% CC 7200 minute winter	3.598	1.422
100 year +40% CC 8640 minute summer	4.768	1.216
100 year +40% CC 8640 minute winter	3.077	1.216
100 year +40% CC 10080 minute summer	4.191	1.069
100 year +40% CC 10080 minute winter	2.705	1.069
100 year +45% CC 15 minute summer	507.408	143.579
100 year +45% CC 15 minute winter	356.076	143.579
100 year +45% CC 30 minute summer	331.824	93.895
100 year +45% CC 30 minute winter	232.859	93.895
100 year +45% CC 60 minute summer	220.871	58.370
100 year +45% CC 60 minute winter	146.742	58.370
100 year +45% CC 120 minute summer	132.954	35.136
100 year +45% CC 120 minute winter	88.331	35.136
100 year +45% CC 180 minute summer	102.225	26.306
100 year +45% CC 180 minute winter	66.449	26.306
100 year +45% CC 240 minute summer	81.335	21.494
100 year +45% CC 240 minute winter	54.037	21.494
100 year +45% CC 360 minute summer	63.095	16.237
100 year +45% CC 360 minute winter	41.014	16.237
100 year +45% CC 480 minute summer	50.284	13.289
100 year +45% CC 480 minute winter	33.408	13.289
100 year +45% CC 600 minute summer	41.491	11.349
100 year +45% CC 600 minute winter	28.349	11.349
100 year +45% CC 720 minute summer	37.150	9.957
100 year +45% CC 720 minute winter	24.967	9.957
100 year +45% CC 960 minute summer	30.614	8.061
100 year +45% CC 960 minute winter	20.279	8.061
100 year +45% CC 1440 minute summer	21.995	5.895
100 year +45% CC 1440 minute winter	14.782	5.895
100 year +45% CC 2160 minute summer	15.309	4.231
100 year +45% CC 2160 minute winter	10.548	4.231
100 year +45% CC 2880 minute summer	12.355	3.311
100 year +45% CC 2880 minute winter	8.304	3.311
100 year +45% CC 4320 minute summer	8.839	2.311
100 year +45% CC 4320 minute winter	5.821	2.311
100 year +45% CC 5760 minute summer	6.991	1.790
100 year +45% CC 5760 minute winter	4.525	1.790
100 year +45% CC 7200 minute summer	5.773	1.473
100 year +45% CC 7200 minute winter	3.726	1.473
100 year +45% CC 8640 minute summer	4.938	1.260
100 year +45% CC 8640 minute winter	3.187	1.260
100 year +45% CC 10080 minute summer	4.340	1.107
100 year +45% CC 10080 minute winter	2.801	1.107

**Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	EX SW 10	1	38.610	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 13	1	38.390	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 11	1	38.580	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 14	1	38.420	0.000	0.0	0.0000	0.0000	OK
240 minute winter	SW01	180	38.579	0.077	0.2	0.0123	0.0000	OK
240 minute winter	SW02	180	38.579	0.105	0.5	1.3480	0.0000	SURCHARGED
360 minute winter	SW03	224	38.689	0.008	0.1	0.1585	0.0000	OK
120 minute winter	SW04	82	38.613	0.013	0.3	0.4473	0.0000	OK
240 minute winter	SW05	176	38.579	0.044	1.1	0.0071	0.0000	OK
240 minute winter	SW06	176	38.579	0.129	1.1	1.0440	0.0000	OK
240 minute winter	SW07	176	38.579	0.085	0.8	0.0136	0.0000	OK
240 minute winter	SW08FC	176	38.579	0.170	1.2	1.6755	0.0000	SURCHARGED
240 minute winter	SW10	180	38.733	0.108	0.1	0.0195	0.0000	OK
240 minute winter	SW11	184	38.733	0.149	0.9	0.0237	0.0000	OK
240 minute winter	SW12FC	184	38.733	0.292	0.9	2.1406	0.0000	SURCHARGED
240 minute winter	EX SW 15	176	38.385	0.025	1.0	0.0136	0.0000	OK
240 minute winter	OUT	176	38.311	0.025	1.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	EX SW 10	1.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 13	2.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 11	3.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 14	1.001	EX SW 15	0.0	0.000	0.000	0.0293	
240 minute winter	SW01	4.000	SW02	0.2	0.229	0.073	0.1020	
240 minute winter	SW02	4.001	SW06	-0.3	0.117	-0.128	0.0940	
360 minute winter	SW03	5.000	SW05	0.1	0.089	0.006	0.0308	
120 minute winter	SW04	6.000	SW05	0.2	0.131	0.014	0.0293	
240 minute winter	SW05	5.001	SW06	1.1	0.333	0.062	0.0869	
240 minute winter	SW06	4.002	SW08FC	0.6	0.137	0.034	0.0687	
240 minute winter	SW07	7.000	SW08FC	0.8	0.327	0.044	0.1185	
240 minute winter	SW08FC	Orifice	EX SW 15	0.8				
240 minute winter	SW10	8.000	SW11	0.1	-0.024	0.005	0.0642	
240 minute winter	SW11	8.001	SW12FC	0.9	0.331	0.050	0.2514	
240 minute winter	SW12FC	Orifice	EX SW 15	0.3				
240 minute winter	EX SW 15	1.002	OUT	1.0	0.431	0.026	0.0306	17.3

**Results for 2 year Critical Storm Duration. Lowest mass balance: 99.64%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	EX SW 10	1	38.610	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 13	1	38.390	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 11	1	38.580	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 14	1	38.420	0.000	0.0	0.0000	0.0000	OK
240 minute winter	SW01	188	38.609	0.107	0.3	0.0171	0.0000	SURCHARGED
240 minute winter	SW02	188	38.609	0.135	0.8	2.4938	0.0000	SURCHARGED
30 minute winter	SW03	24	38.692	0.011	0.4	0.2160	0.0000	OK
120 minute summer	SW04	74	38.615	0.015	0.5	0.5604	0.0000	OK
240 minute winter	SW05	184	38.609	0.074	1.5	0.0118	0.0000	OK
240 minute winter	SW06	184	38.609	0.159	1.4	1.7323	0.0000	SURCHARGED
240 minute winter	SW07	184	38.609	0.115	1.1	0.0183	0.0000	OK
240 minute winter	SW08FC	184	38.609	0.200	1.6	2.7710	0.0000	SURCHARGED
240 minute winter	SW10	188	38.753	0.128	0.1	0.1122	0.0000	OK
240 minute winter	SW11	188	38.753	0.169	1.2	0.0268	0.0000	SURCHARGED
240 minute winter	SW12FC	188	38.753	0.312	1.2	3.3642	0.0000	SURCHARGED
240 minute winter	EX SW 15	184	38.386	0.026	1.1	0.0141	0.0000	OK
240 minute winter	OUT	184	38.312	0.026	1.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	EX SW 10	1.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 13	2.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 11	3.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 14	1.001	EX SW 15	0.0	0.000	0.000	0.0303	
240 minute winter	SW01	4.000	SW02	0.3	0.229	0.107	0.1114	
240 minute winter	SW02	4.001	SW06	-0.5	0.116	-0.187	0.0940	
30 minute winter	SW03	5.000	SW05	0.2	0.078	0.010	0.0405	
120 minute summer	SW04	6.000	SW05	0.3	0.114	0.021	0.0476	
240 minute winter	SW05	5.001	SW06	1.4	0.333	0.081	0.1116	
240 minute winter	SW06	4.002	SW08FC	0.7	0.137	0.040	0.0716	
240 minute winter	SW07	7.000	SW08FC	1.1	0.327	0.061	0.1363	
240 minute winter	SW08FC	Orifice	EX SW 15	0.9				
240 minute winter	SW10	8.000	SW11	-0.1	-0.025	-0.006	0.0690	
240 minute winter	SW11	8.001	SW12FC	1.2	0.331	0.066	0.2515	
240 minute winter	SW12FC	Orifice	EX SW 15	0.3				
240 minute winter	EX SW 15	1.002	OUT	1.1	0.441	0.028	0.0322	23.2

**Results for 5 year Critical Storm Duration. Lowest mass balance: 99.19%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	EX SW 10	1	38.610	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 13	1	38.390	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 11	1	38.580	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 14	1	38.420	0.000	0.0	0.0000	0.0000	OK
240 minute winter	SW01	188	38.647	0.145	0.4	0.0231	0.0000	SURCHARGED
240 minute winter	SW02	188	38.647	0.173	1.2	3.9409	0.0000	SURCHARGED
30 minute winter	SW03	23	38.696	0.015	0.7	0.3112	0.0000	OK
240 minute winter	SW04	188	38.647	0.047	0.8	1.9912	0.0000	OK
240 minute winter	SW05	188	38.647	0.112	2.2	0.0178	0.0000	OK
240 minute winter	SW06	188	38.647	0.197	2.1	2.5999	0.0000	SURCHARGED
240 minute winter	SW07	192	38.647	0.153	1.5	0.0243	0.0000	SURCHARGED
240 minute winter	SW08FC	192	38.647	0.238	2.0	4.1518	0.0000	SURCHARGED
360 minute winter	SW10	288	38.786	0.161	0.1	0.5789	0.0000	SURCHARGED
360 minute winter	SW11	288	38.786	0.202	1.3	0.0321	0.0000	SURCHARGED
360 minute winter	SW12FC	288	38.786	0.345	1.2	5.4743	0.0000	SURCHARGED
240 minute winter	EX SW 15	192	38.387	0.027	1.2	0.0147	0.0000	OK
240 minute winter	OUT	192	38.313	0.027	1.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	EX SW 10	1.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 13	2.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 11	3.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 14	1.001	EX SW 15	0.0	0.000	0.000	0.0320	
240 minute winter	SW01	4.000	SW02	0.4	0.229	0.141	0.1114	
240 minute winter	SW02	4.001	SW06	-0.8	0.112	-0.314	0.0940	
30 minute winter	SW03	5.000	SW05	0.3	0.073	0.019	0.0835	
240 minute winter	SW04	6.000	SW05	-0.5	0.108	-0.042	0.1271	
240 minute winter	SW05	5.001	SW06	2.1	0.336	0.119	0.1346	
240 minute winter	SW06	4.002	SW08FC	0.7	0.137	0.039	0.0716	
240 minute winter	SW07	7.000	SW08FC	1.5	0.327	0.083	0.1493	
240 minute winter	SW08FC	Orifice	EX SW 15	0.9				
360 minute winter	SW10	8.000	SW11	-0.1	-0.014	-0.008	0.0724	
360 minute winter	SW11	8.001	SW12FC	1.2	0.173	0.069	0.2515	
360 minute winter	SW12FC	Orifice	EX SW 15	0.3				
240 minute winter	EX SW 15	1.002	OUT	1.2	0.452	0.031	0.0342	29.9

**Results for 10 year Critical Storm Duration. Lowest mass balance: 99.18%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	EX SW 10	1	38.610	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 13	1	38.390	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 11	1	38.580	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 14	1	38.420	0.000	0.0	0.0000	0.0000	OK
180 minute winter	SW01	172	38.675	0.173	0.6	0.0276	0.0000	SURCHARGED
180 minute winter	SW02	172	38.675	0.201	1.8	5.0124	0.0000	SURCHARGED
30 minute winter	SW03	22	38.698	0.017	0.9	0.3623	0.0000	OK
180 minute winter	SW04	172	38.675	0.075	1.5	3.2354	0.0000	OK
180 minute winter	SW05	172	38.675	0.140	3.1	0.0223	0.0000	OK
180 minute winter	SW06	172	38.675	0.225	3.0	3.2429	0.0000	SURCHARGED
180 minute winter	SW07	168	38.675	0.181	2.2	0.0288	0.0000	SURCHARGED
180 minute winter	SW08FC	168	38.675	0.266	2.7	5.1768	0.0000	SURCHARGED
240 minute winter	SW10	232	38.811	0.186	0.3	1.0996	0.0000	SURCHARGED
240 minute winter	SW11	232	38.811	0.227	2.1	0.0361	0.0000	SURCHARGED
240 minute winter	SW12FC	232	38.811	0.370	1.8	7.0358	0.0000	SURCHARGED
240 minute winter	EX SW 15	200	38.388	0.028	1.3	0.0151	0.0000	OK
240 minute winter	OUT	200	38.314	0.028	1.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	EX SW 10	1.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 13	2.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 11	3.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 14	1.001	EX SW 15	0.0	0.000	0.000	0.0331	
180 minute winter	SW01	4.000	SW02	0.6	0.229	0.211	0.1114	
180 minute winter	SW02	4.001	SW06	-1.2	-0.158	-0.466	0.0940	
30 minute winter	SW03	5.000	SW05	0.5	0.069	0.026	0.1069	
180 minute winter	SW04	6.000	SW05	-1.0	-0.121	-0.081	0.1748	
180 minute winter	SW05	5.001	SW06	3.0	0.376	0.168	0.1473	
180 minute winter	SW06	4.002	SW08FC	0.8	0.174	0.043	0.0716	
180 minute winter	SW07	7.000	SW08FC	2.2	0.268	0.122	0.1493	
180 minute winter	SW08FC	Orifice	EX SW 15	1.0				
240 minute winter	SW10	8.000	SW11	-0.3	-0.037	-0.019	0.0724	
240 minute winter	SW11	8.001	SW12FC	1.8	0.331	0.103	0.2515	
240 minute winter	SW12FC	Orifice	EX SW 15	0.3				
240 minute winter	EX SW 15	1.002	OUT	1.3	0.459	0.032	0.0355	31.7

**Results for 30 year Critical Storm Duration. Lowest mass balance: 99.26%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	EX SW 10	1	38.610	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 13	1	38.390	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 11	1	38.580	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 14	1	38.420	0.000	0.0	0.0000	0.0000	OK
240 minute winter	SW01	224	38.721	0.219	0.6	0.0348	0.0000	SURCHARGED
240 minute winter	SW02	224	38.721	0.247	1.7	6.7494	0.0000	SURCHARGED
240 minute winter	SW03	224	38.721	0.040	0.5	0.9143	0.0000	OK
240 minute winter	SW04	224	38.721	0.121	1.9	5.2527	0.0000	OK
240 minute winter	SW05	224	38.721	0.186	2.9	0.0295	0.0000	SURCHARGED
240 minute winter	SW06	224	38.721	0.271	2.6	4.2859	0.0000	SURCHARGED
240 minute winter	SW07	224	38.721	0.227	2.4	0.0360	0.0000	SURCHARGED
240 minute winter	SW08FC	224	38.720	0.311	2.5	6.8376	0.0000	SURCHARGED
360 minute winter	SW10	344	38.851	0.226	0.4	1.9622	0.0000	SURCHARGED
360 minute winter	SW11	344	38.852	0.268	2.0	0.0425	0.0000	SURCHARGED
360 minute winter	SW12FC	344	38.851	0.410	1.6	9.6086	0.0000	SURCHARGED
240 minute winter	EX SW 15	228	38.389	0.029	1.4	0.0157	0.0000	OK
240 minute winter	OUT	228	38.315	0.029	1.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	EX SW 10	1.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 13	2.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 11	3.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 14	1.001	EX SW 15	0.0	0.000	0.000	0.0344	
240 minute winter	SW01	4.000	SW02	0.6	0.229	0.214	0.1114	
240 minute winter	SW02	4.001	SW06	-1.1	-0.140	-0.414	0.0940	
240 minute winter	SW03	5.000	SW05	-0.3	0.095	-0.019	0.1559	
240 minute winter	SW04	6.000	SW05	-1.3	-0.135	-0.104	0.2207	
240 minute winter	SW05	5.001	SW06	2.6	0.375	0.147	0.1493	
240 minute winter	SW06	4.002	SW08FC	0.8	0.137	0.048	0.0716	
240 minute winter	SW07	7.000	SW08FC	2.4	0.327	0.133	0.1493	
240 minute winter	SW08FC	Orifice	EX SW 15	1.1				
360 minute winter	SW10	8.000	SW11	-0.4	-0.032	-0.024	0.0724	
360 minute winter	SW11	8.001	SW12FC	1.6	0.098	0.092	0.2515	
360 minute winter	SW12FC	Orifice	EX SW 15	0.3				
240 minute winter	EX SW 15	1.002	OUT	1.4	0.470	0.035	0.0374	34.4

**Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.22%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	EX SW 10	1	38.610	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 13	1	38.390	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 11	1	38.580	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 14	1	38.420	0.000	0.0	0.0000	0.0000	OK
240 minute winter	SW01	232	38.789	0.287	0.8	0.0457	0.0000	SURCHARGED
240 minute winter	SW02	232	38.789	0.315	1.9	9.3806	0.0000	SURCHARGED
240 minute winter	SW03	232	38.790	0.109	1.1	2.5597	0.0000	OK
240 minute winter	SW04	232	38.790	0.190	2.6	8.3113	0.0000	SURCHARGED
240 minute winter	SW05	232	38.790	0.255	3.9	0.0405	0.0000	SURCHARGED
240 minute winter	SW06	232	38.789	0.339	2.7	5.8647	0.0000	SURCHARGED
240 minute winter	SW07	232	38.789	0.295	3.2	0.0469	0.0000	SURCHARGED
240 minute winter	SW08FC	232	38.789	0.380	3.1	9.3510	0.0000	SURCHARGED
480 minute winter	SW10	456	38.918	0.293	0.5	3.3765	0.0000	FLOOD RISK
480 minute winter	SW11	456	38.918	0.334	2.2	0.0531	0.0000	SURCHARGED
480 minute winter	SW12FC	456	38.918	0.477	1.7	13.8261	0.0000	SURCHARGED
240 minute winter	EX SW 15	232	38.390	0.030	1.5	0.0164	0.0000	OK
240 minute winter	OUT	232	38.316	0.030	1.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	EX SW 10	1.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 13	2.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 11	3.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 14	1.001	EX SW 15	0.0	0.000	0.000	0.0360	
240 minute winter	SW01	4.000	SW02	0.8	0.229	0.286	0.1114	
240 minute winter	SW02	4.001	SW06	-1.2	-0.152	-0.448	0.0940	
240 minute winter	SW03	5.000	SW05	-0.7	0.089	-0.042	0.2284	
240 minute winter	SW04	6.000	SW05	-1.8	-0.153	-0.143	0.2369	
240 minute winter	SW05	5.001	SW06	2.7	0.383	0.153	0.1493	
240 minute winter	SW06	4.002	SW08FC	0.9	0.174	0.053	0.0716	
240 minute winter	SW07	7.000	SW08FC	3.1	0.268	0.177	0.1493	
240 minute winter	SW08FC	Orifice	EX SW 15	1.2				
480 minute winter	SW10	8.000	SW11	-0.5	-0.032	-0.027	0.0724	
480 minute winter	SW11	8.001	SW12FC	1.7	0.098	0.096	0.2515	
480 minute winter	SW12FC	Orifice	EX SW 15	0.3				
240 minute winter	EX SW 15	1.002	OUT	1.5	0.484	0.039	0.0400	37.8

**Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.22%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	EX SW 10	1	38.610	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 13	1	38.390	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 11	1	38.580	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 14	1	38.420	0.000	0.0	0.0000	0.0000	OK
240 minute winter	SW01	232	38.801	0.299	0.9	0.0475	0.0000	SURCHARGED
240 minute winter	SW02	232	38.801	0.327	2.0	9.8121	0.0000	SURCHARGED
240 minute winter	SW03	232	38.801	0.120	1.2	2.8293	0.0000	OK
240 minute winter	SW04	232	38.801	0.201	2.7	8.8134	0.0000	SURCHARGED
240 minute winter	SW05	232	38.801	0.266	4.0	0.0423	0.0000	SURCHARGED
240 minute winter	SW06	232	38.801	0.351	2.8	6.1236	0.0000	SURCHARGED
240 minute winter	SW07	232	38.801	0.307	3.3	0.0487	0.0000	SURCHARGED
240 minute winter	SW08FC	232	38.800	0.391	3.2	9.7632	0.0000	SURCHARGED
480 minute winter	SW10	456	38.925	0.300	0.5	3.5120	0.0000	FLOOD RISK
480 minute winter	SW11	456	38.925	0.341	2.3	0.0542	0.0000	SURCHARGED
480 minute winter	SW12FC	456	38.925	0.484	1.8	14.2302	0.0000	SURCHARGED
240 minute winter	EX SW 15	232	38.391	0.031	1.6	0.0165	0.0000	OK
240 minute winter	OUT	232	38.316	0.030	1.6	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	EX SW 10	1.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 13	2.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 11	3.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 14	1.001	EX SW 15	0.0	0.000	0.000	0.0362	
240 minute winter	SW01	4.000	SW02	0.8	0.229	0.318	0.1114	
240 minute winter	SW02	4.001	SW06	-1.2	-0.154	-0.454	0.0940	
240 minute winter	SW03	5.000	SW05	-0.8	0.086	-0.048	0.2389	
240 minute winter	SW04	6.000	SW05	-1.8	-0.154	-0.145	0.2369	
240 minute winter	SW05	5.001	SW06	2.8	0.356	0.157	0.1493	
240 minute winter	SW06	4.002	SW08FC	1.0	0.178	0.055	0.0716	
240 minute winter	SW07	7.000	SW08FC	3.2	0.184	0.183	0.1493	
240 minute winter	SW08FC	Orifice	EX SW 15	1.2				
480 minute winter	SW10	8.000	SW11	-0.5	-0.032	-0.028	0.0724	
480 minute winter	SW11	8.001	SW12FC	1.8	0.101	0.100	0.2515	
480 minute winter	SW12FC	Orifice	EX SW 15	0.3				
240 minute winter	EX SW 15	1.002	OUT	1.6	0.486	0.039	0.0405	38.3

**Results for 100 year Critical Storm Duration. Lowest mass balance: 99.23%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	EX SW 10	1	38.610	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 13	1	38.390	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 11	1	38.580	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 14	1	38.420	0.000	0.0	0.0000	0.0000	OK
360 minute winter	SW01	320	38.780	0.278	0.6	0.0443	0.0000	SURCHARGED
360 minute winter	SW02	320	38.780	0.306	1.4	9.0325	0.0000	SURCHARGED
360 minute winter	SW03	320	38.780	0.099	0.8	2.3426	0.0000	OK
360 minute winter	SW04	320	38.780	0.180	1.7	7.9077	0.0000	SURCHARGED
360 minute winter	SW05	320	38.780	0.245	2.9	0.0390	0.0000	SURCHARGED
360 minute winter	SW06	320	38.780	0.330	2.1	5.6565	0.0000	SURCHARGED
360 minute winter	SW07	320	38.780	0.286	2.3	0.0455	0.0000	SURCHARGED
360 minute winter	SW08FC	320	38.780	0.371	2.4	9.0196	0.0000	SURCHARGED
480 minute winter	SW10	448	38.908	0.283	0.5	3.1670	0.0000	FLOOD RISK
480 minute winter	SW11	448	38.908	0.324	2.1	0.0516	0.0000	SURCHARGED
480 minute winter	SW12FC	448	38.908	0.467	1.6	13.2013	0.0000	SURCHARGED
360 minute winter	EX SW 15	328	38.390	0.030	1.5	0.0163	0.0000	OK
360 minute winter	OUT	328	38.316	0.030	1.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	EX SW 10	1.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 13	2.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 11	3.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 14	1.001	EX SW 15	0.0	0.000	0.000	0.0357	
360 minute winter	SW01	4.000	SW02	0.6	0.168	0.216	0.1114	
360 minute winter	SW02	4.001	SW06	-0.8	-0.103	-0.303	0.0940	
360 minute winter	SW03	5.000	SW05	-0.5	0.106	-0.028	0.2193	
360 minute winter	SW04	6.000	SW05	-1.1	-0.117	-0.090	0.2369	
360 minute winter	SW05	5.001	SW06	2.1	0.369	0.116	0.1493	
360 minute winter	SW06	4.002	SW08FC	0.9	0.113	0.052	0.0716	
360 minute winter	SW07	7.000	SW08FC	2.3	0.129	0.127	0.1493	
360 minute winter	SW08FC	Orifice	EX SW 15	1.2				
480 minute winter	SW10	8.000	SW11	-0.5	-0.026	-0.026	0.0724	
480 minute winter	SW11	8.001	SW12FC	1.6	0.098	0.092	0.2515	
480 minute winter	SW12FC	Orifice	EX SW 15	0.3				
360 minute winter	EX SW 15	1.002	OUT	1.5	0.482	0.038	0.0397	46.1

**Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.13%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	EX SW 10	1	38.610	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 13	1	38.390	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 11	1	38.580	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 14	1	38.420	0.000	0.0	0.0000	0.0000	OK
480 minute winter	SW01	376	39.082	0.580	0.7	0.0922	0.0000	FLOOD RISK
480 minute winter	SW02	376	39.082	0.608	1.4	11.5632	0.0000	FLOOD RISK
480 minute winter	SW03	376	39.082	0.401	2.1	7.2126	0.0000	FLOOD RISK
480 minute winter	SW04	376	39.082	0.482	1.8	13.4018	0.0000	FLOOD RISK
480 minute winter	SW05	376	39.082	0.547	2.9	0.0870	0.0000	FLOOD RISK
480 minute winter	SW06	376	39.082	0.632	1.8	6.9632	0.0000	FLOOD RISK
480 minute winter	SW07	376	39.082	0.588	2.6	0.0934	0.0000	FLOOD RISK
480 minute winter	SW08FC	376	39.081	0.672	2.6	11.1136	0.0000	FLOOD RISK
600 minute winter	SW10	570	39.056	0.431	0.5	6.2851	0.0000	FLOOD RISK
600 minute winter	SW11	570	39.056	0.472	2.5	0.0750	0.0000	FLOOD RISK
600 minute winter	SW12FC	570	39.055	0.614	1.9	19.1038	0.0000	SURCHARGED
480 minute winter	EX SW 15	376	38.394	0.034	2.0	0.0186	0.0000	OK
480 minute winter	OUT	376	38.320	0.034	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	EX SW 10	1.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 13	2.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 11	3.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 14	1.001	EX SW 15	0.0	0.000	0.000	0.0377	
480 minute winter	SW01	4.000	SW02	0.7	0.168	0.251	0.1114	
480 minute winter	SW02	4.001	SW06	-0.8	-0.102	-0.300	0.0940	
480 minute winter	SW03	5.000	SW05	-1.9	0.115	-0.105	0.2573	
480 minute winter	SW04	6.000	SW05	-1.4	-0.097	-0.117	0.2369	
480 minute winter	SW05	5.001	SW06	1.8	0.324	0.102	0.1493	
480 minute winter	SW06	4.002	SW08FC	1.4	0.103	0.077	0.0716	
480 minute winter	SW07	7.000	SW08FC	2.6	0.146	0.144	0.1493	
480 minute winter	SW08FC	Orifice	EX SW 15	1.6				
600 minute winter	SW10	8.000	SW11	-0.5	-0.043	-0.031	0.0724	
600 minute winter	SW11	8.001	SW12FC	1.9	0.110	0.109	0.2515	
600 minute winter	SW12FC	Orifice	EX SW 15	0.4				
480 minute winter	EX SW 15	1.002	OUT	2.0	0.522	0.050	0.0480	63.1

**Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.13%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	EX SW 10	1	38.610	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 13	1	38.390	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 11	1	38.580	0.000	0.0	0.0000	0.0000	OK
15 minute summer	EX SW 14	1	38.420	0.000	0.0	0.0000	0.0000	OK
480 minute winter	SW01	336	39.114	0.612	0.7	0.0973	0.0000	FLOOD RISK
480 minute winter	SW02	336	39.114	0.640	1.4	11.5683	0.0000	FLOOD RISK
480 minute winter	SW03	336	39.113	0.432	2.1	7.2175	0.0000	FLOOD RISK
480 minute winter	SW04	336	39.113	0.513	2.3	13.4068	1.5668	FLOOD
480 minute winter	SW05	336	39.114	0.579	3.0	0.0920	0.0000	FLOOD RISK
480 minute winter	SW06	336	39.113	0.663	1.7	6.9682	0.0000	FLOOD RISK
480 minute winter	SW07	336	39.113	0.619	2.7	0.0985	0.0000	FLOOD RISK
480 minute winter	SW08FC	336	39.113	0.704	2.7	11.1225	0.0000	FLOOD RISK
600 minute winter	SW10	495	39.177	0.552	0.7	6.8290	0.4770	FLOOD
480 minute winter	SW11	456	39.177	0.593	3.1	0.0943	0.0000	FLOOD RISK
480 minute winter	SW12FC	456	39.177	0.736	2.4	19.1382	0.0000	FLOOD RISK
600 minute winter	EX SW 15	450	38.395	0.035	2.0	0.0188	0.0000	OK
600 minute winter	OUT	450	38.320	0.034	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	EX SW 10	1.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 13	2.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 11	3.000	EX SW 14	0.0	0.000	0.000	0.0000	
15 minute summer	EX SW 14	1.001	EX SW 15	0.0	0.000	0.000	0.0379	
480 minute winter	SW01	4.000	SW02	0.7	0.168	0.251	0.1114	
480 minute winter	SW02	4.001	SW06	-1.0	-0.126	-0.371	0.0940	
480 minute winter	SW03	5.000	SW05	-1.9	0.115	-0.107	0.2573	
480 minute winter	SW04	6.000	SW05	-1.8	-0.104	-0.149	0.2369	
480 minute winter	SW05	5.001	SW06	1.7	0.324	0.097	0.1493	
480 minute winter	SW06	4.002	SW08FC	1.4	0.103	0.076	0.0716	
480 minute winter	SW07	7.000	SW08FC	2.7	0.151	0.150	0.1493	
480 minute winter	SW08FC	Orifice	EX SW 15	1.7				
600 minute winter	SW10	8.000	SW11	-0.7	-0.043	-0.039	0.0724	
480 minute winter	SW11	8.001	SW12FC	2.4	0.135	0.134	0.2515	
480 minute winter	SW12FC	Orifice	EX SW 15	0.4				
600 minute winter	EX SW 15	1.002	OUT	2.0	0.527	0.051	0.0489	73.7

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type	Non-residential parking with infrequent change (e.g. schools, offices, < 300 traffic movements a day)				
Pollution Hazard Level	Low				
Pollution Hazard Indices					
TSS	0.5				
Metals	0.4				
Hydrocarbons	0.4				
SuDS components proposed					
Component 1	Pervious pavement (where the pavement is not designed as an infiltration component)	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B			
Component 2	None				
Component 3	None				
SuDS Pollution Mitigation Indices					
TSS	0.7				
Metals	0.6				
Hydrocarbons	0.7				
Groundwater protection type	None				
Groundwater protection					
Pollution Mitigation Indices					
TSS	0				
Metals	0				
Hydrocarbons	0				
Combined Pollution Mitigation Indices		Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England			
TSS	0.7				
Metals	0.6				
Hydrocarbons	0.7				
Acceptability of Pollution Mitigation					
TSS	Sufficient				
Metals	Sufficient				
Hydrocarbons	Sufficient				

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type	Non-residential parking with infrequent change (e.g. schools, offices, < 300 traffic movements a day)				
Pollution Hazard Level	Low				
Pollution Hazard Indices					
TSS	0.5				
Metals	0.4				
Hydrocarbons	0.4				
SuDS components proposed					
Component 1	Filter drain (where the trench is not designed as an infiltration component)	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B	Filter drains should be preceded by upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events		
Component 2	None				
Component 3	None				
SuDS Pollution Mitigation Indices					
TSS	0.4				
Metals	0.4				
Hydrocarbons	0.4				
Groundwater protection type	None				
Groundwater protection					
Pollution Mitigation Indices					
TSS	0				
Metals	0				
Hydrocarbons	0				
Combined Pollution Mitigation Indices		Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England			
TSS	0.4				
Metals	0.4				
Hydrocarbons	0.4				
Acceptability of Pollution Mitigation					
TSS	Additional TSS Mitigation Required				
Metals	Sufficient				
Hydrocarbons	Sufficient				