

Technical Note to Discharge Conditions

Project: AGP Burgess Hill
Project No: P23-887
Date: 19th May 2026
Issue: 2

Introduction

This technical note has been prepared by Simpson TWS on behalf of Whitbread PLC to provide information required for the discharge of conditions relating to the proposed Premier Inn Extension at Burgess Hill.

The outstanding conditions state the following:

Condition 11

“No development shall take place, apart from demolition of the building, clearance of the site or any necessary surveys/investigation work unless and until details of the proposed foul and surface water drainage, means of disposal and associated sustainable drainage components and flow control mechanisms and a construction method statement have been submitted to and approved in writing by the local planning authority. The extension shall not be occupied until all the approved drainage works have been carried out in accordance with the approved details. The details shall include a timetable for its implementation and a management and maintenance plan for the lifetime of the development which shall include details of SuDS features and connecting drainage structures and maintenance requirement for each aspect, arrangements for adoption by any public authority or statutory undertaker and any other arrangements to secure the operation of the scheme throughout its lifetime. Maintenance and management during the lifetime of the development should be in accordance with the approved details.”

Condition 14

“Prior to works above slab level a flood warning evacuation plan shall be submitted to and approved in writing by the local planning authority. The plan shall include details and images of the modelled flood depths and hazards, expected frequency of flooding, the safe escape route, and the flood mitigation measures included within the development.”

This note should be read in conjunction with the following appended documents:

- Engineering Layout (P23-0887 100 Rev C1) By Simpson TWS (March 2026)
- Drainage Details (P23-0887 103 Rev C1) By Simpson TWS (March 2026)
- SUDS Details (P23-0887 104 Rev C1) By Simpson TWS (March 2026)
- SuDS Implementation, Maintenance & Management Plan by Simpson TWS (March 2026)
- Method Statement (1262) By Carter Lauren (March 2026)
- Causeway Flow Drainage Model Calculations By Simpson TWS (March 2026)
- Pluvial Flood Modelling Study (25-217) By Odyssey (October 2025)

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AUTHOR:	PB	OFFICE:	HENLEY	CHECKED BY:	AR

Condition 11

The drainage strategy for the development was established within the approved Flood Risk Assessment and Drainage Strategy Report prepared by Simpson TWS (Issue 5, November 2025).

The approved strategy confirmed that surface water runoff from the proposed hotel extension would be attenuated and discharged at a controlled rate to the existing surface water network serving the site using Sustainable Drainage Systems (SuDS). The detailed drainage design submitted with this document has been prepared in accordance with those principles and should be read alongside the Engineering Layout, Drainage Details and SuDS Details drawings.

Surface water runoff from the extension and surrounding hardstanding areas will be collected via gullies, rainwater downpipes and linear drainage channels before entering a below ground surface water drainage network. The network conveys flows towards the eastern part of the site where a flow control chamber limits flows prior to discharging off site to the local sewer network.

The existing site is served by a surface water drainage system which discharges via a flow control chamber limiting flows to approximately 34l/s, with excess runoff attenuated within an existing geocellular attenuation tank upstream of the control.

As part of the proposed development this arrangement will be retained and enhanced through the provision of additional upstream attenuation storage together with the installation of a replacement flow control device.

The existing attenuation tank located within the landscaped area to the east of the extension will be retained as part of the drainage system. The tank has a depth of 800mm and will be locally reduced in plan area to accommodate the extension while continuing to function as part of the attenuation system.

Additional storage will be provided through installation of a new SDS geocellular attenuation tank with a depth of 1.25m located upstream of the existing tank within the landscaped area to the east of the extension.

Further attenuation storage will be provided to the west of the extension through a 250mm deep SDS GeoLight 800 attenuation tank located beneath the parking area together with a shallow landscaped attenuation basin located within the adjacent soft landscaped area.

The attenuation basin has an overall depth of 700mm, providing 400mm of available storage depth, with the remaining 300mm as freeboard to provide additional resilience during extreme rainfall events.

Surface water flows from across the site connect to the drainage network upstream of the flow control chamber and are temporarily stored within the attenuation features during rainfall events before being released at a controlled rate.

The existing flow control device will be replaced with a new Hydro-Brake flow control located within the same chamber and set to limit discharge to a maximum rate of 31.5l/s prior to discharge off site to the local sewer network.

Hydraulic modelling of the drainage network has been undertaken using Causeway Flow software which incorporates the existing and proposed attenuation features together with the replacement flow control device. The modelling confirms that the drainage system will accommodate storm events up to and including the 1 in 100 year rainfall event with a 45% allowance for climate change, with runoff temporarily stored within the drainage network and attenuation features prior to controlled discharge from the site.

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The modelling also demonstrates that peak discharge rates from the redeveloped site are reduced when compared with the existing scenario. A comparison of existing and proposed peak runoff rates is provided in *Table 1* below.

Table 1: Comparison of Existing and Proposed Runoff Rates

Return Period	Existing Runoff Rate (l/s)	Proposed Runoff Rate (l/s)	Reduction
2 year	34.2	15.8	-54%
30 year	34.3	22.6	-34%
100 year	34.0	25.5	-25%
100 year + 20% CC	34.3	26.6	-22%
100 year + 45% CC	34.1	28.0	-18%

The proposed discharge rate from the site is controlled by a new Hydro-Brake flow control device set to a maximum discharge rate of 31.5l/s. The device operates with a linear discharge profile, which allows lower discharge rates during smaller storm events and progressively increases discharge as water levels within the upstream system rise. The modelled discharge rates shown above are therefore lower than the maximum design discharge, as the available upstream attenuation storage temporarily retains runoff during storm events and prevents the flow control from reaching its full capacity. This differs from the existing flow control arrangement on site, which operates as a minimise upstream storage device, where discharge rates remain closer to the maximum setting across a wider range of storm events.

The results demonstrate that despite the increase in impermeable area associated with the extension, the proposed drainage system reduces peak runoff rates across all modelled storm events when compared with the existing scenario.

Foul water from the proposed development will be conveyed via a new gravity foul drainage network connecting to the existing foul sewer serving the site. The foul drainage system will comprise conventional pipework and inspection chambers constructed in accordance with the details shown on the submitted drainage drawings.

Installation of the drainage infrastructure will be undertaken in accordance with the contractor's construction method statement which sets out the procedures for excavation, installation of drainage pipework and chambers, construction of attenuation features and installation of the geocellular storage systems.

The drainage infrastructure will be installed during the early stages of the construction programme and completed prior to occupation of the extension. A SuDS Implementation, Management and Maintenance Plan has been prepared which sets out the inspection and maintenance requirements for the drainage system including attenuation structures, flow control chambers, pipework and associated infrastructure to ensure the continued operation of the system for the lifetime of the development.

The information submitted within this technical note, together with the appended drainage drawings, hydraulic modelling and drainage implementation, management and maintenance plan, provides the details required by Condition 11 and demonstrates that the proposed drainage system will operate effectively for the lifetime of the development.

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Condition 14

Surface water flood mapping published by the Environment Agency and reviewed within the Flood Risk Assessment indicates that parts of the site and surrounding area may be susceptible to surface water flooding during extreme rainfall events, where rainfall intensity temporarily exceeds the capacity of local drainage systems and results in temporary ponding or overland flow across external hardstanding areas.

Further assessment of surface water flood risk has been undertaken through the Odyssey flood modelling report, appended to this technical note, which provides mapping of predicted flood extents, depths and hazard classifications across the site. *Figure 6.5* of the Odyssey report indicates that predicted flooding associated with the 1 in 100 year rainfall event including climate change allowance would be largely confined to the car park area to the west of the building, reflecting the lower topographical levels within this part of the site. The modelling indicates that flood depths and associated hazard levels across the wider site remain limited.

The modelled flooding referenced within the Odyssey assessment relates to an extreme rainfall event with an annual exceedance probability of 1% together with a 45% allowance for climate change. Such events are considered low probability and represent an extreme design scenario for assessment of residual surface water flood risk at the site.

The Odyssey mapping also confirms that the pedestrian access route to Charles Avenue located to the east of the site remains outside the predicted flood extents during the modelled 1 in 100 year rainfall event including climate change allowance. The route therefore provides a safe means of access and egress from the site during extreme rainfall events.

The Flood Risk Assessment identifies that the existing restaurant area of the building is located at an approximate finished floor level of 29.89mAOD, whilst the hotel bedroom accommodation is located at a higher level of approximately 30.40mAOD. The Odyssey modelling indicates that the predicted flood level associated with the 1 in 100 year rainfall event including climate change allowance is approximately 30.40mAOD, which corresponds with the finished floor level of the bedroom accommodation. The principal sleeping accommodation therefore provides safe refuge at or above the predicted extreme flood level, ensuring that occupants can remain in a place of safety during extreme rainfall events if evacuation is temporarily restricted.

Surface water flooding associated with such events is expected to be localised and short in duration, typically resulting in temporary shallow ponding within external hardstanding areas rather than prolonged inundation of buildings. The Odyssey modelling indicates that predicted flood depths and hazards across the wider site remain generally limited, with the principal pedestrian route to Charles Avenue remaining outside the predicted flood extents.

The proposed drainage strategy for the development has been designed to manage runoff from the site for storm events up to and including the 1 in 100 year rainfall event with a 45% allowance for climate change, with runoff attenuated within the on-site drainage network prior to controlled discharge from the site. In the event that rainfall exceeds the design capacity of the drainage system, exceedance flows would follow natural site topography across hardstanding areas before draining away from the building.

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Flood Response and Evacuation Procedure

As the residual flood risk associated with the site relates to surface water flooding during extreme rainfall events, there is no formal Environment Agency flood warning service applicable to the development. The following operational procedures would therefore apply during severe rainfall events:

- Hotel management would monitor severe weather forecasts issued by the Met Office.
- During periods of intense rainfall, hotel staff would monitor external areas of the site for evidence of significant surface water accumulation or exceedance flow routing.
- In the unlikely event that evacuation of the building is required, occupants would be directed via the pedestrian access route to Charles Avenue located to the east of the site.
- The Odyssey flood modelling confirms that this route remains outside the predicted flood extents during the modelled 1 in 100 year plus climate change rainfall event.
- Where temporary evacuation is not immediately possible, upper floor hotel bedroom accommodation provides safe refuge above the predicted modelled flood level.
- Any emergency response would be undertaken in accordance with the hotel operator's standard emergency management procedures and emergency services contacted where required.

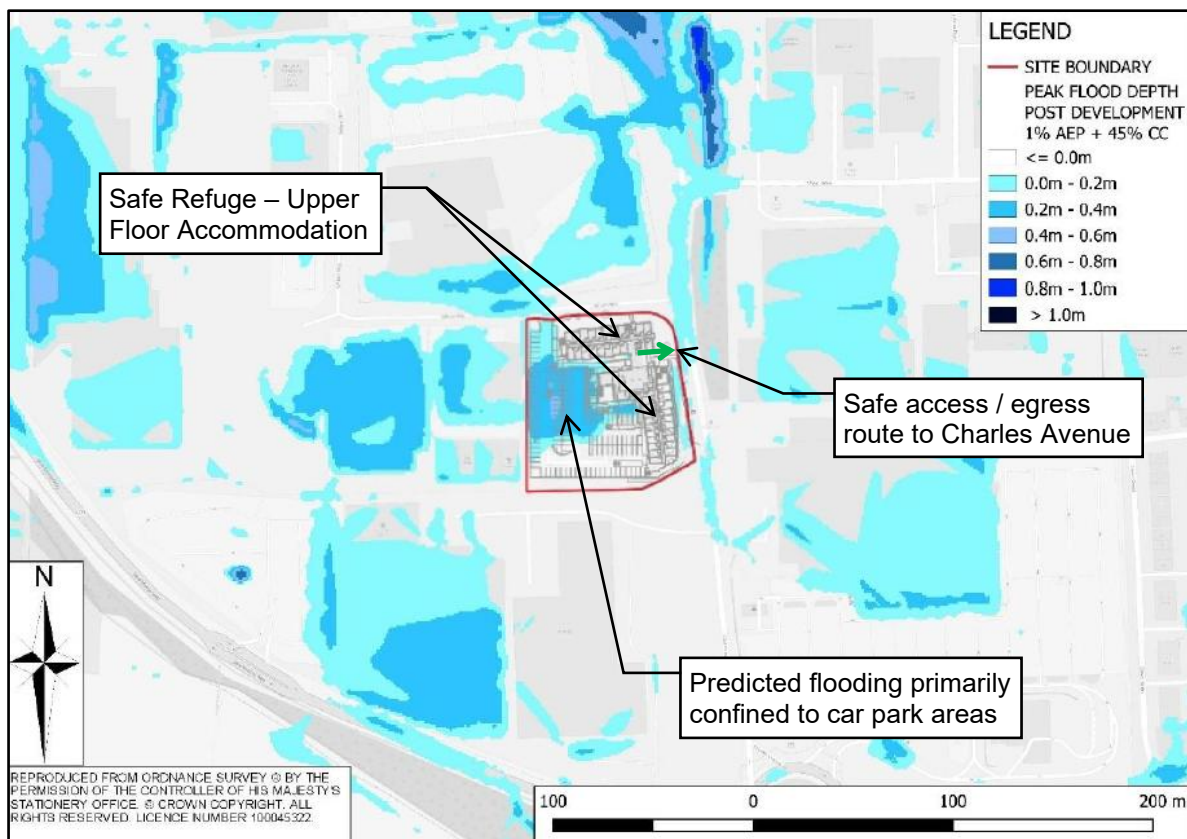
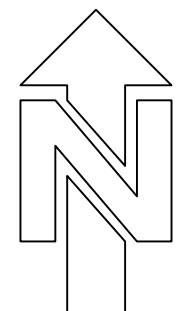


Figure 1: Modelled Surface Water Flood Extents and Safe Access / Egress Route (100 Year + 45% Climate Change Event)

In accordance with national flood risk guidance, the development is considered acceptable during extreme rainfall events due to the availability of safe refuge above predicted flood levels together with a safe access and egress route from the site, as identified in *Figure 1* above. The information provided within this technical note and the appended Odyssey modelling therefore demonstrates that the requirements of Condition 14 have been satisfied.

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APPENDICES



SITE WAS PREVIOUSLY OCCUPIED BY BUILDINGS & STRUCTURES. WHILST SITE INVESTIGATIONS TO DATE HAVE NOT IDENTIFIED ANY EVIDENCE OF CONTAMINATION OR FORMER FOUNDATIONS IT IS POSSIBLE THAT CONTAMINATION / OBSTRUCTIONS MAY STILL EXIST & BE ENCOUNTERED DURING WORKS. CONTRACTOR SHOULD ENSURE SITE PERSONNEL USE APPROPRIATE PPE WHEN CARRYING OUT EXCAVATIONS & THAT CONSTRUCTION HEALTH & SAFETY PLAN INCLUDES METHOD STATEMENT FOR DEALING WITH UNFORESEEN CONTAMINATION / OBSTRUCTIONS IF ENCOUNTERED DURING WORKS. WHERE GROUND CONDITIONS DEVIATE FROM THOSE REPORTED IN THE SITE INVESTIGATION REPORT, THE ENGINEER SHOULD BE CONTACTED IMMEDIATELY FOR ADVICE ON HOW TO PROCEED.

CONSTRUCTION WORKS IN CLOSE PROXIMITY TO EXISTING UKPN LV ELECTRICITY CABLE. CONTRACTORS CONSTRUCTION HEALTH & SAFETY PLAN TO INCLUDE METHOD STATEMENT OUTLINING SAFE METHOD OF WORKING.

CONNECTION TO EXISTING FOUL WATER DRAINAGE. CONTRACTOR SHOULD ENSURE SITE PERSONNEL HAVE APPROPRIATE TRAINING & USE APPROPRIATE PPE WHEN MAKING SEWER CONNECTIONS AND THE CONTRACTORS CONSTRUCTION HEALTH & SAFETY PLAN SHOULD INCLUDE METHOD STATEMENT THAT ADOPTS BEST PRACTICE HEALTH AND SAFETY POLICIES FOR ALL SITE PERSONNEL THROUGHOUT THE DURATION OF SUCH WORKS.

EXISTING FOUL WATER CHAMBER TO BE MAINTAINED WITHIN RECEPTION/LINK CORRIDOR, WITH COVER LEVEL ADJUSTED TO SUIT FFL AND FITTED WITH DOUBLE SEALED RECESSED COVER.

PROPOSED FOUL WATER DRAINAGE, EXISTING FOUL WATER DRAINAGE AND SURFACE WATER DRAINAGE TO PASS THROUGH EXTENSION RECEPTION/LINK CORRIDOR.

EXISTING FOUL WATER CHAMBER AND INCOMING SWP CONNECTIONS TO BE RELOCATED AS SHOWN

PROPOSED FOUL WATER CONNECTION FROM HOTEL EXTENSION TO EXISTING FOUL WATER DRAINAGE NETWORK.

EXISTING FLOW CONTROL MANHOLE LIMITING FLOWS TO 34 l/s TO BE REPLACED WITH HYDROBRAKE FLOW CONTROL SET TO A MAXIMUM RATE OF 31.5 l/s.

EXISTING COVER TO BE ADJUSTED TO SUIT NEW FOOTPATH ROUTE.

PROPOSED SURFACE WATER CONNECTION FROM SDS GEOLIGHT 800 TO EXISTING SURFACE WATER DRAINAGE NETWORK.

CONNECTION TO EXISTING SURFACE WATER DRAINAGE. CONTRACTOR SHOULD ENSURE SITE PERSONNEL HAVE APPROPRIATE TRAINING & USE APPROPRIATE PPE WHEN MAKING SEWER CONNECTIONS AND THE CONTRACTORS CONSTRUCTION HEALTH & SAFETY PLAN SHOULD INCLUDE METHOD STATEMENT THAT ADOPTS BEST PRACTICE HEALTH AND SAFETY POLICIES FOR ALL SITE PERSONNEL THROUGHOUT THE DURATION OF SUCH WORKS.

EXISTING GULLY AND CONNECTING PIPE TO BE REMOVED.

PROPOSED 18.5 x 20.0 x 0.25m DEEP SDS GEOLIGHT 800 TO STORE AND ATTENUATE SURFACE WATER FLOWS FOR ALL STORM RETURN PERIODS UP TO AND INCLUDING THE 1 IN 100 YEAR EVENT PLUS A 45% ALLOWANCE FOR CLIMATE CHANGE.

EXISTING GULLIES AND CONNECTING PIPES TO BE REMOVED.

CONSTRUCTION WORKS IN CLOSE PROXIMITY TO EXISTING UKPN HV ELECTRICITY CABLE. ROUTE BASED ON TRIAL PITS. CONTRACTORS CONSTRUCTION HEALTH & SAFETY PLAN TO INCLUDE METHOD STATEMENT OUTLINING SAFE METHOD OF WORKING.

LEGEND

- Trapped road gully
- Surface water channel drain and trapped outfall unit
- Foul gully
- Surface water drain
- Foul water drain
- Land drain
- Foul water drain to be removed
- Surface water drain to be removed
- Surface water shallow inspection chamber
- Surface water inspection chamber
- Surface water catchpit
- Surface water silt trap chamber
- Althon swale inlet/outlet headwall
- Foul water shallow inspection chamber
- Foul water inspection chamber
- Foul water reduced access chamber
- Existing foul water manhole fitted with double sealed recessed cover
- Proposed finished floor level
- Proposed level
- Existing level
- Retaining wall with max. retained height shown
- Proposed bank
- Denotes extent of Raised Damp Proof Course, with max. height as indicated
- Denotes extent of additional Exposed Brickwork below standard, with max. additional height as indicated.
- Site boundary

INDICATES RESIDUAL RISK AS WARNING.

CONSTRUCTION WORKS AFFECTED EXISTING BT AND IRON MEDIA SUPPLY. CONTRACTORS CONSTRUCTION HEALTH & SAFETY PLAN TO INCLUDE METHOD STATEMENT OUTLINING SAFE METHOD OF WORKING FOR DIVERSION/DISCONNECTION/PROTECTION.

PROPOSED 2.5 x 37.0 x 1.25m DEEP GEOCELLULAR ATTENUATION TANK BY SDS TO STORE AND ATTENUATE SURFACE WATER FLOWS FOR ALL STORM RETURN PERIODS UP TO AND INCLUDING THE 1 IN 100 YEAR EVENT PLUS A 45% ALLOWANCE FOR CLIMATE CHANGE.

ENGINEERING NOTES

- This drawing to be read in conjunction with all relevant Architects, Engineers and Subcontractors drawings and details.
- This drawing is based on topographical survey by Midland Survey.
Drawing Number: 638356/1
Dated: July 2024
- All levels relate to levels given on survey drawing.
- Refer to Architects drawings for details of all paving types & patterns, soft landscaping, fences, gates & bollards.
- For lighting, service supplies & ducting requirements, refer to M&E drawings.
- All works to be carried out in accordance with the current edition of The Building Regulations 'Approved document H'.
- New drainage connections are to be made with appropriate lengths of rocker pipes & couplings.
- All manhole chamber covers to be installed parallel to final kerbs, edgings, paving joints or building lines as appropriate.
- This drawing details all below ground drainage up to finished floor level. For details of drainage above finished floor level, refer to Architects drawings.
- All stack connections under buildings to be minimum 100mm diameter solid PVC-U to BS EN 1401-1/BS4660 & laid at a minimum gradient of 1 in 40 unless otherwise noted. If the stack is greater than 100mm then the diameter of the connection is to be increased to match it.
- All RWP connections to be minimum 100mm diameter solid PVC-U to BS EN 1401-1/BS4660 & laid at a minimum gradient of 1 in 80 unless otherwise noted. If the RWP is greater than 100mm then the diameter of the connection is to be increased to match it.
- All private foul water pipework up to 150mm in diameter to be PVC-U to BS EN 1401-1/BS4660.
- All private surface water pipework up to 150mm in diameter to be solid PVC-U to BS EN 1401-1/BS4660. All private surface water pipework 225mm and above to be structured wall plastic sewer pipe complying with clause 518 of the specification for highway works.
- Concrete manholes shall comply with BS EN 1917 and BS 5911-3.
- Plastic chambers shall comply with BS 7158.
- On completion of development all drainage shall be jet cleaned and CCTV surveyed.
- Redundant drainage & services marked to be removed are to be dug out with chambers demolished & void filled with Type 1 material to clause 803 & 806.
- All road gully connections to be minimum 150mm diameter solid PVC-U pipework to BS EN 1401-1/BS4660 and laid at a minimum gradient of 1 in 150.
- All existing services shown are based on topographical survey by Midland Survey. Location of all services in close proximity to works should be confirmed by means of trial pits under supervision of statutory undertaker & in accordance with HSE document 'Avoiding Danger from Underground Services'.

DESIGNERS RESIDUAL RISK SCHEDULE

CONSTRUCTION

- EXISTING SEWERS / DRAINAGE / SERVICES / OVERHEAD CABLES:
 - REFER TO EXISTING SERVICES LAYOUT (REF: P23-0887-105) / TOPOGRAPHICAL SURVEY (REF: 638356/1) / STATUTORY UNDERTAKERS RECORDS FOR LOCATION OF EXISTING SEWERS / DRAINAGE / SERVICES & OVERHEAD CABLES.
 - WORKS IN CLOSE PROXIMITY TO EXISTING SEWERS / DRAINAGE / SERVICES / OVERHEAD CABLES. CONTRACTORS CONSTRUCTION HEALTH & SAFETY PLAN SHOULD INCLUDE METHOD STATEMENT OUTLINING SAFE METHOD OF WORKING AGREED WITH RELEVANT STATUTORY UNDERTAKER WHERE NECESSARY.
 - WORKS AFFECTED BY EXISTING SEWERS / DRAINAGE / SERVICES / OVERHEAD CABLES. CONTRACTOR SHOULD ARRANGE FOR DIVERSION / LOWERING / PROTECTION BY STATUTORY UNDERTAKER WHERE NECESSARY PRIOR TO COMMENCEMENT OF WORKS.
- GROUND CONDITIONS / SOIL CONTAMINATION / REMEDIATION
 - THE GROUND INVESTIGATION REPORT (REF: RML9168) DID NOT IDENTIFY SOIL CONTAMINATION TO BE PRESENT. HOWEVER, CONTRACTOR SHOULD ENSURE SITE PERSONNEL USE APPROPRIATE PPE WHEN CARRYING OUT EXCAVATIONS & THAT CONSTRUCTION HEALTH & SAFETY PLAN INCLUDES METHOD STATEMENT FOR DEALING WITH UNFORESEEN CONTAMINATION IF ENCOUNTERED DURING WORKS.
 - SITE WAS PREVIOUSLY OCCUPIED BY BUILDINGS & STRUCTURES. WHILST SITE INVESTIGATIONS TO DATE HAVE NOT IDENTIFIED ANY EVIDENCE OF CONTAMINATION OR FORMER FOUNDATIONS IT IS POSSIBLE THAT CONTAMINATION / OBSTRUCTIONS MAY STILL EXIST & BE ENCOUNTERED DURING WORKS. CONTRACTOR SHOULD ENSURE SITE PERSONNEL USE APPROPRIATE PPE WHEN CARRYING OUT EXCAVATIONS & THAT CONSTRUCTION HEALTH & SAFETY PLAN INCLUDES METHOD STATEMENT FOR DEALING WITH UNFORESEEN CONTAMINATION / OBSTRUCTIONS IF ENCOUNTERED DURING WORKS. WHERE GROUND CONDITIONS DEVIATE FROM THOSE REPORTED IN THE SITE INVESTIGATION REPORT, THE ENGINEER SHOULD BE CONTACTED IMMEDIATELY FOR ADVICE ON HOW TO PROCEED.
- EXCAVATIONS & EARTHWORKS
 - REFER TO GROUND INVESTIGATION REPORT (REF: RML9168) FOR DETAILS OF UNDERLYING SOILS. WHERE GROUND CONDITIONS ARE FOUND TO DEVIATE FROM THOSE REPORTED IN THE SITE INVESTIGATION REPORT, THE ENGINEER SHOULD BE CONTACTED IMMEDIATELY FOR ADVICE ON HOW TO PROCEED.
 - EXCAVATIONS WHERE ACCESS IS REQUIRED SHOULD BE TEMPORARY SUPPORTED WITH SLOPES BATTERED WELL BACK AND MAINTAINED AT A SAFE ANGLE.
 - CONTRACTORS CONSTRUCTION HEALTH & SAFETY PLAN SHOULD INCLUDE METHOD STATEMENT OUTLINING SAFE METHOD OF WORKING IN OR ADJACENT TO DEEP EXCAVATIONS ADJACENT TO BOUNDARIES / STRUCTURES / EMBANKMENTS / BULK EARTHWORKS.
 - GROUNDWATER MAY BE ENCOUNTERED IN EXCAVATIONS. CONTRACTORS CONSTRUCTION HEALTH & SAFETY PLAN SHOULD INCLUDE METHOD STATEMENT OUTLINING SAFE METHOD FOR DEWATERING EXCAVATIONS DURING GROUNDWORKS.
- WORKS ON OR ADJACENT TO HIGHWAY
 - CONTRACTOR SHOULD ENSURE SITE PERSONNEL HAVE APPROPRIATE TRAINING & USE APPROPRIATE PPE WHEN CARRYING OUT WORKS IN THE HIGHWAY AND THE CONSTRUCTION HEALTH & SAFETY PLAN SHOULD INCLUDE METHOD STATEMENT THAT ADOPTS BEST PRACTICE HEALTH AND SAFETY POLICIES FOR ALL SITE PERSONNEL THROUGHOUT THE DURATION OF THE WORKS ON / ADJACENT TO HIGHWAY.
- CONNECTING TO EXISTING MANHOLES / SEWERS
 - CONTRACTORS CONSTRUCTION HEALTH & SAFETY PLAN SHOULD INCLUDE METHOD STATEMENT THAT ADOPTS BEST PRACTICE HEALTH AND SAFETY POLICIES FOR ALL SITE PERSONNEL THROUGHOUT THE DURATION OF SUCH WORKS.
 - CONTRACTOR SHOULD ENSURE SITE PERSONNEL HAVE APPROPRIATE TRAINING & USE APPROPRIATE PPE WHEN MAKING SEWER CONNECTIONS TO EXISTING MANHOLES / SEWERS.

MAINTENANCE / CLEANING

6. ACCESS OF MANHOLES / CHAMBERS FOR MAINTENANCE OF DRAINAGE SYSTEM & HIGH PRESSURE JETTING

- MAINTENANCE CONTRACTOR SHOULD PROVIDE RISK ASSESSMENT AND METHOD STATEMENT THAT ADOPTS BEST PRACTICE HEALTH AND SAFETY POLICIES FOR MAINTENANCE PERSONNEL THROUGHOUT THE DURATION OF SUCH WORKS.
- MAINTENANCE PERSONNEL SHOULD HAVE APPROPRIATE TRAINING & USE APPROPRIATE PPE.

DEMOLITION

- DEMOLITION CONTRACTOR SHOULD PROVIDE RISK ASSESSMENT AND METHOD STATEMENT THAT ADOPTS BEST PRACTICE HEALTH AND SAFETY POLICIES FOR ALL SITE PERSONNEL THROUGHOUT THE DURATION OF SUCH WORKS.

FOUL WATER DRAINAGE SCHEDULE														
CHAMBER No.	CHAMBER TYPE	CHAMBER	COVER	COVER	COVER	INVERT LEVEL		DEPTH TO INVERT (m)	PIPE DIAMETER (mm)	LENGTH (m)	GRADIENT 1 in	BEDDING CLASS	PIPE MATERIAL	
		SIZE (mm)	GRADE EN 124	SIZE (mm)	LEVEL (m) AOD	INCOMING (m) AOD	OUTGOING (m) AOD							
F1	UIC	475 Ø	B125	600x600	30.14	29.12	29.12	1.02	150	38.0	146	S	PVC-U	
F2	UIC	475 Ø	B125	600x600	29.99	28.86	28.86	1.13		150	6.6	21	S	PVC-U
F3	RA	475 Ø	B125	600x600	30.36	28.55	28.47	1.89			150	3.5	15	S
EXISTING MANHOLE					29.64	28.24	28.24	1.40						
F4	UIC	475 Ø	D400	600x600	29.72	28.95	28.95	0.77	150	3.5	64	Z	PVC-U	
F5	UIC	475 Ø	D400	600x600	29.42	28.90	28.82	0.60		150	11.3	141	Z	PVC-U
F6	UIC	475 Ø	A15	525x525	29.54	28.74	28.74	0.80			150	28.4	146	S
F3	RA	475 Ø	B125	600x600	30.36	28.55	28.47	1.89						
F7	UIC	475 Ø	A15	525x525	29.78	29.14	29.14	0.64	150	1.3	3	Z	PVC-U	
BRANCH BETWEEN F6 & F3					28.69	28.69	-							
F8	UIC	475 Ø	B125	600x600	30.30	29.10	29.10	1.20	150	0.3	1	S	PVC-U	
BRANCH BETWEEN F1 & F2					28.91	28.91	-							

C1	CONSTRUCTION ISSUE. UPDATED TO LATEST ARCHITECTS PLAN INDICATING SPLIT FLOOR LEVEL. EXTERNAL RAMPS AND MINOR PARKING UPDATES. ATTENUATION TANKS UPDATED TO SDS.	PB	12.03.26
T1	TENDER ISSUE.	PB	28.03.25
P1	PRELIMINARY ISSUE.	PB	21.02.25
MK	REVISION	BY	DATE

SURFACE WATER DRAINAGE SCHEDULE														
CHAMBER No.	CHAMBER TYPE	CHAMBER SIZE (mm)	COVER GRADE EN 124	COVER SIZE (mm)	COVER LEVEL (m) AOD	INVERT LEVEL INCOMING (m) AOD	OUTGOING (m) AOD	DEPTH TO INVERT (m)	PIPE DIAMETER (mm)	LENGTH	GRADIENT 1 in	BEDDING CLASS	PIPE MATERIAL	
S1	UIC	475 Ø	D400	600x600	30.26	29.31	29.31	0.95	150	3.4	113	Z	PVC-U	
EXISTING MANHOLE					30.34	29.28	29.28	1.08						
S2	UIC	475 Ø	A15	525x525	30.33	29.23	29.23	1.10	150	18.5	143	S/Z	PVC-U	
S3	UIC	475 Ø	B125	600x600	29.82	29.10	29.10	0.72	150	2.7	136	Z	PVC-U	
ALTHON SWALE INLET HEADWALL					29.08	29.08	-							
ALTHON SWALE OUTLET HEADWALL					28.99	28.99	-							
EXISTING MANHOLE					29.37	28.78	28.70	0.67	150	11.5	54	Z	PVC-U	
S4	UIC	475 Ø	A15	525x525	30.22	29.25	29.25	0.97	150	0.6	19	S	PVC-U	
BRANCH BETWEEN S2 & S3					29.22	29.22	-							
S6	ST	500 Ø	D400	600x600	29.84	28.72	28.72	1.12	225	1.0	-	S	HDPE	
SDS GEOLIGHT 800					28.72	28.72	-							
S5	ST	500 Ø	D400	600x600	29.39	28.72	28.72	0.67						
EXISTING MANHOLE					29.37	28.70	28.70	0.67	225	2.1	105	Z	HDPE	
S7	ST	500 Ø	A15	600x600	30.20	29.60	29.60	0.60	150	2.3	1	S	PVC-U	
S8	CP	1200 Ø	A15	600x600	30.18	27.88	27.88	2.30						
SDS GEOLIGHT					27.88	27.88	-							
S9	CP	1200 Ø	A15	600x600	29.85	27.88	27.88	1.97	300	1.0	-	S	HDPE	

DRAWING STATUS

FINAL

DRAWING TITLE

ENGINEERING LAYOUT

PROJECT

PREMIER INN
BURGESS HILL
RH15 9TQ

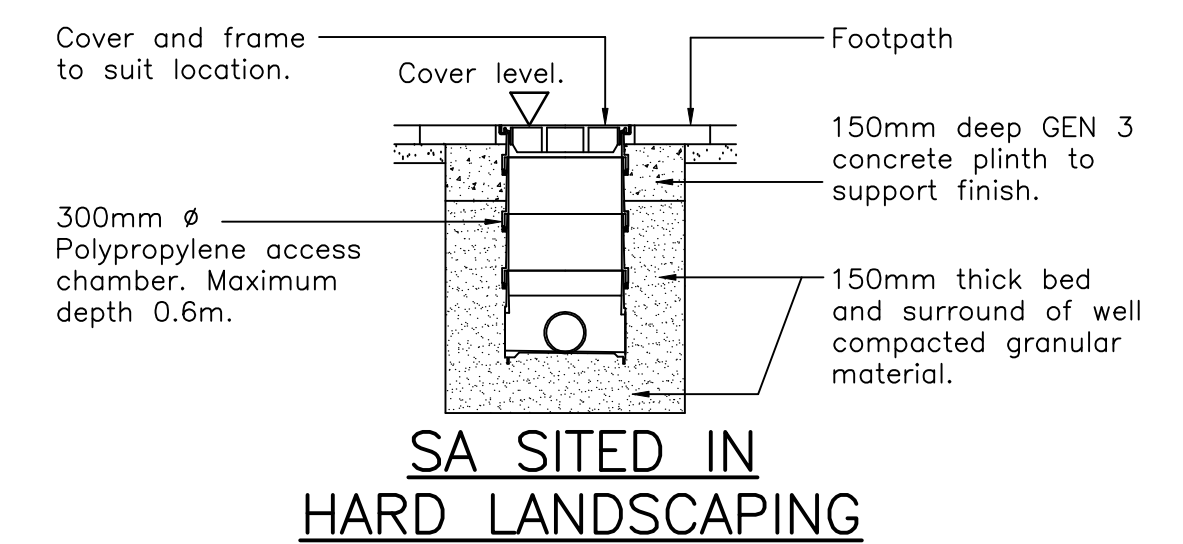
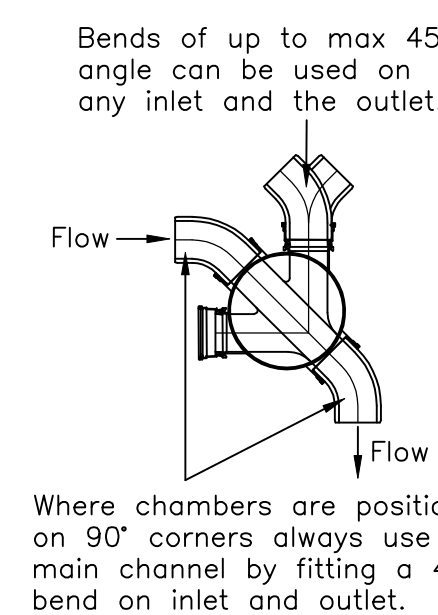
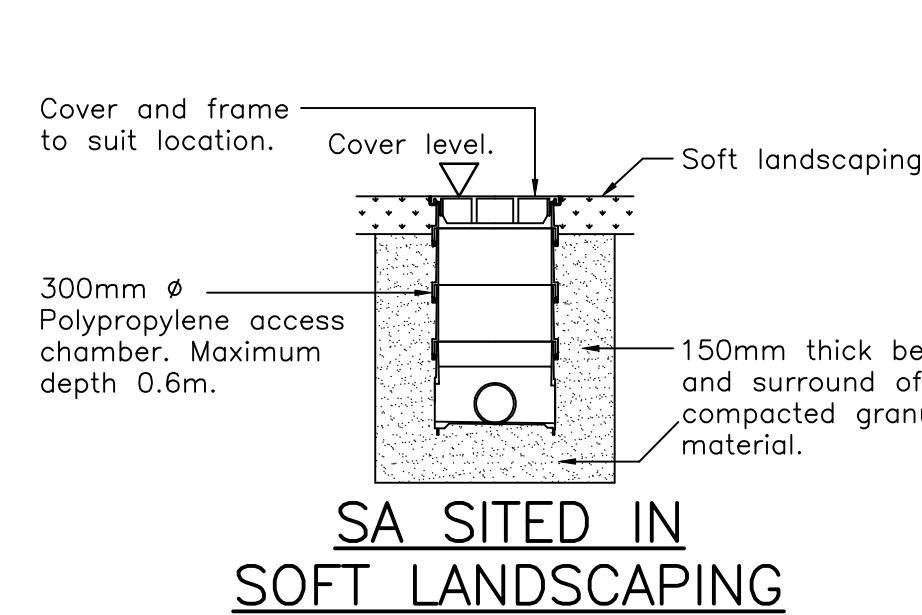
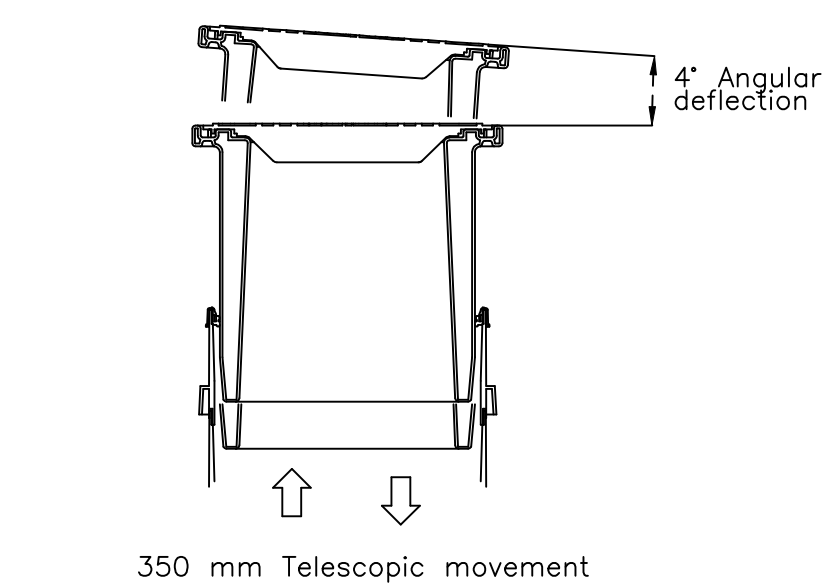
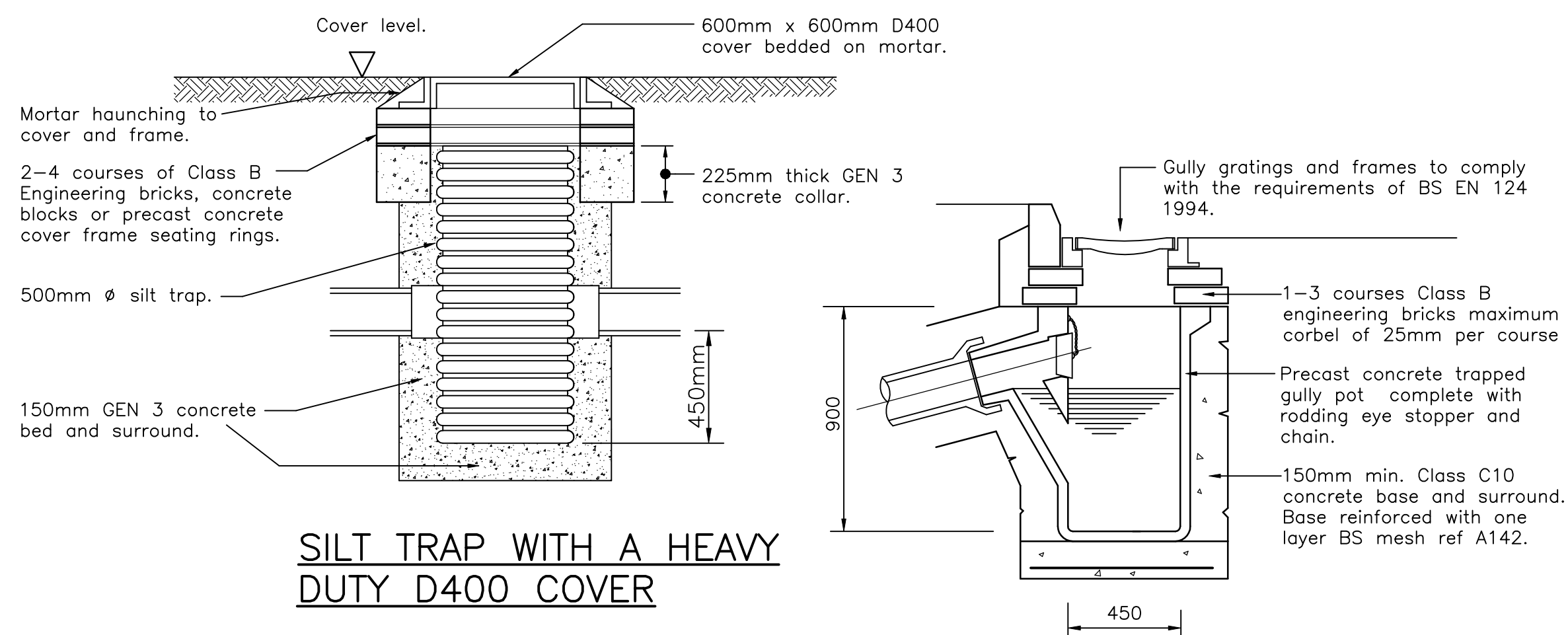
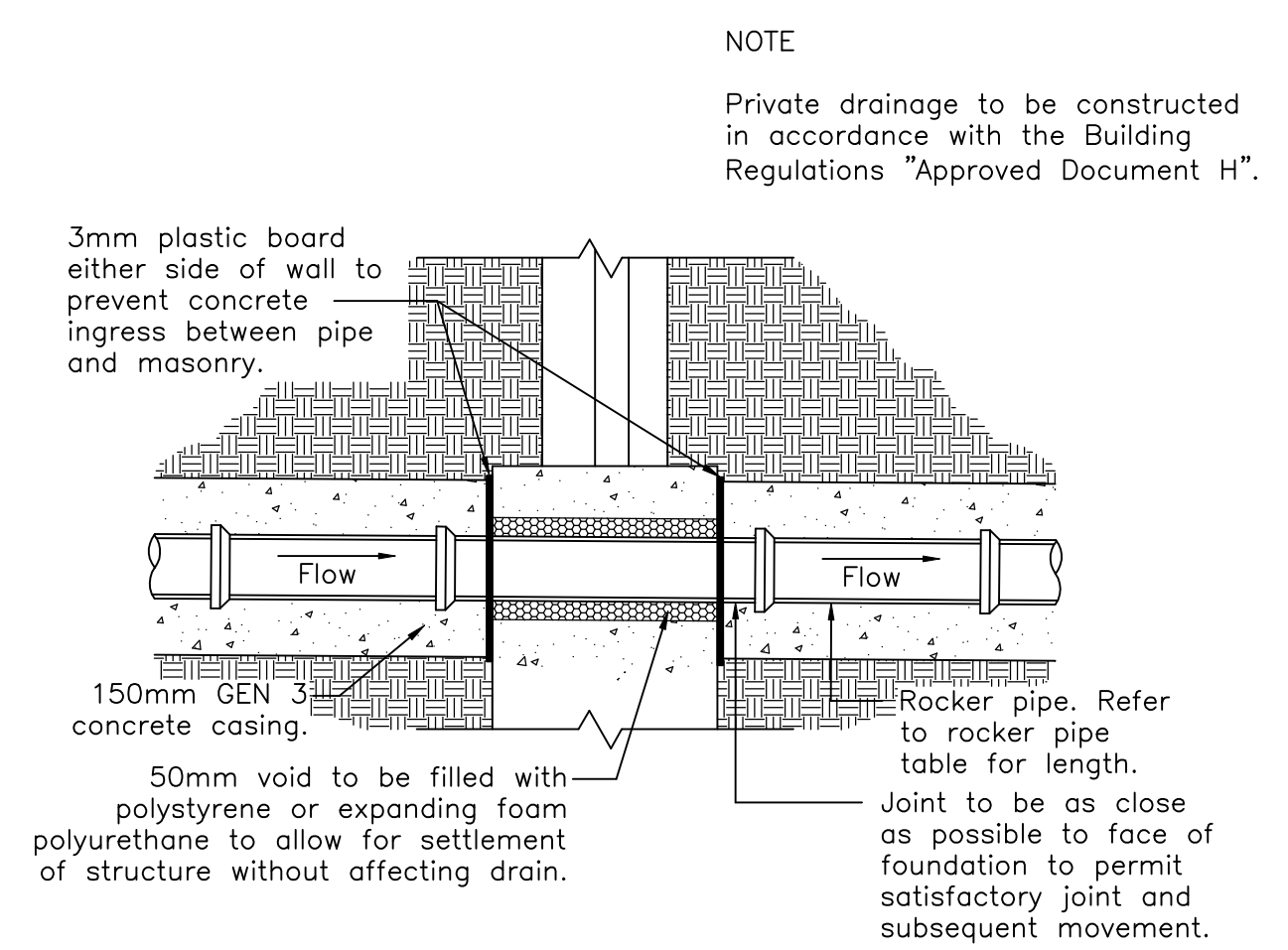
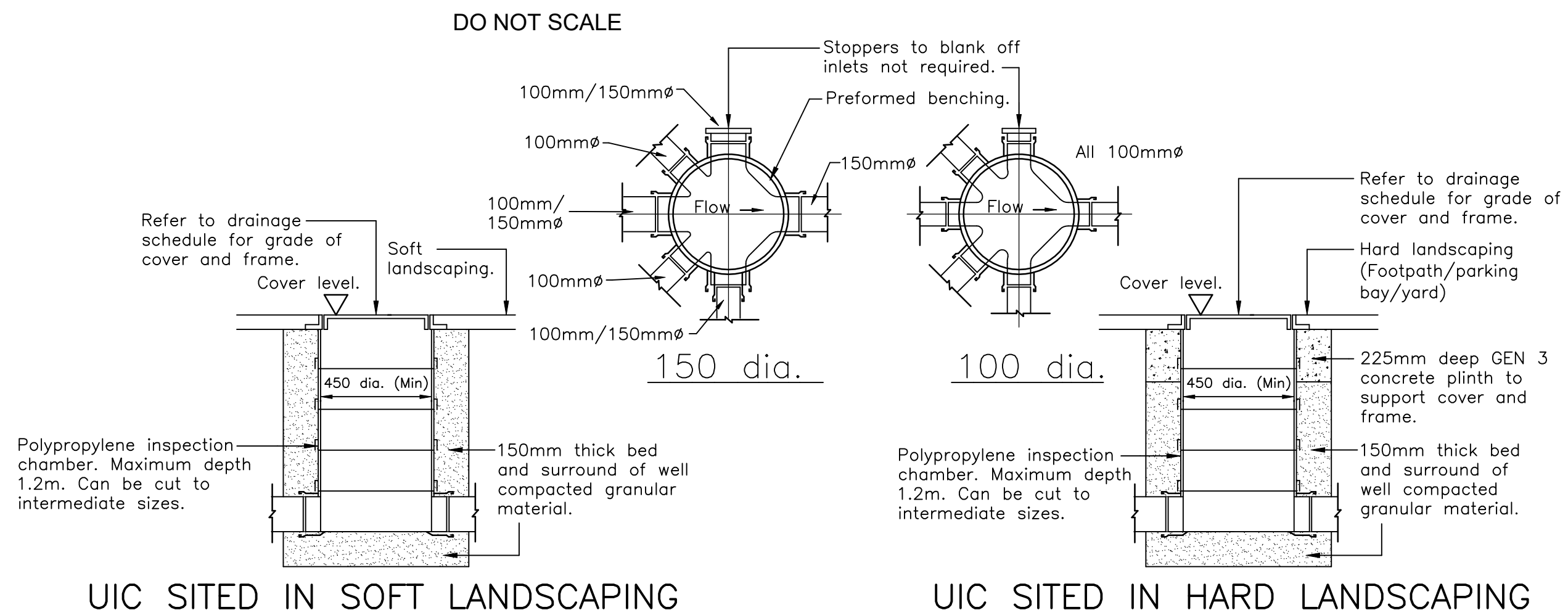
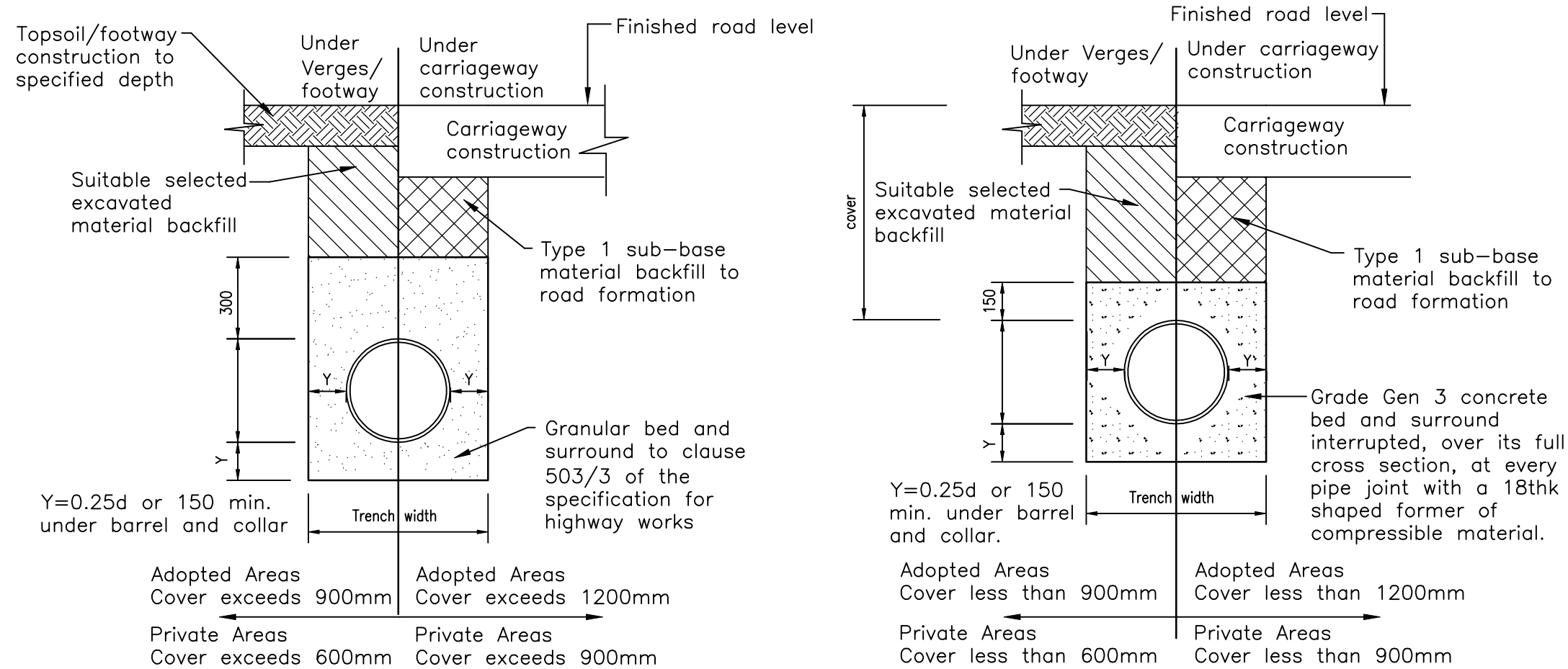


London, Henley-on-Thames and Gloucester

Drawn: PB, Chkd: AR, Scales: 1:200 @ A1, Date: FEB 2025

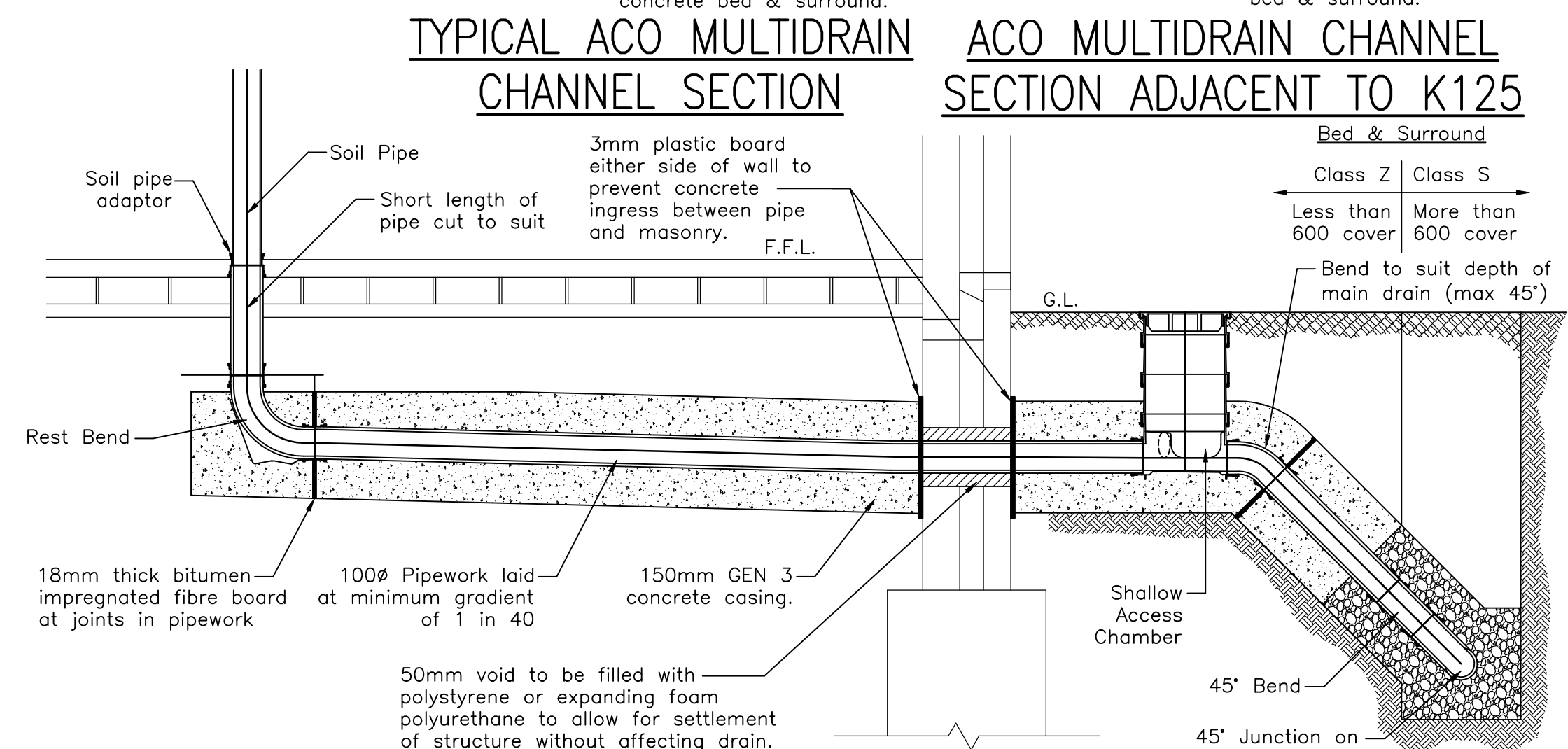
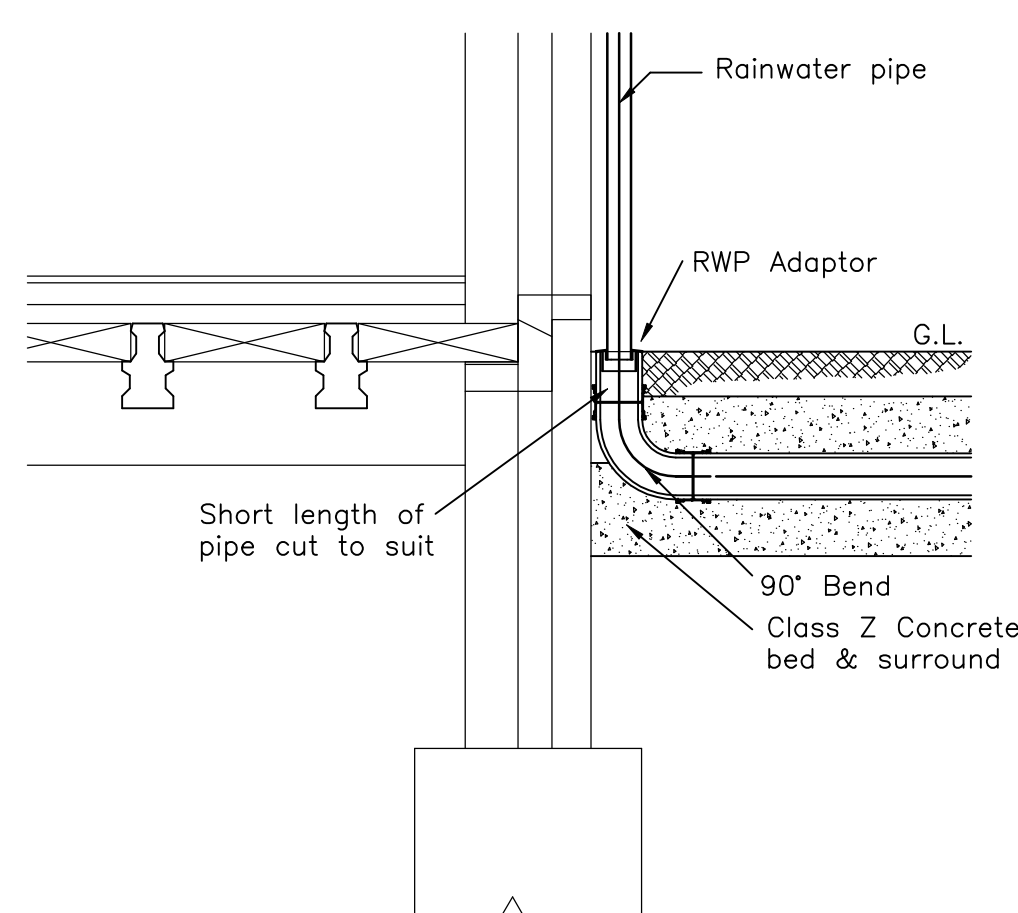
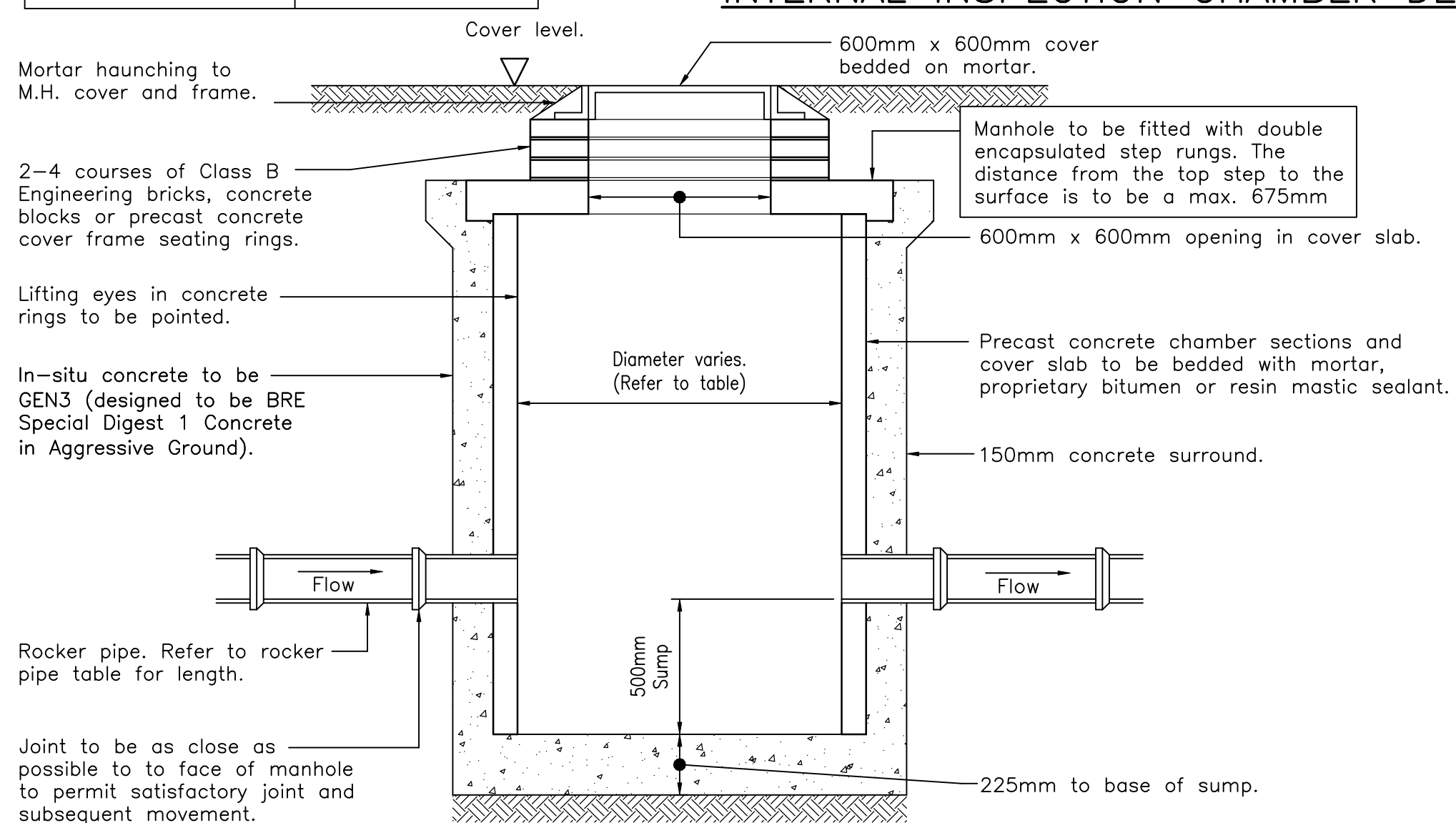
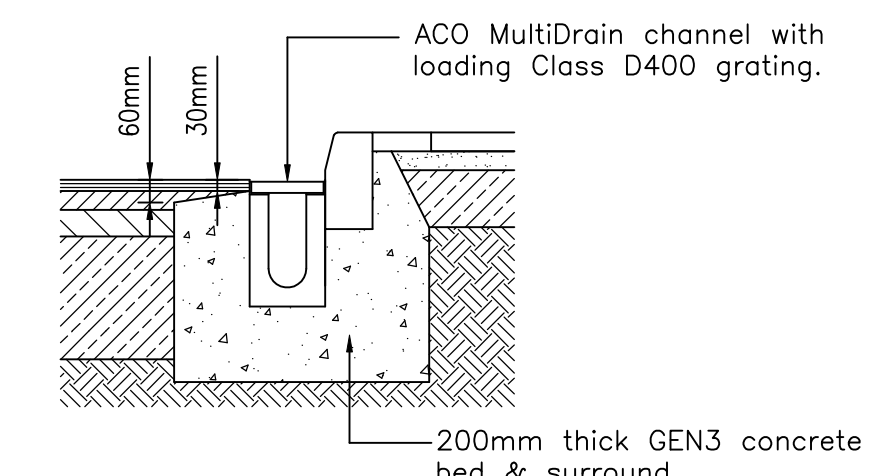
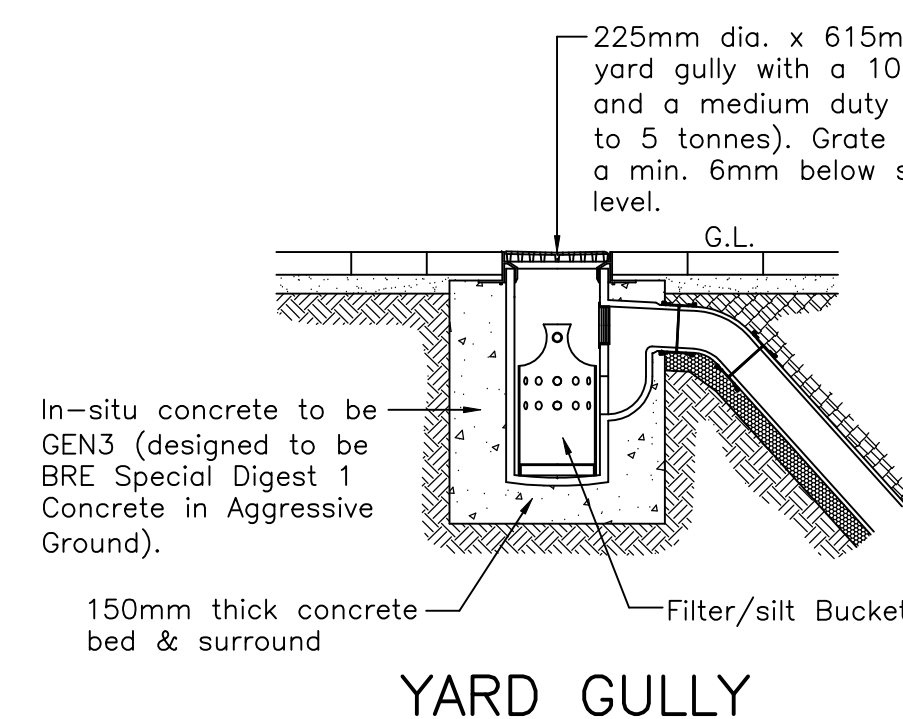
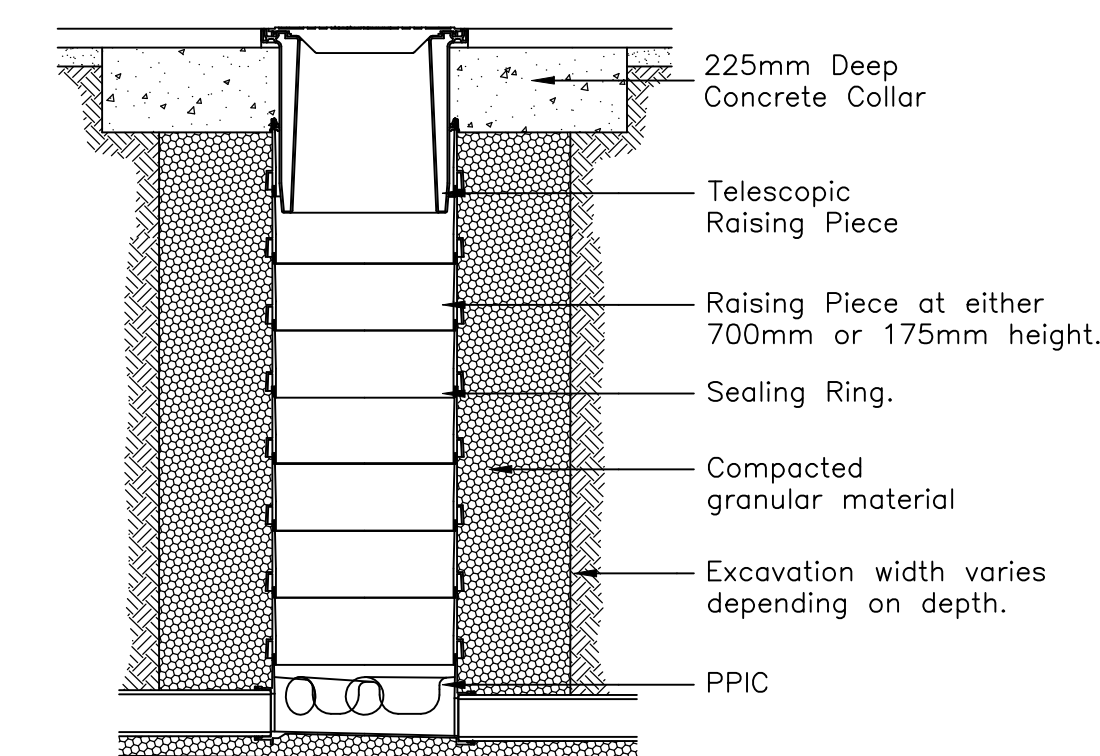
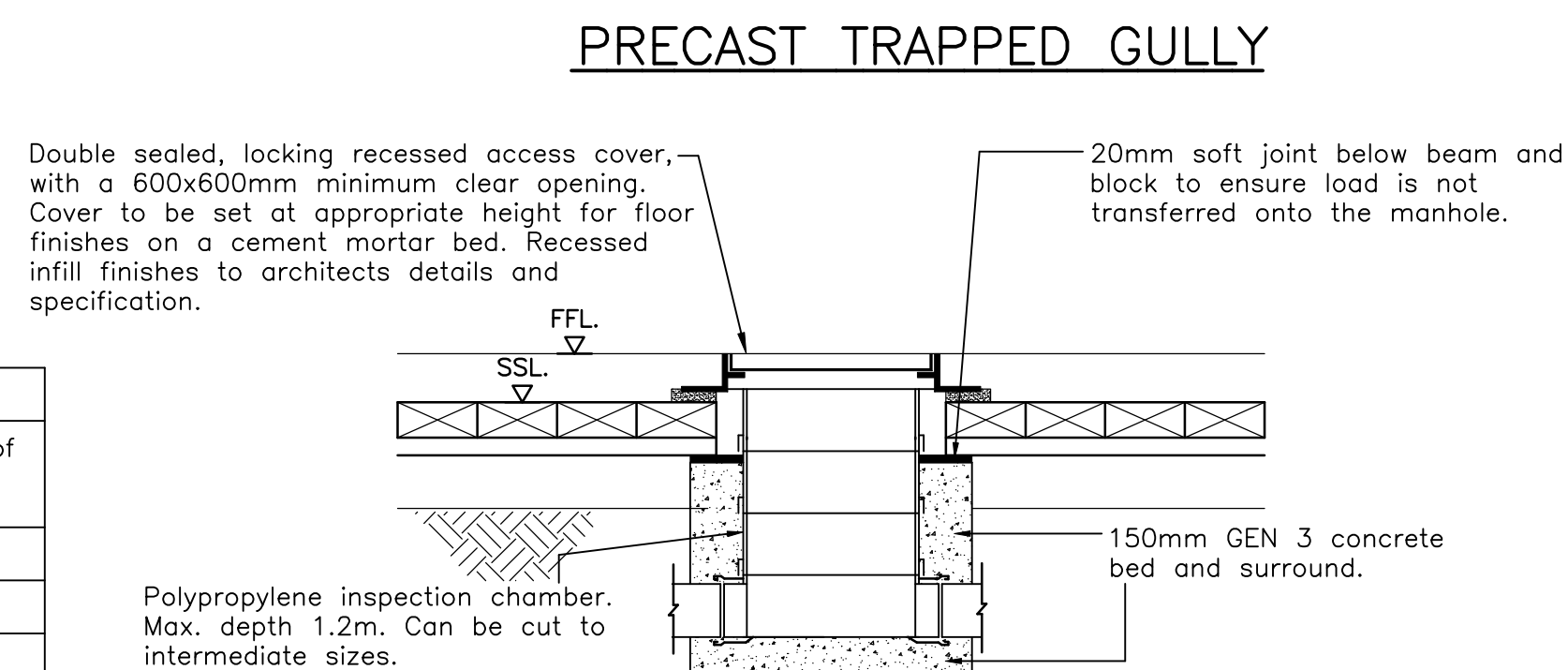
CONSTRUCTION

Project Number	Drawing Number	Revision
P23-0887	100	C1

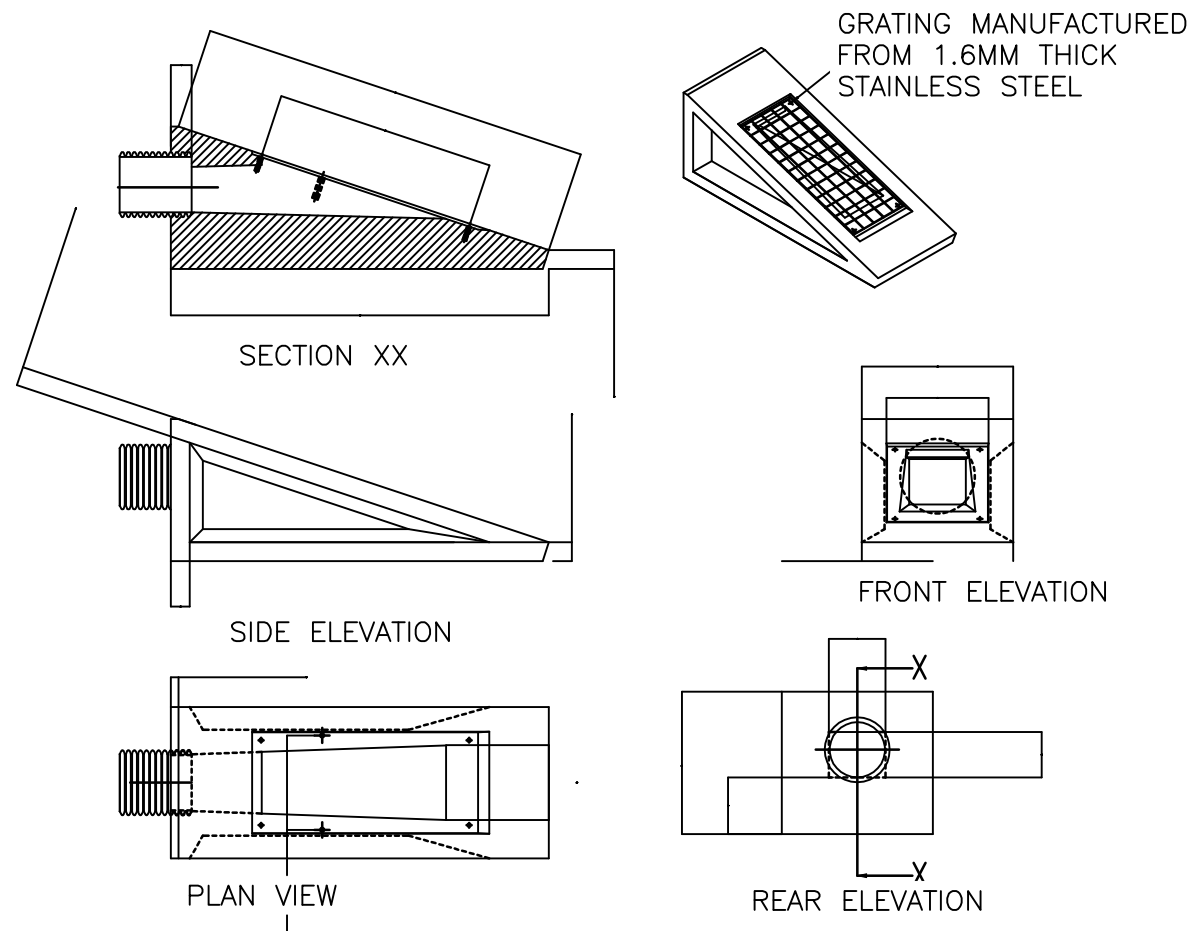
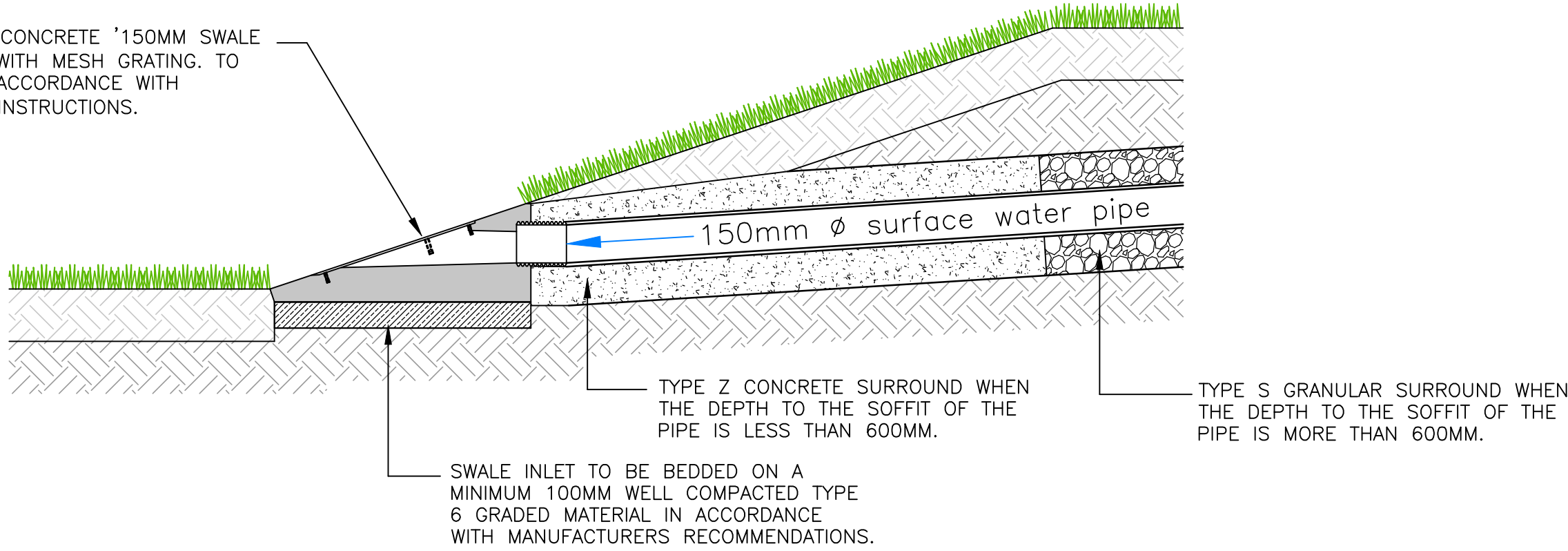


Rocker Pipes	
Nominal dia. (mm)	Effective length (m)
150 – 600	0.6
601 – 750	1.0
Over 750	1.25

Manhole Diameters	
Diameter of largest pipe in manhole (mm)	Internal diameter of manhole (mm)
Less than 300	1200
375 – 450	1350
500 – 700	1500
750 – 900	1800
Greater than 900	Consult Undertaker

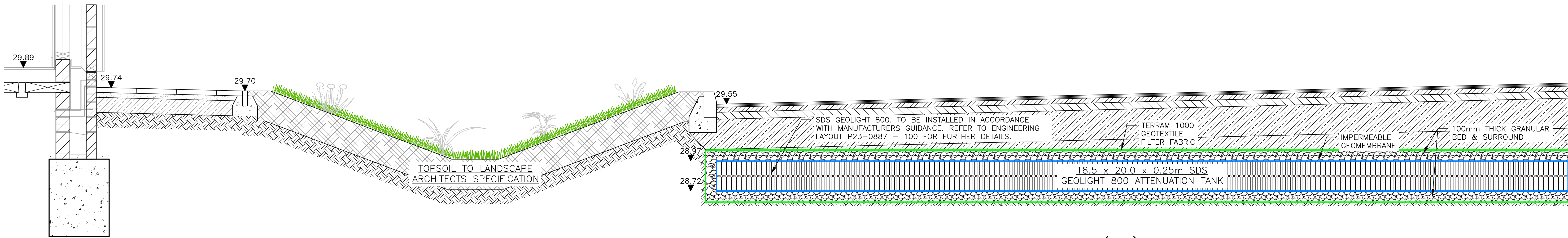


ALTHON PRECAST CONCRETE '150MM SWALE INLET' HEADWALL WITH MESH GRATING. TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

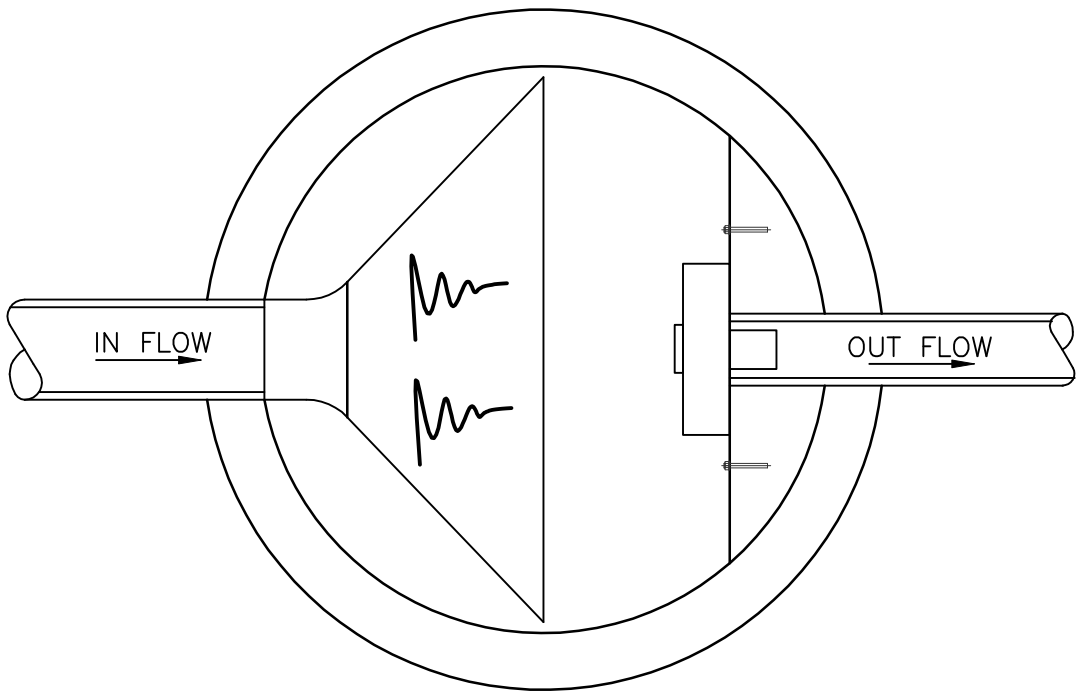


DETAILS OF ALTHON PRECAST CONCRETE "SWALE INLET" HEADWALL WITH MESH GRATING

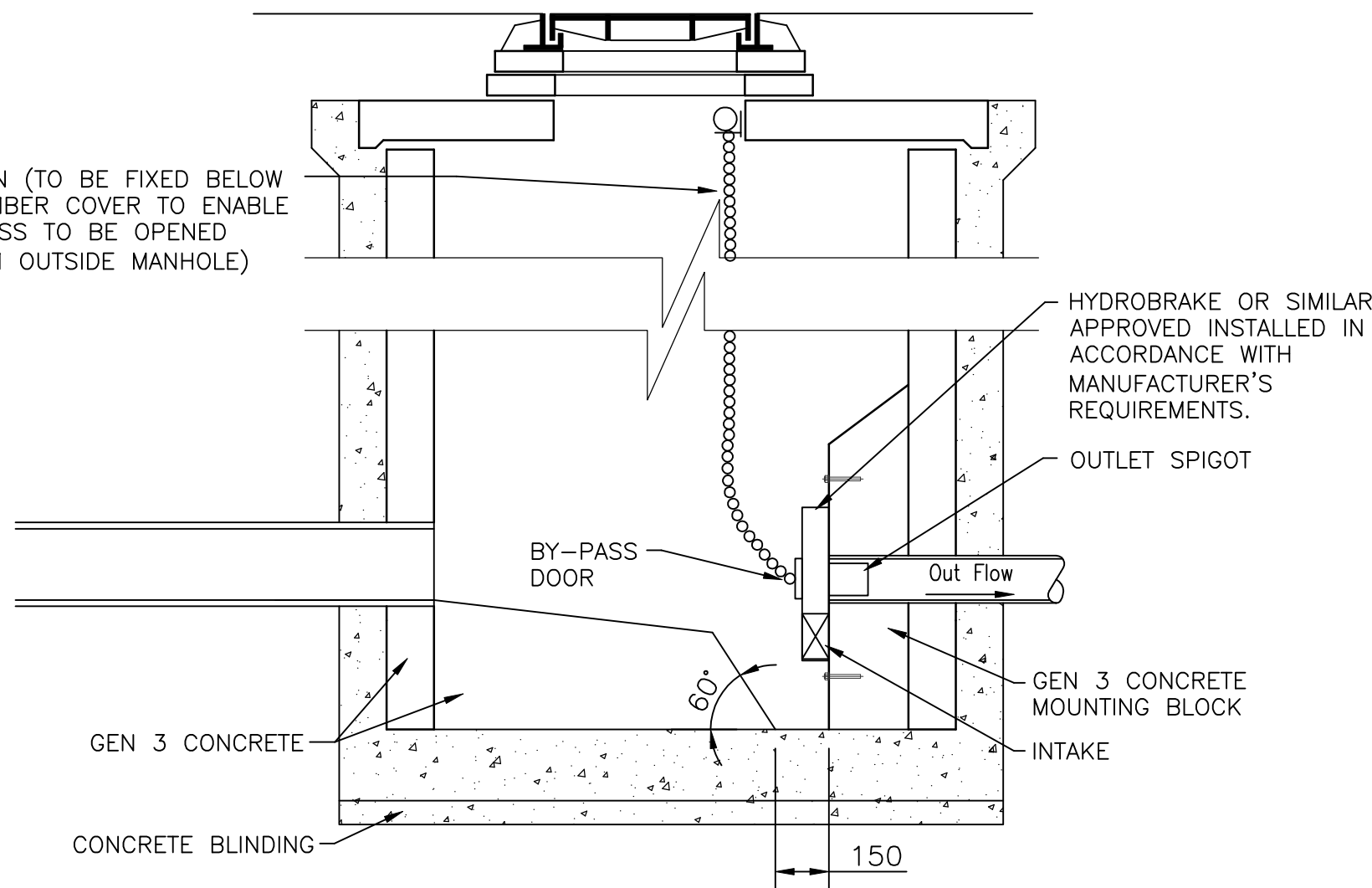
TYPICAL SECTION THROUGH SWALE INLET HEADWALL



SECTION THROUGH ATTENUATION BASIN & SDS GEOLIGHT 800 TANK (A2)



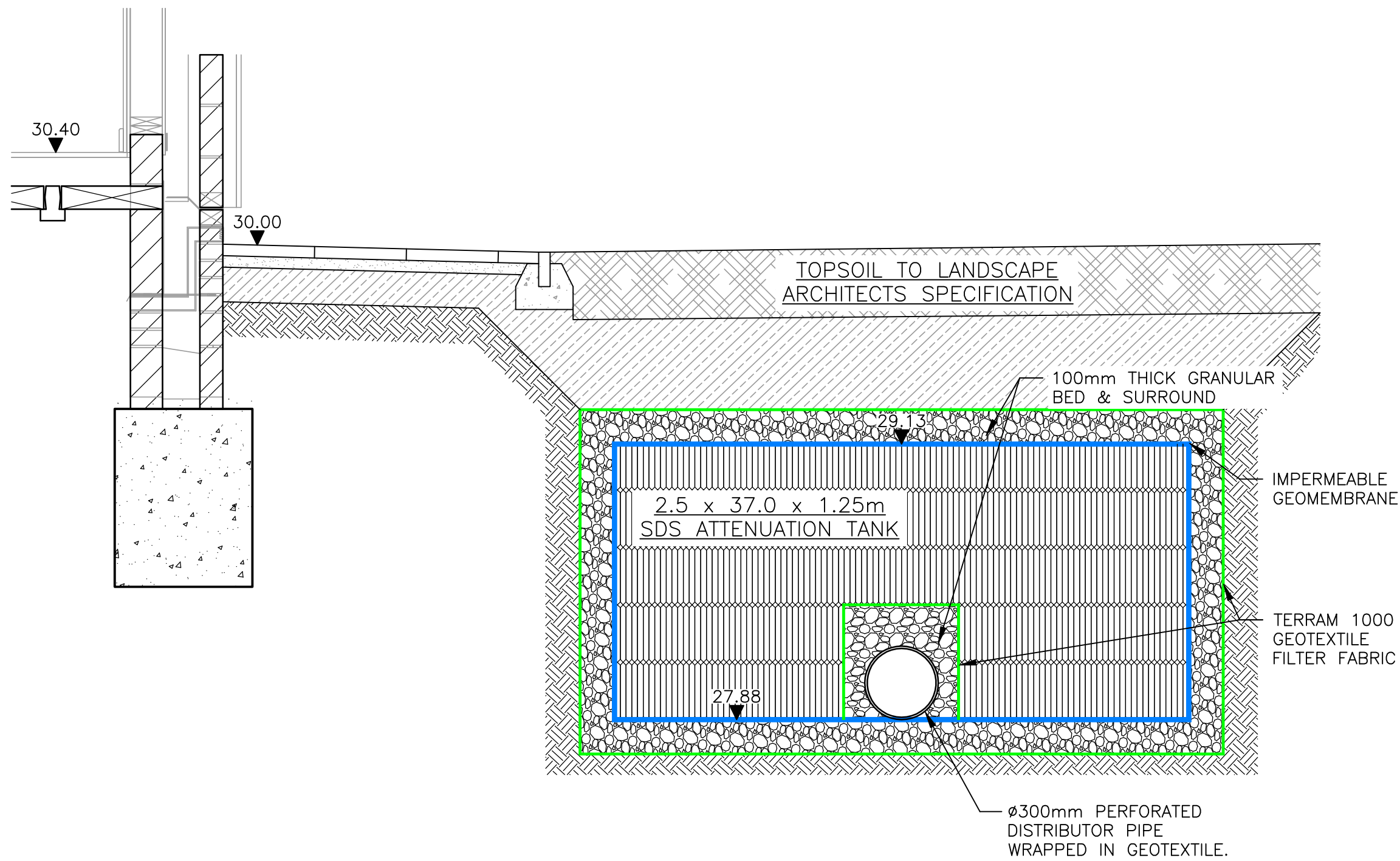
HYDROBRAKE CHAMBER (PLAN)



HYDROBRAKE CHAMBER (SECTION)

NOTES:

- CHAMBER COVER TO BE POSITIONED DIRECTLY ABOVE BY-PASS DOOR.
- DIMENSIONS ARE INDICATIVE ONLY AND ARE DEPENDANT ON TYPE OF CONTROL DEVICE USED. REFER TO MANUFACTURER'S SPECIFICATIONS FOR DETAILS.
- HYDROBRAKE FLOW CONTROL CHAMBER A TO LIMIT FLOWS TO 31.5 L/S
TYPE - CTL-SCU-0169-3150-1250-3150
DESIGN HEAD - 1.25M
ORIFICE DIAMETER - 0.169M
- HYDROBRAKE TO BE INSTALLED IN EXISTING CHAMBER TO REPLACE EXISTING FLOW CONTROL.



SECTION THROUGH ATTENUATION TANK (A1)

C1	CONSTRUCTION ISSUE	PB	12.03.26
T1	TENDER ISSUE	PB	28.03.25
MK	REVISION	BY	DATE

DRAWING STATUS
FINAL

DRAWING TITLE
SUDS DETAILS

PROJECT
PREMIER INN BURGESS HILL RH15 9TQ

8 Friday Street Henley-On-Thames Oxfordshire, RG9 1AH T: 01491 576 221 E: mail@simpsoneng.com W: www.simpsoneng.com

Drawn PB	Ch'd AR	Scales NTS	Date MAR 2025
Project Number P23-0887	Drawing Number 104	Revision C1	

**DRAINAGE IMPLEMENTATION,
MANAGEMENT & MAINTENANCE PLAN**
PREMIER INN BURGESS HILL
CHARLES AVE
BURGESS HILL
RH15 9TQ

PREPARED FOR:



JOB NO: P23-887
DATE: 18th March 2026
ISSUE NO: 1



DOCUMENT HISTORY

Issue No.	Description	Date
1	First issue.	18/03/2026

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1. INTRODUCTION

- 1.1 This report has been prepared by Simpson TWS on behalf of Premier Inn Hotels Ltd to provide details of the operation and maintenance requirements for the drainage proposals for the development.
- 1.2 Premier Inn Hotels Ltd have an established management team who are responsible for the management / maintenance of their commercial properties throughout the UK. The management team would ensure that the hotel's drainage system is operated and maintained in accordance with this plan.
- 1.3 On occupation of the development, this maintenance and management plan should be incorporated into the development's "Operation and Maintenance Manual" with the as-built drainage system operated and maintained in accordance with the requirements set out in the following section of this report to prevent a reduction in the performance of the drainage system over the lifetime of the development.
- 1.4 Premier Inn Hotels Ltd.'s appointed management company should ensure that the maintenance contractor tasked with carrying out any maintenance works provides a risk assessment and method statement that adopts best practice health and safety policies for maintenance personnel throughout the duration of any maintenance works. Measures may include:
 - Ensure the use of safe systems of work and procedures are followed.
 - Certificated operatives only to be used for all confined space entry.
 - Ensure appropriate PPE is worn at all times including the use of safety goggles, ear defenders and other relevant equipment when using high pressure jetting.
 - Do not work in weather conditions where flooding or surging is likely.
 - Erect barriers where appropriate and provide adequate lighting.
 - No operations to be carried out by operatives working alone.
 - Time maintenance to not conflict with other on-site activities.
 - Method statement to be prepared and approved prior to entry into confined space.

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2. DRAINAGE IMPLEMENTATION PLAN

- 2.1 This Implementation Plan sets out measures to be implemented during construction of the surface water drainage system for the scheme to ensure the site and areas downstream are protected from runoff during construction of the development. It is recommended that the plan is incorporated into the Contractor's Construction Health and Safety Plan with the development carried out in accordance with the measures proposed.
- 2.2 The surface water drainage network and associated flow control will be constructed at an early stage of the development's programme as part of the earthworks phase. During construction, this will assist in managing runoff and help settle out the high volumes of sediments created during construction. The attenuation tank, detention basin and filter drain will not be installed until the second phase of groundworks when the scaffold for the extension is down. This will ensure the tank is not loaded by construction plant or material and minimise the risk of silt and sediment entering the new drainage system during construction works. The contractor will then complete the finishes from around the back and work their way out around the building so nothing is damaged or contaminated.
- 2.3 In accordance with the principles set out within C753 The SuDS Manual, appropriate measures will be implemented to ensure that the SuDS components are protected during the construction phase. Construction plant and heavy machinery will be prevented from trafficking over installed drainage infrastructure through the use of defined working areas and suitable site management procedures. Where necessary, temporary protective barriers will be installed to prevent accidental damage to the attenuation tank and associated drainage infrastructure.
- 2.4 During construction, it is normal practice for a drainage system to be installed at an early stage in the programme. As such, runoff from the construction site, which can be heavily laden with silt, are likely to restrict flow within the drainage system. Therefore, the following measures will be considered to address this issue:
- Protective coverings would be used to help prevent runoff stripping material stockpiles.
 - Catchpit and silt trap chambers will be installed for the geocellular attenuation tank and Permavoid unit to prevent sediments such as soil and mud from transferring into the drainage system. The catchpits and silt traps are to be regularly inspected throughout construction.
 - Surfaces used as access roads and storage areas during construction should be swept regularly to prevent accumulation of dust and mud.
 - Should groundwater be encountered in excavations, such water would not be discharged to the drainage system until the amount of suspended solids has been reduced through the controlled use of skips or tanks, which will act as stilling basins.

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- To prevent contamination associated with the use of oils and hydrocarbons during construction, the Contractor would ensure that the following precautionary measures are employed during construction:

- Regular maintenance of machinery and plant.
- Use of drip trays.
- Regular checking of machinery and plant for oil leaks.
- Use of correct storage facilities.
- Regular checks for signs of wear and tear on tanks.
- Specific procedures are followed when refuelling.
- Use of a designated area for refuelling.
- Emergency spill kit to be located near refuelling area.
- Regular emptying of bunds.
- Tanks should be located in secure areas to stop vandalism.

2.5 The above measures would help to ensure that untreated construction runoff would not be discharged to the surface water drainage system.

2.6 During construction, all components of the drainage system should be constructed in accordance with relevant drawings, specifications, and manufacturer's guidelines. Further to this Building Control should visit site on a regular basis to inspect completed works and ensure that the drainage system is installed correctly.

2.7 Upon completion, all underground pipework would be jet cleaned, and CCTV surveyed, areas of porous surfacing would be swept and cleaned and silt / debris present in the swales would be removed. The Contractor would be responsible for rectifying any significant defects identified at this stage and for a period of approximately 12 months thereafter. At the end of this period a further inspection will be carried out by the Contract Administrator and on completion of any outstanding remedial works, the drainage system would be handed over.

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3. DRAINAGE MANAGEMENT & MAINTENANCE PLAN

- 3.1 This Drainage Management & Maintenance Plan provides details of the plan proposed for maintenance and management of the drainage scheme associated with the proposed development.
- 3.2 On occupation of the development, it is recommended that each element of the as-built drainage system is maintained in accordance with the regime set out in the tables below.

Table 1: Below Ground Drainage System - Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Remove all litter and debris from external hard landscaped areas and adjacent landscaping, which may pose a risk to the performance of the system.	Monthly.
	Remove build-up of sediment / silt in catchpits and dispose of oils / petrol residues using safe standard practices.	As required.
	Stabilise and mow adjacent landscaped areas and remove weeds.	
Remedial actions	Repair or rehabilitate inlet and outlets to ensure they are in good condition and operating as designed.	As required.
	Remediate any landscaping, which has raised to within 50mm of the level of adjacent hard landscaping.	
Monitoring	Check of all inlets / outlets for blockages or evidence of physical damage with any necessary remedial action or clearance carried out if required.	On a monthly basis for the first 3 months of operation, thereafter every 6 months & following severe rainfall events.
	Inspect all surfaces for ponding, or silt accumulation. Record areas where water is ponding for more than 48 hours and carry out any remedial work deemed necessary.	After severe storms.

Table 2: Existing/Proposed Geocellular Storage Tank - Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for first 3 months of operation, then every 6 months.
	Debris removal from catchment surface (where may cause risks to performance).	Monthly.
	Where rainfall infiltrates into blocks from above, check surface of filter for blockage by silt, algae or other matter. Remove and replace surface infiltration medium as necessary.	Monthly / after severe storms.
	Remove sediment from pre-treatment structures.	Annually, or as required.
Remedial actions	Repair/rehabilitation of inlets, outlet, overflows and vents.	As required.
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually and after large storms.

Table 3: Flow Control Chamber - Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Cleaning off the flow control device of any debris/ sediment.	As required.
Remedial actions	Flow control device repairs.	As required.
	Repair of erosion damage, or damage to chamber.	
Monitoring	Inspection of the chamber for debris and sediment build up.	Monthly for first 3 months, thereafter, every 6 months and following severe storm events.

Table 4: Existing Bypass Separator - Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Cleaning of interceptor, inlets, and outlets of retained pollutants & silt.	Every 3, 6 or 12 months depending on site conditions (or following poor performance).
Remedial actions	Repair of erosion damage, or damage to tank. Interceptor repairs.	As required.
Monitoring	Inspection of the tank for pollutants and silt. Inspection of inlets and outlets. Inspection of areas receiving overflow, for evidence of erosion.	Every 3, 6 or 12 months depending on site conditions (or following poor performance).

Table 5: Attenuation Basin - Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Litter and debris removal.	Monthly.
	Grass cutting for spillways and access routes.	Monthly (during growing season), or as required.
	Grass cutting of meadow grass in and around basin.	Every 6 months (spring - before nesting season, and autumn).
	Manage other vegetation and remove nuisance plants.	Monthly (at start, then as required).
	Tidy all dead growth before start of growing season.	Annually.
	Manage wetland plants in outlet pool – where provided.	
	Remove sediment from inlets, outlet and forebay.	Annually or as required.
Occasional Maintenance	Re-seed areas of poor vegetation growth.	Annually or as required.
	Prune and trim trees and remove cuttings.	Every 2 years or as required.
	Remove sediment from forebay, when 50% full and from micropools if volume reduced by > 25%.	3 – 10 years (or as required).
Remedial actions	Repair of erosion or other damage by re-seeding or re-turfing.	As required.
	Realignment of rip-rap.	
	Repair/rehabilitation of inlets, outlets and overflows.	
	Re-level uneven surfaces and reinstate design levels.	
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly/after severe storms.
	Inspect banksides, structures, pipework, etc for evidence of physical damage.	
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Every 6 months.
	Check penstocks and other mechanical devices.	

Method Statement

Site: Premier Inn Burgess Hill	Job No. 1262
Drainage Work	

Date Works Commence: 27/04/2026

Duration of Work: (TBC)

Personnel:

Site personnel undertaking this work are CPCS / NPORS trained plant operators, confined space trained and first aid qualified.

Before work commences the operatives undertaking these works will be briefed on work procedure and safety precautions outlined in this document.

Description of work to be completed:

Installation of the sustainable drainage system (SUDs), including 2 SDS attenuation tanks, swales, new drainage chambers, manholes, pipes and gullies as per Simpsons TWS 'Engineering Layout drawing.

Method of Work:

Installation of new drainage pipes, gullies, chambers and manholes:

- All site staff will be briefed on work procedure and safety precautions.
- Check existing service location drawings.
- Scan the drainage run / excavation area using Cat and Genny.
- Permit to dig will be completed prior to excavation / breaking ground.
- Erect safety barriers (either metal crowd barriers or heras fencing), displaying warning & safety signs around the work area to provide segregation and protection of the works and to prevent unauthorised access.
- Excavate trench to install the new drainage. Where possible the excavation will be stepped / battered back so trench supports are not required. If it is not possible to step / batter the sides of the excavation to a safe angle - due to restricted space of the depth of the excavation - a trench box will be used.
- A banksman will be used to assist in the safe movement of plant and to observe the area being excavated, to ensure there are no undiscovered services.
- Care to be taken when working around existing underground services. No mechanical tools are to be used within 1 metre of known live services – hand digging only.
- Excavated material will be safely stockpiled away from the excavation.
- Install new drainage pipes, gullies, chambers and manholes. Form sub base, pipe surrounds and bedding as per the engineers details:
 - New drainage connections will be made with the appropriate lengths of rocker pipes and couplings.
 - All manhole chamber covers will be installed parallel to final kerbs, edgings, paving joints or building lines, as appropriate.

- All stack connections under the building to be a minimum 100mm diameter solid PVC-U and laid at a gradient of 1 in 40 unless otherwise stated. If the stack is greater than 100mm, then the diameter of the connection is to be increased to match it.
- All RWP connections to be minimum 100 diameter solid PVC-U and laid at a gradient of 1 in 80 unless otherwise noted. If the RWP is greater than 100mm, then the diameter of the connection is to be increased to match it.
- All private foul water pipework to be 150mm in diameter to be PVC-U
- All private surface water pipework up to 150mm in diameter in solid PVC-U. All private surface water pipework 225mm and above to be structured wall plastic sewer pipe.
- Concrete manholes will comply with BS EN 1917 and BS5911-3. Plastic chamber will comply with BS 7158.
- All road gulley connections will be a minimum 150mm diameter solid PVC-U pipework and lain to a minimum gradient of 1 in 150.
- Redundant drainage and services marked to be removed will be dug out with the chambers demolished and void filled with type 1 material.
- Complete backfilling and reinstatement works (see below).

Connecting the new drainage pipes to existing manholes:

- Confined Space work precautions to be implemented when working in existing manholes (see **confined space section** below).
- Where required – trench boxes will be install to protect deep excavations that cannot be stepped / battered back.
- Trench boxes will be installed as per manufacturers instructions. Secure ladder access and edge protection will be fixed to trench box prior to entry.
- Cut through wall of manhole & benching and connect length of pipe into the manhole.
- Install and connect the new drainage pipes into existing manhole
- Connect pipe to end of drain run to complete connection.
- Test the completed drain run.
- Remove trench box
- Complete backfilling and reinstatement works (see below).

Installation Sustainable Drainage System (SUDs), including installation of 2no attenuation tanks:

- Check existing service location drawings.
- Scan the drainage run / excavation area using Cat and Genny.
- Permit to dig will be completed prior to excavation / breaking ground.
- The ground will be excavated to the required depth – see Simpsons TWS 'Engineering Layout' drawing - for each attenuation tank. The ground will be prepared to a level of plus of minus 20mm with all sharp objects and protrusions removed.
- At least 500mm of work space will be left around the perimeter of each tanks to allow for the membrane to be pulled up over the tank in the final welding stage.
- Safety barriers (either metal crowd barriers or heras fencing), displaying warning & safety signs around the work area to provide segregation and protection of the works and to prevent unauthorised access.

Sequence of work for SDS attenuation tanks installation:

1. Lay GEOTextile into the excavation prepared for the membrane
2. Lay GEMembrane into the excavation
3. Lift GEOLight units into the excavation by machine / excavator
4. GEOLight blocks are lifted in place within the excavation by hand
5. Line sides of the pipe trench with GEOTextile to cover the sides of the GEOLight blocks.
6. Install the pipe work between the GEOLight blocks to specified SDS drawings, Attenuation Tank 1 Detail, drawing no: E127425_01 and Attenuation Tank 2 Detail, drawing no: E127425_02.
7. GEOTextile to pipe
8. Pipe bedding placed into the pipe trench, over pipe work between the GEOLight blocks.
9. Install remainder of GEOLight blocks
10. Wrap GEOLight blocks with GEMembrane and weld
11. Lay GEOTextile over the GEMembrane.
12. Backfill with single size self-compacting stone.

GEOTextile:

- GEOTextile is laid over the excavated area (min 200 lapped joints) ensuring enough material is prepared to completely encase the system with the minimum number of joints. This will be achieved by two operatives rolling out the GEOTextile in the base of the excavation and cutting to size using a safety knife with retractable hooked blade.
- The GEOTextile is also installed on face of the GEOLight blocks along the area of the distribution pipe to prevent clogging of the lateral channels in the GEOLight blocks.
- The GEOTextile is pinned and secured in place on the banks of the excavation to ensure a clean excavation area.

GEMembrane:

- On both attenuation tanks a specially designed impermeable GEMembrane will be installed between the GEOTextile and the GEOLight blocks.
- The GEMembrane is laid over the GEOTextile which is lining the excavation, prior to the GEOLight blocks being placed in position.
- The GEMembrane is pulled up and over the sides of the GEOLight blocks in order to fully encase them.
- The GEMembrane is initially pre-welded by an airtight twin edge weld off site at the SDS production facility. To seal the tank, the top membrane is welded in place on site using a hot air type welder (110v)

GEOLight Installation:

- The GEOLight blocks are supplied to site ready to installed. The layout is provided to the SDS installation team via the SDS drawings, Attenuation Tank 1 Detail, drawing no: E127425_01 and Attenuation Tank 2 Detail, drawing no: E127425_02.
- The blocks will be lifted from the lorry, carried to the work area by mechanical means, i.e.

telehandler or 360 with fork extension sleeves (minimum 1.8m) and distributed to the invert of the area of works.

- Once in the excavation, the blocks will then be moved by hand / slid into their final position by the installation team.

Pipe work / stone:

- The GEOLight attenuation tanks uses a distribution pipe to fill the system which is connected to the upstream and downstream manholes (inspection chambers) situated at either end of the tank.
- The pipework is placed into the tank as the approved design drawings indicate and surrounded with approved material (15-25mm clean stone).
- All pipe positions within the system and levels will be confirmed by our engineer prior to the placement of the pipe bedding.

Backfilling:

- Once the tank is completed to the layout drawing, completely sealed and encased with the appropriate layer of GEOTextile, backfilling can begin at a safe distance behind installation.
- Backfilling using specified material (Type 1).

Attenuation Swale and Hydrobrake Chamber:

- The SUDs system will include a swale constructed to the Simpsons TWS 'SUD Details' drawing no: P23-0887-104-C1.
- The swale will have a Althon precast construe inlet headwall with mesh grating.
- An Hydrobrake chamber will be installed into an existing manhole chamber. The Hydrobrke flow control will be set to a maximum rate of 31.5 l/s, and will replace the existing chamber.

Reinstatement:

- All works must be reinstated in accordance with the approved Engineering drawings, documents and specification.
- The work area will be cleaned, with all waste and loose materials will be removed from the works area.
- Remove heras fencing, safety barriers & warning signs.

Confined Space procedures:

- Operatives shall be trained and competent in the hazards of operating in confined spaces (see attached certificates).
- The minimum manning level for entry is 3 operatives, 1 top man, 1 entry man and 1 spare. The top man must be in attendance at all times during entry.
- A confined space permit will be completed prior to the works commencing and will be signed off at the end of the shift.

- To help in recovery in the event of an emergency, a rescue harness, which ensures that an unconscious man can be lifted in an upright position, should always be worn by men working in confined spaces.
- A gas monitor will be used to check the atmosphere with the manhole before entry. No confined space entry is permitted until air monitoring shows that it is safe to enter.
- Constant vigilance and continuous air monitoring must be maintained to guard against the hazards of the atmosphere deteriorating during the working period.
- The procedure for rescue in an emergency should be set out clearly in the permit-to-work, with specific jobs allocated to individual persons.
- Internal combustion engines shall not be used inside confined spaces.
- No smoking, naked flames or spark producing equipment to be used in or close to a manhole.
- Operatives who will, or may have to use breathing apparatus must be fit and not suffering from any chronic or acute respiratory ailment – they must be properly trained in the use of the equipment.
- Work in confined spaces shall only be carried out when weather conditions do not jeopardise the health and safety of persons involved in the work.
- All cuts and grazes, no matter how minor, must be immediately cleaned and covered with waterproof dressing.
- Suitable arrangements shall be in place for safe access into and egress from the confined space – fixed ladder in place at all times.

Waste

All waste will be placed into the skips provided and transported from site by a licenced waste removal contractor.

Personal protective Equipment

- Safety footwear, hard hats and hi-viz clothing will be worn at all times.
- Operators of mechanical cutting, sawing and grinding equipment must wear suitable and sufficient eye protection.
- When using mechanical cutting, equipment (i.e., petrol disc cutter, road saw), to cut precast concrete items, concrete kerbs etc, water dust suppression equipment must be used, and in addition Respirable Protective Equipment (RPE) must be worn. The minimum requirement is an FFP3 dust mask.
- All personnel involved in handling cement and mortar must wear suitable protective gloves.
- Hearing protection must be worn when using mechanical tools that omit high noise levels such as petrol disc cutter, road saw, wacker plate.
- Those involved in laying wet concrete must ensure that no areas of skin are exposed to the wet material, and that waterproof footwear and trousers are worn when standing or kneeling in the wet material.

- Safety Harness connected to the rescue winch, will be worn at all times by operatives working inside a confined space / existing manhole.

Plant & Equipment:

- Excavators
- Dumpers
- Waste skips (for removal of waste material)
- Compaction equipment
- Various hand tools
- Trench box , guardrails & ladders
- Confined space equipment – rescue tripod, harness, retrieval winch, 15 minute escape set, quad gas monitor
- Heras fencing / metal crowd barriers / warning signs
- Drainage equipment including pipes, manhole rings etc
- Lifting equipment and accessories
- Abrasive wheels and breakers.
- Service detection equipment (Cat & Genny)
- Insulated tools for hand digging around live underground services.

RISK ASSESSMENT:

Hazard	Risk	Control Measures
Site Access, Public Safety & Security Access.	Vehicles or pedestrians coming into contact with construction plant / machinery. Unauthorised access onto site.	Secure Heras fencing / metal crowd barriers will be installed to fully segregated the work area and from members of the public and vehicles. Heras fence panels will be double clipped together and braced at intervals to prevent collapse of the fence from high winds or external forces. All works will be completed within the site boundary / perimeter.
Movement of Construction Plant. Management of Deliveries.	Contact between site traffic, public and pedestrian traffic when entering and leaving the site. Vehicle collisions resulting in damage or personal injury Unauthorised use of plant and machinery.	The construction plant will only be used inside the segregated area – to prevent contact with pedestrians or other vehicles. Any changes to traffic routes using the car park will be highlighted on the traffic management plan (TMP) and communicated to all relevant parties. Operatives must work from within the confines of the protected area.

		Hi-viz clothes to be worn at all times. Plant operated by trained personnel. All plant to be equipped with amber warning beacon & white noise alarm. Excavators to be equipped with rear mirrors. All items of plant will be inspected every seven days. Any defects noted during the inspection will be recorded and rectify. All plant and equipment is to be left safe and secure at the end of the shift where unauthorised personnel are unable to tamper with it.
Existing Services	Contact with live underground services.	Before any excavation / breaking ground works are allowed to start a permit to dig will be completed. Utilities plans and survey drawings will be available for the site teams reference when identifying underground services contained within the work area. The dig / excavation area will be scanned using a Cat and Genny to identify any live services in the area. Any services indicated will be located by hand dig. No mechanical tools are to be used within 1 metre of known live services. A banksman will be in place to assist the excavator operator when excavating. Protection of underground services - temporary supporting may be required depending on the depth and type of service. Supports could include installing timber across top of trench opening, pipe supported with non-metallic slings at 1m intervals. Drains and Sewers may require additional support under apparatus as well as

		above measures.
Excavations Excavating trench for drainage Maximum depth of excavations is approximately 3-4m	Contact with underground services Collapse of unsupported trench excavations Person or plant falling into excavation.	See Existing Services above Trench boxes will be used to support the sides of the excavation when depth is greater than 1.2m- unless the excavation can be safely battered back. Operatives must not work outside the trench box or in any unsupported excavation. Trench boxes will be fitted with guardrails or utilised in such a way that the top of the sheet or box protrudes 950mm above ground level, thus providing a physical barrier, preventing falling into the excavation. Erect safety barriers fencing around open excavations. No materials are to be stored close to the edge of the excavation. Suitable means of access into excavation must be provided when required, i.e. secure ladder. The Groundworks Manager will check the safety of the excavation; - At the start of every shift - After any event likely to have affected the stability of the excavation - After any material unintentionally falls or is dislodged. Operatives will only be permitted to enter an excavation after an inspection and the Groundwork manager deems it safe. No significant groundwater problems are anticipated during this work but if ingress of water occurs during any time the excavation is open, this will be

		removed using a pump.
Confined space	Confined space work required when working in new and existing manholes – and when connection to live manhole. Confined space risks: • Asphyxiation • Breathing difficulties • Drowning Falls into confined space.	If the manhole / inspection chamber is greater than 1.5m deep than the works will be classified as NC2/NC3 Medium risk. Site Manager to fully brief all staff regarding the working procedure and safety precaution required. Confined space permits must be issued by Site Manager, prior to works commencing. Fuel driven plant must not be operated in a position where the exhaust fumes could contaminate the air quality in the work area. Check atmosphere before entering using a gas detector / monitor. The duration of the atmosphere monitoring will be at least 20mins. Entry will only be permitted if the air test determines the conditions within the confined space are safe. Life supporting atmospheres will be constantly monitored and means of ventilation will be arranged to ensure the quality of respirable air (if required). At least three persons must be involved with one 'Top Man' outside the confined space, and in constant contact with those working in the confined space, and trained in the use of rescue equipment.

Storage and use of fuel and oils	Storage of Diesel fuel & refueling construction plant. Environmental impact of fuel spillage. Risk of fire, explosion and burns.	Keep petrol and diesel only in small quantities & in secure ventilated storage, well away from heat sources. Spill kits available on site. Refuel plant away from work areas & heat sources in designated fuel storage & refueling area. Appropriate fire-fighting equipment available when refueling.
Noise	Damage to hearing caused by prolonged exposure to excessive noise levels.	When using machinery / tools that produce noise levels in above 85dB (A) (Wacker Plate, Stihl saw, Road Saw etc) the use of hearing protection is mandatory. Earplugs should only be used once, and never by persons with dirty hands. If hearing protection is to be used in conjunction with other PPE, care must be taken to ensure that one does not impair the effectiveness of the other (e.g. when using ear muffs attached to a safety helmet, care must be taken to ensure that an effective seal around the ear is maintained at all times. Dirty or damaged hearing protection must not be used.
Vibration: Using power tools & equipment	Whole body vibration to plant operators Hand / arm vibration to operatives caused by excessive use of vibration creating tools	Tools and equipment to be in good condition, properly maintained and serviced. Daily HAVS monitoring form will be used to manage operatives use of vibration creating tools. Gloves and PPE to be worn to ensure operatives are warm and dry. Symptoms to be reported to supervisor without delay. Job task rotation will be used to limit individuals use of vibration creating tools.
Housekeeping,	Slips, trips and falls caused by	Waste will be cleared away as works

material storage and waste management	poor housekeeping and obstructed access routes. Danger of injury to operatives through contact with vehicles when delivering and collecting skips. Overfilling skips causing materials to become unstable and fall	progress and ensure that access routes are kept clear and the site is clean at the end of the working day. Skip will be located away from pedestrian routes and in a location where the risk of danger to pedestrians and vehicles can be minimised during deliveries and collections. Sufficient number of skips will be provided to prevent the build-up of waste and rubbish. Skips will be removed from site when they are full.
Silica Dust.	Risk of silica dust being produced when cutting, sawing breaking of cement products. Regularly breathing in silica dust can cause diseases like lung cancer, asthma and silicosis.	Relevant dust suppression controls must be implemented i.e. on-tool extraction system, use of water suppression etc. No dry sweeping is permitted. Wet sweeping can be undertaken. The dust / area must thoroughly dampened down. When airborne dust is possible RPE must be work – as a minimum, FFP3 masks will be used. All personnel who require the use of a dust mask will need to provide a Face Fit test certificate.
Manual Handling Handling & moving materials and equipment	Risk of injuries sustained by operatives through moving of materials and equipment. Risk of injury to hands, feet and back through cuts, bruising, sprains, and strains.	Use mechanical handling aids to move materials. If mechanical lifting equipment is not available or cannot be used the personnel carrying out the operation will need to assess the load to be moved in line with his / her capabilities. Area of lift and route along which the load is to be transported, to be well lit, with non-slip surface and free of trip hazards. Where ever possible the load should be divided into smaller units / broken

		down to manageable loads. Where large or heavy loads cannot be divided, Team lifting will be carried out under the direction of a competent co-coordinator. Team members will be fully fit and of similar abilities.
Working with wet concrete, wet cement and mortar products	Damage to skin – Allergic Dermatitis Damage to skin – Irritant Dermatitis Cement burns to skin or eyes	Keep wet product off skin by using gloves and other protective clothing such as long sleeves or overalls. Contaminated clothing should be removed – do not leave in contact with the skin. Wash cement based products from the skin at regular intervals and use barrier creams and hand creams. If clothing or boots become impregnated with cement based materials, remove and thoroughly clean or replace. Use wellington boots or similar when laying wet concrete and ensure none gets inside the boot. If splashing, wet mixing or in windy conditions use eye protection.
Use of abrasive wheels or cutting discs.	Wheel or disc bursting Particles flying at high speed hitting others Contact with rotating wheel or disc Potential for hazardous substances in the dust. High noise levels	Only trained and authorised persons to use this equipment or change the wheel or disc. Eye and hearing protection must be worn. Care must be taken to ensure other people are not affected by flying particles, dust or noise. If petrol driven fuel to be kept well away from work area. Only refuel machine when cool. If prolonged use, there is a risk of vibration white finger – see vibration section. Relevant dust suppression controls must be implemented i.e. extraction

		system, damping down etc.
Use of hand tools and equipment	Risk of injury caused by defective or unsuitable tools.	All tools provided must be assessed to ensure that they are fit for purpose, and fit for the environment in which they are to be used and they are in good working condition. Any electrical hand tools used on this project will be PAT tested in accordance with current safety regulations and be visually inspected prior to use every day. Tools that are deemed unsuitable for use will be discarded and replaced. Tools should not be left lying around, to prevent trip hazards and potential damage.
Environmental Pollution: Use of construction chemicals and fuels, e.g. Gas Oil	Pollution of existing drainage systems.	Spill kits will be available on site for clearing up accidental spillage Spills to be cleaned up immediately, & contaminated material disposed of to appropriate licenced landfill site.

Distribution:

<u>Name</u>	<u>Company</u>
Jason Bell Contracts Manager	Carter Lauren Construction
Danny Read Site Manager	Carter Lauren Construction
Scott Rees Groundworker Supervisor	Carter Lauren Construction
Griffith Hampton Engineer	Carter Lauren Construction

Prepared by: Stephen Lloyd
Health & Safety Manager - Carter Lauren Construction Ltd.

I have read and understand this RAMS and will follow the control measures put in place to reduce the risk of harm from the hazards identified. (To be signed by all operatives undertaking the task(s) specified).

Name	Date
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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)	0.200
CV	0.950	Preferred Cover Depth (m)	1.200
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)	Depth (m)
S1	0.013	5.00	30.260	1200	0.950
MH1			30.340	1200	1.060
MH2	0.028	5.00	29.950	1200	1.000
MH3	0.089	5.00	29.390	1200	0.690
MH4	0.141	5.00	29.340	1200	0.710
MH5	0.038	5.00	29.330	1200	1.060
MH6	0.091	5.00	29.510	1200	1.380
MH7			29.720	1200	1.840
S2	0.028	5.00	30.330	1200	1.100
S3	0.034	5.00	29.820	1200	0.720
S5			29.390	1200	0.670
S6		5.00	29.840	1200	1.120
S7		5.00	30.200	1200	0.600
S8			30.180	1200	2.300
S9	0.013	5.00	29.850	1200	1.970
MH10			29.690	1200	1.810
OUTFALL			29.660	1200	1.960

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	S1	MH1	2.940	0.600	29.310	29.280	0.030	98.0	150	5.05	50.0
1.001	MH1	MH2	32.607	0.600	29.280	28.950	0.330	98.8	150	5.59	50.0
1.002	MH2	MH3	26.225	0.600	28.950	28.700	0.250	104.9	150	6.03	50.0
1.003	MH3	MH5	14.268	0.600	28.700	28.270	0.430	33.2	225	6.14	50.0
1.004	MH5	MH6	6.813	0.600	28.270	28.130	0.140	48.7	225	6.20	50.0
1.005	MH6	MH7	34.316	0.600	28.130	27.880	0.250	137.3	300	6.62	49.4
2.000	S2	S3	18.533	0.600	29.230	29.100	0.130	142.6	150	5.37	50.0
2.001	S3	MH3	24.541	0.600	29.100	28.700	0.400	61.4	150	5.69	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.015	17.9	2.2	0.800	0.910	0.013	0.0	35	0.690
1.001	1.011	17.9	2.2	0.910	0.850	0.013	0.0	36	0.694
1.002	0.981	17.3	7.0	0.850	0.540	0.041	0.0	67	0.930
1.003	2.279	90.6	33.0	0.465	0.835	0.192	0.0	94	2.102
1.004	1.879	74.7	63.7	0.835	1.155	0.371	0.0	160	2.103
1.005	1.340	94.7	78.4	1.080	1.540	0.462	0.0	209	1.491
2.000	0.839	14.8	4.8	0.950	0.570	0.028	0.0	59	0.751
2.001	1.286	22.7	10.6	0.570	0.540	0.062	0.0	72	1.267

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)
3.000	S6	S5	20.500	0.600	28.720	28.720	0.000	0.0	225	5.34	50.0
3.001	S5	MH3	2.098	0.600	28.720	28.700	0.020	104.9	225	5.37	50.0
4.000	MH4	MH5	11.114	0.600	28.630	28.270	0.360	30.9	150	5.10	50.0
5.000	S7	S8	2.304	0.600	29.600	27.880	1.720	1.3	150	5.00	50.0
5.001	S8	S9	40.000	0.600	27.880	27.880	0.000	0.0	300	5.67	50.0
5.002	S9	MH10	5.894	0.600	27.880	27.880	0.000	0.0	300	5.77	50.0
5.003	MH10	MH7	1.000	0.600	27.880	27.880	0.000	0.0	300	5.79	50.0
1.006	MH7	OUTFALL	15.717	0.600	27.880	27.700	0.180	87.3	225	6.81	48.7

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)
3.000	1.000	39.8	0.0	0.895	0.445	0.000	0.0	0	0.000
3.001	1.276	50.7	0.0	0.445	0.465	0.000	0.0	0	0.000
4.000	1.818	32.1	24.2	0.560	0.910	0.141	0.0	98	1.994
5.000	8.778	155.1	0.0	0.450	2.150	0.000	0.0	0	0.000
5.001	1.000	70.7	0.0	2.000	1.670	0.000	0.0	0	0.000
5.002	1.000	70.7	2.2	1.670	1.510	0.013	0.0	0	∞
5.003	1.000	70.7	2.2	1.510	1.540	0.013	0.0	0	∞
1.006	1.400	55.7	79.5	1.615	1.735	0.475	0.0	225	1.426

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)
Rainfall Events	Singular	Skip Steady State	✓	Check Discharge Rate(s) x
Summer CV	0.950	Drain Down Time (mins)	1440	Check Discharge Volume x
Winter CV	0.950	Additional Storage (m³/ha)	0.0	

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 %)
2	0	0	0
30	0	0	0
100	0	0	0
100	20	0	0
100	45	0	0

Node MH7 Online Hydro-Brake® Control

Flap Valve	x	Objective	(CU) Linear Discharge
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	27.880	Product Number	CTL-SCU-0172-3150-1150-3150
Design Depth (m)	1.150	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	31.5	Min Node Diameter (mm)	1200

Node MH10 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	27.880
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	58

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	50.0	50.0	0.800	50.0	70.1	0.801	0.0	70.1

Node S9 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	27.880
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	100

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	92.5	92.5	1.250	92.5	135.1	1.251	0.0	135.1

Node S5 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	28.720
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	56

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	370.0	370.0	0.250	370.0	387.0	0.251	0.0	387.0

Node MH3 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	28.990
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	2

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	5.7	5.7	0.700	50.5	52.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 98.53%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	29.349	0.039	2.3	0.0444	0.0000	OK
15 minute summer	MH1	11	29.316	0.036	2.3	0.0405	0.0000	OK
15 minute summer	MH2	11	29.016	0.066	7.1	0.0747	0.0000	OK
15 minute summer	MH3	10	28.782	0.082	33.2	0.0000	0.0000	OK
15 minute summer	MH4	10	28.736	0.106	24.8	0.0000	0.0000	OK
15 minute summer	MH5	10	28.466	0.196	57.4	0.2221	0.0000	OK
15 minute summer	MH6	10	28.338	0.208	72.8	0.2353	0.0000	OK
180 minute summer	MH7	112	28.161	0.281	30.5	0.3180	0.0000	SURCHARGED
15 minute summer	S2	10	29.289	0.059	4.9	0.0000	0.0000	OK
15 minute summer	S3	10	29.172	0.072	10.8	0.0000	0.0000	OK
180 minute summer	S5	124	28.730	0.010	2.2	3.5273	0.0000	OK
180 minute summer	S6	128	28.730	0.010	0.0	0.0114	0.0000	OK
15 minute summer	S7	1	29.600	0.000	0.0	0.0000	0.0000	OK
180 minute summer	S8	112	28.161	0.281	0.9	0.3180	0.0000	OK
180 minute summer	S9	112	28.161	0.281	13.1	24.7102	0.0000	OK
180 minute summer	MH10	112	28.161	0.281	18.4	13.3556	0.0000	OK
180 minute summer	OUTFALL	112	27.781	0.081	15.8	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	S1	1.000	MH1	2.3	0.673	0.127	0.0100	
15 minute summer	MH1	1.001	MH2	2.2	0.426	0.126	0.1743	
15 minute summer	MH2	1.002	MH3	7.0	0.809	0.403	0.2265	
15 minute summer	MH3	1.003	MH5	26.1	1.021	0.288	0.3559	
15 minute summer	MH4	4.000	MH5	24.6	1.472	0.766	0.1716	
15 minute summer	MH5	1.004	MH6	56.8	1.510	0.760	0.2560	
15 minute summer	MH6	1.005	MH7	72.4	1.459	0.764	1.7774	
180 minute summer	MH7	1.006	OUTFALL	15.8	1.173	0.283	0.2115	98.5
15 minute summer	S2	2.000	S3	4.8	0.656	0.327	0.1370	
15 minute summer	S3	2.001	MH3	10.7	1.170	0.470	0.2241	
180 minute summer	S5	3.001	MH3	-2.2	-0.729	-0.044	0.0079	
180 minute summer	S6	3.000	S5	0.0	-0.038	0.000	0.0124	
15 minute summer	S7	5.000	S8	0.0	0.000	0.000	0.0203	
180 minute summer	S8	5.001	S9	-0.9	-0.092	-0.013	2.7441	
180 minute summer	S9	5.002	MH10	-12.2	-0.539	-0.172	0.4043	
180 minute summer	MH10	5.003	MH7	-18.4	-0.872	-0.260	0.0686	

Results for 30 year Critical Storm Duration. Lowest mass balance: 98.53%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	29.375	0.065	5.7	0.0737	0.0000	OK
15 minute summer	MH1	11	29.337	0.057	5.7	0.0649	0.0000	OK
15 minute summer	MH2	11	29.143	0.193	17.9	0.2187	0.0000	SURCHARGED
15 minute summer	MH3	10	28.901	0.201	78.2	0.0000	0.0000	OK
15 minute summer	MH4	9	29.340	0.710	62.0	0.0000	0.0000	FLOOD RISK
15 minute summer	MH5	10	28.903	0.633	87.8	0.7161	0.0000	SURCHARGED
30 minute summer	MH6	18	28.637	0.507	116.6	0.5736	0.0000	SURCHARGED
120 minute summer	MH7	82	28.563	0.683	80.8	0.7724	0.0000	SURCHARGED
15 minute summer	S2	11	29.495	0.265	12.3	0.0000	0.0000	SURCHARGED
15 minute summer	S3	11	29.416	0.316	25.6	0.0000	0.0000	SURCHARGED
30 minute summer	S5	23	28.779	0.059	66.6	20.7250	0.0000	OK
30 minute summer	S6	22	28.786	0.066	1.2	0.0743	0.0000	OK
15 minute summer	S7	1	29.600	0.000	0.0	0.0000	0.0000	OK
120 minute summer	S8	82	28.564	0.684	1.3	0.7740	0.0000	SURCHARGED
120 minute summer	S9	84	28.564	0.684	42.0	60.0646	0.0000	SURCHARGED
120 minute summer	MH10	82	28.563	0.683	61.8	32.4417	0.0000	SURCHARGED
120 minute summer	OUTFALL	84	27.799	0.099	22.6	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	S1	1.000	MH1	5.7	0.844	0.316	0.0199	
15 minute summer	MH1	1.001	MH2	5.6	0.509	0.312	0.3881	
15 minute summer	MH2	1.002	MH3	16.5	0.984	0.954	0.4617	
15 minute summer	MH3	1.003	MH5	38.3	1.258	0.423	0.5505	
15 minute summer	MH4	4.000	MH5	59.7	3.391	1.858	0.1957	
15 minute summer	MH5	1.004	MH6	82.5	2.075	1.104	0.2710	
30 minute summer	MH6	1.005	MH7	115.9	1.646	1.224	2.4165	
120 minute summer	MH7	1.006	OUTFALL	22.6	1.283	0.407	0.2774	187.3
15 minute summer	S2	2.000	S3	11.3	0.773	0.765	0.3263	
15 minute summer	S3	2.001	MH3	24.8	1.434	1.091	0.4320	
30 minute summer	S5	3.001	MH3	-66.6	-3.441	-1.313	0.0415	
30 minute summer	S6	3.000	S5	-1.2	-0.213	-0.031	0.1823	
15 minute summer	S7	5.000	S8	0.0	0.000	0.000	0.0203	
120 minute summer	S8	5.001	S9	-1.3	-0.153	-0.019	2.8168	
120 minute summer	S9	5.002	MH10	-39.4	-0.837	-0.558	0.4151	
120 minute summer	MH10	5.003	MH7	-61.8	-1.304	-0.874	0.0704	

Results for 100 year Critical Storm Duration. Lowest mass balance: 98.53%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	11	29.385	0.075	7.2	0.0853	0.0000	OK
15 minute summer	MH1	12	29.357	0.077	7.2	0.0873	0.0000	OK
15 minute summer	MH2	11	29.327	0.377	22.5	0.4264	0.0000	SURCHARGED
15 minute summer	MH3	10	28.943	0.243	115.0	0.0000	0.0000	SURCHARGED
15 minute summer	MH4	8	29.340	0.710	77.9	0.0000	0.0000	FLOOD RISK
15 minute summer	MH5	11	28.962	0.692	94.1	0.7825	0.0000	SURCHARGED
120 minute summer	MH6	84	28.758	0.628	86.8	0.7101	0.0000	SURCHARGED
120 minute summer	MH7	90	28.733	0.853	86.4	0.9652	0.0000	SURCHARGED
15 minute summer	S2	11	29.841	0.611	15.5	0.0000	0.0000	SURCHARGED
15 minute summer	S3	11	29.723	0.623	31.5	0.0000	0.0000	FLOOD RISK
30 minute summer	S5	23	28.825	0.105	107.4	36.9461	0.0000	OK
30 minute summer	S6	23	28.826	0.106	2.1	0.1202	0.0000	OK
15 minute summer	S7	1	29.600	0.000	0.0	0.0000	0.0000	OK
120 minute winter	S8	92	28.734	0.854	1.6	0.9655	0.0000	SURCHARGED
120 minute summer	S9	90	28.734	0.854	45.8	75.0023	0.0000	SURCHARGED
120 minute summer	MH10	90	28.733	0.853	67.1	38.0238	0.0000	SURCHARGED
120 minute summer	OUTFALL	90	27.806	0.106	25.5	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	S1	1.000	MH1	7.2	0.892	0.399	0.0256	
15 minute summer	MH1	1.001	MH2	7.0	0.499	0.394	0.4359	
15 minute summer	MH2	1.002	MH3	20.3	1.152	1.170	0.4617	
15 minute summer	MH3	1.003	MH5	39.1	1.581	0.431	0.5675	
15 minute summer	MH4	4.000	MH5	74.1	4.212	2.308	0.1957	
15 minute summer	MH5	1.004	MH6	83.1	2.090	1.112	0.2710	
120 minute summer	MH6	1.005	MH7	86.4	1.227	0.912	2.4165	
120 minute summer	MH7	1.006	OUTFALL	25.5	1.320	0.458	0.3036	234.1
15 minute summer	S2	2.000	S3	14.0	0.795	0.942	0.3263	
15 minute summer	S3	2.001	MH3	30.5	1.732	1.341	0.4320	
30 minute summer	S5	3.001	MH3	-107.4	-4.065	-2.117	0.0538	
30 minute summer	S6	3.000	S5	-2.1	-0.269	-0.053	0.3753	
15 minute summer	S7	5.000	S8	0.0	0.000	0.000	0.0203	
120 minute winter	S8	5.001	S9	-1.6	-0.179	-0.023	2.8168	
120 minute summer	S9	5.002	MH10	-42.6	-0.911	-0.602	0.4151	
120 minute summer	MH10	5.003	MH7	-67.1	-1.405	-0.949	0.0704	

Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 98.53%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	12	29.537	0.227	8.6	0.2568	0.0000	SURCHARGED
15 minute summer	MH1	12	29.528	0.248	8.0	0.2804	0.0000	SURCHARGED
15 minute summer	MH2	12	29.457	0.507	25.2	0.5739	0.0000	SURCHARGED
15 minute summer	MH3	11	29.020	0.320	147.4	0.2014	0.0000	SURCHARGED
15 minute summer	MH4	8	29.340	0.710	93.5	0.0000	0.0000	FLOOD RISK
15 minute summer	MH5	11	29.095	0.825	111.6	0.9333	0.0000	FLOOD RISK
30 minute summer	MH6	18	28.847	0.717	128.1	0.8104	0.0000	SURCHARGED
120 minute summer	MH7	92	28.807	0.927	87.3	1.0482	0.0000	SURCHARGED
15 minute summer	S2	12	30.224	0.994	18.6	0.0000	0.0000	FLOOD RISK
15 minute summer	S3	10	29.820	0.720	37.0	0.0000	0.0000	FLOOD RISK
60 minute summer	S5	42	28.877	0.157	105.4	55.2236	0.0000	OK
60 minute summer	S6	41	28.881	0.161	2.1	0.1817	0.0000	OK
15 minute summer	S7	1	29.600	0.000	0.0	0.0000	0.0000	OK
120 minute summer	S8	90	28.809	0.929	1.4	1.0502	0.0000	SURCHARGED
120 minute summer	S9	92	28.807	0.927	46.2	81.4486	0.0000	SURCHARGED
120 minute summer	MH10	92	28.807	0.927	67.6	38.0238	0.0000	SURCHARGED
120 minute summer	OUTFALL	92	27.809	0.109	26.6	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	S1	1.000	MH1	8.0	0.928	0.446	0.0518	
15 minute summer	MH1	1.001	MH2	9.4	0.536	0.528	0.5740	
15 minute summer	MH2	1.002	MH3	22.8	1.293	1.314	0.4617	
15 minute summer	MH3	1.003	MH5	44.3	1.250	0.489	0.5675	
15 minute summer	MH4	4.000	MH5	87.6	4.975	2.726	0.1957	
15 minute summer	MH5	1.004	MH6	81.2	2.043	1.087	0.2710	
30 minute summer	MH6	1.005	MH7	126.5	1.797	1.336	2.4165	
120 minute summer	MH7	1.006	OUTFALL	26.6	1.333	0.478	0.3139	281.4
15 minute summer	S2	2.000	S3	16.4	0.929	1.103	0.3263	
15 minute summer	S3	2.001	MH3	36.0	2.046	1.584	0.4320	
60 minute summer	S5	3.001	MH3	-105.4	-3.777	-2.077	0.0668	
60 minute summer	S6	3.000	S5	-2.1	-0.228	-0.054	0.6126	
15 minute summer	S7	5.000	S8	0.0	0.000	0.000	0.0203	
120 minute summer	S8	5.001	S9	-1.4	-0.182	-0.020	2.8168	
120 minute summer	S9	5.002	MH10	-42.9	-0.983	-0.607	0.4151	
120 minute summer	MH10	5.003	MH7	-67.6	-1.493	-0.956	0.0704	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 98.53%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	12	29.812	0.502	10.4	0.5674	0.0000	SURCHARGED
15 minute summer	MH1	12	29.800	0.520	9.1	0.5881	0.0000	SURCHARGED
15 minute summer	MH2	12	29.720	0.770	26.5	0.8713	0.0000	FLOOD RISK
15 minute summer	MH3	11	29.121	0.421	186.0	1.3014	0.0000	FLOOD RISK
15 minute summer	MH4	7	29.340	0.710	113.0	0.0000	0.0000	FLOOD RISK
15 minute summer	MH5	11	29.298	1.028	132.6	1.1623	0.0000	FLOOD RISK
15 minute summer	MH6	11	29.027	0.897	150.8	1.0142	0.0000	SURCHARGED
120 minute summer	MH7	92	28.902	1.022	86.9	1.1562	0.0000	SURCHARGED
15 minute summer	S2	10	30.330	1.100	22.4	0.0000	0.0000	FLOOD RISK
15 minute summer	S3	9	29.820	0.720	43.9	0.0000	0.0000	FLOOD RISK
120 minute summer	S5	90	28.959	0.239	85.3	84.1039	0.0000	SURCHARGED
60 minute summer	S6	44	28.961	0.241	2.4	0.2720	0.0000	SURCHARGED
15 minute summer	S7	1	29.600	0.000	0.0	0.0000	0.0000	OK
120 minute summer	S8	92	28.904	1.024	2.0	1.1577	0.0000	SURCHARGED
120 minute summer	S9	92	28.902	1.022	46.0	89.8369	0.0000	SURCHARGED
120 minute summer	MH10	92	28.902	1.022	67.3	38.0238	0.0000	SURCHARGED
120 minute summer	OUTFALL	92	27.812	0.112	28.0	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	S1	1.000	MH1	9.1	0.949	0.509	0.0518	
15 minute summer	MH1	1.001	MH2	11.6	0.682	0.650	0.5740	
15 minute summer	MH2	1.002	MH3	25.9	1.474	1.497	0.4617	
15 minute summer	MH3	1.003	MH5	-52.5	1.341	-0.580	0.5675	
15 minute summer	MH4	4.000	MH5	103.6	5.888	3.226	0.1957	
15 minute summer	MH5	1.004	MH6	81.4	2.047	1.090	0.2710	
15 minute summer	MH6	1.005	MH7	149.3	2.121	1.576	2.4165	
120 minute summer	MH7	1.006	OUTFALL	28.0	1.349	0.504	0.3265	340.5
15 minute summer	S2	2.000	S3	19.0	1.082	1.284	0.3263	
15 minute summer	S3	2.001	MH3	41.9	2.383	1.846	0.4320	
120 minute summer	S5	3.001	MH3	-85.3	-3.162	-1.681	0.0834	
60 minute summer	S6	3.000	S5	-2.4	-0.240	-0.061	0.8153	
15 minute summer	S7	5.000	S8	0.0	0.000	0.000	0.0203	
120 minute summer	S8	5.001	S9	-2.0	-0.197	-0.028	2.8168	
120 minute summer	S9	5.002	MH10	-42.8	-1.060	-0.606	0.4151	
120 minute summer	MH10	5.003	MH7	-67.3	-1.566	-0.952	0.0704	



ODYSSEY

DEVELOPING JOURNEYS

**PREMIER INN BURGESS HILL
PLUVIAL FLOOD MODELLING STUDY**



PREMIER INN BURGESS HILL

PLUVIAL FLOOD MODELLING STUDY ON BEHALF OF SIMPSON ENGINEERING

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**DOCUMENT CONTROL SHEET**

Project Name Premier Inn Burgess Hill

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Rev	Issue Purpose	Author	Checked	Reviewed	Approved	Date
-	Initial Draft Issue	CR	CR	EC	GG	October 2025
A	Additional Results Added	EC	CR	CR	GG	October 2025
B	Post-Dev Results Updated	EC	CR	CR	GG	November 2025
C	Figure 6.6 Updated	EC	CR	CR	GG	November 2025
D	Flood Levels Added	EC	CR	CR	GG	November 2025



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APPENDICES

Appendix A Survey Data: Topographical Survey

Appendix B Model Files



1.0 INTRODUCTION

1.1 *Appointment and Brief*

1.1.1 Odyssey has been commissioned by Simpson Associates Consulting Engineers to undertake a site-specific hydraulic modelling assessment, in support of a commercial development at Charles Avenue, Burgess Hill.

1.1.2 The proposed development comprises demolition of an existing restaurant and construction of an extension to an existing hotel.

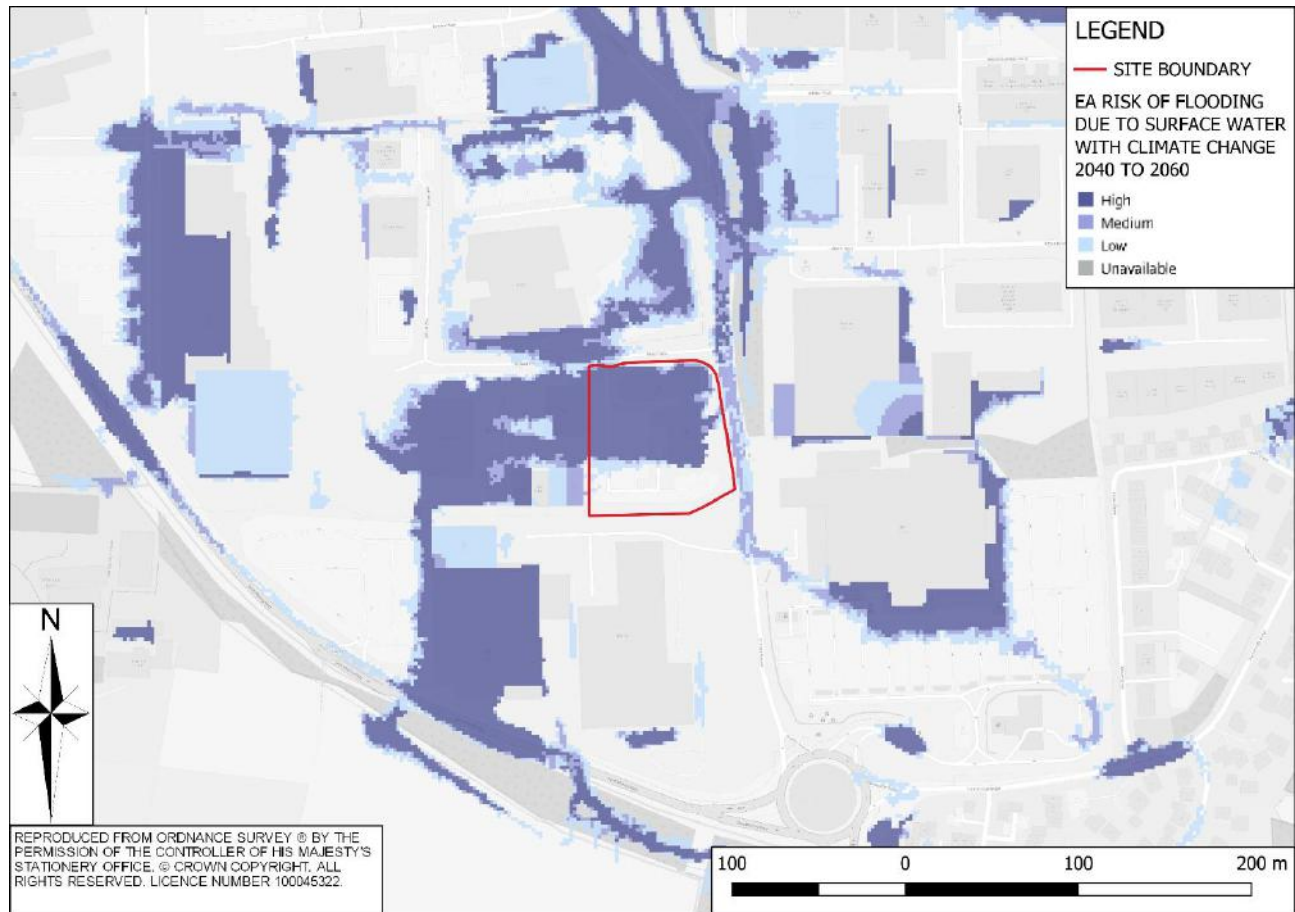
1.1.3 According to the current Environment Agency (EA) Risk of Flooding from Surface Water (RoFSW) map, the site is subject to a 'high' risk of pluvial flooding (more than 3.33% Annual Exceedance Probability (AEP)). Since the RoFSW mapping was undertaken to inform a national database, the modelling does not take into consideration detailed site-specific topographical survey or allow for investigation of proposed scenarios. Therefore, it was necessary to carry out direct rainfall hydraulic modelling of the catchment draining into the site in order to quantify the risk from overland flows, and to determine flood levels and the resulting flood extents.

1.1.4 This hydraulic modelling study has been planned and conducted in accordance with the EA Hydraulic Modelling: best practice (model approach) updated on 21 December 2023.

1.1.5 This modelling report has been prepared in accordance with the National Planning Policy Framework (NPPF), updated in December 2024, and its Planning Practice Guidance (PPG), updated in September 2025, and summarises the modelling methodology and outputs derived for the pre-development (i.e. baseline) and post-development scenarios.

1.2 *Site Description*

1.2.1 The site is located at the intersection of Charles Avenue and William Way, in Burgess Hill, West Sussex. The national grid reference for the site is 529992E, 118483N. **Figure 1.1** shows the site location and the EA Flood RoFSW classifications. **Table 1.1** summarises the site description.

**Figure 1.1: Site Location Plan and EA RoFSW Climate Change 2040 to 2060****Table 1.1: Site Description Summary**

Site National Grid Reference:	The Ordnance Survey (OS) grid reference at the centre of the site is 529992E, 118483N.
Site area:	The total site area is 0.67ha.
Current Use:	The Site currently comprises buildings used as a restaurant and a hotel, with an associated hardstanding car park.
Wider setting:	The Site is bounded by William Way to the north, Charles Avenue to the east, and commercial units to the south and west.
Existing water bodies:	The nearest 'Main River' is the Pook Bourne Stream, situated approximately 0.2km north of the Site boundary at its nearest point.
Existing flood defences:	There are no known formal flood defences currently protecting the site.

1.3 Scope of Works

1.3.1 In accordance with the assessment criteria found in the NPPF and PPG, the purpose of this modelling report is to:



- Identify and quantify the pluvial flood risk associated with the overland flow generated by the local catchment; and
- Inform the design of the masterplan layout for the proposed development.

1.3.2 The modelling study has been carried out to establish the flood levels and floodplain extents for the following design events:

- 3.3% AEP (Annual Exceedance Probability) storm event (1 in 30 year);
- 1% AEP storm event (1 in 100 year);
- 1% AEP storm event plus 45% climate change (CC) (1 in 100 year + 45%CC); and,
- 0.1% AEP storm event (1 in 1000 year).

1.4 Project Assumptions and Limitations

1.4.1 Odyssey's hydraulic modelling is based on best practice and current guidance at the time of undertaking the project.

1.4.2 The representation of any complex system by a model requires a number of assumptions to be made. Coefficients can have significant impact on model results. Although best practice guidance has been adopted for this modelling study, it has been based on the interpretation and assessment of data provided by third parties. Odyssey cannot be held responsible for the accuracy of third-party data, and the conclusions and findings of this report may change if the data is amended or updated after the date of consultation.

1.4.3 The conclusions of this modelling report are based on the data gathered for the purpose of the project, and therefore are limited in their accuracy in proportion to the validity of the dataset. The data gathered in turn has been based on an agreed scope of works. Odyssey cannot guarantee that the data used is the best available at the time of the modelling, but it is the best available data that could be gathered within the scope of the agreed instruction.

2.0 INPUT DATA

2.1 Data Availability

2.1.1 Multiple sources of information have been used in the development of the hydraulic model. **Table 2.1** provides the data sources used in this modelling study.

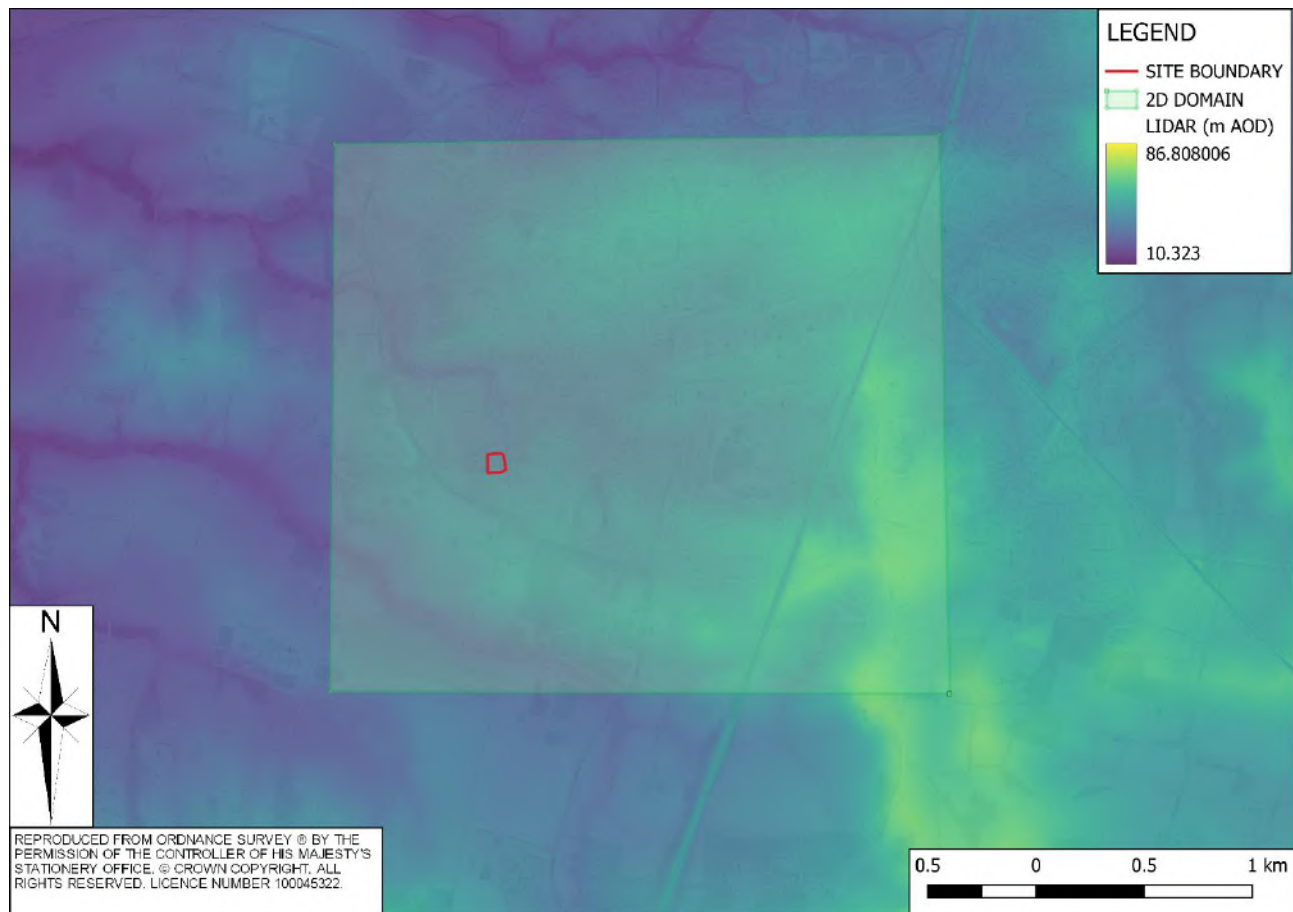
**Table 2.1: Data Availability**

Dataset	Source	Date	Use	Quality ¹
LiDAR (Light Detection and Ranging)	Environment Agency LiDAR	Flown in 2022 (1 metre (m) resolution). Downloaded August 2025.	Forms the basis of ground level data for the two-dimensional (2D) component of the hydraulic model.	1-2
Site Topographical Survey	Midland Survey Ltd	Surveyed July 2024.	Provides ground level data within the site for the 2D model.	1
Base Mapping	OS Open Data	Accessed August 2025	Used to identify watercourses in the vicinity of the site and create material layers.	1
Catchment Data	FEH (Flood Estimation Handbook) Webservice	Downloaded August 2025	Catchment descriptors used for the hydrological calculations.	1

2.2 LiDAR

2.2.1 The most recent 1m resolution Digital Terrain Model (DTM) composite LiDAR data was downloaded from the EA survey open data website. The LiDAR data shows that ground elevations vary across the model from 22 metres above Ordnance Datum (mAOD) to 65 mAOD. Site specific levels vary between 29.3m AOD to 30.75m AOD. **Figure 2.1** shows the extent of LiDAR data used in the model.

¹ Data quality scoring taken from Multi-Coloured Manual (Flood Hazard Research Centre, 2005) – 1 = best possible, 2 = data with known deficiencies, 3 = gross assumptions, 4 = heroic assumptions

Figure 2.1: LiDAR Data

2.2.2 LiDAR data is very beneficial as it is available across a large amount of Britain and is the standard source used within models of floodplains in the UK. It is however, a poor source of data in areas of dense vegetation or complex urban areas. Therefore, topographical survey data is more favourable when available. Topographical survey data has been obtained across the area of the site as detailed in **Section 2.3**.

2.3 Topographical Survey

2.3.1 Topographical surveys of the site were undertaken by Midland Survey Limited in July 2024. The extent of the survey is shown in **Figure 2.2**. The detailed survey is shown in **Appendix A**.

**Figure 2.2: Topographical Survey Extent**

2.3.2 The point data received from the survey has been converted to form a 3D interpolated surface that has been incorporated into the model.

2.3.3 The topographical survey has been compared to the LiDAR data and it is determined that the topographical survey closely matches the trends of the LiDAR with levels that are typically 0.1 to 0.2 metres lower. The topographical survey data provides more detailed levels in the location of ditches and vegetation.



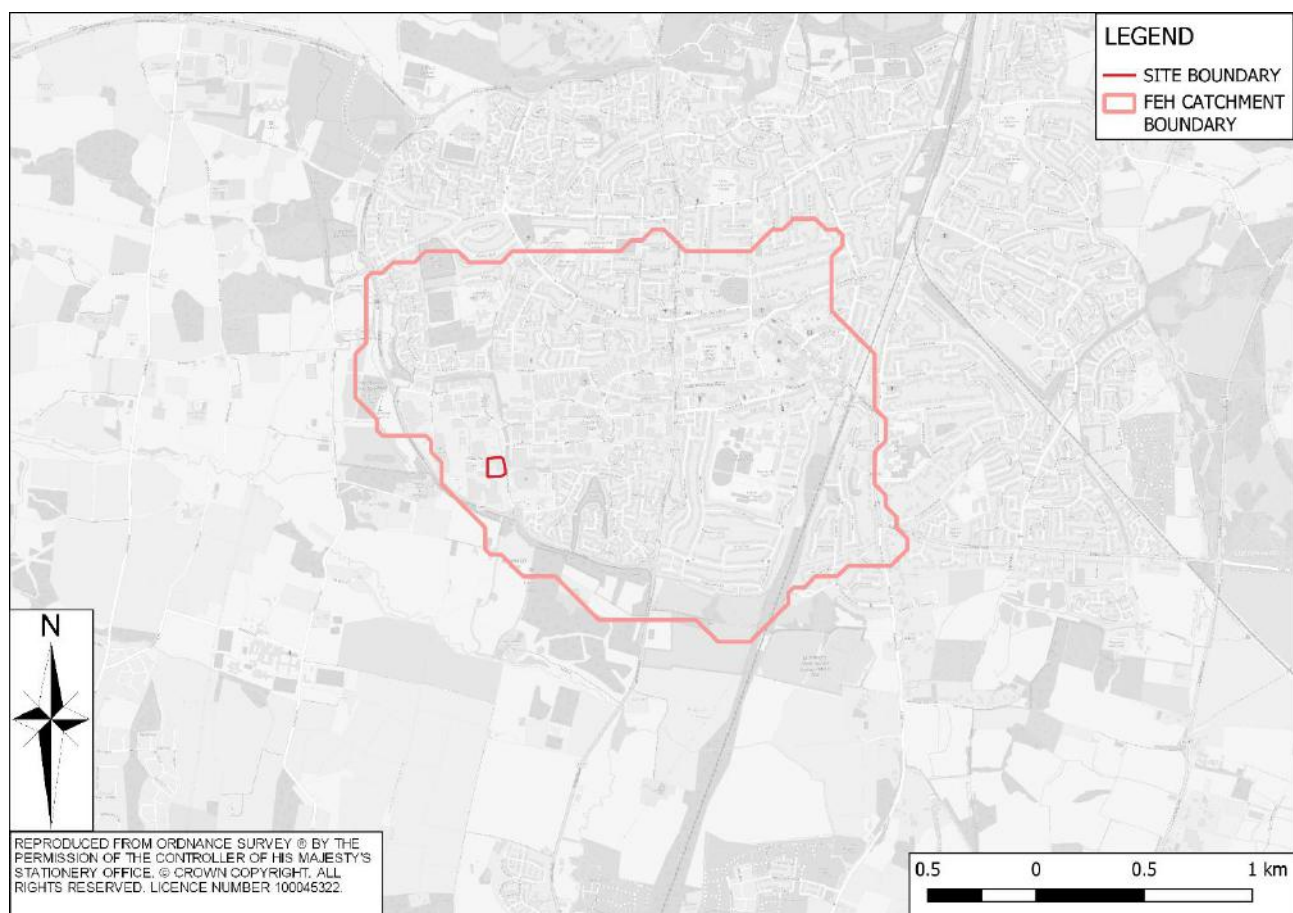
3.0 HYDROLOGICAL ANALYSIS

3.1.1 A hydrological analysis was undertaken as part of this study to derive the rainfall hyetographs for the hydraulic model. A summary of this analysis is provided in this section.

3.2 Methodology

3.2.1 The purpose of this hydrological analysis is to create rainfall hyetographs for input into the hydraulic model. This has been undertaken in accordance with the Centre for Ecology and Hydrology Flood Estimation Handbook (FEH) methods. The FEH catchment boundary is presented in **Figure 3.1**.

Figure 3.1 FEH Catchment Boundary



3.2.2 Design and net rainfall hyetographs have been calculated using the Revitalised Flood Hydrograph (ReFH) Method for the 3.3% AEP, 1% AEP and 0.1% AEP events. The hyetographs have been calculated using the FEH catchment descriptors downloaded from the FEH Webservice.



3.2.3 The urban net rainfall hyetograph has been applied to urban areas, with the rural net rainfall hyetograph applied to the rural areas. The net rainfall hyetograph has been created using the losses model from the ReFH2 rainfall-runoff method. Losses are controlled by a single parameter, the maximum soil moisture storage capacity (Cmax). This was estimated from the BFIHOST and PROPWET, two of the FEH catchment descriptors. The initial starting value of the soil moisture (Cini) was also estimated from catchment descriptors. The default Cmax and Cini values generated by ReFH2 have been used. This is detailed in **Section 5.2**.

3.2.4 This hydrological analysis methodology has been selected owing to the small catchment area and the fact that the overland flow routes in the area do not originate from a specific single point of discharge.

3.3 Climate Change

3.3.1 Due to uncertainties in flood estimation and expected climate change impacts, it is usually required that hydrological analysis of peak rainfall include an allowance for increased rainfall due to climate change as required in the NPPF and PPG. The latest guidance, available from May 2022, provides updated climate change allowances and is now required for all new Flood Risk Assessments.

3.3.2 The anticipated increase in the rainfall intensity varies for each management catchment for both the 3.3% AEP and 1% AEP rainfall event. It is based on two grades – central allowance and upper end allowance (**Table 3.1**). The range of allowances included is based on percentiles. The central allowance is based on the 50th percentile and upper end allowance is based on the 95th percentile. The selection of peak rainfall intensity allowance will depend on the nature of the proposed development and its design life.

Table 3.1: Anticipated Change in Peak Rainfall Intensity for Adur and Ouse Management Catchment for the 3.33% AEP and 1% AEP Rainfall Event

Epoch	Central allowance		Upper end allowance	
	3.3% AEP	1% AEP	3.3% AEP	1% AEP
2050s	20%	20%	35%	45%
2070s	20%	25%	40%	45%

3.3.3 EA guidance suggests that all residential development should have a minimum design lifetime of 100 years. For all developments with a lifetime beyond 2100 the upper end allowance should be used. Therefore, a 45% climate change allowance for the 1% AEP rainfall event is the most appropriate allowance to be considered for the site based on a design lifetime of 100 years.



3.4 Catchment Data

3.4.1 The catchment descriptors obtained from the FEH Webservice catchments are shown below in **Table 3.2**.

Table 3.2: Key Catchment Characteristics

Catchment Descriptor	Catchment 1
EASTING (metres (m))	529400
NORTHING (m)	119250
AREA (km ²)	3.45
FARL	1
PROPWET	0.34
BFIHOST19	0.236
LDP (kilometres (km))	3.28
DPLBAR (km)	1.93
DPSBAR (m/km)	29.1
SAAR (millimetres (mm))	830
SPRHOST	49.06
URBEXT1990	0.344
URBEXT2000	0.5427
FPEXT	0.0703
Pumped watercourse?	No
Any unusual catchment features? In particular is BFIHOST>0.65, SPRHOST<20, URBEXT2000>0.150, FARL<0.90 or high FPEXT?	Yes

4.0 HYDRAULIC MODELLING

4.1 Methodology

Software

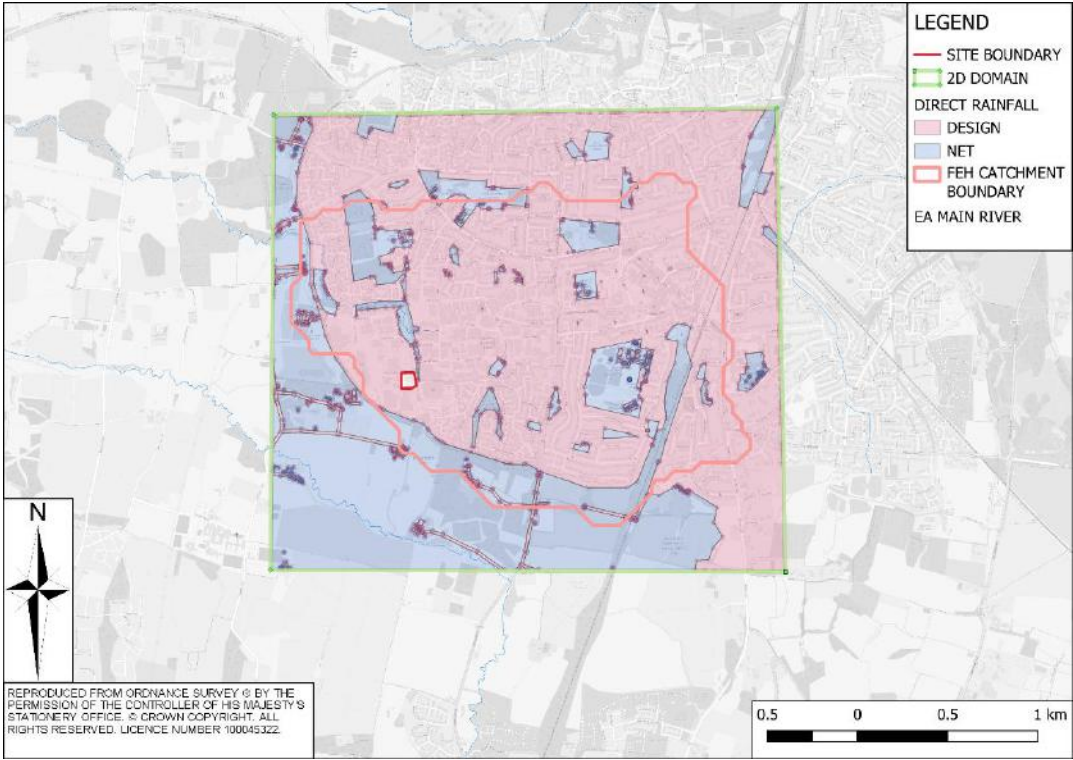
4.1.1 The hydraulic model is 2D model constructed in TUFLOW (version 2023-03-AE-iSP-w64) with the use of HPC solver. This software is able to model culverted networks with a 2D floodplain model based on a finite grid approach.

2D Domain

4.1.2 The 2D domain was constructed using TUFLOW and based upon filtered LiDAR data. The active area of the domain is 7.2 km². Topographical survey data has been used to represent the 2D domain within the site boundary. A grid size of 2m was chosen to allow for detailed modelling of the overland flood paths. Refer to **Figure 4.1** for the hydraulic model schematic.



Figure 4.1: Model Schematic



*Flood Defences*

4.1.3 There are no known formal flood defences along the modelled watercourses.

Boundary Conditions

4.1.4 A Rainfall verses Time (RF) boundary, based on current land use, has been created to apply the rainfall hyetograph to the model.

4.1.5 A 2D Stage-Discharge (HQ) boundary condition, based on floodplain slope, has been applied to the downstream boundary of the model to allow flow to exit the 2D domain. The boundaries have been given a constant water surface slope value of 0.001 m/m.

Roughness

4.1.6 Floodplain roughness has been represented within the model by using Manning's n values for roughness. Parameters were chosen with reference to standard values (Chow, 1959), using site photographs, engineering judgement, and OS data. The roughness values used within the model are detailed in **Table 4.2**.

Table 4.1: Manning's n Values

Material	Manning's n
TUFLOW – Woodland	0.06
TUFLOW – Roads	0.025
TUFLOW – Buildings	0.5
TUFLOW – Inland Water	0.035

Run Parameters

4.1.7 No changes have been made to the default model run parameters.

4.1.8 A 1.0 second timestep has been used for the model runs. This is in accordance with the recommended timestep that should be between one quarter and half the grid cell size.

4.1.9 A simulation end time of 8 hours has been selected for all model runs to ensure peak flows are met in all locations throughout the model.



4.2 Model Health

Model Stability

4.2.1 The majority of the model shows little fluctuation in model results through the 2D. Negative depths have not been detected during the model simulations.

4.2.2 Mass error expresses the difference between the total simulated water inputted into the model against the total water retained in the model, less any water below that has exited through boundary conditions. This can be used to assess the stability of the model.

4.2.3 The mass balance error at the end of the model runs was within +/-0.05% in 2D which is acceptable for the assessment of the flood risk at the site.

Model Warnings and Checks

4.2.4 All warnings and checks within the model are associated with non-critical TUFLOW checks.



5.0 MODEL PROVING

5.1 *Calibration and Other Models*

5.1.1 Calibration of a model is important to ensure that the model schematisation accurately represents the system being modelled.

5.1.2 No existing models are available in the vicinity of the site. In addition, no historic flooding records have been made available for the purpose of this study.

5.1.3 Thus, in this study, no calibration data was available for the model and therefore a greater emphasis was put on understanding the model sensitivity and model uncertainty.



6.0 MODEL RESULTS

6.1 *Baseline Scenario*

6.1.1 The primary aim of the hydraulic modelling study is to demonstrate that the proposed development is not at risk of flooding and does not increase the risk of flooding elsewhere. The model was used to predict pluvial flood levels for the following events.

- 3.3% AEP (1 in 30 year)
- 1% AEP (1 in 100 year)
- 1% AEP plus 45% climate change (1 in 100 year plus 45% climate change)
- 0.1% AEP (1 in 1000 year)

6.1.2 The modelled results for the baseline scenario are shown in **Figure 6.1** to **Figure 6.4**. The results show that the flooding on the site is in the low area of the car park, originating from the north, and on the east part of the site, originating from water flowing along Charles Avenue from the south east.

6.1.3 For the 1% AEP plus 45% climate change event, the flood level in the southeast corner of the site is 30.40mAOD.

6.1.4 The link to model and result files are presented in **Appendix B**.



Figure 6.1: Peak Flood Depth for 3.3% AEP Event – Baseline Scenario

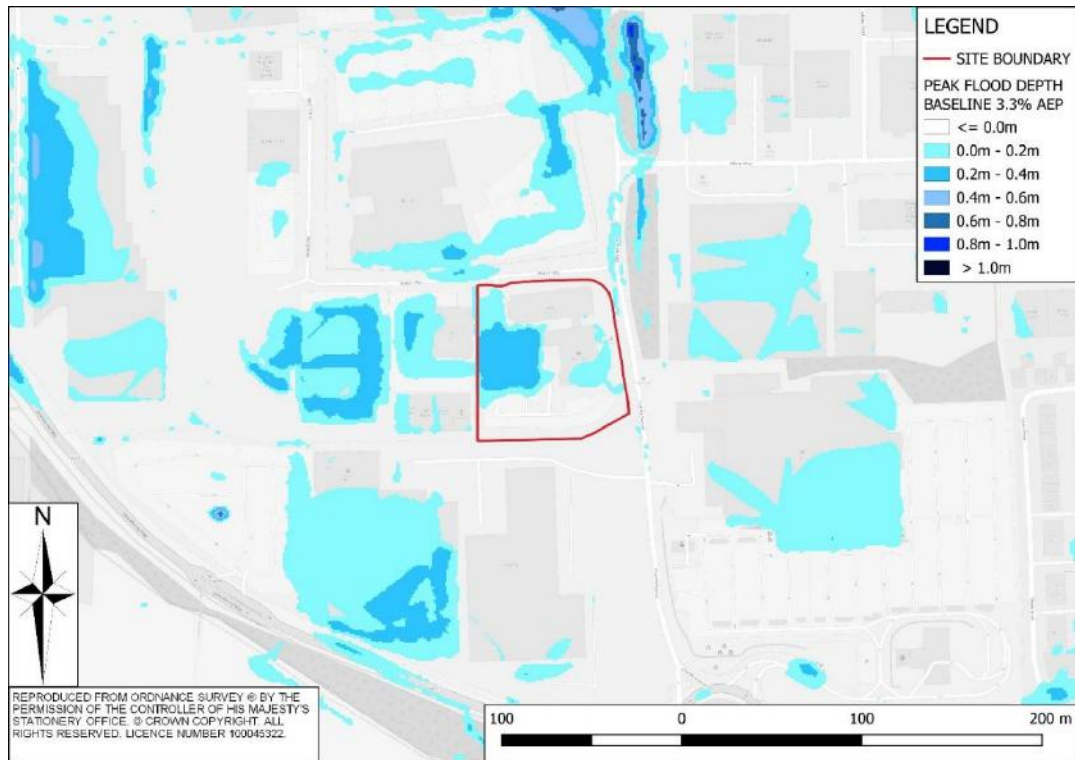


Figure 6.2: Peak Flood Depth for 1% AEP Event – Baseline Scenario

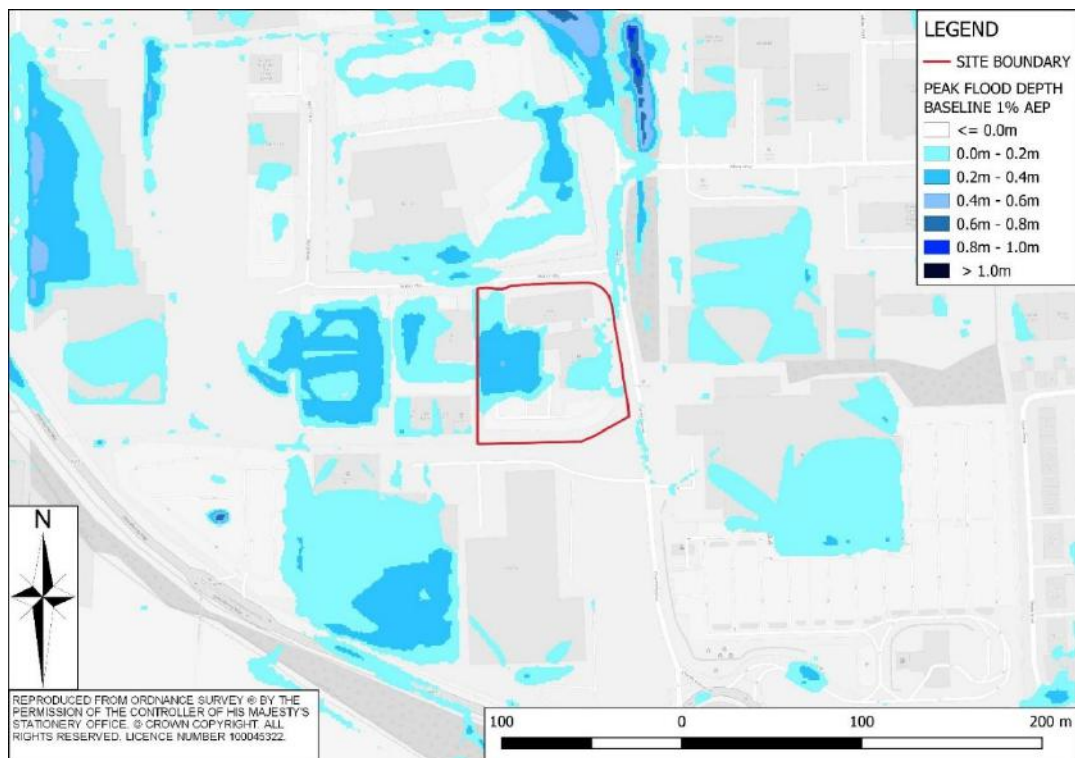




Figure 6.3: Peak Flood Depth for 1% AEP + 45% CC Event – Baseline Scenario

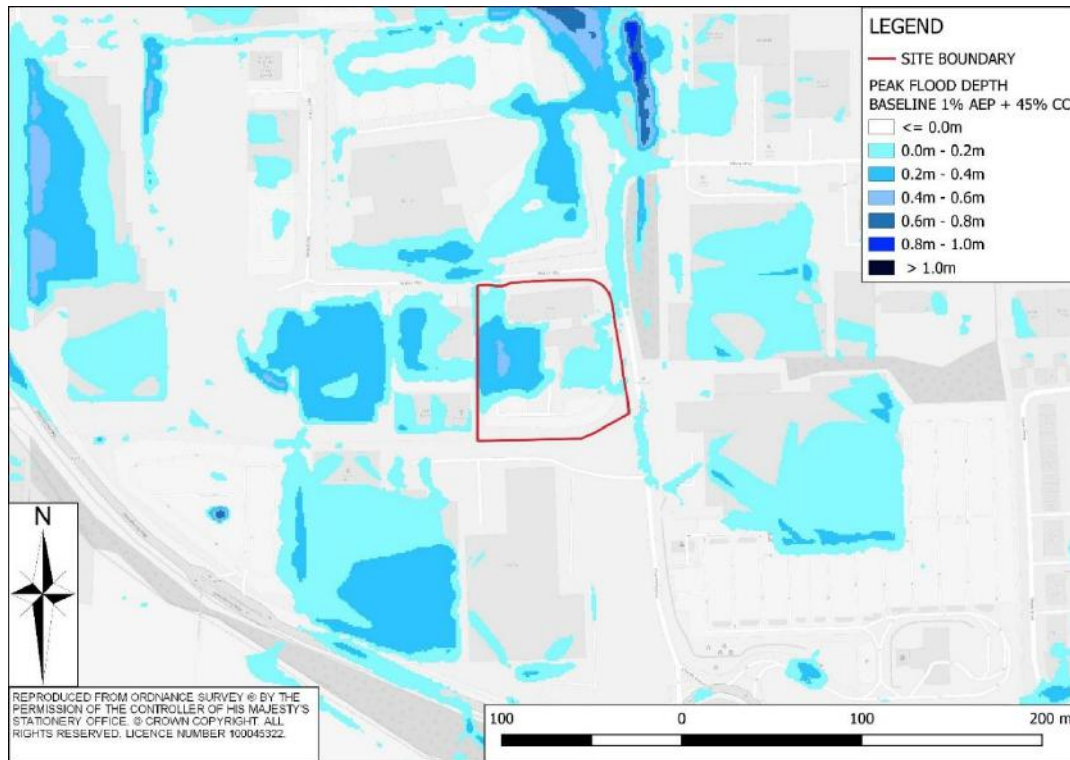
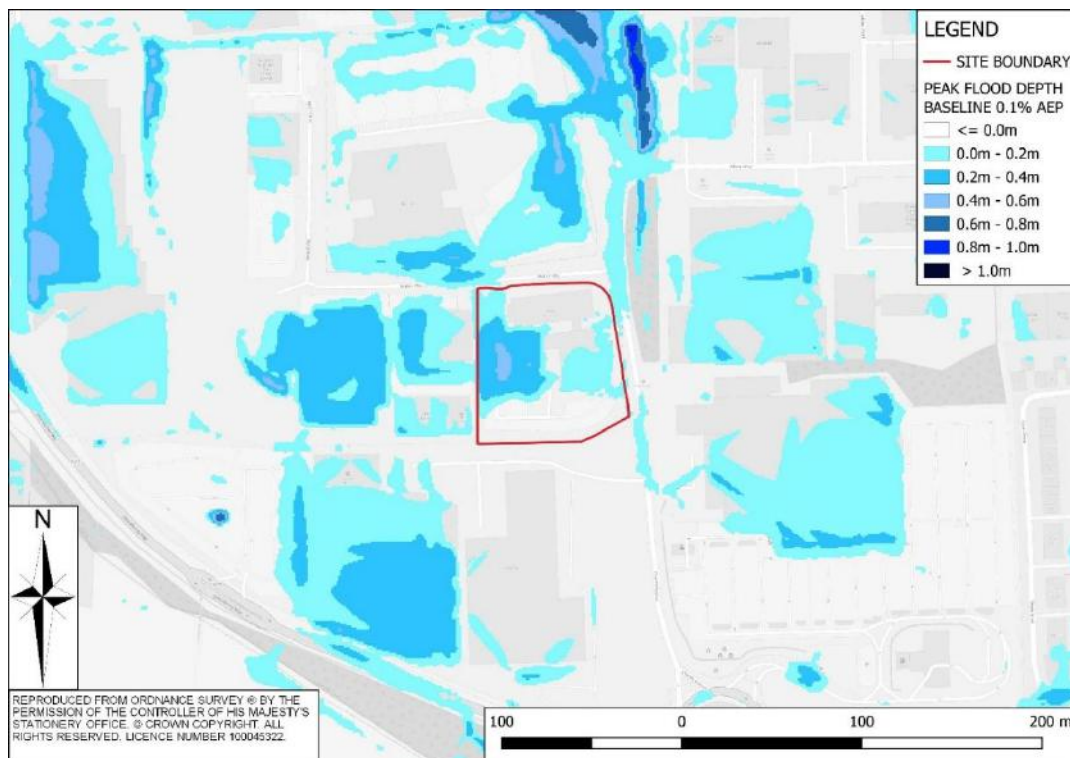


Figure 6.4: Peak Flood Depth for 0.1% AEP Event – Baseline Scenario





6.2 Post-development Scenario

6.2.1 The post-development scenario has been run for the design flood event (1% AEP + 45%CC). The model results are shown in **Figure 6.5**. A comparison of the post-development and baseline results is shown in **Figure 6.6**.

6.2.2 The post-development scenario includes:

- Removal of the existing restaurant building.
- The newly proposed expansion of the hotel, and associated changes to the rear of this, including the construction of an attenuation basin and changes to the car park layout.

6.2.3 The drainage strategy for the proposed development includes improvements to the surface water drainage network within the car park and elsewhere on site. This has been modelled by removing the rainfall from the developed area of the site.

6.2.4 The attenuation basin is modelled with the base set to the max design water level (29.41mAOD), to represent the basin being full during a flood event.

6.2.5 For the 1% AEP plus 45% climate change event, the flood level in the southeast corner of the site is 30.38mAOD.

6.2.6 The proposed levels for site as per the engineering layout were used to create a 3D interpolated surface that has been incorporated into the post-development model.



Figure 6.5: Peak Flood Depth for 1% AEP + 45%CC Event – Post-Development Scenario

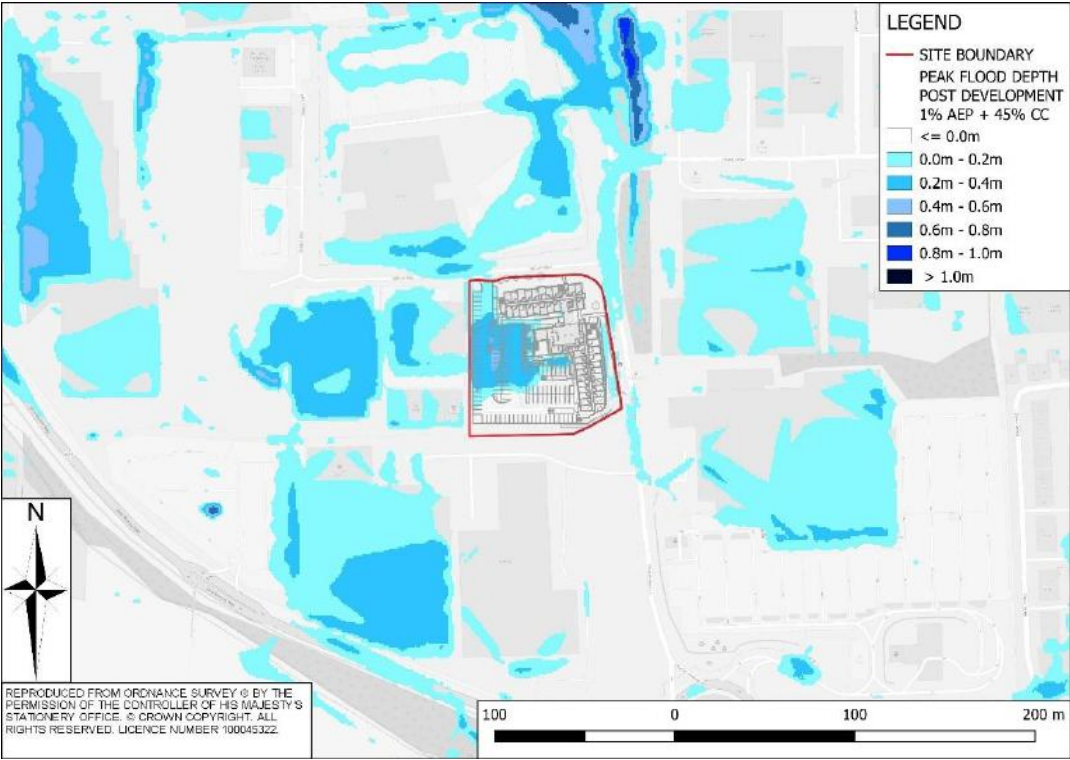
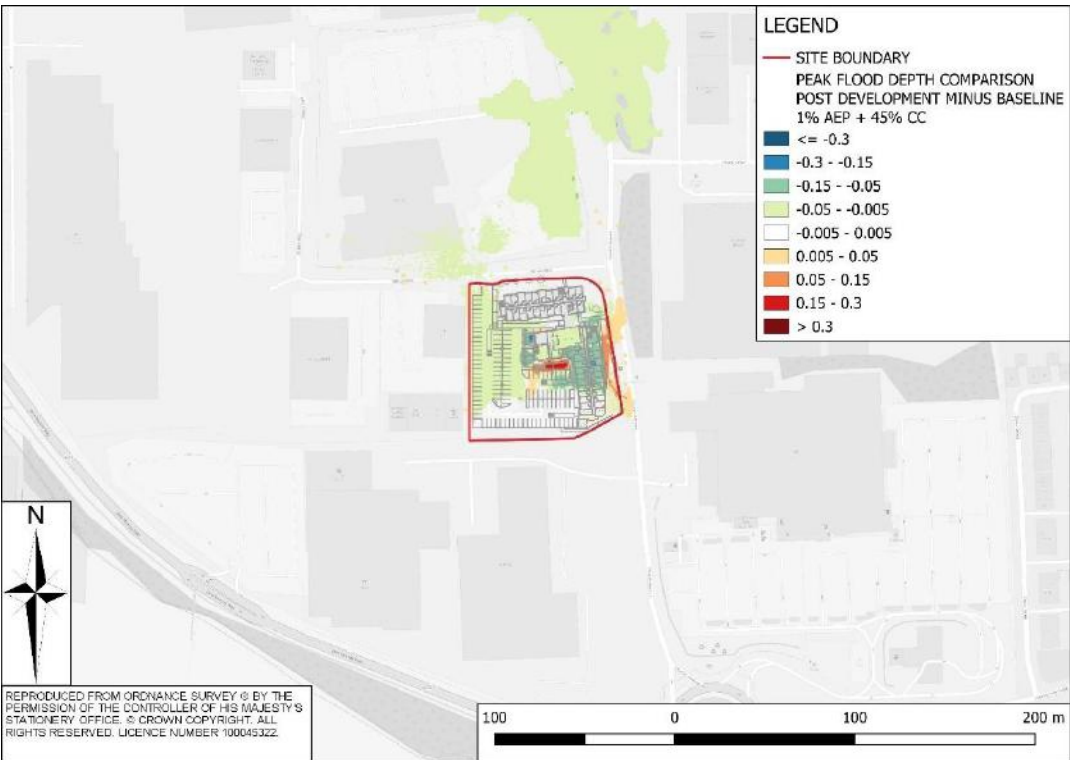


Figure 6.6: Pre-Development and Post-Development Peak Depth Comparison

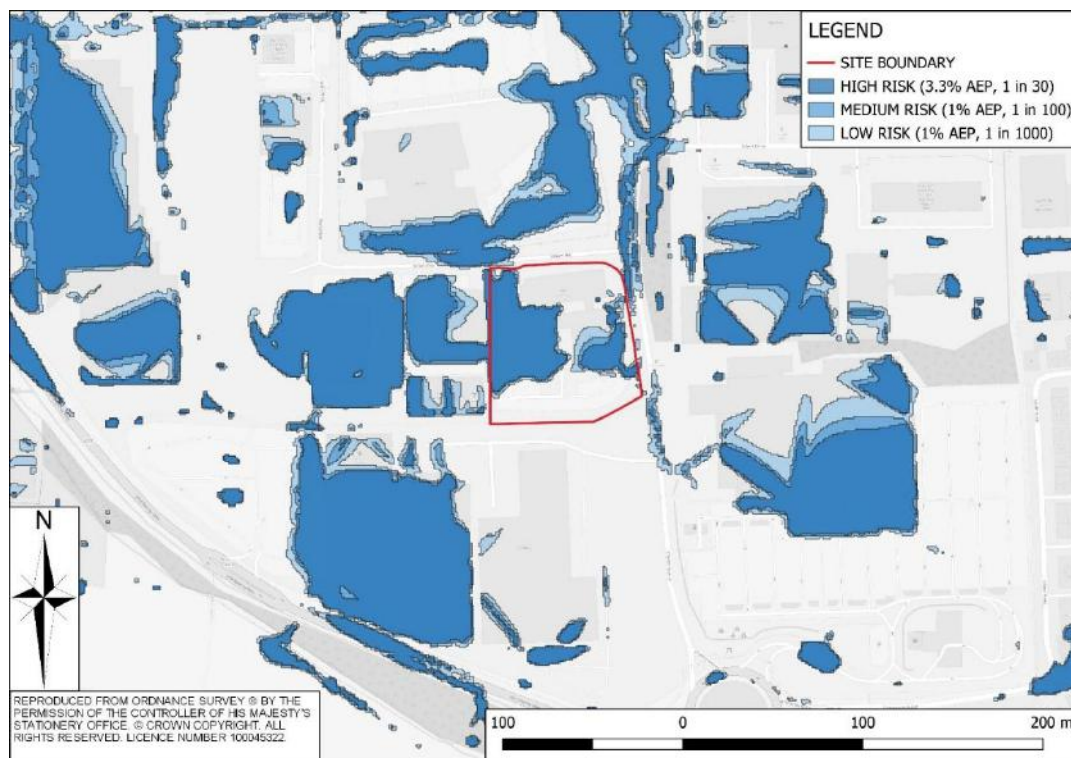




6.3 Risk of Flooding from Surface Water Classification

6.3.1 The updated surface water classification for the site, based on the above modelling, is shown in **Figure 6.7**. The result show that the low area of the car park falls within low (0.1% AEP) to high (3.3% AEP) risk of flooding from surface water. The majority of the remainder of the site is within very low (<0.1% AEP) to low (0.1% AEP) risk of flooding from surface water.

Figure 6.7: Risk of Flooding from Surface Water Classification



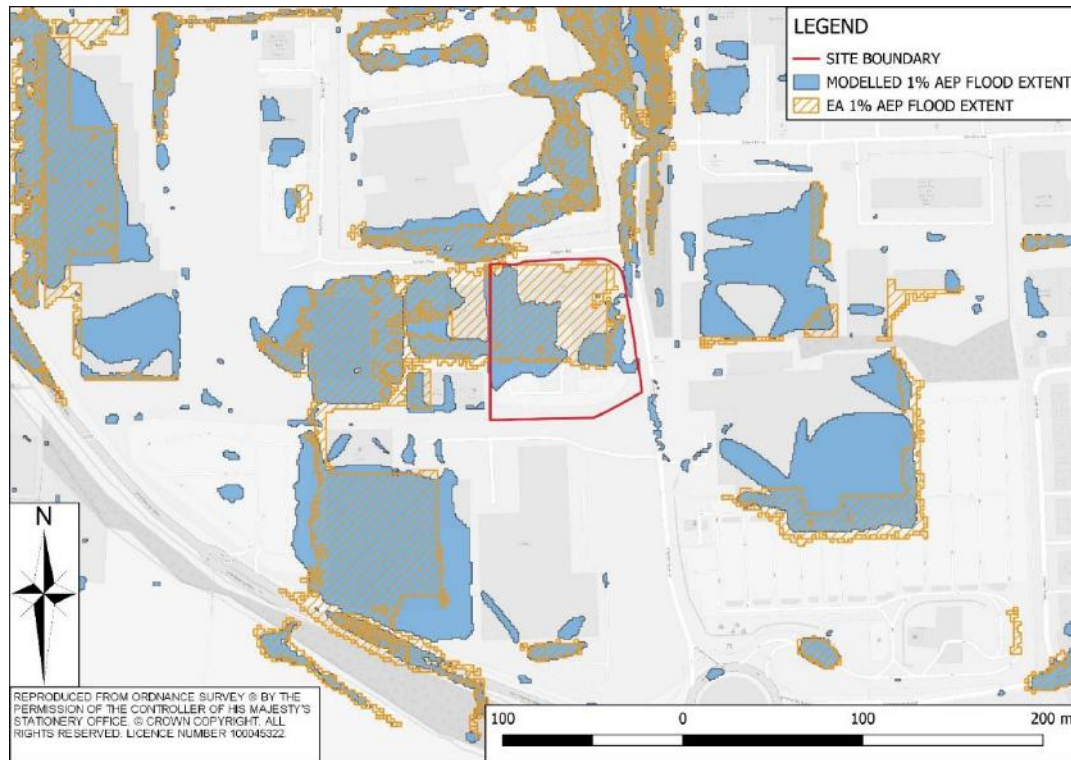
6.4 Comparison with the Environment Agency Flood Mapping

6.4.1 The modelled flood extent for the baseline scenario 1% AEP storm event has been compared to the EA RoFSW medium risk mapping (1% AEP). The comparison of the extent is shown in **Figure 6.8**.

6.4.2 These results show that the modelled flood extent for the 1% AEP storm event closely match that of the EA RoFSW medium risk extent. Difference between the extents occur due to a more detailed ground model and the site specific hydrology.



Figure 6.8 Comparison of Baseline Model 1% AEP Event to EA RoFSW 1% AEP





7.0 MODEL ASSUMPTIONS AND LIMITATIONS

7.1 *Assumptions*

7.1.1 The following assumptions have been made in the development of the hydraulic model:

- The ground model has been derived from EA LiDAR DTM data, obtained from the EA open survey portal. The data has been assumed to be fit for purpose. Some small adjustments have been made to localised areas, specifically where the LiDAR did not pick up drainage channels and watercourses obscured by vegetation.
- 2D surface roughness values have been assumed based on online aerial photography and OS map data.

7.2 *Limitations*

7.2.1 The following limitations of the hydraulic model should be noted:

- The area of interest is defined by the red line boundary and therefore the model should not be used by third parties to assess flood risk elsewhere in the model domain;
- The model has been tested on normal design storms only, due to the complexity and variability of real storm events, the flood risk profile determined by this model is a prediction only; and
- No hydrometric data exists for the watercourses within the model. Consequently, the model cannot be calibrated against observed data.



8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 *Conclusions*

8.1.1 Odyssey has been commissioned by Simpson Associates Consulting Engineers to undertake a site-specific hydraulic modelling assessment, in support of a commercial development at Charles Avenue, Burgess Hill.

8.1.2 According to the current Environment Agency (EA) Risk of Flooding from Surface Water (RoFSW) map, the site is subject to a 'high' risk of pluvial flooding (more than 3.33% Annual Exceedance Probability (AEP)). Since the RoFSW mapping was undertaken to inform a national database, the modelling does not take into consideration detailed site-specific topographical survey or allow for investigation of proposed scenarios. Therefore, it was necessary to carry out direct rainfall hydraulic modelling of the catchment draining into the site in order to quantify the risk from overland flows, and to determine flood levels and the resulting flood extents.

8.1.3 The model was constructed using the TUFLOW hydraulic modelling software package. The 2D domain was designed to cover the area at risk of flooding with a 2m grid cell size.

8.1.4 The baseline modelling results show that the flooding on the site is in the low area of the car park, caused by overland flow originating from the north, and on the east part of the site, originating from water flowing along Charles Avenue from the southeast.

8.2 *Recommendations*

8.2.1 The modelling has been used to re-define the risk of flooding for surface water mapping across the site. The modelling outputs confirm that the site falls in 'high' to 'very low' risk of pluvial flooding.

8.2.2 It is recommended that this hydraulic assessment is accepted as the best available source of information for the site, informing the mitigation measures captured within the proposed scheme to appropriately manage the risk of pluvial flooding to the site and the wider catchment.

APPENDIX B

Model Files

https://odysseyconsultllp.sharepoint.com/:f:/g/EoqmmVp9xTRKIFH_rrOEiNUBDhd1HmhABZJ3oR7znTpPHg

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