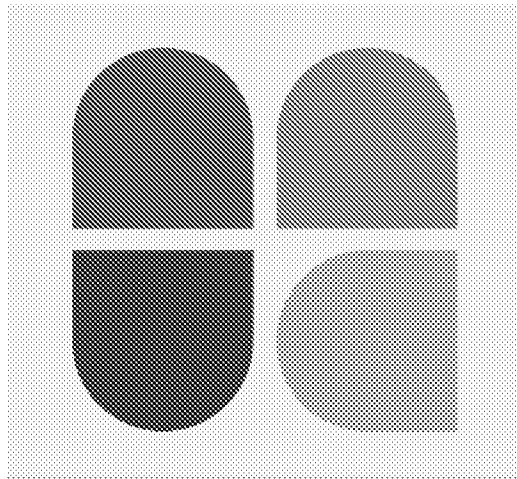




BRIGHT PLAN CIVILS

LAND AT SUMMER LANE, PAGHAM

PROPOSED RESIDENTIAL DEVELOPMENT

Drainage Strategy Report

Prepared on Behalf of

Foreman Homes

D1915/DS1.1

25 October 2021

DOCUMENT CONTROL

Project: Land at Summer Lane, Pagham
Proposed Residential Development

Document: Drainage Strategy Report

Client: Foreman Homes

Reference: D1915/DS1.1

Document Checking:

Author: DJL

Date: 25/10/2021

Checked by: MJA

Date: 20/10/2021

Approved by: MJA

Date: 20/10/2021

Status:

Issue	Date	Status	Issued by
1.0	20/10/2021	Original Issue	DJL

CONTENTS

1	INTRODUCTION	5
1.1	Background.....	5
1.2	Site Location and Description	5
1.3	Ground Conditions	5
1.4	Existing Drainage	6
2	FLOOD RISK	8
2.1	Previous Flood Risk Assessment	8
2.2	Flood Maps and Modelling	8
3	PROPOSED DEVELOPMENT	9
3.1	Description of Development	9
4	PROPOSED DRAINAGE STRATEGY	10
4.1	Surface Water	10
4.2	Treatment	11
4.3	Foul Water Drainage	12
4.4	Climate Change.....	13
4.5	Urban Creep	13
5	MAINTENANCE.....	14
5.1	Proposed Maintenance Regime	14
6	OFFSITE IMPACTS	18
7	SUMMARY.....	19

DRAWINGS

200-203	Proposed Levels & Contours
300-303	Proposed FW & SW Drainage Strategy
304	Proposed FW Off-Site Discharge
400-401	Proposed Impermeable Areas
402-403	Catchment Overview
404-405	Flow Model Catchments

APPENDICES

Appendix A	Geotechnical Investigation
Appendix B	Existing Drainage Findings
Appendix C	Flood Risk Assessment Extracts
Appendix D	Approved Planning Extracts
Appendix E	Surface Water Hydraulic Modelling Results
Appendix F	Foul Network Models

1 INTRODUCTION

1.1 Background

- 1.1.1 Bright Plan Civils is instructed by Foreman Homes to prepare a Drainage Strategy Report and preliminary design to support a planning application for a Proposed Residential Development at the Land at Summer Lane, Pagham.
- 1.1.2 This report has been undertaken in accordance with National Planning Policy Framework (NPPF) and The Planning Practice Guidance on the use of SuDS for achieving sustainable development.
- 1.1.3 The proposed development will involve the construction of 375 residential homes - as demonstrated within the preliminary site layout, contained within **Appendix A** of this report.
- 1.1.4 In preparing this report, Bright Plan Civils has referred to the following documents and information:
- Environment Agency Flood Maps for Planning
 - Long Term Flood Risk Information; Flood Risk Maps
 - Southern Water and Local Authority Drainage Records
 - British Geological Survey & Records
- 1.1.5 This document has been prepared to propose assess drainage constraints and propose a drainage strategy that is appropriate for the design life of the development, without causing offsite impacts from runoff in a design event.
- 1.1.6 This report has been prepared for the benefit of the named Client only.

1.2 Site Location and Description

- 1.2.1 The existing site consists of agricultural fields, at the western edge of the residential area of Pagham, within the District of Arun in West Sussex. It is bordered by Summer Lane to the north, Pagham Road to the east, and fields to the west.
- 1.2.2 A topographical survey of the site has been undertaken and provided by the client, which shows that the site falls from the northern central area of the site at approximately 5.50mAOD, westwards and eastwards to approximately 4.50mAOD, and southerly to approximately 3.50mAOD.
- 1.2.3 The previous site is drained by overland runoff to the existing boundary watercourse network, which flows away from the site, to the Pagham Rife 550 metres to the north, and the Pagham Lagoon 550 metres to the south.
- 1.2.4 The existing site has a total area of approximately 173,097m² (17.31 Ha.), with approximately 10.5 Ha. to the southern parcel and 6.7 Ha. to the northern parcel.

1.3 Ground Conditions

- 1.3.1 Ashdown SI undertook ground investigation in winter 2018-2019, as well as groundwater monitoring in winter 2019-2020.
- 1.3.2 The site investigation found River Terrace Deposits underlying the topsoil to a depth between 3.3-4.0

metres below ground level (mbgl). This is underlain by London Clay Formation Bedrock.

- 1.3.3 Soakage testing was not undertaken due to instability encountered within the soils and groundwater recorded at depths of between 0.2mbgl and 2.8mbgl.
- 1.3.4 Ashdown SI undertook ground investigation in winter 2018-2019, as well as groundwater monitoring in winter 2019-2020. Groundwater standing water levels were recorded at between 0.2mbgl and 1.7mbgl. Maximum groundwater levels at each groundwater monitoring location were recorded between 0.2-0.8mbgl, meaning that infiltration SuDS are unviable across the site.
- 1.3.5 It is noted however that groundwater levels were recorded in proximity to the boundary watercourses, which may have locally affected groundwater levels. Site level raising will also ensure that tanked SuDS features are above maximum groundwater levels wherever possible.
- 1.3.6 Extracts of the groundwater monitoring by Ashdown SI are included within **Appendix A**.

1.4 Existing Drainage

- 1.4.1 The local Water Authority is Southern Water, who provide sewerage services within the area. Public sewer records have been obtained from Southern Water, as contained within this report in **Appendix B**.

1.4.2 Surface Water:

- The Southern Water public sewer records (**Appendix B**) show public surface water sewers draining the existing residential areas to the east of the site. In addition, it would appear that a 675mm surface water sewer adjacent the Haven Church Farm Holiday Village (south of the site) drains the boundary watercourse network to the Pagham Lagoon.
- The existing site appears to be drained by overland runoff to the existing boundary watercourse network, which flows away from the site, to the Pagham Rife 550 metres to the north, and the Pagham Lagoon 550 metres to the south.
- The nearest surface water feature is the Pagham Lagoon, 550 metres south of the site.
- The nearest watercourse appears is the Pagham River (Main River) 550m north of the site, which runs west and south before becoming tidal approximately 650 metres southwest of the site as part of Pagham Harbour.
- The previous approved Drainage Strategy by Ridge and Partners found the Greenfield runoff rate (Qbar) to be 3.5l/s/Ha.
- The approved discharge rates for the South and North land parcels have therefore been calculated to be 34.0l/s and 22.0l/s respectively.

1.4.3 Foul Water:

- The Southern Water public sewer records (**Appendix B**) show a 375mm rising main running northwest across the site.

- At present, there is no confirmation of the foul water connection from the site, and investigation is required to establish connection arrangements of the proposed development to the existing public foul sewer.
- The approved drainage strategy proposed a foul pumping station between the northern and southern parcels of the site, to connect to Southern Water Manhole 0302 at the junction between Pagham Road and Church Way. The existing manhole has a recorded cover level of 5.10mAOD and invert level of 4.49mAOD.

1.4.4 Highway Drainage:

- Pagham Road is drained by highway gullies to the boundary watercourse along the eastern side of the site. Summer Lane is drained by over-the-edge runoff to the existing watercourse network.

2 FLOOD RISK

2.1 Previous Flood Risk Assessment

- 2.1.1 The approved Flood Risk Assessment (FRA) report by MJA Consulting in 2016 assessed the risk of flooding to the site from all sources.
- 2.1.2 The site was found to be within Flood Zone 1, other than at the southern boundary where the site is within Tidal Flood Zone 3 (Undefended).
- 2.1.3 The site was assessed to be 'not at risk' from all other sources of flooding.
- 2.1.4 It was indicated within the FRA report that although the site is not considered to be at risk of groundwater flooding with no previous incidents found, the existing site is liable to becoming waterlogged due to soil impermeability, surface water ponding and ground saturation, and potential sheet runoff. This is to be taken into account for the levels and drainage design to ensure sufficient drainage infrastructure and site falls to ensure drainage of the site area without exceedance.
- 2.1.5 The FRA report confirmed an undefended tidal flood level for year 2115 of 4.70mAOD within Pagham Harbour, however did not consider the site to be at significant risk of tidal breaches due to the distance from the tidally affected area.
- 2.1.6 The FRA considered the surface water flood risk at the site to be 'very low', with surface water flow paths associated with 'in-bank' flows within the existing drainage ditches.
- 2.1.7 The FRA proposed raised property slab levels to be a minimum of 150mm above the surrounding development finished ground level, and 300mm above the 2115 tidal level.
- 2.1.8 The FRA also confirmed that correspondence with the Environment Agency confirmed the floodplain was tidal and not fluvial, and therefore flood compensation works would not be required at the site.

2.2 Flood Maps and Modelling

- 2.2.1 The initial assessment of flood risk by Bright Plan Civils in November 2020 summarised the FRA findings, and indicated the proposed development areas as confirmed within Flood Zone 1, other than a small area along the southern border of the southern parcel as within Flood Zone 2.
- 2.2.2 The Product 4 response from the Environment Agency confirmed the site as within Flood Zone 1, and the aforementioned area within Flood Zone 2.
- 2.2.3 There are flood defences in the form of a beach and an embankment. The assets are maintained by Environment Agency. Flood modelling information has been provided, based off the flood modelling named 'River Arun to East Head Coastal Modelling (2D)' which was completed by JBA Consulting in 2016.
- 2.2.4 The flood modelling data indicated the southern boundary of the southern parcel at risk of flooding in a 0.5% defended tidal event in year 2115, as well as a 0.5% undefended tidal event in year 2070 and 2115.
- 2.2.5 The flood levels provided by the Environment Agency corresponding to the flood modelling indicate maximum flood levels of 4.25mAOD for a defended flood event (0.5% AEP, year 2115) and 4.74mAOD (0.5% AEP, year 2115).

3 PROPOSED DEVELOPMENT

3.1 Description of Development

- 3.1.1 The proposed development will involve the construction of a 375 residential homes, with associated landscaping and hardstanding.
- 3.1.2 The type of development falls within the 'More Vulnerable' classification (Flood Risk and Coastal Change Table 2) and is appropriate in Flood Zone 1 and Flood Zone 2 (Flood Risk and Coastal Change Table 3).
- 3.1.3 The proposed development will increase the hardstanding area of the site; however SuDS measures will be used where possible in order to prevent any increase in the rate of run-off generated by the site.
- 3.1.4 The post-development impermeable/hardstanding area has been determined to be 46,354m² (4.64 Ha.) for the southern parcel and 27,586m² (2.76Ha.) for the northern parcel.
- 3.1.5 The use of Sustainable Drainage System (SuDS) methods and techniques (where site conditions and constraints allow) within the bounds of the site (whilst adhering to the SuDS hierarchy as stated within Building Regulations (Part H) and The CIRIA SuDS Manual C753) will be used to control the surface water run-off rate to the equivalent of the existing site.
- 3.1.6 The specific Surface Water and Foul Water drainage proposals are detailed in **Section 4** of this report.

4 PROPOSED DRAINAGE STRATEGY

4.1 Surface Water

4.1.1 The SUDS manual and Building Regulations set out a hierarchy of drainage methods to ensure that developments maximise the use of sustainable drainage techniques. The hierarchy favours infiltration methods of disposal over other methods such as watercourse and sewers, as detailed below;

- i. Utilise infiltration techniques
- ii. Attenuate rainwater in ponds or open water features for gradual release
- iii. Attenuate rainwater by storing in tanks or sealed water features for gradual release
- iv. Discharge rainwater direct to a watercourse
- v. Discharge rainwater to a surface water sewer/drain
- vi. Discharge rainwater to a combined sewer

SUDS Technique	Suitable	Comments
Living Roof	No	Not consistent with architects proposals.
Basins and Ponds (such as Wetlands, Balancing Ponds, Detention Basins, Retention Ponds)	Yes	Viable, with areas of open land at the site low points adjacent to the existing ditches available.
Filter strips and swales	Yes	Viable, with areas of open land at the site low points adjacent to the existing ditches available.
Infiltration Devices - Soakaways - Infiltration trenches and basins	No	Underlying ground conditions are indicated impermeable with high groundwater levels, preventing infiltration methods.
Permeable surfaces and filter drains (such as gravelled areas and porous block paving)	Yes	As above, however permeable surfaces provide a source of treatment and shallow attenuation.
Tanked systems (such as oversized pipes or cellular tanks)	Yes	No initial constraints, would provide considerable attenuation volume.

- 4.1.2 It is not considered that infiltration measures are viable, given underlying Clay bedrock and high groundwater levels across the site.
- 4.1.3 It is proposed that surface water runoff is captured and attenuated within permeable block pavement (min 400-550mm subbase thickness, see modelling calculations for site variance), geocellular underground storage, and open ponds across the site, adjacent to the existing boundary watercourses.
- 4.1.4 For the southern site, permeable paving will have a total plan area of 6,749m², providing approximately 1,000m³ storage (based on a sub-base depth of between 400-550mm and 32% voids). Geocellular storage will provide a total attenuation volume of 427.5m³, based on tank depths of 0.8m and 95% voids. The open storage ponds will provide a total attenuation volume of 1,597.5m³, with 1:3 sloped sides. The approved drainage strategy determined the Greenfield runoff rate (QBar) for 'Site A' - South Site to be 34.0l/s.
- 4.1.5 Further to the above, run-off from the southern parcel of development will be discharged to the adjacent watercourse network at a rate of 34.0l/s.
- 4.1.6 For the northern site, permeable paving will have a total plan area of 4,105m², providing approximately 600m³ storage (based on a sub-base depth of between 450-500mm and 32% voids). The open storage ponds have a total area of 2,260m², with 1:3 sloped sides and depths of between 1.30 and 1.50m. Total proposed attenuation volume of the open ponds is 2046.8m³. The approved drainage strategy determined the Greenfield runoff rate (QBar) for 'Site A' - South Side to be 22.0l/s.
- 4.1.7 Further to the above, run-off from the northern parcel of development will be discharged at a rate of 16.0l/s, representing a betterment compared to the approved Drainage Strategy.
- 4.1.8 The proposed surface water drainage strategy is detailed in **Drawings 300-303**.
- 4.1.9 It is proposed that all captured runoff from the proposed hardstanding areas is captured up to the 100-year event including 40% climate change without exceedance.
- 4.1.10 The strategy above will ensure that there is no increase in the rate of run-off leaving the site, therefore no increase in the risk of flooding from this source.

4.2 Treatment

- 4.2.1 The use of permeable paving will ensure that run-off from the site receives a level of treatment required by the SuDS manual, with hydrocarbons being filtered by the aggregate and geotextile layers.
- 4.2.2 The use of open ponds will provide a two stage treatment to these flows, as well as providing treatment for all runoff and exceedance flows from the development area.
- 4.2.3 In accordance with the CIRIA SuDS Manual C753 regarding methods for managing pollution risks, the risk posed by surface water runoff to the receiving environment depends on the pollution hazard at the site (the source), SuDS treatment techniques (the pathway), and the sensitivity of the environment (the receptor).
- 4.2.4 The simple index approach considers whether SuDS techniques are appropriate for the site. The states that for SuDS components to deliver adequate treatment, the total pollution mitigation index for each contaminant type should equal or exceed the pollution hazard index.
- 4.2.5 The SuDS Manual outlines three categories of pollution hazard identification, which vary depending on proposed land use, which are as follows:

- Total Suspended Solids (TSS).
- Metals (M).
- Hydrocarbons (H).

4.2.6 In accordance with C753 Table 26.2, the proposed land uses at the site are categorised as follows:

- Residential Roofs and non-trafficked areas – very low/TSS=0.2/M=0.2/H=0.05
- Driveways and low traffic roads – low/TSS=0.5/M=0.4/H=0.4

4.2.7 In accordance with C753 Table 26.3, the values of SuDS Mitigation indices are provided for the proposed SuDS features:

- Permeable Pavement – TSS=0.7/M=0.6/H=0.7
- Pond – TSS=0.7/M=0.7/H=0.5

4.2.8 As the pollution hazard index does not exceed any pollution mitigation index for any contaminant type, the proposed SuDS methods will provide sufficient treatment for the proposed development.

4.3 Foul Water Drainage

4.3.1 The approved Drainage Strategy for the development is for a foul pumping station to discharge runoff to the existing foul sewer at Southern Water Manhole 0302 at the junction between Pagham Road and Church Way. The existing manhole has a recorded cover level of 5.10mAOD and invert level of 4.49mAOD

4.3.2 The proposed foul arrangement is detailed in Drawings 300-303 for the sites, and Drawing 304 for the off-site discharge arrangement.

4.3.3 Post development, there will be an estimated increase in peak foul water flows to 18.75l/s (based on Sewers for Adoption).

4.3.4 Agreement will be needed with Southern Water as to the connection arrangement and timeline to ensure the existing foul sewer network can support the proposed development.

4.3.5 Recent changes to infrastructure and connection charges (OFWAT Charging Rules) place the onus on the sewerage undertaker to reinforce their network should there no longer be sufficient capacity to serve the new development. Funding for this is provided by revised charging arrangements for infrastructure and connection charges for each dwelling constructed comprising a Network Reinforcement Charge and Site-Specific Charges. The revised charging arrangement (funded by the developer) covers alterations to the Existing Sewer Network and the sewerage undertaker remains responsible for the cost of reinforcing their Strategic Assets. The developer is responsible for connecting the development to the public sewer network.

4.3.6 The existing foul rising main (375mm diameter) required further investigation, with any works in the vicinity subject to agreement with the local water authority, Southern Water.

4.4 Climate Change

- 4.4.1 In July 2021 the Environment Agency updates the latest climate change allowances (available online at <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>), which supports the NPPF in making an allowance for climate change within flood risk assessment. The allowances provide predictions of anticipated change for peak river flow by river basin district and peak rainfall intensity.
- 4.4.2 The table below shows the anticipated changes in extreme rainfall intensity. For flood risk assessments, both the central and upper end allowances should be assessed to understand the range of impact.

Applies across all of England	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Upper End	10%	20%	40%
Central	5%	10%	20%

- 4.4.3 Based on the latest allowances, an increase of 20% should be applied to peak rainfall to this development, with a review undertaken to determine the impact of a 40% increase.
- 4.4.4 The proposed drainage strategy has considered the impact of a 40% increase in rainfall.
- 4.4.5 The impacts of climate change on the tidal flood levels have been accounted for within the tidal modelling provided by the Environment Agency. The proposed levels design has considered the existing tidal flood risk, and the future defended and residual (undefended) flood risk as a result of climate change, for the lifetime of the development.

4.5 Urban Creep

- 4.5.1 The impact of up to 10% urban creep has been considered in accordance with the West Sussex LLFA Policy for the Management of Surface Water.
- 4.5.2 Minor exceedance of the proposed drainage system in an extreme scenario with an urban creep allowance would result in ponding in design low points of the site within the proposed road network, however this would not impact the safety, use, access or egress of the site and would be drained by the proposed drainage network.

5 MAINTENANCE

5.1 Proposed Maintenance Regime

- 5.1.1 Maintenance is required to ensure the long-term operational performance of the proposed surface water drainage system.
- 5.1.2 The drainage system has been designed to minimise maintenance requirements; however a number of key tasks will need to be undertaken so that the system remains in optimal condition. These operations are summarised in the table below, along with the required frequency of works.

Drainage System feature	Proposed maintenance / remedial works	Required frequency of works
Inlet, Outfall and Existing Watercourses	Inspection, vegetation clearance and additional clearing/cleansing of potential outfall blockages	At least once a year
	Desilting	Year 1, Year 3, then every 5 years
Permeable Paving	Surface sweeping to reduce silt and debris accumulation.	Every 8 to 12 weeks
	Removal / management of weed growth	At least once a year
	Silt removal from permeable surfaces, possibly involving raking out of joints, redressing, removal and remedial works.	As required / to be specified by manufacturer
Diffuser units & catch pits, gully sumps and drains	Inspection and additional cleansing as required.	Annual
	Desilting	Year 1, Year 3, then every 5 years
Pipework	Jetting to clear blockages	As required
Flow Control Chamber	Inspection and cleansing	Annual
	Desilting	Year 1, Year 3, then every 5 years
	Additional product-specific requirements	As required / to be specified by manufacturer
Storage Ponds	See table 2.	

Maintenance Table 1

- 5.1.3 The responsibility of maintenance regime will be determined by the Developer, by agreed appointment.

Permeable Paving / Diffuser Units

- 5.1.4 The areas of permeable paving are designed to allow infiltration of surface water run-off through the joints in the block paving surface course and into the subbase below. The water is then collected and discharged into the positive drainage system.
- 5.1.5 As part of the permeable paving system, diffuser units are used to discharge surface water run-off from roof areas into the sub-base, as well as forming links between areas of permeable paving. These diffuser units are small heavy-duty cellular units which allow more efficient discharge of surface water into the sub-base base of the permeable paved areas.

5.1.6 The areas of permeable paving will require additional maintenance measures to ensure they operate as designed. Failure in carrying out this maintenance, could increase the risk of flooding. The additional measures are as follow:

- Periodic surface sweeping to reduce silt and debris accumulation. The permeable surfaces should be swept at least every 8 to 12 weeks with additional sweeps in the autumn to clear fallen leaves
- Removal / management of weed growth, as required. Typically, once or twice a year for regularly used areas
- Periodic silt removal from permeable surfaces as described by the manufacturer. If any areas are showing signs of ponding, they shall be dealt with by raking out the joints and redressing. The entire surface shall be monitored and when there are signs of excessive siltation resulting in poor drainage over the whole area, the blocks shall be taken up and a replacement of bedding layer and geotextile shall be undertaken
- Redressing of joints on the block paving as required
- Catchpits upstream of diffuser units, should be emptied and inspected on the same regime as all catchpits specified previously set out in this document

HydroBrake (Flow Control Chamber)

5.1.7 The HydroBrake flow control system is self-activating, relying on upstream hydraulic head to generate an air-filled vortex within the centre of the casing. Once the vortex is initiated water drains down through a small opening in the back of the device at the designed restricted flow rate.

5.1.8 The flow control device has two measures encase of emergency (i.e. blockage). The first is a door situated in the front of the unit itself, this can be operated from the surface by a release cable situated just under the manhole cover which closes under its own weight and does not require any mechanism to operate. The second is a high-level overflow pipe situated with the flow control manhole. Both measures allow the system to drain down freely, until the blockage can be cleared.

5.1.9 The HydroBrake flow control chamber will require additional maintenance measures to ensure it operates as designed. The additional measures are as follows:

- The sump within the flow control chamber should be monitored for build-up of silts and should be emptied, as a minimum, on the same regime as specified for catchpits previously within this document
- The drain down door located on the centre of the unit will require inspection and opening annually, to ensure it is operating as intended

Proposed Storage Ponds

5.1.10 The proposed attenuation ponds will require a maintenance regime to ensure they remain operational, safe, and optimal in terms of storage capacity, flow and treatment.

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly
	Cut grass in and around pond	Monthly (during growing season) or as required
	Manage other vegetation and remove nuisance plants	Monthly at start and then as required
	Inspect inlets and outlets for blockages and clear as required	Monthly
	Inspect banks for damage and repair as required	Monthly
	Inspect inlets and pond surface for silt accumulation. Establish silt removal frequency	Monthly for first year then annually or as required
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlet	Annually or as required
Occasional Maintenance	Reseed areas of poor growth	As required
	Trim overhanging trees and remove cuttings	Every 2 years
Remedial Actions	Repair erosion or other damage by reseeding or returfing	As required
	Repair inlets and outlets	As required
	Relevel uneven surfaces and reinstate design levels	As required

Maintenance Table 2

Remedial/Repair Actions

- 5.1.11 Significant storm events may cause considerable damage to SuDS and their associated components. As such, it may be necessary to inspect and carry out essential recovery works to return the feature to full working order.
- 5.1.12 Resetting of uneven blocks by lifting block area, removing bedding material and relaying to match original design are all actions which may need to be undertaken.

Accidental Spillages

- 5.1.13 It is not envisaged that any materials are to be stored onsite once the development has been completed, which could cause major spills and potential pollution issues within the drainage system. If this situation alters in the future consultation with a specialist will be required in order to confirm if any upgrades to the existing system are necessary.
- 5.1.14 Minor spillages of fuels and oils will be dealt with by the permeable paving and deep trapped gullies, by bio-degrading and collecting the hydrocarbons respectively.

Future Alterations to the Development

- 5.1.15 Any future alterations to the permeable paving should be confirmed by a specialist. Where possible any future services are to avoid being located through areas of permeable paving. If new services are required to run through areas of permeable paving, services should be installed below the depth of permeable paving with the permeable system reinstalled above.

6 OFFSITE IMPACTS

- 6.1.1 The proposed development will not result in any increase in runoff from the site, and therefore will not cause an increase in flood risk offsite.
- 6.1.2 Post development foul water flows will contribute an increase to the sewer network compared to the previous use – it is expected that the foul sewer flow will be 18.75l/s.
- 6.1.3 The effects of climate change have been considered in the design of the proposed surface water drainage system, to ensure there is no off-site impact.

7 SUMMARY

- 7.1.1 The existing site consists of agricultural fields, at the western edge of the residential area of Pagham, within the District of Arun in West Sussex. It is bordered by Summer Lane to the north, Pagham Road to the east, and fields to the west.
- 7.1.2 A topographical survey of the site has been undertaken and provided by the client, which shows that the site falls from the northern central area of the site at approximately 5.50mAOD, westwards and eastwards to approximately 4.50mAOD, and southerly to approximately 3.50mAOD.
- 7.1.3 The previous site is drained by overland runoff to the existing boundary watercourse network, which flows away from the site, to the Pagham Rife 550 metres to the north, and the Pagham Lagoon 550 metres to the south.
- 7.1.4 The existing site has a total area of approximately 173,097m² (17.31 Ha.), with approximately 10.5 Ha. to the southern parcel and 6.7 Ha. to the northern parcel.
- 7.1.5 The site is within Flood Zone 1, with the southern boundary within Flood Zone 2. Flood modelling indicates maximum flood levels of 4.25mAOD for a defended flood event (0.5% AEP, year 2115) and 4.74mAOD (0.5% AEP, year 2115) at the site, and the approved Flood Risk Assessment report recommends finished floor levels to be a minimum of 150mm above the surrounding development finished ground level, and 300mm above the 2115 tidal level.
- 7.1.6 Post-development surface water run-off will be managed through sustainable drainage measures, with the installation of permeable paving, geocellular storage and open ponds with off-site discharge to the existing watercourse network at approved greenfield rates, without causing surface water flooding on site.
- 7.1.7 The wastewater from the proposed development will discharge to the public foul sewer network, with a foul pumping station connecting to the existing public sewer manhole at the Pagham Road and Church Way junction.
- 7.1.8 The foul rising main (Public Sewer) will require further investigation.
- 7.1.9 The completion of the development will not increase flood risk on or off the site.
- 7.1.10 In conclusion, this development is suitable with regards to flood risk and surface water drainage.

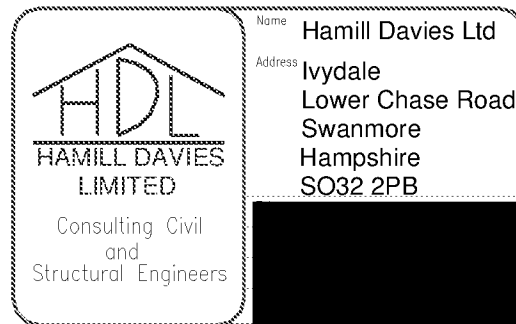
DRAWINGS

200-203	Proposed Levels & Contours
300-303	Proposed FW & SW Drainage Strategy
304	Proposed FW Off-Site Discharge
400-401	Proposed Impermeable Areas
402-403	Catchment Overview
404-405	Flow Model Catchments

APPENDICES

Appendix A Geotechnical Investigation

Mr Graham Foreman
Foreman Homes
Unit 1
Station Industrial Park
Duncan Road
Park Gate
Hampshire
SO31 1BX



23rd March 2020

Dear Graham,

Land South of Summer Lane, Pagham, West Sussex

I confirm that I have reviewed the Ashdown Site Investigation Limited report reference R18-13402 dated 22nd January 2019 and comment with regard to proposed foundations as follows:-

1.0 Ground Investigation

- 1.1 50 no. boreholes were drilled to depths of between 3.0m and 5.0m depths below existing ground level. Continuous dynamic probe tests were undertaken adjacent to boreholes to depths of between 3.6m and 5.0m below ground level. Disturbed samples were taken for testing. Undrained shear strength determinations were made in-situ and testing to determine CBR values were conducted at shallow depth.
- 1.2 Groundwater monitoring standpipes were installed to depth of between 3.5m and 5.0m in six boreholes.

2.0 Ground Conditions

- 2.1 A surface cover of topsoil between 100mm and 400mm depth was found above River Terrace Deposits.
- 2.2 The River Terrace Deposits underlying the topsoil comprised a variable sequence of undisturbed natural soils predominated by gravelly or sandy soil deposits to depths of between 3.3m and 4.0m below ground levels.
- 2.3 The London Clay Formation was encountered below the River Terrace Deposits.
- 2.4 Instability was recorded locally within the soils encountered and groundwater was recorded at depths of between 0.2m and 2.8m below ground level. Standing water depths of between 0.2m and 1.7m were recorded in standpipes.

3.0 Geotechnical Assessment

- 3.1 The fine grained soils of the River Terrace Deposits have been classified as clays of low to intermediate plasticity with medium volume change potential. The indicative maximum foundation depths for broad leafed and coniferous trees will need to be 2.0m depth.
- 3.2 The bearing capacity recommended for spread footings at 1.0m depth is 100 kN/m².

4.0 Foundation Requirements

- 4.1 The site investigation report indicates that shallow foundations could be used.
- 4.2 We however recommend the use of piled foundations to overcome problems and costs associated with the prevailing high water table and the instability of excavations indicated above.

Yours sincerely,
for Hamill Davies Limited

Brian Hamill

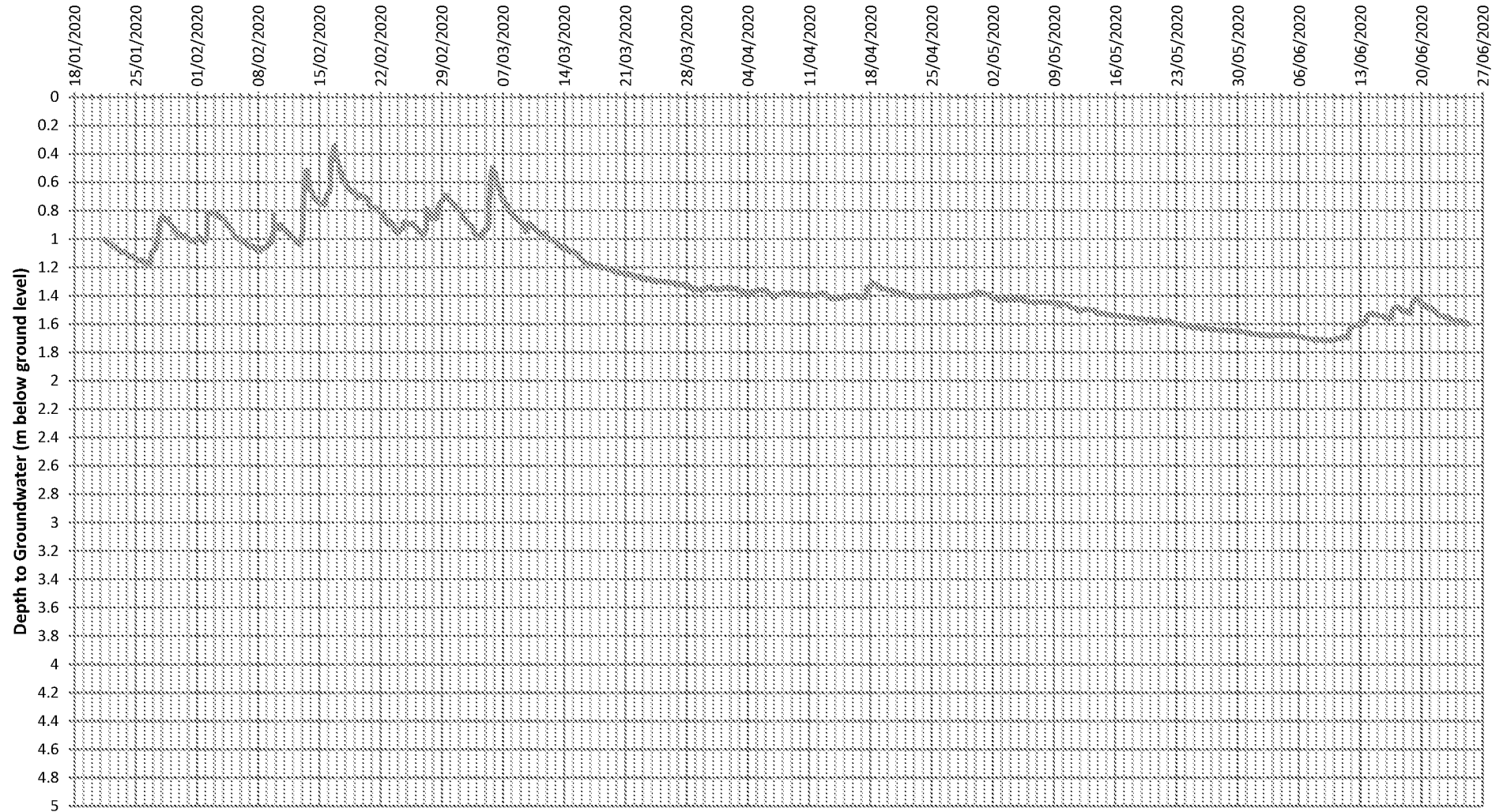
Cc – Neil Calderwood / Michael Avery – Foreman Homes Limited

Ashdown Site Investigation Limited

Site: Land South of Summer Lane, Pagham, West Sussex

Report No. P14405

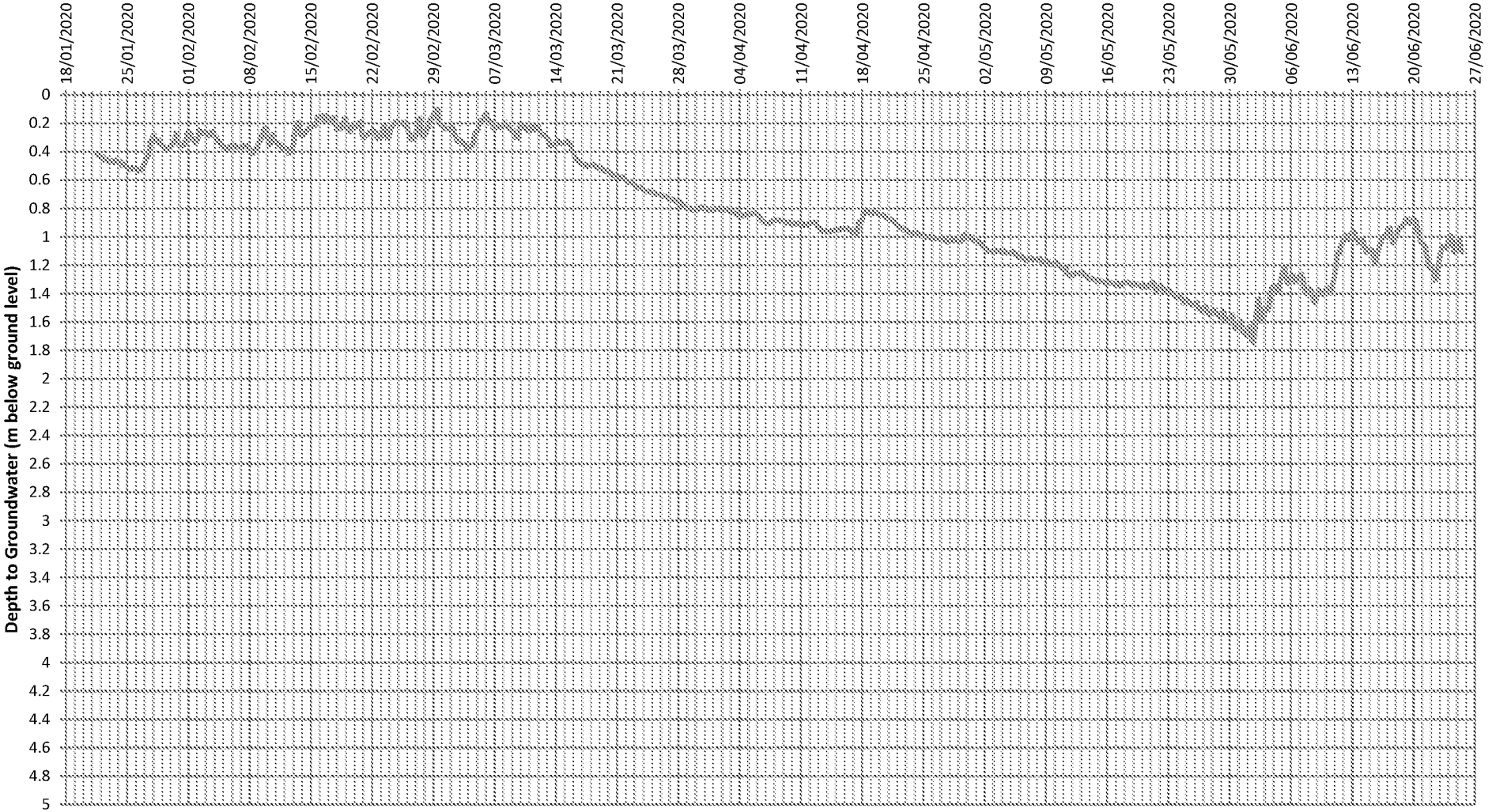
Groundwater Monitoring Results - WS101



Ashdown Site Investigation Limited

Site: Land South of Summer Lane, Pagham, West Sussex	Report No. P14405
--	-------------------

Groundwater Monitoring Results - WS114

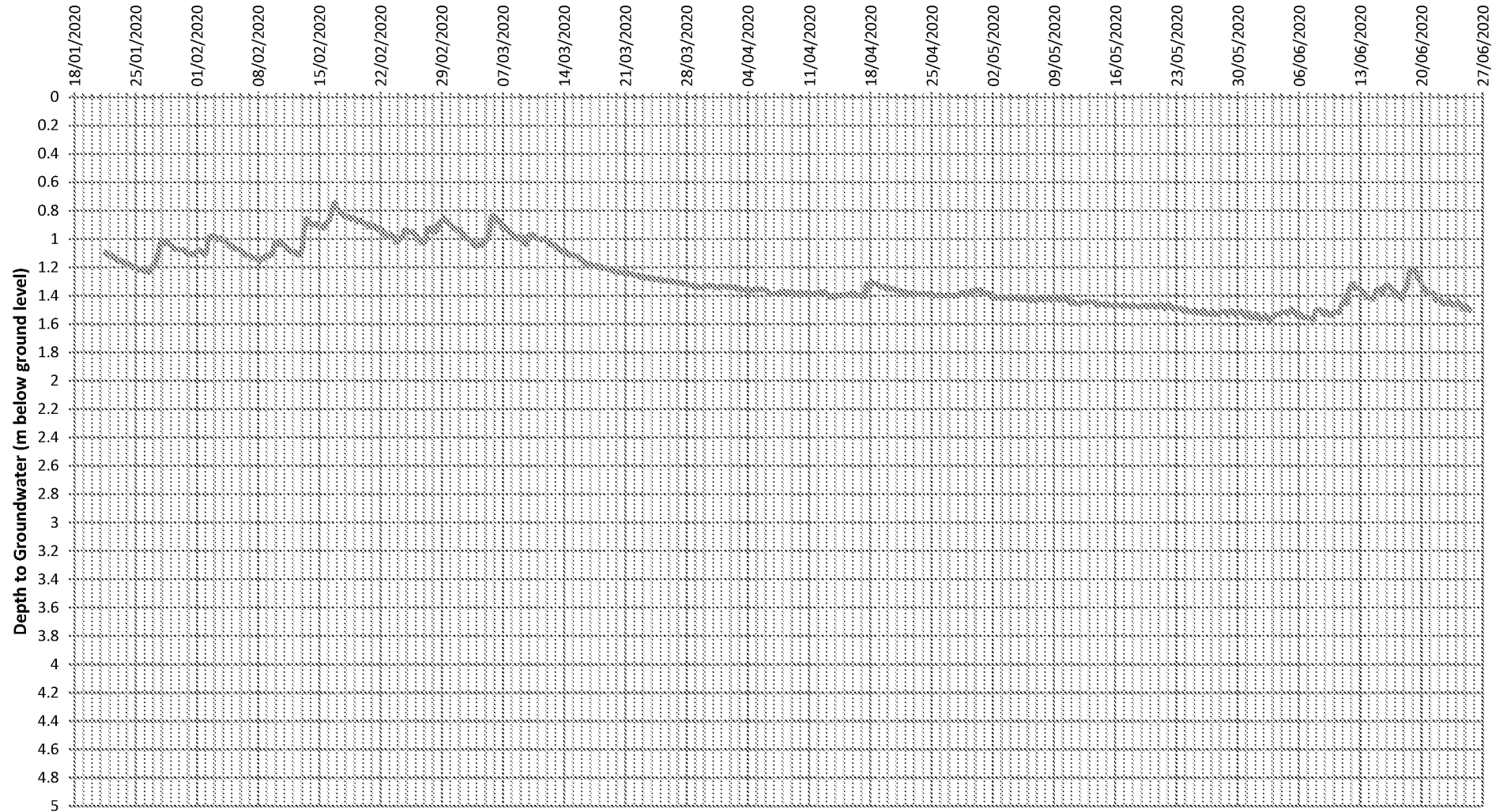


Ashdown Site Investigation Limited

Site: Land South of Summer Lane, Pagham, West Sussex

Report No. P14405

Groundwater Monitoring Results - WS123

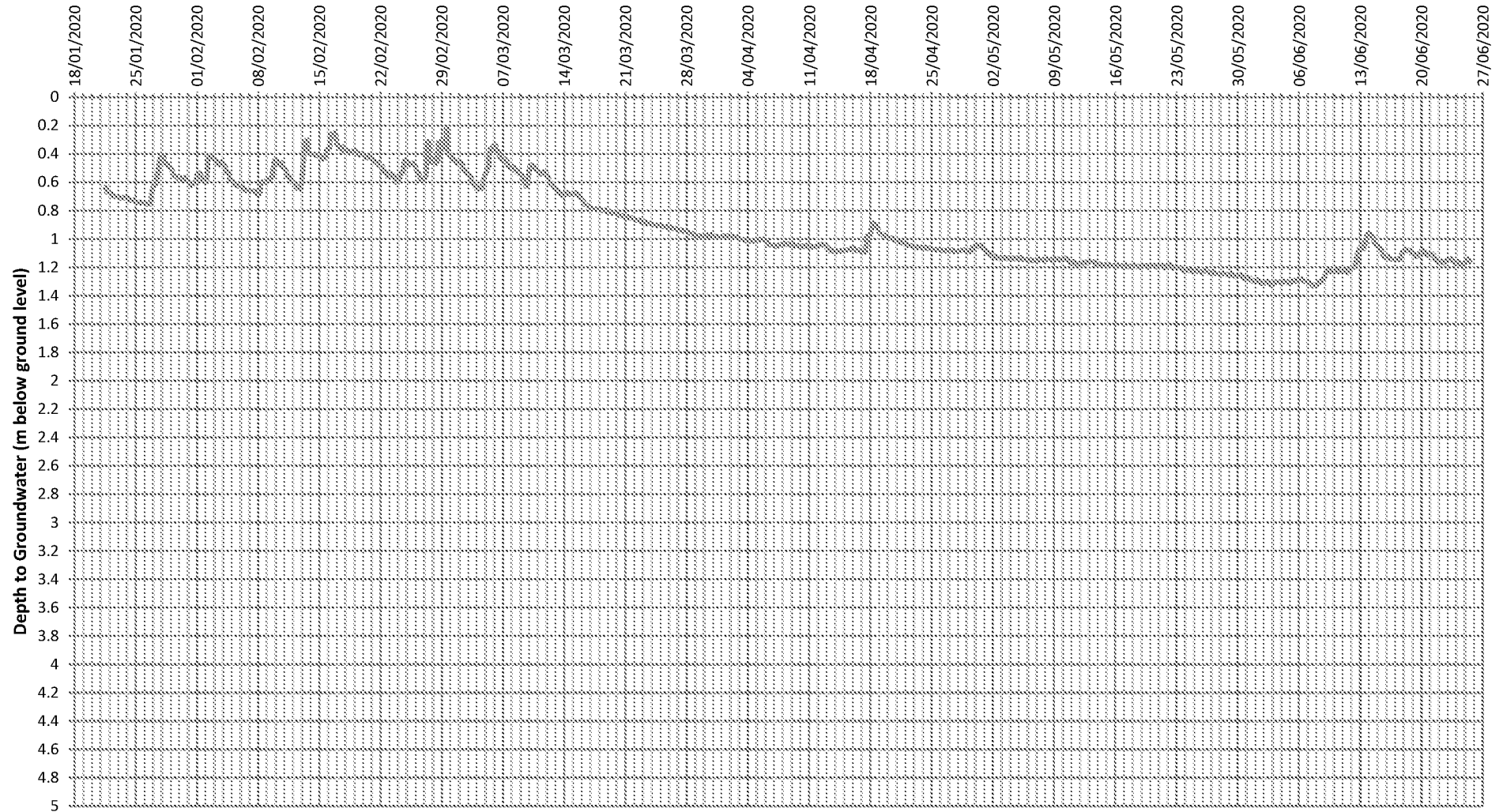


Ashdown Site Investigation Limited

Site: Land South of Summer Lane, Pagham, West Sussex

Report No. P14405

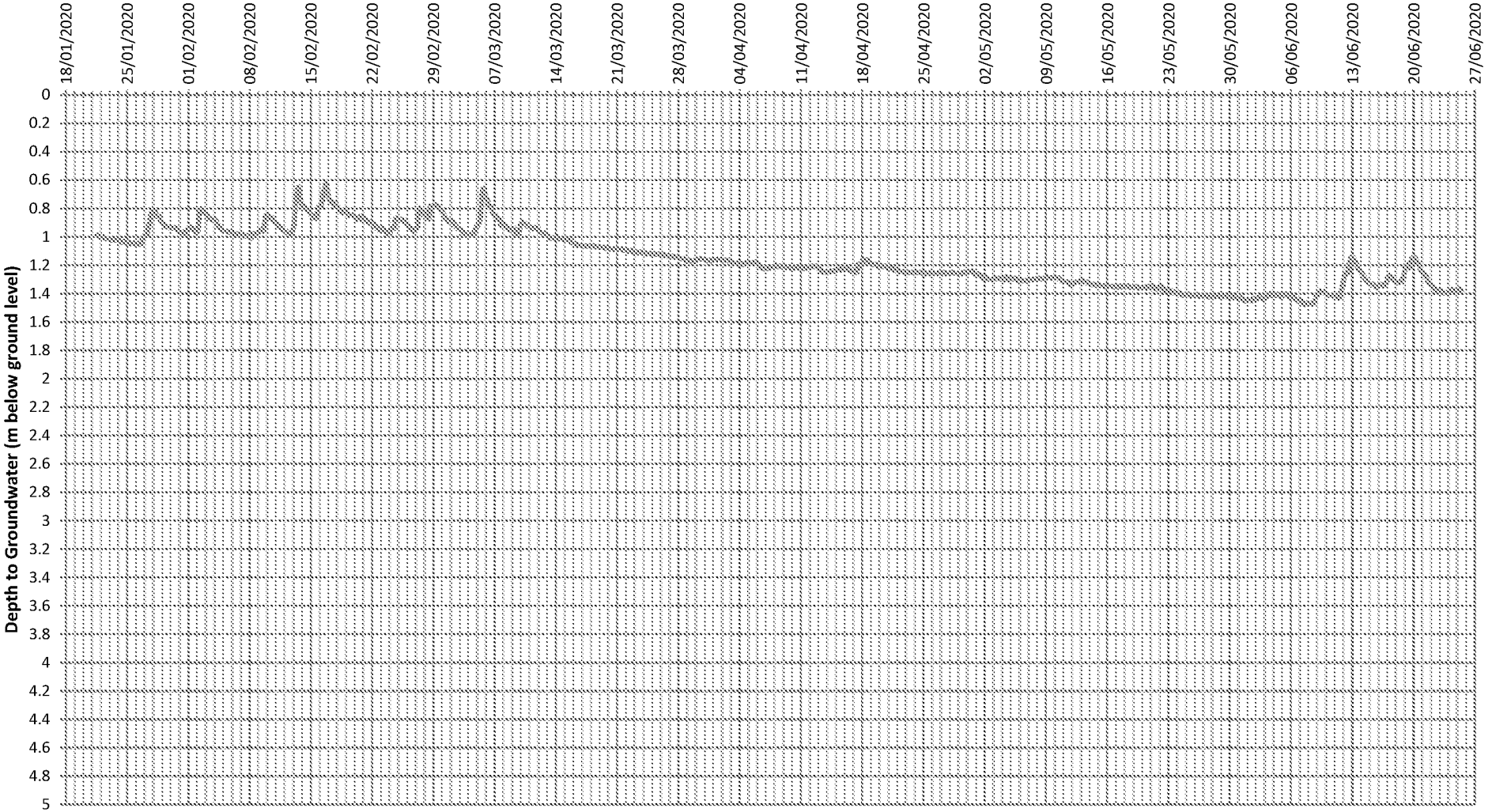
Groundwater Monitoring Results - WS134



Ashdown Site Investigation Limited

Site: Land South of Summer Lane, Pagham, West Sussex	Report No. P14405
--	-------------------

Groundwater Monitoring Results - WS135

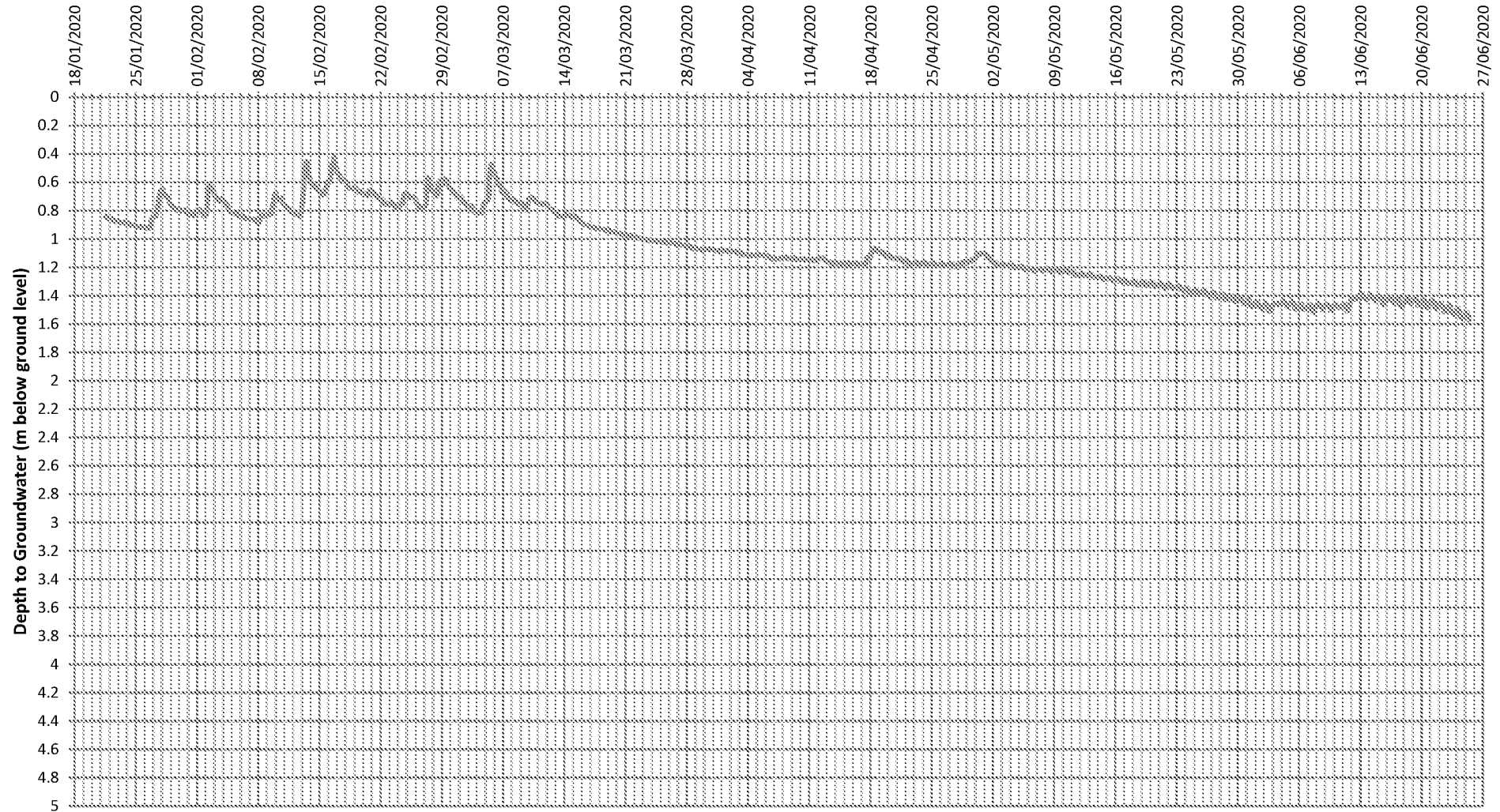


Ashdown Site Investigation Limited

Site: Land South of Summer Lane, Pagham, West Sussex

Report No. P14405

Groundwater Monitoring Results - WS150



Appendix B Existing Drainage Findings



The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accepts no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd to Crown copyright and database rights 2021 Ordnance Survey 100010273. This map is to be used for the purposes of viewing the location of Southern Water pipes only. Any other use of the map data is not permitted.

WARNING: Laid down (LDR) materials may include Boronated Asphalt Concrete.

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
0001	F	5.73	0.00	
0101	F	5.42	4.68	
0102	F	5.24	4.36	
0103	F	5.94	4.28	
0201	F	5.77	5.11	
0301	F	5.73	4.05	
0302	F	5.10	4.49	
0401	F	4.67	4.20	
0401	F	5.35	0.00	
0402	F	5.00	3.78	
0403	F	4.93	3.63	
0404	F	4.95	3.16	
0405	F	4.88	2.94	
0406	F	4.87	3.26	
0407	F	4.78	0.00	
0501	F	4.98	1.60	
0502	F	4.83	2.03	
0503	F	4.80	2.62	
0504	F	0.00	0.00	
0601	F	4.77	2.16	
0602	F	0.00	0.00	
0603	F	0.00	0.00	
0701	F	4.93	2.52	
0702	F	0.00	0.00	
0703	F	0.00	0.00	
0704	F	0.00	0.00	
0705	F	0.00	0.00	
0801	F	4.78	2.59	
0802	F	4.93	3.03	
0901	F	5.50	3.05	
0902	F	5.13	2.83	
0903	F	5.51	3.60	
0904	F	5.18	3.66	
1001	F	5.75	0.00	
1002	F	0.00	3.55	
1101	F	6.06	4.83	
1102	F	6.09	4.62	
1104	F	6.24	4.05	
1105	F	6.08	4.41	
1201	F	0.00	4.40	
1301	F	5.47	3.51	
1302	F	5.45	3.33	
1303	F	5.91	5.12	
1304	F	6.23	5.46	
1305	F	0.00	0.00	
1401	F	0.00	3.05	
1401	F	5.68	3.99	
1402	F	4.86	3.48	
1402	F	5.68	3.70	
1403	F	4.86	3.37	
1403	F	5.73	4.44	
1404	F	4.67	3.23	
1404	F	5.67	3.68	
1405	F	4.88	3.95	
1405	F	0.00	3.64	
1406	F	4.91	3.59	
1406	F	5.41	3.95	
1407	F	4.68	3.14	
1407	F	5.64	3.75	
1408	F	4.93	3.35	
1409	F	4.88	4.23	
1409	F	0.00	0.00	
1501	F	4.73	1.81	
1501	F	5.21	4.25	
1502	F	4.81	2.59	
1502	F	0.00	4.45	
1503	F	4.85	2.77	
1503	F	5.16	4.22	
1504	F	0.00	2.97	
1504	F	0.00	0.00	
1505	F	4.88	3.66	
1505	F	0.00	0.00	
1506	F	0.00	0.00	
1507	F	0.00	0.00	
1508	F	0.00	0.00	
1509	F	0.00	0.00	
1601	F	4.95	1.93	
1602	F	4.54	1.87	
1603	F	4.53	1.88	
1604	F	5.29	1.99	
1605	F	5.18	2.01	
1606	F	5.16	2.11	
1607	F	0.00	2.30	
1701	F	5.27	4.09	
1702	F	5.20	3.76	
1703	F	5.18	3.52	
1801	F	5.15	3.65	
1802	F	5.10	3.78	
1803	F	5.31	3.41	
1804	F	5.30	3.78	
1901	F	5.42	3.78	
1902	F	5.64	3.62	
1903	F	5.28	3.46	
1904	F	5.37	3.19	
2001	F	5.57	3.85	
2002	F	5.66	4.30	
2101	F	5.94	4.72	
2201	F	6.23	5.21	
2202	F	6.35	5.07	
2203	F	6.22	4.87	
2204	F	6.11	4.73	
2206	F	6.08	5.29	
2301	F	5.57	3.21	
2401	F	4.89	3.77	
2402	F	0.00	4.01	
2404	F	0.00	0.00	
2501	F	4.77	3.31	
2501	F	6.17	3.33	
2502	F	4.88	0.00	
2503	F	4.95	3.14	
2504	F	4.74	3.58	
2505	F	4.69	2.69	
2506	F	0.00	0.00	
2601	F	4.92	2.04	
2601	F	6.33	3.60	
2602	F	4.92	2.21	
2602	F	6.31	3.47	
2603	F	4.82	2.33	
2603	F	5.96	3.80	
2604	F	4.90	3.17	
2605	F	4.81	3.56	
2606	F	4.81	3.30	
2608	F	5.13	2.56	
2609	F	0.00	0.00	
2610	F	0.00	0.00	
2611	F	0.00	0.00	
2612	F	0.00	0.00	
2701	F	5.20	3.35	
2701	F	6.06	4.52	
2702	F	5.19	3.93	
2702	F	6.23	4.99	
2703	F	5.23	3.62	
2703	F	5.84	4.42	
2704	F	5.19	3.78	
2704	F	5.63	4.81	
2705	F	0.00	0.00	
2801	F	5.31	2.76	
2802	F	5.23	3.05	
2803	F	5.39	2.89	
2804	F	5.46	3.08	
2805	F	0.00	3.28	
2806	F	5.35	3.23	
2807	F	3.70	1.68	
2901	F	5.60	4.10	
2902	F	5.60	4.33	
2903	F	5.56	4.14	
2904	F	5.56	3.78	
2905	F	5.41	3.29	
2906	F	5.32	3.12	
3501	F	5.27	3.27	
3501	F	4.67	3.13	
3502	F	4.72	2.73	
3505	F	0.00	0.00	
4401	F	3.07	0.00	
4403	F	3.80	1.90	
4501	F	4.27	2.24	
5401	F	2.97	1.43	
5402	F	2.86	1.29	
5403	F	2.49	0.00	
5404	F	0.00	0.00	
5501	F	2.83	1.29	
5502	F	2.67	1.53	
6401	F	4.19	3.18	
6501	F	3.61	2.05	
6502	F	2.88	1.46	
6503	F	3.64	2.10	
6504	F	3.81	0.00	
6505	F	2.98	1.72	
6506	F	0.00	1.95	
6601	F	3.74	2.18	
7405	F	4.23	0.00	
7406	F	4.56	2.93	
7501	F	4.00	2.83	
7601	F	3.66	2.73	
7602	F	4.23	2.65	
7603	F	4.05	2.85	
7701	F	0.00	2.53	
7702	F	3.89	2.78	
7703	F	3.90	2.82	
7704	F	3.95	2.87	
7705	F	4.05	2.93	
7706	F	4.24	3.06	
7707	F	0.00	3.20	
8402	F	4.46	2.68	
8403	F	4.59	2.63	
8404	F	4.61	2.78	
8501	F	4.32	2.46	
8502	F	4.44	2.31	
8503	F	4.37	2.49	
8504	F	0.00	3.03	
8505	F	4.65	3.55	
8506	F	0.00	3.10	
8507	F	0.00	3.20	
8601	F	0.00	0.00	
8702	F	4.33	3.10	
8703	F	4.48	3.32	
9001	F	5.24	4.06	
9402	F	4.59	3.42	
9501	F	4.69	2.16	
9502	F	0.00	0.00	
9503	F	0.00	0.00	
9504	F	0.00	0.00	
9701	F	4.58	3.36	
9702	F	0.00	3.59	
9703	F	4.74	2.66	
9704	F	0.00	0.00	
9801	F	0.00	3.12	
9901	F	5.17	3.55	
9902	F	5.29	3.59	
9903	F	0.00	3.85	
0051	S	5.84	4.08	
0052	S	5.87	4.47	
0053	S	5.76	4.89	
0054	S	5.56	3.99	
0055	S	5.73	4.71	

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
0151	S	0.00	5.07	
0152	S	6.03	4.80	
0451	S	4.67	3.16	
0452	S	4.90	3.18	
0453	S	4.83	3.23	
0454	S	4.87	3.37	
0455	S	4.87	3.48	
0751	S	4.93	3.89	
0851	S	5.05	3.61	
0852	S	5.23	4.01	
0853	S	5.16	4.21	
0854	S	4.99	3.73	
0855	S	5.00	3.57	
0856	S	5.02	3.59	
0951	S	5.58	3.85	
0952	S	5.28	3.79	
0953	S	5.31	4.31	
0954	S	5.26	4.21	
0955	S	5.26	4.02	
0956	S	4.97	4.34	
1051	S	5.68	3.82	
1052	S	5.72	4.23	
1053	S	5.64	4.24	
1151	S	5.97	4.35	
1152	S	6.05	5.32	
1153	S	5.97	4.80	
1251	S	6.15	4.53	
1252	S	6.19	5.62	
1253	S	6.07	5.15	
1254	S	6.09	5.28	
1451	S	4.86	3.54	
1452	S	4.84	3.40	
1453	S	4.91	3.92	
1454	S	4.84	3.78	
1455	S	4.88	3.79	
1456	S	4.91	3.59	
1457	S	4.98	3.52	
1458	S	4.87	4.15	
1459	S	4.85	3.72	
1460	S	4.92	4.04	
1551	S	4.64	3.38	
1551	S	5.15	4.41	
1552	S	4.85	4.04	
1552	S	5.39	4.61	
1553	S	4.85	3.92	
1651	S	0.00	3.94	
1651	S	5.50	4.69	
1652	S	4.58	3.39	
1751	S	5.23	3.42	
1851	S	4.98	3.60	
1852	S	5.15	3.85	
1853	S	5.13	3.69	
1854	S	5.22	4.04	
1951	S	5.31	3.71	
1952	S	5.42	3.77	
1953	S	5.24	3.65	
1954	S	5.34	3.56	
1955	S	5.36	0.00	
1956	S	5.33	4.17	
2051	S	5.71	3.91	
2052	S	5.68	4.85	
2054	S	5.78	4.80	
2151	S	5.87	4.93	
2153	S	5.87	4.09	
2154	S	5.95	4.25	
2155	S	5.90	4.26	
2251	S	6.21	5.01	
2252	S	6.22	4.92	
2253	S	6.17	5.27	
2254	S	6.07	4.95	
2255	S	6.02	4.77	
2451	S	4.86	3.96	
2452	S	4.84	3.89	
2453	S	4.91	4.11	
2551	S	4.77	4.21	
2551	S	5.39	4.30	
2552	S	4.74	3.81	
2553	S	5.03	4.25	
2554	S	4.94	3.98	
2555	S	4.86	3.79	
2556	S	4.82	4.16	
2557	S	4.99	4.23	
2558	S	4.90	4.17	
2559	S	4.88	3.76	
2651	S	5.11	3.31	
2652	S	4.83	3.43	
2653	S	4.79	3.61	
2654	S	4.68	3.76	
2655	S	4.66	3.95	
2656	S	4.73	3.41	
2657	S	4.82	3.45	
2658	S	4.94	3.48	
2659	S	0.00	0.00	
2660	S	0.00	0.00	
2661	S	0.00	0.00	
2662	S	0.00	0.00	
2664	S	0.00	0.00	
2751	S	5.38	3.33	
2751	S	5.60	4.37	
2752	S	5.36	3.74	
2752	S	5.86	4.44	
2851	S	5.32	3.34	
2852	S	5.29	0.00	
2853	S	5.35	0.00	
2854	S	5.37	3.56	
2855	S	5.24	3.92	
2951	S	5.61	4.61	
2952	S	5.66	0.00	
2953	S	5.53	0.00	
5451	S	2.94	1.54	
5452	S	2.66	1.48	
5552	S	2.80	1.41	
5553	S	2.91	1.66	
5554	S	2.96	1.70	
6451	S	0.00	3.39	
6454	S	3.89	3.14	
6551	S	2.96	1.70	
6552	S	2.85	1.74	
6553	S	2.99	1.80	
6554	S	3.40	2.18	
6555	S	3.50	2.34	
6556	S	3.66	2.36	
7551	S	3.69	2.44	
7552	S	3.55	2.66	
8451	S	4.60	2.79	
9750	S	0.00	0.00	

Appendix C Flood Risk Assessment Extracts

Stuart Burnett
Bright Plan Civils,
2 West Barn,
Norton Lane,
Chichester,
PO20 3AF

Our ref: SSD191065
Date: 12/11/2020

Dear Stuart,

Enquiry Regarding Product 4 for Flood Risk Assessment for Summer Lane, Pagham, PO21 4NJ

Thank you for your enquiry which was received on 28 October 2020.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004. The information is attached.

The information on Flood Zones in the area relating to this address is as follows:

The site is in an area located within Flood Zone 1 and 2 as shown on our Flood Map for Planning (Rivers and Sea).

Note - This information relates to the area that the above named property is in and is not specific to the property itself as it is influenced by factors such as the height of door steps, air bricks or the height of surrounding walls. We do not have access to this information and is not currently used in our flood modelling.

Flood Zone definitions can be found at www.gov.uk/guidance/flood-risk-and-coastal-change#Table-1-Flood-Zones

Flood Defences

There are flood defences in the form of a beach and an embankment. The assets are maintained by Environment Agency.

Model Information

The model used was the River Arun to East Head Coastal Modelling (2D) which was completed by JBA Consulting in 2016.

Flood History

We hold no record of previous flooding events affecting this site.

Please note our records are not comprehensive and may not include all events. I recommend contacting the Lead Local Flood Authority, **West Sussex County Council** or the Local Authority, **Arun District Council** for a more comprehensive flood history check.

FRA advisory text

Name	Product 4
Description	Detailed Flood Risk Assessment Map for Summer Lane, Pagham, PO21 4NJ
Licence	<u>Open Government Licence</u>
Information Warning - OS background mapping	<i>The mapping of features provided as a background in this product is © Ordnance Survey. It is provided to give context to this product. The Open Government Licence does not apply to this background mapping. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial purposes for the period during which the Environment Agency makes it available. You are not permitted to copy, sub-license, distribute, sell or otherwise make available the Licensed Data to third parties in any form. Third party rights to enforce the terms of this licence shall be reserved to OS.</i>
Attribution	Contains Environment Agency information © Environment Agency and/or database rights. Contains Ordnance Survey data © Crown copyright 2019 Ordnance Survey 100024198.

Data Available Online

Many of our flood datasets are available online:

- [Flood Map For Planning \(Flood Zone 2, Flood Zone 3 ,Flood Storage Areas, Flood Defences, Areas Benefiting from Defences\)](#)
- [Risk of Flooding from Rivers and Sea](#)
- [Historic Flood Map](#)
- [Current Flood Warnings](#)

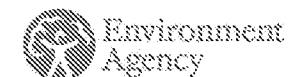
Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Yours sincerely,

Oli Haydon

FCRM Officer, Partnership & Strategic Overview | Solent and South Downs Environment Agency | Guildbourne House, Chatsworth Road, Worthing, West Sussex, BN11 1LD

SSD191065 - Flood Map for Planning (Rivers and Sea)



1: 10,000

0 Metres 250



Flood Map for Planning (Rivers & Sea)

- Defences
- Flood Storage Areas
- Areas benefiting from flood defences
- Flood Zone 3
- Flood Zone 2

Flood Map Areas (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Product 4 Flood Risk Data Requested by: Bright Plan Civils

Site: Summer Lane, Pagham

Table 1: Water Levels: Tidal Undefended

Node Ref	NGR		Modelled Flood Levels in Metres AOD			
	Eastings	Northings	Undefended Annual Exceedance Probability			
			0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	488570.2	97797.1	-	4.11	4.73	-
2	488686.4	97770.9	-	-	4.74	-

Table 2: Water Levels: Tidal Defended

Node Ref	NGR		Modelled Flood Levels in Metres AOD			
	Eastings	Northings	Defended Annual Exceedance Probability			
			0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	488570.2	97797.1	-	0.34	0.96	-
2	488686.4	97770.9	-	-	0.49	-

Table 3: Water Depths: Tidal Undefended

Node Ref	NGR		Modelled Flood Depths in Metres			
	Eastings	Northings	Undefended Annual Exceedance Probability			
			0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	488570.2	97797.1	-	-	4.25	-
2	488686.4	97770.9	-	-	4.25	-

Table 4: Water Depths: Tidal Defended

Node Ref	NGR		Modelled Flood Depths in Metres			
	Eastings	Northings	Defended Annual Exceedance Probability			
			0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	488570.2	97797.1	-	-	0.48	-
2	488686.4	97770.9	-	-	0.03	-

All levels taken from: River Arun to East Head Coastal Modelling (2D) (2016)

Office Address: Guildbourne House, Chatsworth Road, Worthing BN11 1LD.

Produced on: 12/11/2020

The flood risk data provided is based on existing EA hydraulic models for existing 0.5% annual probability events with an allowance for climate change. Please note the climate change allowances provided are not up to date. These were updated on 17 December 2019. You should refer to 'Flood risk assessments: climate change allowances' for the most up to date allowances. You will need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.

There is no additional information or health warnings for these levels/depths or the model from which they have been produced.





Environment
Agency

N



Legend

- Site Boundary
- 20% AEP (Defended Tidal)
- 5% AEP (Defended Tidal)
- 3.3% AEP (Defended Tidal)
- 1.3% AEP (Defended Tidal)
- 1% AEP (Defended Tidal)
- 0.5% AEP (Defended Tidal)
- 0.5% AEP (2070) NPPF (Defended Tidal)
- 0.5% AEP (2115) NPPF (Defended Tidal)
- 0.2% AEP (Defended Tidal)
- 0.1% AEP (Defended Tidal)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

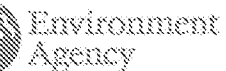
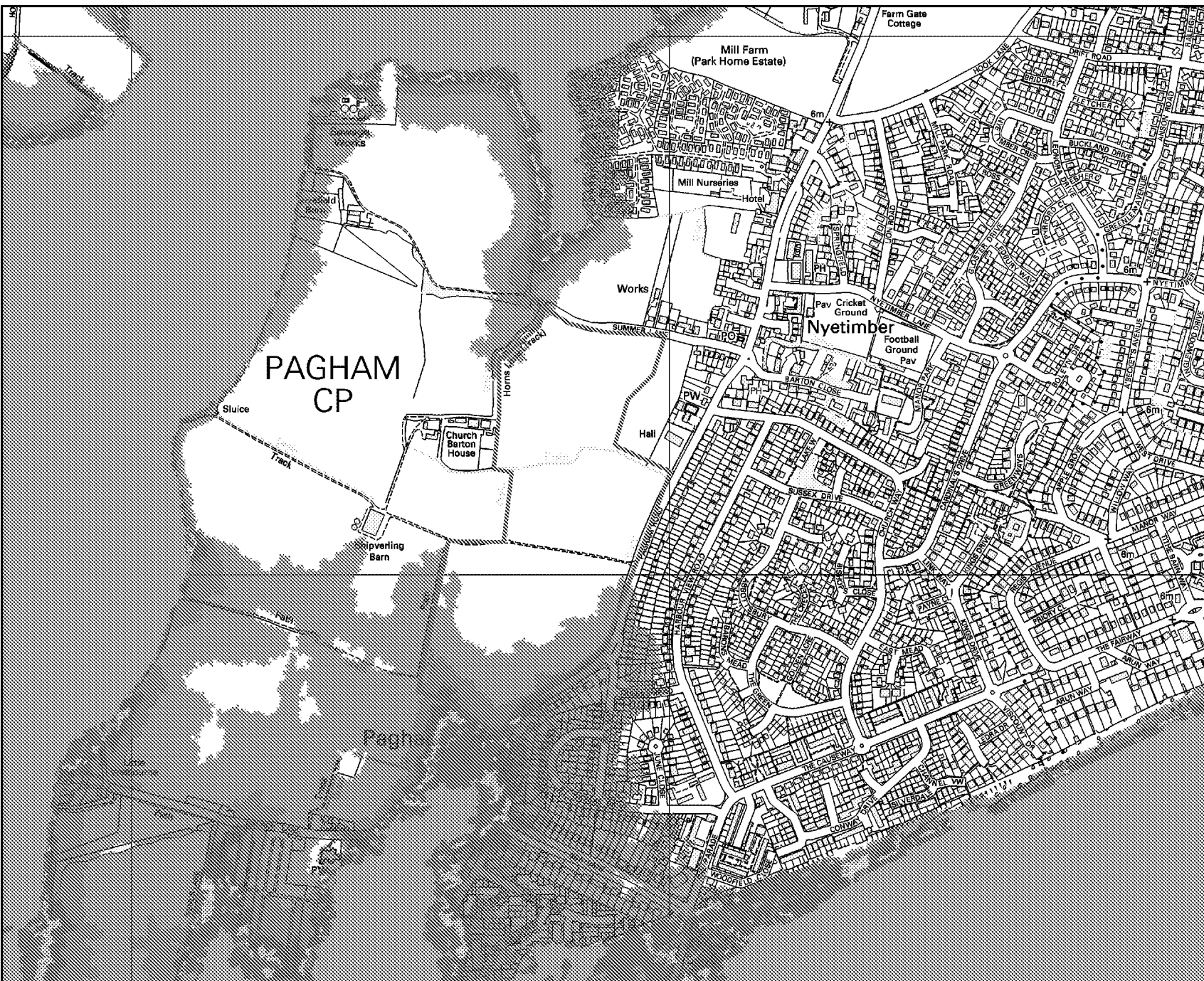
Scale: 1:10,000

0

0.225

0.45

Kilometers

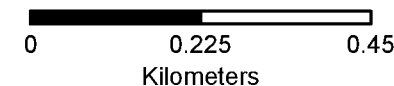


Legend

-
- Legend:
- Site Boundary
 - 20% AEP (Undefended Tidal)
 - 5% AEP (Undefended Tidal)
 - 3.3% AEP (Undefended Tidal)
 - 1.3% AEP (Undefended Tidal)
 - 1% AEP (Undefended Tidal)
 - 0.5% AEP (Undefended Tidal)
 - 0.5% AEP (2070) NPPF (Undefended Tidal)
 - 0.5% AEP (2115) NPPF (Undefended Tidal)
 - 0.2% AEP (Undefended Tidal)
 - 0.1% AEP (Undefended Tidal)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000



SSD191065 - Risk of Flooding from Surface Water



Environmental
Agency

1: 10,000

0 Metres 250



Likelihood of flooding from Surface Water

-  High ($\geq 3.3\%$)
 Medium ($3.3\% - 1\%$)
 Low ($1\% - 0.1\%$)
 Very Low
 Flood Extent 1 in 30
 Flood Extent 1 in 100
 Flood Extent 1 in 1000

Likelihood of flooding from Surface Water

- | | |
|-----------|---|
| High: | Greater than or equal to 3.3% (1 in 30) chance in any given year |
| Medium: | Less than 3.3% (1 in 30) but greater than or equal to 1% (1 in 100) chance in any given year |
| Low: | Less than 1% (1 in 100) but greater than or equal to 0.1% (1 in 1,000) chance in any given year |
| Very Low: | Less than 0.1% (1 in 1,000) chance in any given year |

This information is shown on the Risk of Flooding from Surface Water map on GOV.UK.

© Crown Copyright and database rights 2020 Ordnance Survey 100024198

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). E-mail: enquires@environment-agency.gov.uk

Appendix D Approved Planning Extracts

Appendix E Surface Water Hydraulic Modelling Results



Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	10	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.500
Ratio-R	0.400	Preferred Cover Depth (m)	0.900
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
1	0.063	5.00	5.925	1200	1.575
2	0.046	5.00	5.600	1200	1.400
3	0.046	5.00	5.400	1200	1.350
3_OUT			5.150	1200	1.350
4	0.016	5.00	5.150	1200	1.350
5	0.089	5.00	5.075	1200	1.350
6	0.089	5.00	4.900	1200	1.350
6_OUT			4.800	1200	1.300

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	28.989	193.3	300	5.925	4.350	1.275	5.600	4.200	1.100
1.001	23.884	157.9	300	5.600	4.200	1.100	5.400	4.050	1.050
1.002	23.878	95.5	300	5.400	4.050	1.050	5.150	3.800	1.050
2.000	9.644	128.6	300	5.150	3.800	1.050	5.075	3.725	1.050
2.001	30.778	246.2	300	5.075	3.725	1.050	4.900	3.600	1.000
2.002	14.884	297.7	300	4.900	3.550	1.050	4.800	3.500	1.000

Link	US Node	DS Node
1.000	1	2
1.001	2	3
1.002	3	3_OUT
2.000	4	5
2.001	5	6
2.002	6	6_OUT

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
1	5.925	1.575	1200		0	1.000	4.350	300
2	5.600	1.400	1200		1	1.000	4.200	300
					0	1.001	4.200	300



Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
3	5.400	1.350	1200		1	1.001	4.050
3_OUT	5.150	1.350	1200		1	1.002	3.800
4	5.150	1.350	1200		0	2.000	3.800
5	5.075	1.350	1200		1	2.000	3.725
6	4.900	1.350	1200		1	2.001	3.600
6_OUT	4.800	1.300	1200		1	2.002	3.500

Node 6 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	3.550	Product Number	CTL-SHE-0100-5000-1350-5000
Design Depth (m)	1.350	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node 3 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.050	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.300		

Node 4 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	10.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	3.800	Main Channel Slope (1:X)	1000.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.025

Inlets

3_OUT

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	75.0	0.0	1.000	195.4	0.0	1.350	250.9	0.0



Rainfall

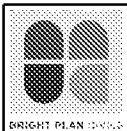
Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute winter	64.927	26.180	100 year 15 minute winter	204.748	82.560
1 year 30 minute winter	42.121	16.984	100 year 30 minute winter	134.724	54.324
1 year 60 minute winter	26.839	10.676	100 year 60 minute winter	85.873	34.158
1 year 120 minute winter	16.596	6.602	100 year 120 minute winter	52.377	20.834
1 year 180 minute winter	12.527	4.959	100 year 180 minute winter	38.980	15.431
1 year 240 minute winter	10.165	4.043	100 year 240 minute winter	31.209	12.414
1 year 360 minute winter	7.654	3.030	100 year 360 minute winter	22.923	9.075
1 year 480 minute winter	6.207	2.469	100 year 480 minute winter	18.171	7.228
1 year 600 minute winter	5.249	2.101	100 year 600 minute winter	15.126	6.055
1 year 720 minute winter	4.609	1.838	100 year 720 minute winter	13.147	5.243
1 year 960 minute winter	3.745	1.489	100 year 960 minute winter	10.500	4.174
1 year 1440 minute winter	2.773	1.106	100 year 1440 minute winter	7.579	3.023
1 year 2160 minute winter	2.050	0.822	100 year 2160 minute winter	5.448	2.185
1 year 2880 minute winter	1.671	0.666	100 year 2880 minute winter	4.349	1.734
1 year 4320 minute winter	1.250	0.496	100 year 4320 minute winter	3.150	1.251
1 year 5760 minute winter	1.016	0.402	100 year 5760 minute winter	2.505	0.991
1 year 7200 minute winter	0.864	0.341	100 year 7200 minute winter	2.091	0.827
1 year 8640 minute winter	0.756	0.299	100 year 8640 minute winter	1.803	0.713
1 year 10080 minute winter	0.676	0.267	100 year 10080 minute winter	1.590	0.628
30 year 15 minute winter	158.733	64.005	100 year +40% CC 15 minute winter	286.647	115.584
30 year 30 minute winter	103.475	41.724	100 year +40% CC 30 minute winter	188.614	76.054
30 year 60 minute winter	65.517	26.061	100 year +40% CC 60 minute winter	120.222	47.821
30 year 120 minute winter	39.827	15.842	100 year +40% CC 120 minute winter	73.327	29.168
30 year 180 minute winter	29.640	11.734	100 year +40% CC 180 minute winter	54.572	21.604
30 year 240 minute winter	23.758	9.450	100 year +40% CC 240 minute winter	43.693	17.380
30 year 360 minute winter	17.511	6.932	100 year +40% CC 360 minute winter	32.092	12.705
30 year 480 minute winter	13.940	5.545	100 year +40% CC 480 minute winter	25.439	10.119
30 year 600 minute winter	11.642	4.661	100 year +40% CC 600 minute winter	21.176	8.477
30 year 720 minute winter	10.143	4.045	100 year +40% CC 720 minute winter	18.406	7.340
30 year 960 minute winter	8.133	3.233	100 year +40% CC 960 minute winter	14.700	5.844
30 year 1440 minute winter	5.906	2.355	100 year +40% CC 1440 minute winter	10.611	4.232
30 year 2160 minute winter	4.273	1.714	100 year +40% CC 2160 minute winter	7.628	3.059
30 year 2880 minute winter	3.428	1.367	100 year +40% CC 2880 minute winter	6.089	2.428
30 year 4320 minute winter	2.501	0.993	100 year +40% CC 4320 minute winter	4.410	1.751
30 year 5760 minute winter	2.000	0.791	100 year +40% CC 5760 minute winter	3.507	1.387
30 year 7200 minute winter	1.677	0.663	100 year +40% CC 7200 minute winter	2.928	1.157
30 year 8640 minute winter	1.451	0.574	100 year +40% CC 8640 minute winter	2.524	0.998
30 year 10080 minute winter	1.284	0.507	100 year +40% CC 10080 minute winter	2.226	0.880



Results for 1 year Critical Storm Duration. Lowest mass balance: 98.71%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	4.416	0.066	8.9	0.1282	0.0000	OK
15 minute winter	2	11	4.283	0.083	15.2	0.1475	0.0000	OK
15 minute winter	3	11	4.205	0.155	21.2	0.2803	0.0000	OK
60 minute winter	3_OUT	52	4.004	0.204	11.2	0.2304	0.0000	OK
60 minute winter	4	51	4.004	0.204	10.7	0.2786	0.0000	OK
60 minute winter	5	52	4.004	0.279	8.1	0.6824	0.0000	OK
60 minute winter	6	52	4.003	0.453	11.0	1.1100	0.0000	SURCHARGED
15 minute winter	6_OUT	1	3.500	0.000	5.0	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 winter	1	1.000	2	8.7	0.643	0.109	0.3942	
15 minute winter	2	1.001	3	14.9	0.577	0.169	0.6198	
15 minute winter	3	1.002	3_OUT	21.6	1.577	0.190	0.5420	
60 minute winter	3_OUT	Flow through pond	4	5.3	0.036	0.000	17.3007	
60 minute winter	4	2.000	5	-6.0	0.412	-0.061	0.5745	
60 minute winter	5	2.001	6	6.4	0.415	0.091	2.1336	
60 minute winter	6	Hydro-Brake®	6_OUT	5.0				37.1



Results for 30 year Critical Storm Duration. Lowest mass balance: 98.71%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	4.457	0.107	21.8	0.2071	0.0000	OK
120 minute winter	2	114	4.415	0.215	11.9	0.3849	0.0000	OK
120 minute winter	3	120	4.426	0.376	16.9	0.6806	0.0000	SURCHARGED
120 minute winter	3_OUT	118	4.409	0.609	16.7	0.6889	0.0000	OK
120 minute winter	4	120	4.405	0.605	15.8	0.8276	0.0000	SURCHARGED
120 minute winter	5	116	4.407	0.682	14.1	1.6695	0.0000	SURCHARGED
120 minute winter	6	116	4.406	0.856	9.8	2.0960	0.0000	SURCHARGED
15 minute winter	6_OUT	1	3.500	0.000	5.0	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 winter	1	1.000	2	21.7	0.800	0.272	0.7906	
120 minute winter	2	1.001	3	11.9	0.557	0.135	1.4747	
120 minute winter	3	1.002	3_OUT	16.7	0.911	0.147	1.6815	
120 minute winter	3_OUT	Flow through pond	4	3.6	0.035	0.000	66.9287	
120 minute winter	4	2.000	5	-13.5	0.434	-0.138	0.6791	
120 minute winter	5	2.001	6	4.9	0.391	0.069	2.1674	
120 minute winter	6	Hydro-Brake®	6_OUT	5.0				95.9



Results for 100 year Critical Storm Duration. Lowest mass balance: 98.71%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	1	164	4.613	0.263	6.7	0.5072	0.0000	OK
180 minute winter	2	180	4.614	0.414	11.6	0.7400	0.0000	SURCHARGED
180 minute winter	3	180	4.625	0.575	16.4	1.0414	0.0000	SURCHARGED
180 minute winter	3_OUT	176	4.601	0.801	14.8	0.9058	0.0000	OK
180 minute winter	4	176	4.597	0.797	15.2	1.0909	0.0000	SURCHARGED
180 minute winter	5	176	4.599	0.874	14.0	2.1399	0.0000	SURCHARGED
180 minute winter	6	176	4.598	1.048	9.5	2.5666	0.0000	SURCHARGED
15 minute winter	6_OUT	1	3.500	0.000	5.0	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)
180 minute winter	1	1.000	2	6.7	0.591	0.084	1.9689	
180 minute winter	2	1.001	3	11.5	0.540	0.131	1.6678	
180 minute winter	3	1.002	3_OUT	14.5	0.858	0.127	1.6815	
180 minute winter	3_OUT	Flow through pond	4	-13.7	0.030	-0.001	97.5836	
180 minute winter	4	2.000	5	-13.5	0.440	-0.138	0.6791	
180 minute winter	5	2.001	6	4.6	0.392	0.065	2.1674	
180 minute winter	6	Hydro-Brake®	6_OUT	5.0				106.8



Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.71%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	1	208	4.917	0.567	7.6	1.0956	0.0000	SURCHARGED
240 minute winter	2	228	4.914	0.714	12.6	1.2768	0.0000	SURCHARGED
240 minute winter	3	244	4.919	0.869	16.6	1.5754	0.0000	SURCHARGED
240 minute winter	3_OUT	232	4.906	1.106	23.1	1.2511	0.0000	OK
240 minute winter	4	224	4.899	1.099	18.3	1.5028	0.0000	FLOOD RISK
240 minute winter	5	228	4.902	1.177	16.9	2.8816	0.0000	FLOOD RISK
240 minute winter	6	224	4.900	1.350	10.8	3.3062	0.9753	FLOOD
15 minute winter	6_OUT	1	3.500	0.000	5.0	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)
240 minute winter	1	1.000	2	7.3	0.587	0.091	2.0414	
240 minute winter	2	1.001	3	11.1	0.523	0.126	1.6678	
240 minute winter	3	1.002	3_OUT	16.0	0.859	0.141	1.6815	
240 minute winter	3_OUT	Flow through pond	4	-23.1	0.030	-0.002	154.9519	
240 minute winter	4	2.000	5	-16.4	0.443	-0.167	0.6791	
240 minute winter	5	2.001	6	-6.1	0.400	-0.087	2.1674	
240 minute winter	6	Hydro-Brake®	6_OUT	5.0				132.6



Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	10	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.500
Ratio-R	0.400	Preferred Cover Depth (m)	0.900
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
1	0.085	5.00	6.950	1200	1.550
2	0.058	5.00	6.600	1200	1.450
3	0.141	5.00	6.375	1200	1.425
4	0.107	5.00	6.375	1350	1.500
5			6.250	1350	1.475
7	0.033	5.00	6.050	1350	1.350
8	0.133	5.00	6.200	1350	1.700
9	0.007	5.00	6.175	1350	1.725
10	0.112	5.00	6.100	1350	1.200
11	0.029	5.00	6.550	1350	1.275
12	0.112	5.00	6.325	1200	0.560
13			6.325	1350	1.625
14	0.018	5.00	6.150	1350	1.525
15	0.006	5.00	6.050	1350	1.475
16	0.054	5.00	5.800	1200	0.560
17	0.040	5.00	5.800	1200	0.560
18	0.072	5.00	5.800	1350	1.550
18_OUT	0.060		5.600	1350	1.405
19		5.00	5.600	1350	1.425
20			5.600	1350	1.475
20_OUT	0.030		5.600	1350	1.525
21		5.00	5.600	1500	1.475
21_OUT			5.300	1200	1.225

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	42.133	168.5	300	6.950	5.400	1.250	6.600	5.150	1.150
1.001	26.173	130.9	300	6.600	5.150	1.150	6.375	4.950	1.125
1.002	41.302	165.2	300	6.375	5.000	1.075	6.050	4.750	1.000
2.000	30.559	305.6	375	6.375	4.875	1.125	6.250	4.775	1.100
2.001	17.853	238.0	375	6.250	4.775	1.100	6.050	4.700	0.975

Link	US Node	DS Node
1.000	1	2
1.001	2	3
1.002	3	7
2.000	4	5
2.001	5	7



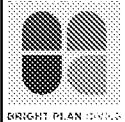
Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.003	53.637	268.2	450	6.050	4.700	0.900	6.200	4.500	1.250
1.004	11.811	236.2	450	6.200	4.500	1.250	6.175	4.450	1.275
1.005	47.970	383.8	450	6.175	4.450	1.275	5.800	4.325	1.025
3.000	39.146	195.7	375	6.100	4.900	0.825	6.325	4.700	1.250
4.000	29.632	206.3	375	6.550	5.275	0.900	6.325	5.175	0.775
5.000	5.730	57.3	150	6.325	5.765	0.410	6.325	5.665	0.510
3.001	22.694	302.6	375	6.325	4.700	1.250	6.150	4.625	1.150
3.002	10.155	203.1	375	6.150	4.625	1.150	6.050	4.575	1.100
3.003	41.420	207.1	375	6.050	4.575	1.100	5.800	4.375	1.050
6.000	6.024	60.2	150	5.800	5.240	0.410	5.800	5.140	0.510
7.000	4.357	43.6	150	5.800	5.240	0.410	5.800	5.140	0.510
1.006	10.597	423.9	450	5.800	4.250	1.100	5.600	4.225	0.925
8.000	16.084	321.7	450	5.600	4.175	0.975	5.600	4.125	1.025
8.001	14.553	291.1	450	5.600	4.125	1.025	5.600	4.075	1.075
9.000	5.414	108.3	225	5.600	4.125	1.250	5.300	4.075	1.000

Link	US Node	DS Node
1.003	7	8
1.004	8	9
1.005	9	18
3.000	10	13
4.000	11	13
5.000	12	13
3.001	13	14
3.002	14	15
3.003	15	18
6.000	16	18
7.000	17	18
1.006	18	18_OUT
8.000	19	20
8.001	20	20_OUT
9.000	21	21_OUT

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	6.950	1.550	1200				
					0	1.000	5.400
2	6.600	1.450	1200		1	1.000	5.150
					0	1.001	5.150
3	6.375	1.425	1200		1	1.001	4.950
					0	1.002	5.000

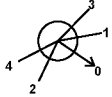


Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
4	6.375	1.500	1350		0	2.000	4.875 375
5	6.250	1.475	1350		1	2.000	4.775 375
6	6.050	1.350	1350		0	2.001	4.775 375
7	6.050	1.350	1350		1	2.001	4.700 375
					2	1.002	4.750 300
8	6.200	1.700	1350		0	1.003	4.700 450
					1	1.003	4.500 450
9	6.175	1.725	1350		0	1.004	4.500 450
					1	1.004	4.450 450
10	6.100	1.200	1350		0	1.005	4.450 450
11	6.550	1.275	1350		0	3.000	4.900 375
12	6.325	0.560	1200		0	4.000	5.275 375
13	6.325	1.625	1350		1	5.000	5.765 150
					2	4.000	5.175 375
					3	3.000	4.700 375
					0	3.001	4.700 375
14	6.150	1.525	1350		1	3.001	4.625 375
15	6.050	1.475	1350		0	3.002	4.625 375
					1	3.002	4.575 375
16	5.800	0.560	1200		0	3.003	4.575 375
17	5.800	0.560	1200		0	6.000	5.240 150
					0	7.000	5.240 150



Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
18	5.800	1.550	1350		1 7.000 5.140 150 2 6.000 5.140 150 3 3.003 4.375 375 4 1.005 4.325 450 0 1.006 4.250 450		
18_OUT	5.600	1.405	1350		1 1.006 4.225 450		
19	5.600	1.425	1350		0 8.000 4.175 450		
20	5.600	1.475	1350		1 8.000 4.125 450 0 8.001 4.125 450		
20_OUT	5.600	1.525	1350		1 8.001 4.075 450		
21	5.600	1.475	1500		0 9.000 4.125 225 1 9.000 4.075 225		
21_OUT	5.300	1.225	1200				

Node 21 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	4.125	Product Number	CTL-SHE-0099-5000-1475-5000
Design Depth (m)	1.475	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node 12 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.560	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	2.5		
Invert Level (m)	5.765	Diameter (m)	0.040		

Node 18 OUT Online Orifice Control

Flap Valve	x	Invert Level (m)	4.195	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

Node 20 OUT Online Orifice Control

Flap Valve	x	Invert Level (m)	4.075	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		



Node 12 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	5.765	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.450
Safety Factor	1.0	Width (m)	6.000	Inf Depth (m)	0.450
Porosity	0.32	Length (m)	61.300		

Node 16 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	5.250	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	1.0	Width (m)	6.000	Inf Depth (m)	0.450
Porosity	0.32	Length (m)	57.600		

Node 17 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	5.240	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	2	Depth (m)	0.450
Safety Factor	1.0	Width (m)	6.000	Inf Depth (m)	0.450
Porosity	0.32	Length (m)	31.000		

Node 21 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	30.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.125	Main Channel Slope (1:X)	1000.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.025

Inlets

20_OUT

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)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	90.0	0.0	0.500	147.5	0.0	1.000	219.2	0.0	1.500	305.0	0.0

Node 19 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	20.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.175	Main Channel Slope (1:X)	1000.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.025

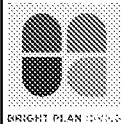
Inlets

18_OUT

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)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	274.0	0.0	0.500	368.9	0.0	1.000	477.9	0.0	1.500	601.1	0.0

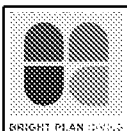
Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute winter	64.927	26.180	1 year 240 minute winter	10.165	4.043
1 year 30 minute winter	42.121	16.984	1 year 360 minute winter	7.654	3.030
1 year 60 minute winter	26.839	10.676	1 year 480 minute winter	6.207	2.469
1 year 120 minute winter	16.596	6.602	1 year 600 minute winter	5.249	2.101
1 year 180 minute winter	12.527	4.959	1 year 720 minute winter	4.609	1.838



Rainfall

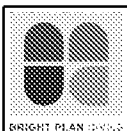
Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 960 minute winter	3.745	1.489	100 year 240 minute winter	31.209	12.414
1 year 1440 minute winter	2.773	1.106	100 year 360 minute winter	22.923	9.075
1 year 2160 minute winter	2.050	0.822	100 year 480 minute winter	18.171	7.228
1 year 2880 minute winter	1.671	0.666	100 year 600 minute winter	15.126	6.055
1 year 4320 minute winter	1.250	0.496	100 year 720 minute winter	13.147	5.243
1 year 5760 minute winter	1.016	0.402	100 year 960 minute winter	10.500	4.174
1 year 7200 minute winter	0.864	0.341	100 year 1440 minute winter	7.579	3.023
1 year 8640 minute winter	0.756	0.299	100 year 2160 minute winter	5.448	2.185
1 year 10080 minute winter	0.676	0.267	100 year 2880 minute winter	4.349	1.734
30 year 15 minute winter	158.733	64.005	100 year 4320 minute winter	3.150	1.251
30 year 30 minute winter	103.475	41.724	100 year 5760 minute winter	2.505	0.991
30 year 60 minute winter	65.517	26.061	100 year 7200 minute winter	2.091	0.827
30 year 120 minute winter	39.827	15.842	100 year 8640 minute winter	1.803	0.713
30 year 180 minute winter	29.640	11.734	100 year 10080 minute winter	1.590	0.628
30 year 240 minute winter	23.758	9.450	100 year +40% CC 15 minute winter	286.647	115.584
30 year 360 minute winter	17.511	6.932	100 year +40% CC 30 minute winter	188.614	76.054
30 year 480 minute winter	13.940	5.545	100 year +40% CC 60 minute winter	120.222	47.821
30 year 600 minute winter	11.642	4.661	100 year +40% CC 120 minute winter	73.327	29.168
30 year 720 minute winter	10.143	4.045	100 year +40% CC 180 minute winter	54.572	21.604
30 year 960 minute winter	8.133	3.233	100 year +40% CC 240 minute winter	43.693	17.380
30 year 1440 minute winter	5.906	2.355	100 year +40% CC 360 minute winter	32.092	12.705
30 year 2160 minute winter	4.273	1.714	100 year +40% CC 480 minute winter	25.439	10.119
30 year 2880 minute winter	3.428	1.367	100 year +40% CC 600 minute winter	21.176	8.477
30 year 4320 minute winter	2.501	0.993	100 year +40% CC 720 minute winter	18.406	7.340
30 year 5760 minute winter	2.000	0.791	100 year +40% CC 960 minute winter	14.700	5.844
30 year 7200 minute winter	1.677	0.663	100 year +40% CC 1440 minute winter	10.611	4.232
30 year 8640 minute winter	1.451	0.574	100 year +40% CC 2160 minute winter	7.628	3.059
30 year 10080 minute winter	1.284	0.507	100 year +40% CC 2880 minute winter	6.089	2.428
100 year 15 minute winter	204.748	82.560	100 year +40% CC 4320 minute winter	4.410	1.751
100 year 30 minute winter	134.724	54.324	100 year +40% CC 5760 minute winter	3.507	1.387
100 year 60 minute winter	85.873	34.158	100 year +40% CC 7200 minute winter	2.928	1.157
100 year 120 minute winter	52.377	20.834	100 year +40% CC 8640 minute winter	2.524	0.998
100 year 180 minute winter	38.980	15.431	100 year +40% CC 10080 minute winter	2.226	0.880



Results for 1 year Critical Storm Duration. Lowest mass balance: 98.87%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	5.475	0.075	12.1	0.1670	0.0000	OK
15 minute winter	2	11	5.241	0.091	20.0	0.1748	0.0000	OK
15 minute winter	3	11	5.145	0.195	39.1	0.6064	0.0000	OK
15 minute winter	4	10	4.969	0.094	15.2	0.2674	0.0000	OK
15 minute winter	5	11	4.868	0.093	14.8	0.1337	0.0000	OK
15 minute winter	7	11	4.862	0.162	57.3	0.3112	0.0000	OK
15 minute winter	8	12	4.716	0.216	74.2	0.6459	0.0000	OK
15 minute winter	9	12	4.669	0.219	73.0	0.3308	0.0000	OK
15 minute winter	10	10	4.982	0.082	15.9	0.2715	0.0000	OK
15 minute winter	11	11	5.323	0.048	4.1	0.0908	0.0000	OK
180 minute winter	12	136	5.878	0.113	3.8	10.2499	0.0000	OK
15 minute winter	13	11	4.810	0.110	20.0	0.1576	0.0000	OK
15 minute winter	14	11	4.733	0.108	22.4	0.1803	0.0000	OK
15 minute winter	15	12	4.676	0.101	23.0	0.1532	0.0000	OK
15 minute winter	16	13	5.288	0.048	7.7	1.5055	0.0000	OK
15 minute winter	17	13	5.276	0.036	5.7	1.3276	0.0000	OK
15 minute winter	18	13	4.559	0.309	111.4	0.7301	0.0000	OK
15 minute winter	18_OUT	13	4.512	0.317	113.1	0.7255	0.0000	OK
240 minute winter	19	232	4.449	0.274	19.0	0.3924	0.0000	OK
360 minute winter	20	280	4.450	0.325	11.9	0.4652	0.0000	OK
240 minute winter	20_OUT	228	4.453	0.378	11.9	0.6902	0.0000	OK
360 minute winter	21	304	4.449	0.324	15.2	0.5722	0.0000	SURCHARGED
15 minute winter	21_OUT	1	4.075	0.000	4.5	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 winter	1	1.000	2	11.8	0.753	0.138	0.6605	
15 minute winter	2	1.001	3	19.6	0.594	0.202	0.8684	
15 minute winter	3	1.002	7	38.6	1.176	0.447	1.3542	
15 minute winter	4	2.000	5	14.8	0.740	0.130	0.6472	
15 minute winter	5	2.001	7	14.3	0.456	0.111	0.5977	
15 minute winter	7	1.003	8	56.4	0.901	0.287	3.3782	
15 minute winter	8	1.004	9	72.2	0.974	0.345	0.8939	
15 minute winter	9	1.005	18	73.4	0.944	0.448	3.8076	
15 minute winter	10	3.000	13	15.5	0.714	0.109	0.8740	
15 minute winter	11	4.000	13	3.9	0.515	0.034	0.2270	
180 minute winter	12	Orifice	13	1.0				
15 minute winter	13	3.001	14	20.0	0.751	0.175	0.6039	
15 minute winter	14	3.002	15	22.2	0.887	0.159	0.2542	
15 minute winter	15	3.003	18	22.8	0.772	0.164	1.5941	
15 minute winter	16	6.000	18	4.4	0.961	0.193	0.0277	
15 minute winter	17	7.000	18	3.0	0.964	0.111	0.0136	
15 minute winter	18	1.006	18_OUT	107.1	0.966	0.686	1.1821	
15 minute winter	18_OUT	Flow through pond	19	66.7	0.133	0.003	41.2012	
240 minute winter	19	8.000	20	12.1	0.407	0.067	1.7966	
360 minute winter	20	8.001	20_OUT	10.7	0.163	0.057	1.9200	
240 minute winter	20_OUT	Flow through pond	21	12.2	0.064	0.002	33.3065	
360 minute winter	21	Hydro-Brake®	21_OUT	4.9				139.2



Results for 30 year Critical Storm Duration. Lowest mass balance: 98.87%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	5.522	0.122	29.5	0.2710	0.0000	OK
15 minute winter	2	11	5.323	0.173	49.2	0.3336	0.0000	OK
15 minute winter	3	12	5.290	0.340	94.2	1.0580	0.0000	OK
15 minute winter	4	13	5.074	0.199	37.1	0.5681	0.0000	OK
15 minute winter	5	13	5.069	0.294	36.3	0.4202	0.0000	OK
15 minute winter	7	13	5.067	0.367	133.1	0.7038	0.0000	OK
15 minute winter	8	11	5.004	0.504	169.2	1.5087	0.0000	SURCHARGED
15 minute winter	9	12	4.960	0.510	152.7	0.7720	0.0000	SURCHARGED
15 minute winter	10	10	5.031	0.131	38.8	0.4318	0.0000	OK
15 minute winter	11	11	5.350	0.075	10.1	0.1409	0.0000	OK
180 minute winter	12	156	6.025	0.260	9.1	28.2411	0.0000	SURCHARGED
15 minute winter	13	12	4.892	0.192	48.9	0.2744	0.0000	OK
15 minute winter	14	12	4.882	0.257	54.2	0.4283	0.0000	OK
15 minute winter	15	12	4.871	0.296	52.1	0.4476	0.0000	OK
15 minute winter	16	13	5.314	0.074	18.7	4.1478	0.0000	OK
15 minute winter	17	13	5.304	0.064	13.9	3.0509	0.0000	OK
480 minute winter	18	496	4.848	0.598	35.0	1.4124	0.0000	SURCHARGED
480 minute winter	18_OUT	496	4.862	0.667	36.0	1.5239	0.0000	OK
480 minute winter	19	472	4.843	0.668	24.9	0.9561	0.0000	SURCHARGED
480 minute winter	20	456	4.842	0.717	13.4	1.0266	0.0000	SURCHARGED
480 minute winter	20_OUT	456	4.857	0.782	29.0	1.4269	0.0000	OK
480 minute winter	21	472	4.842	0.717	17.2	1.2667	0.0000	SURCHARGED
15 minute winter	21_OUT	1	4.075	0.000	4.9	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 winter	1	1.000	2	29.1	0.941	0.341	1.4232	
15 minute winter	2	1.001	3	45.3	0.789	0.467	1.4712	
15 minute winter	3	1.002	7	90.6	1.384	1.050	2.8947	
15 minute winter	4	2.000	5	36.3	0.811	0.319	2.3206	
15 minute winter	5	2.001	7	33.9	0.501	0.263	1.8050	
15 minute winter	7	1.003	8	123.2	1.004	0.626	7.9578	
15 minute winter	8	1.004	9	150.3	1.103	0.717	1.8714	
15 minute winter	9	1.005	18	149.3	0.968	0.910	7.6005	
15 minute winter	10	3.000	13	38.4	0.892	0.269	1.7018	
15 minute winter	11	4.000	13	9.8	0.660	0.085	0.4394	
180 minute winter	12	Orifice	13	1.6				
15 minute winter	13	3.001	14	48.3	0.916	0.422	1.5560	
15 minute winter	14	3.002	15	50.0	1.066	0.357	0.8822	
15 minute winter	15	3.003	18	48.7	0.754	0.351	4.2161	
15 minute winter	16	6.000	18	9.5	1.162	0.414	0.0492	
15 minute winter	17	7.000	18	8.3	1.245	0.306	0.0289	
480 minute winter	18	1.006	18_OUT	33.7	0.648	0.216	1.6790	
480 minute winter	18_OUT	Flow through pond	19	24.9	0.037	0.001	221.9916	
480 minute winter	19	8.000	20	13.4	0.423	0.075	2.5484	
480 minute winter	20	8.001	20_OUT	14.0	0.212	0.074	2.3058	
480 minute winter	20_OUT	Flow through pond	21	17.2	0.061	0.002	92.1033	
480 minute winter	21	Hydro-Brake®	21_OUT	4.9				178.9



Results for 100 year Critical Storm Duration. Lowest mass balance: 98.87%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	12	5.823	0.423	38.0	0.9419	0.0000	SURCHARGED
15 minute winter	2	12	5.793	0.643	63.3	1.2421	0.0000	SURCHARGED
15 minute winter	3	12	5.734	0.784	103.4	2.4385	0.0000	SURCHARGED
15 minute winter	4	12	5.431	0.556	47.9	1.5886	0.0000	SURCHARGED
15 minute winter	5	12	5.409	0.634	46.5	0.9072	0.0000	SURCHARGED
15 minute winter	7	12	5.402	0.702	139.2	1.3473	0.0000	SURCHARGED
15 minute winter	8	12	5.302	0.802	183.2	2.4022	0.0000	SURCHARGED
15 minute winter	9	12	5.236	0.786	180.0	1.1885	0.0000	SURCHARGED
15 minute winter	10	13	5.109	0.209	50.1	0.6897	0.0000	OK
15 minute winter	11	10	5.360	0.085	13.0	0.1603	0.0000	OK
180 minute winter	12	172	6.110	0.345	12.0	38.6079	0.0000	FLOOD RISK
15 minute winter	13	13	5.109	0.409	63.1	0.5859	0.0000	SURCHARGED
15 minute winter	14	13	5.096	0.471	67.8	0.7854	0.0000	SURCHARGED
15 minute winter	15	12	5.084	0.509	56.9	0.7707	0.0000	SURCHARGED
15 minute winter	16	13	5.326	0.086	24.1	5.5008	0.0000	OK
15 minute winter	17	13	5.316	0.076	17.9	3.8242	0.0000	OK
15 minute winter	18	12	5.057	0.807	275.0	1.9052	0.0000	SURCHARGED
720 minute winter	18_OUT	720	5.052	0.857	32.4	1.9582	0.0000	OK
720 minute winter	19	720	5.052	0.877	22.2	1.2553	0.0000	SURCHARGED
720 minute winter	20	720	5.053	0.928	13.1	1.3287	0.0000	SURCHARGED
600 minute winter	20_OUT	600	5.055	0.980	22.6	1.7886	0.0000	OK
720 minute winter	21	705	5.051	0.926	14.6	1.6371	0.0000	SURCHARGED
15 minute winter	21_OUT	1	4.075	0.000	4.9	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 winter	1	1.000	2	37.4	0.946	0.438	2.9670	
15 minute winter	2	1.001	3	51.0	0.799	0.525	1.8431	
15 minute winter	3	1.002	7	92.5	1.364	1.073	2.9085	
15 minute winter	4	2.000	5	46.5	0.809	0.409	3.3706	
15 minute winter	5	2.001	7	35.6	0.555	0.275	1.9691	
15 minute winter	7	1.003	8	137.7	1.011	0.700	8.4984	
15 minute winter	8	1.004	9	177.6	1.121	0.847	1.8714	
15 minute winter	9	1.005	18	180.0	1.136	1.097	7.6005	
15 minute winter	10	3.000	13	49.6	0.940	0.348	3.3948	
15 minute winter	11	4.000	13	12.6	0.708	0.109	0.5277	
180 minute winter	12	Orifice	13	1.9				
15 minute winter	13	3.001	14	59.8	0.936	0.522	2.5031	
15 minute winter	14	3.002	15	55.1	1.112	0.394	1.1201	
15 minute winter	15	3.003	18	58.0	0.779	0.418	4.5685	
15 minute winter	16	6.000	18	12.0	1.226	0.523	0.0589	
15 minute winter	17	7.000	18	11.0	1.331	0.409	0.0361	
15 minute winter	18	1.006	18_OUT	274.1	1.730	1.757	1.6790	
720 minute winter	18_OUT	Flow through pond	19	22.2	0.026	0.001	311.1974	
720 minute winter	19	8.000	20	13.1	0.401	0.073	2.5484	
720 minute winter	20	8.001	20_OUT	12.8	0.195	0.068	2.3058	
600 minute winter	20_OUT	Flow through pond	21	15.1	0.049	0.002	131.5617	
720 minute winter	21	Hydro-Brake®	21_OUT	4.9				220.2



Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.87%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	11	6.702	1.302	53.2	2.9014	0.0000	FLOOD RISK
15 minute winter	2	11	6.572	1.422	82.7	2.7463	0.0000	FLOOD RISK
15 minute winter	3	11	6.375	1.425	163.2	4.4318	7.1939	FLOOD
15 minute winter	4	11	6.069	1.194	67.0	3.4131	0.0000	SURCHARGED
15 minute winter	5	12	6.032	1.257	84.5	1.7988	0.0000	FLOOD RISK
15 minute winter	7	11	6.022	1.322	171.1	2.5387	0.0000	FLOOD RISK
15 minute winter	8	12	5.834	1.334	247.4	3.9966	0.0000	SURCHARGED
15 minute winter	9	12	5.714	1.264	241.2	1.9130	0.0000	SURCHARGED
15 minute winter	10	12	5.560	0.660	70.1	2.1775	0.0000	SURCHARGED
15 minute winter	11	12	5.537	0.262	28.2	0.4936	0.0000	OK
180 minute winter	12	128	6.325	0.560	16.7	52.1791	3.9204	FLOOD
15 minute winter	13	12	5.545	0.845	79.3	1.2095	0.0000	SURCHARGED
15 minute winter	14	12	5.511	0.886	78.2	1.4773	0.0000	SURCHARGED
15 minute winter	15	12	5.483	0.908	76.9	1.3736	0.0000	SURCHARGED
15 minute winter	16	14	5.383	0.143	36.9	11.9969	0.0000	OK
15 minute winter	17	14	5.393	0.153	30.4	8.5858	0.0000	SURCHARGED
15 minute winter	18	12	5.394	1.144	350.9	2.7004	0.0000	SURCHARGED
960 minute winter	18_OUT	945	5.368	1.173	36.4	2.6797	0.0000	OK
960 minute winter	19	945	5.364	1.189	24.8	1.7011	0.0000	FLOOD RISK
960 minute winter	20	930	5.362	1.237	15.3	1.7703	0.0000	FLOOD RISK
960 minute winter	20_OUT	945	5.371	1.296	29.0	2.3647	0.0000	OK
960 minute winter	21	960	5.362	1.237	21.6	2.1854	0.0000	FLOOD RISK
15 minute winter	21_OUT	1	4.075	0.000	4.9	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 winter	1	1.000	2	48.6	0.951	0.569	2.9670	
15 minute winter	2	1.001	3	80.1	1.138	0.826	1.8431	
15 minute winter	3	1.002	7	104.2	1.480	1.209	2.9085	
15 minute winter	4	2.000	5	57.8	0.827	0.508	3.3706	
15 minute winter	5	2.001	7	58.7	0.533	0.455	1.9691	
15 minute winter	7	1.003	8	170.6	1.077	0.867	8.4984	
15 minute winter	8	1.004	9	237.1	1.497	1.131	1.8714	
15 minute winter	9	1.005	18	240.9	1.521	1.469	7.6005	
15 minute winter	10	3.000	13	63.0	0.997	0.442	4.3177	
15 minute winter	11	4.000	13	21.1	0.768	0.182	2.8463	
180 minute winter	12	Orifice	13	2.5				
15 minute winter	13	3.001	14	67.6	0.946	0.591	2.5031	
15 minute winter	14	3.002	15	74.7	1.142	0.534	1.1201	
15 minute winter	15	3.003	18	78.4	0.782	0.566	4.5685	
15 minute winter	16	6.000	18	21.0	1.352	0.914	0.1053	
15 minute winter	17	7.000	18	22.3	1.529	0.824	0.0767	
15 minute winter	18	1.006	18_OUT	328.4	2.073	2.105	1.6790	
960 minute winter	18_OUT	Flow through pond	19	24.8	0.027	0.001	462.1375	
960 minute winter	19	8.000	20	15.3	0.408	0.085	2.5484	
960 minute winter	20	8.001	20_OUT	15.4	0.199	0.082	2.3058	
960 minute winter	20_OUT	Flow through pond	21	21.6	0.054	0.003	204.1566	
960 minute winter	21	Hydro-Brake®	21_OUT	4.9				298.6



Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	10	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.500
Ratio-R	0.400	Preferred Cover Depth (m)	0.900
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

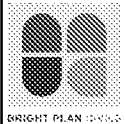
Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
1	0.042	5.00	5.675	1200	1.200
2	0.024	5.00	5.375	1200	1.075
3	0.024	5.00	5.025	1200	0.900
4	0.062	5.00	4.750	1200	0.660
5	0.056	5.00	4.750	1200	0.660
6	0.012	5.00	4.800	1200	0.900
7	0.043	5.00	5.400	1200	1.200
8	0.012	5.00	5.075	1200	1.075
9	0.030	5.00	4.900	1200	1.050
9_OUT			4.600	1200	0.800

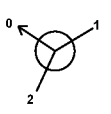
Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	19.239	109.9	300	5.675	4.475	0.900	5.375	4.300	0.775
1.001	19.246	110.0	300	5.375	4.300	0.775	5.025	4.125	0.600
1.002	28.460	126.5	300	5.025	4.125	0.600	4.800	3.900	0.600
2.000	6.299	157.5	150	4.750	4.090	0.510	4.800	4.050	0.600
3.000	5.026	125.7	150	4.750	4.090	0.510	4.800	4.050	0.600
1.003	13.849	277.0	300	4.800	3.900	0.600	4.900	3.850	0.750
4.000	23.525	117.6	300	5.400	4.200	0.900	5.075	4.000	0.775
4.001	12.420	82.8	300	5.075	4.000	0.775	4.900	3.850	0.750
1.004	5.600	112.0	300	4.900	3.850	0.750	4.600	3.800	0.500

Link	US Node	DS Node
1.000	1	2
1.001	2	3
1.002	3	6
2.000	4	6
3.000	5	6
1.003	6	9
4.000	7	8
4.001	8	9
1.004	9	9_OUT



Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	5.675	1.200	1200				
					0	1.000	4.475 300
2	5.375	1.075	1200		1	1.000	4.300 300
					0	1.001	4.300 300
3	5.025	0.900	1200		1	1.001	4.125 300
					0	1.002	4.125 300
4	4.750	0.660	1200				
					0	2.000	4.090 150
5	4.750	0.660	1200				
					0	3.000	4.090 150
6	4.800	0.900	1200		1	3.000	4.050 150
					2	2.000	4.050 150
					3	1.002	3.900 300
					0	1.003	3.900 300
7	5.400	1.200	1200				
					0	4.000	4.200 300
8	5.075	1.075	1200		1	4.000	4.000 300
					0	4.001	4.000 300
9	4.900	1.050	1200		1	4.001	3.850 300
					2	1.003	3.850 300
					0	1.004	3.850 300
9_OUT	4.600	0.800	1200		1	1.004	3.800 300

Node 9 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	3.850	Product Number	CTL-SHE-0082-3000-1050-3000
Design Depth (m)	1.050	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	3.0	Min Node Diameter (mm)	1200



Node 4 Carpark Storage Structure

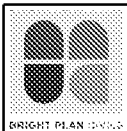
Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.090	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.500
Safety Factor	1.0	Width (m)	6.000	Inf Depth (m)	0.500
Porosity	0.32	Length (m)	89.600		

Node 5 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.090	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.500
Safety Factor	1.0	Width (m)	6.000	Inf Depth (m)	0.500
Porosity	0.32	Length (m)	59.000		

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute winter	64.927	26.180	100 year 15 minute winter	204.748	82.560
1 year 30 minute winter	42.121	16.984	100 year 30 minute winter	134.724	54.324
1 year 60 minute winter	26.839	10.676	100 year 60 minute winter	85.873	34.158
1 year 120 minute winter	16.596	6.602	100 year 120 minute winter	52.377	20.834
1 year 180 minute winter	12.527	4.959	100 year 180 minute winter	38.980	15.431
1 year 240 minute winter	10.165	4.043	100 year 240 minute winter	31.209	12.414
1 year 360 minute winter	7.654	3.030	100 year 360 minute winter	22.923	9.075
1 year 480 minute winter	6.207	2.469	100 year 480 minute winter	18.171	7.228
1 year 600 minute winter	5.249	2.101	100 year 600 minute winter	15.126	6.055
1 year 720 minute winter	4.609	1.838	100 year 720 minute winter	13.147	5.243
1 year 960 minute winter	3.745	1.489	100 year 960 minute winter	10.500	4.174
1 year 1440 minute winter	2.773	1.106	100 year 1440 minute winter	7.579	3.023
1 year 2160 minute winter	2.050	0.822	100 year 2160 minute winter	5.448	2.185
1 year 2880 minute winter	1.671	0.666	100 year 2880 minute winter	4.349	1.734
1 year 4320 minute winter	1.250	0.496	100 year 4320 minute winter	3.150	1.251
1 year 5760 minute winter	1.016	0.402	100 year 5760 minute winter	2.505	0.991
1 year 7200 minute winter	0.864	0.341	100 year 7200 minute winter	2.091	0.827
1 year 8640 minute winter	0.756	0.299	100 year 8640 minute winter	1.803	0.713
1 year 10080 minute winter	0.676	0.267	100 year 10080 minute winter	1.590	0.628
30 year 15 minute winter	158.733	64.005	100 year +40% CC 15 minute winter	286.647	115.584
30 year 30 minute winter	103.475	41.724	100 year +40% CC 30 minute winter	188.614	76.054
30 year 60 minute winter	65.517	26.061	100 year +40% CC 60 minute winter	120.222	47.821
30 year 120 minute winter	39.827	15.842	100 year +40% CC 120 minute winter	73.327	29.168
30 year 180 minute winter	29.640	11.734	100 year +40% CC 180 minute winter	54.572	21.604
30 year 240 minute winter	23.758	9.450	100 year +40% CC 240 minute winter	43.693	17.380
30 year 360 minute winter	17.511	6.932	100 year +40% CC 360 minute winter	32.092	12.705
30 year 480 minute winter	13.940	5.545	100 year +40% CC 480 minute winter	25.439	10.119
30 year 600 minute winter	11.642	4.661	100 year +40% CC 600 minute winter	21.176	8.477
30 year 720 minute winter	10.143	4.045	100 year +40% CC 720 minute winter	18.406	7.340
30 year 960 minute winter	8.133	3.233	100 year +40% CC 960 minute winter	14.700	5.844
30 year 1440 minute winter	5.906	2.355	100 year +40% CC 1440 minute winter	10.611	4.232
30 year 2160 minute winter	4.273	1.714	100 year +40% CC 2160 minute winter	7.628	3.059
30 year 2880 minute winter	3.428	1.367	100 year +40% CC 2880 minute winter	6.089	2.428
30 year 4320 minute winter	2.501	0.993	100 year +40% CC 4320 minute winter	4.410	1.751
30 year 5760 minute winter	2.000	0.791	100 year +40% CC 5760 minute winter	3.507	1.387
30 year 7200 minute winter	1.677	0.663	100 year +40% CC 7200 minute winter	2.928	1.157
30 year 8640 minute winter	1.451	0.574	100 year +40% CC 8640 minute winter	2.524	0.998
30 year 10080 minute winter	1.284	0.507	100 year +40% CC 10080 minute winter	2.226	0.880



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.66%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute winter	1	10	4.523	0.048	6.0	0.0875	0.0000	OK
15 minute winter	2	10	4.360	0.060	9.3	0.0948	0.0000	OK
15 minute winter	3	12	4.217	0.092	12.5	0.1535	0.0000	OK
60 minute winter	4	59	4.191	0.101	9.3	9.9303	0.0000	OK
60 minute winter	5	60	4.191	0.101	9.1	8.3610	0.0000	OK
15 minute winter	6	12	4.213	0.313	19.3	0.4373	0.0000	SURCHARGED
15 minute winter	7	10	4.249	0.049	6.1	0.0902	0.0000	OK
15 minute winter	8	11	4.215	0.215	8.8	0.2906	0.0000	OK
15 minute winter	9	12	4.212	0.362	11.3	0.6169	0.0000	SURCHARGED
15 minute winter	9_OUT	1	3.800	0.000	3.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
15 minute winter	1	1.000	2	5.9	0.687	0.056	0.1657	
15 minute winter	2	1.001	3	9.2	0.808	0.087	0.2630	
15 minute winter	3	1.002	6	12.4	0.546	0.125	1.2635	
60 minute winter	4	2.000	6	-4.8	0.458	-0.344	0.0937	
60 minute winter	5	3.000	6	-5.1	0.489	-0.321	0.0747	
15 minute winter	6	1.003	9	-8.1	0.218	-0.123	0.9752	
15 minute winter	7	4.000	8	6.0	0.704	0.058	0.7200	
15 minute winter	8	4.001	9	7.3	0.267	0.059	0.7722	
15 minute winter	9	Hydro-Brake®	9_OUT	3.0				19.9



Results for 30 year Critical Storm Duration. Lowest mass balance: 99.66%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute winter	1	10	4.552	0.077	14.6	0.1402	0.0000	OK
15 minute winter	2	10	4.393	0.093	22.7	0.1462	0.0000	OK
15 minute winter	3	12	4.390	0.265	30.7	0.4402	0.0000	OK
180 minute winter	4	176	4.364	0.274	11.9	40.2938	0.0000	SURCHARGED
180 minute winter	5	176	4.364	0.274	8.0	28.5182	0.0000	SURCHARGED
15 minute winter	6	12	4.375	0.475	52.3	0.6643	0.0000	SURCHARGED
15 minute winter	7	12	4.388	0.188	14.9	0.3483	0.0000	OK
15 minute winter	8	12	4.386	0.386	16.9	0.5226	0.0000	SURCHARGED
15 minute winter	9	12	4.382	0.532	25.5	0.9059	0.0000	SURCHARGED
15 minute winter	9_OUT	1	3.800	0.000	3.0	0.0000	0.0000	OK

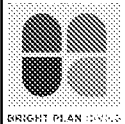
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
15 minute winter	1	1.000	2	14.4	0.885	0.136	0.3140	
15 minute winter	2	1.001	3	22.4	0.899	0.211	0.8009	
15 minute winter	3	1.002	6	26.8	0.578	0.271	1.9380	
180 minute winter	4	2.000	6	-6.9	0.428	-0.491	0.1109	
180 minute winter	5	3.000	6	-3.6	0.450	-0.227	0.0885	
15 minute winter	6	1.003	9	-22.2	-0.316	-0.335	0.9752	
15 minute winter	7	4.000	8	13.0	0.752	0.127	1.3764	
15 minute winter	8	4.001	9	15.7	0.303	0.129	0.8746	
15 minute winter	9	Hydro-Brake®	9_OUT	3.0				45.1



Results for 100 year Critical Storm Duration. Lowest mass balance: 99.66%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	4.563	0.088	18.8	0.1608	0.0000	OK
15 minute winter	2	12	4.536	0.236	29.7	0.3723	0.0000	OK
15 minute winter	3	12	4.526	0.401	36.2	0.6678	0.0000	SURCHARGED
240 minute winter	4	236	4.480	0.390	12.9	60.4947	0.0000	FLOOD RISK
240 minute winter	5	236	4.480	0.390	9.0	41.9177	0.0000	FLOOD RISK
15 minute winter	6	12	4.500	0.600	62.8	0.8395	0.0000	FLOOD RISK
15 minute winter	7	12	4.521	0.321	19.2	0.5937	0.0000	SURCHARGED
15 minute winter	8	12	4.517	0.517	19.7	0.7006	0.0000	SURCHARGED
15 minute winter	9	12	4.512	0.662	31.6	1.1275	0.0000	SURCHARGED
15 minute winter	9_OUT	1	3.800	0.000	3.0	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 winter	1	1.000	2	19.0	0.926	0.179	0.7072	
15 minute winter	2	1.001	3	26.1	0.918	0.246	1.2499	
15 minute winter	3	1.002	6	31.2	0.628	0.316	2.0041	
240 minute winter	4	2.000	6	-7.6	-0.432	-0.540	0.1109	
240 minute winter	5	3.000	6	-4.1	0.457	-0.262	0.0885	
15 minute winter	6	1.003	9	-29.1	-0.413	-0.438	0.9752	
15 minute winter	7	4.000	8	15.0	0.728	0.146	1.6566	
15 minute winter	8	4.001	9	19.0	0.334	0.156	0.8746	
15 minute winter	9	Hydro-Brake®	9_OUT	3.0				44.8



Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.66%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute winter	1	12	4.892	0.417	26.3	0.7632	0.0000	SURCHARGED
15 minute winter	2	12	4.881	0.581	38.6	0.9167	0.0000	SURCHARGED
15 minute winter	3	12	4.857	0.732	46.9	1.2184	0.0000	FLOOD RISK
240 minute winter	4	168	4.750	0.660	18.6	80.3517	11.9757	FLOOD
240 minute winter	5	168	4.750	0.660	13.3	55.2243	11.7143	FLOOD
15 minute winter	6	12	4.800	0.900	90.2	1.2582	0.2429	FLOOD
15 minute winter	7	12	4.854	0.654	26.9	1.2077	0.0000	SURCHARGED
15 minute winter	8	12	4.843	0.843	29.8	1.1409	0.0000	FLOOD RISK
15 minute winter	9	12	4.829	0.979	43.8	1.6668	0.0000	FLOOD RISK
15 minute winter	9_OUT	1	3.800	0.000	3.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
15 minute winter	1	1.000	2	24.5	0.957	0.231	1.3548	
15 minute winter	2	1.001	3	32.8	0.907	0.310	1.3553	
15 minute winter	3	1.002	6	44.3	0.632	0.449	2.0041	
240 minute winter	4	2.000	6	-11.2	-0.637	-0.796	0.1109	
240 minute winter	5	3.000	6	-6.5	0.464	-0.410	0.0885	
15 minute winter	6	1.003	9	-40.0	-0.569	-0.603	0.9752	
15 minute winter	7	4.000	8	22.7	0.791	0.221	1.6566	
15 minute winter	8	4.001	9	27.7	0.394	0.227	0.8746	
15 minute winter	9	Hydro-Brake®	9_OUT	3.0				43.9



Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	10	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.500
Ratio-R	0.400	Preferred Cover Depth (m)	0.900
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
✓ 1	0.043	5.00	6.700	1200	1.125
✓ 2	0.043	5.00	6.100	1200	1.125
✓ 3	0.061	5.00	6.075	1200	0.560
✓ 4	0.044	5.00	6.075	1200	1.175
✓ 5	0.017	5.00	6.225	1200	1.475
✓ 6			6.300	1200	1.650
✓ 7	0.012	5.00	6.400	1200	1.850
✓ 8	0.039	5.00	6.450	1200	2.075
✓ 9	0.034	5.00	6.300	1200	2.025
✓ 10	0.016	5.00	5.850	1200	1.675
✓ 11	0.079	5.00	6.200	1200	1.400
✓ 12	0.091	5.00	5.750	1200	1.250
✓ 13	0.016	5.00	5.950	1200	1.550
✓ 14	0.114	5.00	6.950	1200	1.350
✓ 15	0.114	5.00	6.450	1200	1.150
✓ 16	0.027	5.00	6.250	1350	2.175
✓ 17	0.028	5.00	5.175	1200	1.200
✓ 18	0.094	5.00	5.475	1200	0.560
✓ 19	0.046	5.00	5.475	1350	1.750
✓ 19_OUT	0.111		5.200	1350	1.525
✓ 20		5.00	5.000	1200	1.325
✓ 20_OUT			4.800	1200	1.175

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	50.825	101.7	225	6.700	5.575	0.900	6.100	5.075	0.800
1.001	7.429	99.1	225	6.100	4.975	0.900	6.075	4.900	0.950
2.000	4.342	43.4	150	6.075	5.515	0.410	6.075	5.415	0.510
1.002	27.943	186.3	225	6.075	4.900	0.950	6.225	4.750	1.250
1.003	13.212	132.1	225	6.225	4.750	1.250	6.300	4.650	1.425

Link	US Node	DS Node
1.000	1	2
1.001	2	4
2.000	3	4
1.002	4	5
1.003	5	6

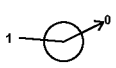


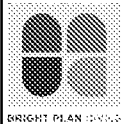
Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.004	13.063	130.6	225	6.300	4.650	1.425	6.400	4.550	1.625
1.005	14.409	144.1	225	6.400	4.550	1.625	6.450	4.450	1.775
1.006	28.622	286.2	300	6.450	4.375	1.775	6.300	4.275	1.725
1.007	43.479	434.8	300	6.300	4.275	1.725	5.850	4.175	1.375
1.008	40.795	407.9	300	5.850	4.175	1.375	5.475	4.075	1.100
3.000	53.377	177.9	225	6.200	4.800	1.175	5.750	4.500	1.025
3.001	15.111	151.1	225	5.750	4.500	1.025	5.950	4.400	1.325
3.002	22.169	221.7	225	5.950	4.400	1.325	6.250	4.300	1.725
4.000	44.104	147.0	225	6.950	5.600	1.125	6.450	5.300	0.925
4.001	13.720	137.2	225	6.450	5.300	0.925	6.250	5.200	0.825
3.003	45.229	150.8	450	6.250	4.075	1.725	5.475	3.775	1.250
5.000	28.881	288.8	300	5.175	3.975	0.900	5.475	3.875	1.300
6.000	6.892	68.9	150	5.475	4.915	0.410	5.475	4.815	0.510
1.009	6.906	138.1	450	5.475	3.725	1.300	5.200	3.675	1.075
7.000	7.565	151.3	100	5.000	3.675	1.225	4.800	3.625	1.075

Link	US Node	DS Node
1.004	6	7
1.005	7	8
1.006	8	9
1.007	9	10
1.008	10	19
3.000	11	12
3.001	12	13
3.002	13	16
4.000	14	15
4.001	15	16
3.003	16	19
5.000	17	19
6.000	18	19
1.009	19	19_OUT
7.000	20	20_OUT

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	6.700	1.125	1200		0	1.000	5.575
2	6.100	1.125	1200		1	1.000	5.075
3	6.075	0.560	1200		0	1.001	4.975
					0	2.000	5.515

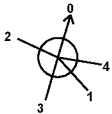


Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
4	6.075	1.175	1200		1	2.000	5.415 150
					2	1.001	4.900 225
					0	1.002	4.900 225
5	6.225	1.475	1200		1	1.002	4.750 225
					0	1.003	4.750 225
6	6.300	1.650	1200		1	1.003	4.650 225
					0	1.004	4.650 225
7	6.400	1.850	1200		1	1.004	4.550 225
					0	1.005	4.550 225
8	6.450	2.075	1200		1	1.005	4.450 225
					0	1.006	4.375 300
9	6.300	2.025	1200		1	1.006	4.275 300
					0	1.007	4.275 300
10	5.850	1.675	1200		1	1.007	4.175 300
					0	1.008	4.175 300
11	6.200	1.400	1200		1	3.000	4.800 225
					0	3.001	4.500 225
13	5.950	1.550	1200		1	3.001	4.400 225
					0	3.002	4.400 225
14	6.950	1.350	1200		1	4.000	5.600 225
					0	4.001	5.300 225
16	6.250	2.175	1350		1	4.001	5.200 225
					2	3.002	4.300 225
					0	3.003	4.075 450



Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
17	5.175	1.200	1200		0	5.000	300
18	5.475	0.560	1200		0	6.000	4.915
19	5.475	1.750	1350		1	6.000	4.915
					2	5.000	3.875
					3	3.003	3.775
					4	1.008	4.075
					0	1.009	3.725
19_OUT	5.200	1.525	1350		1	1.009	3.675
20	5.000	1.325	1200		0	7.000	3.675
20_OUT	4.800	1.175	1200		1	7.000	3.625

Node 19 OUT Online Orifice Control

Flap Valve	x	Invert Level (m)	3.675	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

Node 3 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.560	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	5.515	Diameter (m)	0.025		

Node 20 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	3.675	Product Number	CTL-SHE-0078-3000-1325-3000
Design Depth (m)	1.325	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	3.0	Min Node Diameter (mm)	1200

Node 18 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.560	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	4.915	Diameter (m)	0.025		



Node 20 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	100.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	3.675	Main Channel Slope (1:X)	1000.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.025

Inlets

19_OUT

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	495.0	0.0	1.000	759.9	0.0	1.300	850.4	0.0

Node 3 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	5.515	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.450
Safety Factor	1.0	Width (m)	6.000	Inf Depth (m)	0.450
Porosity	0.32	Length (m)	102.000		

Node 18 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.915	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.450
Safety Factor	1.0	Width (m)	6.000	Inf Depth (m)	0.450
Porosity	0.32	Length (m)	108.600		

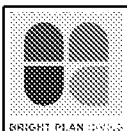
Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute winter	64.927	26.180	30 year 360 minute winter	17.511	6.932
1 year 30 minute winter	42.121	16.984	30 year 480 minute winter	13.940	5.545
1 year 60 minute winter	26.839	10.676	30 year 600 minute winter	11.642	4.661
1 year 120 minute winter	16.596	6.602	30 year 720 minute winter	10.143	4.045
1 year 180 minute winter	12.527	4.959	30 year 960 minute winter	8.133	3.233
1 year 240 minute winter	10.165	4.043	30 year 1440 minute winter	5.906	2.355
1 year 360 minute winter	7.654	3.030	30 year 2160 minute winter	4.273	1.714
1 year 480 minute winter	6.207	2.469	30 year 2880 minute winter	3.428	1.367
1 year 600 minute winter	5.249	2.101	30 year 4320 minute winter	2.501	0.993
1 year 720 minute winter	4.609	1.838	30 year 5760 minute winter	2.000	0.791
1 year 960 minute winter	3.745	1.489	30 year 7200 minute winter	1.677	0.663
1 year 1440 minute winter	2.773	1.106	30 year 8640 minute winter	1.451	0.574
1 year 2160 minute winter	2.050	0.822	30 year 10080 minute winter	1.284	0.507
1 year 2880 minute winter	1.671	0.666	100 year 15 minute winter	204.748	82.560
1 year 4320 minute winter	1.250	0.496	100 year 30 minute winter	134.724	54.324
1 year 5760 minute winter	1.016	0.402	100 year 60 minute winter	85.873	34.158
1 year 7200 minute winter	0.864	0.341	100 year 120 minute winter	52.377	20.834
1 year 8640 minute winter	0.756	0.299	100 year 180 minute winter	38.980	15.431
1 year 10080 minute winter	0.676	0.267	100 year 240 minute winter	31.209	12.414
30 year 15 minute winter	158.733	64.005	100 year 360 minute winter	22.923	9.075
30 year 30 minute winter	103.475	41.724	100 year 480 minute winter	18.171	7.228
30 year 60 minute winter	65.517	26.061	100 year 600 minute winter	15.126	6.055
30 year 120 minute winter	39.827	15.842	100 year 720 minute winter	13.147	5.243
30 year 180 minute winter	29.640	11.734	100 year 960 minute winter	10.500	4.174
30 year 240 minute winter	23.758	9.450	100 year 1440 minute winter	7.579	3.023



Rainfall

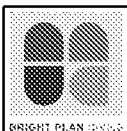
Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year 2160 minute winter	5.448	2.185	100 year +40% CC 360 minute winter	32.092	12.705
100 year 2880 minute winter	4.349	1.734	100 year +40% CC 480 minute winter	25.439	10.119
100 year 4320 minute winter	3.150	1.251	100 year +40% CC 600 minute winter	21.176	8.477
100 year 5760 minute winter	2.505	0.991	100 year +40% CC 720 minute winter	18.406	7.340
100 year 7200 minute winter	2.091	0.827	100 year +40% CC 960 minute winter	14.700	5.844
100 year 8640 minute winter	1.803	0.713	100 year +40% CC 1440 minute winter	10.611	4.232
100 year 10080 minute winter	1.590	0.628	100 year +40% CC 2160 minute winter	7.628	3.059
100 year +40% CC 15 minute winter	286.647	115.584	100 year +40% CC 2880 minute winter	6.089	2.428
100 year +40% CC 30 minute winter	188.614	76.054	100 year +40% CC 4320 minute winter	4.410	1.751
100 year +40% CC 60 minute winter	120.222	47.821	100 year +40% CC 5760 minute winter	3.507	1.387
100 year +40% CC 120 minute winter	73.327	29.168	100 year +40% CC 7200 minute winter	2.928	1.157
100 year +40% CC 180 minute winter	54.572	21.604	100 year +40% CC 8640 minute winter	2.524	0.998
100 year +40% CC 240 minute winter	43.693	17.380	100 year +40% CC 10080 minute winter	2.226	0.880



Results for 1 year Critical Storm Duration. Lowest mass balance: 98.51%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	11	5.626	0.051	6.1	0.0971	0.0000	OK
15 minute winter	2	11	5.054	0.079	11.7	0.1504	0.0000	OK
360 minute winter	3	272	5.597	0.082	1.3	6.7380	0.0000	OK
15 minute winter	4	11	5.012	0.112	17.9	0.2112	0.0000	OK
15 minute winter	5	11	4.864	0.114	20.2	0.1553	0.0000	OK
15 minute winter	6	11	4.764	0.114	20.2	0.1294	0.0000	OK
15 minute winter	7	11	4.669	0.119	21.7	0.1506	0.0000	OK
15 minute winter	8	11	4.511	0.136	26.5	0.2055	0.0000	OK
15 minute winter	9	12	4.443	0.168	30.6	0.2459	0.0000	OK
15 minute winter	10	13	4.341	0.166	32.1	0.2193	0.0000	OK
15 minute winter	11	11	4.880	0.080	11.2	0.1812	0.0000	OK
15 minute winter	12	11	4.630	0.130	23.6	0.3354	0.0000	OK
15 minute winter	13	11	4.549	0.149	25.2	0.1987	0.0000	OK
15 minute winter	14	10	5.694	0.094	16.2	0.2640	0.0000	OK
15 minute winter	15	11	5.451	0.151	31.9	0.4701	0.0000	OK
15 minute winter	16	11	4.218	0.143	59.8	0.2405	0.0000	OK
15 minute winter	17	10	4.024	0.049	4.0	0.0782	0.0000	OK
240 minute winter	18	232	5.022	0.107	2.7	11.3601	0.0000	OK
15 minute winter	19	12	4.024	0.299	95.3	0.5842	0.0000	OK
15 minute winter	19_OUT	12	4.007	0.332	105.7	0.9596	0.0000	OK
480 minute winter	20	472	3.967	0.292	9.9	0.3300	0.0000	SURCHARGED
15 minute winter	20_OUT	1	3.625	0.000	2.5	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 winter	1	1.000	2	5.8	0.863	0.113	0.3423	
15 minute winter	2	1.001	4	11.6	0.720	0.222	0.1200	
360 minute winter	3	2.000	4	0.3	0.522	0.013	0.0029	
15 minute winter	4	1.002	5	17.9	0.897	0.473	0.5588	
15 minute winter	5	1.003	6	20.2	1.000	0.448	0.2673	
15 minute winter	6	1.004	7	20.1	0.965	0.442	0.2721	
15 minute winter	7	1.005	8	21.4	1.052	0.496	0.2938	
15 minute winter	8	1.006	9	26.2	0.740	0.402	1.0218	
15 minute winter	9	1.007	10	30.3	0.775	0.574	1.7259	
15 minute winter	10	1.008	19	30.9	0.874	0.565	1.4401	
15 minute winter	11	3.000	12	10.8	0.602	0.277	0.9700	
15 minute winter	12	3.001	13	23.1	0.900	0.548	0.3891	
15 minute winter	13	3.002	16	25.0	0.961	0.718	0.5758	
15 minute winter	14	4.000	15	15.7	0.723	0.367	0.9654	
15 minute winter	15	4.001	16	31.3	1.161	0.705	0.3692	
15 minute winter	16	3.003	19	59.6	1.055	0.226	2.9846	
15 minute winter	17	5.000	19	3.8	0.451	0.059	0.6013	
240 minute winter	18	6.000	19	0.4	0.465	0.018	0.0059	
15 minute winter	19	1.009	19_OUT	93.4	0.787	0.340	0.8190	
15 minute winter	19_OUT	Flow through pond	20	101.2	0.248	0.011	54.1051	
480 minute winter	20	Hydro-Brake®	20_OUT	2.8				94.0



Results for 30 year Critical Storm Duration. Lowest mass balance: 98.51%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	5.657	0.082	14.9	0.1552	0.0000	OK
15 minute winter	2	12	5.234	0.259	29.0	0.4917	0.0000	SURCHARGED
360 minute winter	3	336	5.657	0.142	3.0	18.3623	0.0000	OK
15 minute winter	4	12	5.210	0.310	40.5	0.5837	0.0000	SURCHARGED
15 minute winter	5	12	5.058	0.308	43.9	0.4194	0.0000	SURCHARGED
15 minute winter	6	12	4.953	0.303	43.1	0.3431	0.0000	SURCHARGED
15 minute winter	7	12	4.849	0.299	46.1	0.3776	0.0000	SURCHARGED
15 minute winter	8	12	4.718	0.343	57.8	0.5175	0.0000	SURCHARGED
15 minute winter	9	12	4.635	0.360	65.9	0.5285	0.0000	SURCHARGED
15 minute winter	10	12	4.479	0.304	66.7	0.4024	0.0000	SURCHARGED
15 minute winter	11	12	5.072	0.272	27.4	0.6148	0.0000	SURCHARGED
15 minute winter	12	12	4.953	0.453	53.6	1.1728	0.0000	SURCHARGED
15 minute winter	13	12	4.772	0.372	53.9	0.4970	0.0000	SURCHARGED
15 minute winter	14	11	6.004	0.404	39.5	1.1391	0.0000	SURCHARGED
15 minute winter	15	11	5.763	0.463	72.8	1.4423	0.0000	SURCHARGED
15 minute winter	16	12	4.385	0.310	134.1	0.5201	0.0000	OK
960 minute winter	17	945	4.347	0.372	1.2	0.5938	0.0000	SURCHARGED
360 minute winter	18	352	5.113	0.198	4.6	30.7613	0.0000	SURCHARGED
960 minute winter	19	945	4.346	0.621	18.1	1.2160	0.0000	SURCHARGED
960 minute winter	19_OUT	945	4.358	0.683	20.2	1.9713	0.0000	OK
960 minute winter	20	945	4.337	0.662	18.0	0.7487	0.0000	SURCHARGED
15 minute winter	20_OUT	1	3.625	0.000	2.8	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 winter	1	1.000	2	14.3	1.088	0.278	1.0566	
15 minute winter	2	1.001	4	24.9	0.783	0.477	0.2955	
360 minute winter	3	2.000	4	0.5	0.572	0.017	0.0035	
15 minute winter	4	1.002	5	38.0	1.015	1.001	1.1113	
15 minute winter	5	1.003	6	43.1	1.120	0.955	0.5255	
15 minute winter	6	1.004	7	41.9	1.078	0.923	0.5195	
15 minute winter	7	1.005	8	44.3	1.208	1.026	0.5731	
15 minute winter	8	1.006	9	54.1	0.827	0.829	2.0155	
15 minute winter	9	1.007	10	62.4	0.911	1.181	3.0618	
15 minute winter	10	1.008	19	66.0	1.056	1.209	2.7104	
15 minute winter	11	3.000	12	23.9	0.683	0.615	2.1229	
15 minute winter	12	3.001	13	49.5	1.246	1.174	0.6010	
15 minute winter	13	3.002	16	54.4	1.375	1.565	0.8423	
15 minute winter	14	4.000	15	35.6	0.895	0.832	1.7541	
15 minute winter	15	4.001	16	72.0	1.809	1.624	0.5378	
15 minute winter	16	3.003	19	127.9	1.089	0.486	6.2135	
960 minute winter	17	5.000	19	-1.1	0.276	-0.017	2.0338	
360 minute winter	18	6.000	19	0.6	0.514	0.026	0.0074	
960 minute winter	19	1.009	19_OUT	17.7	0.209	0.064	1.0942	
960 minute winter	19_OUT	Flow through pond	20	18.0	0.063	0.002	353.1263	
960 minute winter	20	Hydro-Brake®	20_OUT	2.8				159.3



Results for 100 year Critical Storm Duration. Lowest mass balance: 98.51%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	5.668	0.093	19.2	0.1770	0.0000	OK
15 minute winter	2	13	5.640	0.665	38.0	1.2597	0.0000	SURCHARGED
360 minute winter	3	344	5.693	0.178	3.9	25.4682	0.0000	SURCHARGED
15 minute winter	4	13	5.614	0.714	44.2	1.3427	0.0000	SURCHARGED
15 minute winter	5	13	5.445	0.695	45.6	0.9459	0.0000	SURCHARGED
15 minute winter	6	13	5.326	0.676	43.3	0.7645	0.0000	SURCHARGED
15 minute winter	7	13	5.203	0.653	47.6	0.8234	0.0000	SURCHARGED
15 minute winter	8	12	5.065	0.690	61.5	1.0402	0.0000	SURCHARGED
15 minute winter	9	12	4.973	0.698	70.0	1.0233	0.0000	SURCHARGED
15 minute winter	10	12	4.783	0.608	73.4	0.8031	0.0000	SURCHARGED
15 minute winter	11	12	5.576	0.776	35.3	1.7538	0.0000	SURCHARGED
15 minute winter	12	12	5.407	0.907	67.5	2.3461	0.0000	SURCHARGED
15 minute winter	13	12	5.146	0.746	65.4	0.9972	0.0000	SURCHARGED
15 minute winter	14	11	6.381	0.781	51.0	2.2033	0.0000	SURCHARGED
15 minute winter	15	11	5.989	0.689	93.5	2.1469	0.0000	SURCHARGED
15 minute winter	16	12	4.717	0.642	165.0	1.0792	0.0000	SURCHARGED
15 minute winter	17	12	4.571	0.596	13.7	0.9519	0.0000	SURCHARGED
360 minute winter	18	352	5.165	0.250	6.0	41.8776	0.0000	SURCHARGED
15 minute winter	19	12	4.572	0.847	263.4	1.6568	0.0000	SURCHARGED
1440 minute winter	19_OUT	1440	4.527	0.852	19.0	2.4611	0.0000	OK
1440 minute winter	20	1410	4.526	0.851	12.7	0.9621	0.0000	SURCHARGED
15 minute winter	20_OUT	1	3.625	0.000	2.8	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 winter	1	1.000	2	18.8	1.046	0.365	1.4063	
15 minute winter	2	1.001	4	26.8	0.788	0.513	0.2955	
360 minute winter	3	2.000	4	0.5	0.592	0.019	0.0039	
15 minute winter	4	1.002	5	38.4	1.019	1.011	1.1113	
15 minute winter	5	1.003	6	43.3	1.123	0.959	0.5255	
15 minute winter	6	1.004	7	46.2	1.162	1.018	0.5195	
15 minute winter	7	1.005	8	50.8	1.277	1.175	0.5731	
15 minute winter	8	1.006	9	60.4	0.858	0.925	2.0155	
15 minute winter	9	1.007	10	69.9	0.993	1.323	3.0618	
15 minute winter	10	1.008	19	75.6	1.073	1.385	2.8728	
15 minute winter	11	3.000	12	27.4	0.690	0.705	2.1229	
15 minute winter	12	3.001	13	59.1	1.487	1.402	0.6010	
15 minute winter	13	3.002	16	65.5	1.647	1.885	0.8817	
15 minute winter	14	4.000	15	45.6	1.148	1.067	1.7541	
15 minute winter	15	4.001	16	92.2	2.319	2.082	0.5401	
15 minute winter	16	3.003	19	164.4	1.098	0.625	7.1662	
15 minute winter	17	5.000	19	12.1	0.473	0.186	2.0338	
360 minute winter	18	6.000	19	0.6	0.533	0.029	0.0081	
15 minute winter	19	1.009	19_OUT	264.0	1.667	0.961	1.0942	
1440 minute winter	19_OUT	Flow through pond	20	12.7	0.055	0.001	481.8677	
1440 minute winter	20	Hydro-Brake®	20_OUT	2.8				222.7



Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.51%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	12	6.208	0.633	26.9	1.1988	0.0000	SURCHARGED
15 minute winter	2	12	6.100	1.125	49.2	2.1319	2.4203	FLOOD
360 minute winter	3	352	5.754	0.239	5.4	37.5450	0.0000	SURCHARGED
15 minute winter	4	12	6.075	1.175	56.4	2.2090	1.2847	FLOOD
15 minute winter	5	12	5.966	1.216	51.0	1.6545	0.0000	FLOOD RISK
15 minute winter	6	12	5.868	1.218	46.5	1.3780	0.0000	SURCHARGED
15 minute winter	7	12	5.772	1.222	51.7	1.5406	0.0000	SURCHARGED
15 minute winter	8	12	5.633	1.258	64.8	1.8952	0.0000	SURCHARGED
15 minute winter	9	12	5.515	1.240	79.5	1.8191	0.0000	SURCHARGED
15 minute winter	10	12	5.246	1.071	87.3	1.4154	0.0000	SURCHARGED
15 minute winter	11	11	6.200	1.400	49.5	3.1640	0.0858	FLOOD
15 minute winter	12	10	5.750	1.250	98.4	3.2338	6.7950	FLOOD
15 minute winter	13	11	5.541	1.141	73.3	1.5259	0.0000	SURCHARGED
15 minute winter	14	11	6.950	1.350	71.4	3.8070	0.7803	FLOOD
15 minute winter	15	11	6.410	1.110	126.5	3.4569	0.0000	FLOOD RISK
15 minute winter	16	11	5.147	1.072	199.8	1.8016	0.0000	SURCHARGED
15 minute winter	17	11	4.947	0.972	17.5	1.5531	0.0000	FLOOD RISK
480 minute winter	18	464	5.258	0.343	6.6	61.8060	0.0000	FLOOD RISK
15 minute winter	19	11	4.935	1.210	320.3	2.3683	0.0000	SURCHARGED
2160 minute winter	19_OUT	2100	4.854	1.179	19.9	3.4042	0.0000	OK
2160 minute winter	20	2100	4.853	1.178	13.0	1.3321	0.0000	FLOOD RISK
15 minute winter	20_OUT	1	3.625	0.000	2.8	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 winter	1	1.000	2	23.9	1.043	0.464	2.0214	
15 minute winter	2	1.001	4	30.5	0.791	0.584	0.2955	
360 minute winter	3	2.000	4	0.6	0.619	0.023	0.0043	
15 minute winter	4	1.002	5	41.6	1.045	1.095	1.1113	
15 minute winter	5	1.003	6	46.5	1.170	1.030	0.5255	
15 minute winter	6	1.004	7	50.3	1.265	1.108	0.5195	
15 minute winter	7	1.005	8	56.0	1.408	1.296	0.5731	
15 minute winter	8	1.006	9	66.9	0.951	1.025	2.0155	
15 minute winter	9	1.007	10	80.6	1.145	1.525	3.0618	
15 minute winter	10	1.008	19	89.4	1.270	1.638	2.8728	
15 minute winter	11	3.000	12	44.8	1.127	1.154	2.1229	
15 minute winter	12	3.001	13	63.9	1.607	1.514	0.6010	
15 minute winter	13	3.002	16	70.6	1.774	2.031	0.8817	
15 minute winter	14	4.000	15	56.7	1.425	1.324	1.7541	
15 minute winter	15	4.001	16	121.5	3.055	2.743	0.5401	
15 minute winter	16	3.003	19	198.6	1.254	0.755	7.1662	
15 minute winter	17	5.000	19	14.6	0.492	0.224	2.0338	
480 minute winter	18	6.000	19	0.7	0.560	0.035	0.0091	
15 minute winter	19	1.009	19_OUT	322.3	2.034	1.173	1.0942	
2160 minute winter	19_OUT	Flow through pond	20	13.0	0.049	0.001	727.8806	
2160 minute winter	20	Hydro-Brake®	20_OUT	2.8				347.4



Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	250.0
Additional Flow (%)	10	Minimum Velocity (m/s)	0.75
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	0.600
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
130	0.077	5.00	5.250	1200	0.750
129 - PP	0.077	5.00	4.950	1200	0.825
129			4.950	1200	0.841
128			4.700	1200	0.825
127	0.055	5.00	6.750	1200	0.750
126			6.450	1200	0.750
125	0.055	5.00	6.200	1200	0.750
124			6.200	1200	0.782
123			5.750	1200	0.750
122	0.055	5.00	5.300	1200	0.750
121			5.300	1200	0.858
120			5.100	1200	0.825
119	0.115	5.00	5.950	1200	0.825
118 - PP	0.114	5.00	5.550	1200	0.825
118			5.550	1200	0.840
117	0.080	5.00	5.100	1200	0.989
116	0.020	5.00	4.900	1200	0.900
115	0.020	5.00	4.750	1200	0.900
114	0.019	5.00	4.650	1350	0.975
113			4.600	1350	1.300
112			4.600	1350	1.320
111			4.400	1350	1.150
110	0.050	5.00	5.400	1200	0.750
109	0.050	5.00	5.550	1200	0.750
108	0.050	5.00	5.250	1200	0.825
107			5.050	1200	0.825
106	0.136	5.00	5.150	1200	0.825
105			4.850	1200	0.825
104 - PP	0.137	5.00	4.700	1200	0.825
104			4.700	1200	0.913
103	0.021	5.00	4.550	1350	1.100
102	0.070	5.00	5.600	1200	0.750
101	0.070	5.00	5.200	1200	0.825
100	0.070	5.00	4.650	1200	0.825
99	0.077	5.00	4.450	1200	0.900
98	0.021	5.00	4.450	1350	1.100
97			4.300	1350	0.980
96			4.300	1350	1.010
95			4.300	1350	1.040
94	0.046	5.00	6.800	1200	0.750
93	0.046	5.00	6.600	1200	0.773



Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
92			6.400	1200	0.825
91			6.250	1200	0.825
90	0.076	5.00	6.000	1200	0.825
89			6.000	1200	0.849
88			5.900	1200	0.825
87	0.076	5.00	5.700	1200	0.825
86			5.700	1200	0.848
85			5.600	1200	0.825
84			5.400	1200	0.825
83	0.076	5.00	5.300	1200	0.825
82			5.300	1200	0.844
81	0.062	5.00	6.550	1200	0.750
80			6.300	1200	0.750
79	0.062	5.00	6.200	1200	0.750
78			6.200	1200	0.860
77			6.000	1200	0.825
76	0.062	5.00	5.900	1200	0.750
75			5.900	1200	0.930
74			5.900	1200	0.950
73	0.040	5.00	6.800	1200	0.750
72	0.046	5.00	6.600	1200	0.750
71	0.046	5.00	6.300	1200	0.825
70	0.094	5.00	6.400	1200	0.750
69			6.200	1200	0.825
68			6.100	1200	0.825
67			6.000	1200	0.825
66	0.095	5.00	5.900	1200	0.825
65			5.900	1200	0.920
64			5.800	1200	0.900
63	0.043	5.00	6.550	1200	0.750
62	0.055	5.00	6.750	1200	0.750
61	0.055	5.00	6.700	1200	0.750
60			6.700	1200	0.905
59	0.030	5.00	6.400	1200	0.825
58	0.024	5.00	6.200	1200	0.825
57	0.072	5.00	5.900	1200	0.825
56	0.095	5.00	5.700	1200	0.825
55			5.700	1350	0.992
54			5.700	1350	1.038
53			5.700	1350	1.074
52	0.095	5.00	5.700	1200	0.750
51			5.700	1350	1.190
50	0.041	5.00	5.750	1350	1.282
49	0.041	5.00	6.000	1350	1.558
48	0.041	5.00	6.100	1350	1.681
47	0.072	5.00	5.800	1350	1.432
46			6.000	1350	1.647
45			5.800	1500	1.552
44			5.800	1800	1.555
43	0.072	5.00	5.550	1500	1.321
42	0.050	5.00	5.300	1500	1.125
41	0.050	5.00	5.150	1500	1.125



Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
40	0.050	5.00	5.100	1500	1.125
39			5.100	1500	1.147
38			5.100	1500	1.167
37			5.100	1500	1.345
36	0.040	5.00	4.900	1200	0.750
35			4.900	1200	1.145
32	0.100	5.00	4.700	1200	0.825
31	0.100	5.00	4.600	1200	0.825
30	0.057	5.00	5.050	1200	0.750
29	0.057	5.00	5.050	1200	0.750
28			5.050	1200	0.911
27	0.048	5.00	5.575	1200	0.750
26	0.048	5.00	5.300	1200	0.750
25	0.051	5.00	5.075	1200	1.072
24	0.051	5.00	4.800	1200	0.900
23			4.600	1350	0.991
22			4.550	1350	0.975
21			4.550	1350	1.023
20	0.042	5.00	5.125	1200	0.750
19	0.042	5.00	4.900	1200	0.750
18	0.037	5.00	5.175	1200	0.750
17	0.037	5.00	5.350	1200	0.750
16			5.350	1200	1.026
15	0.038	5.00	5.475	1200	1.301
14	0.038	5.00	5.350	1200	1.226
13	0.046	5.00	4.650	1200	0.900
12	0.046	5.00	4.600	1200	0.928
11			4.550	1200	0.948
10	0.105	5.00	4.550	1200	0.750
9			4.550	1350	1.054
8			4.550	1500	1.231
7			4.500	1500	1.534
6	0.047	5.00	4.500	1200	1.550
5			4.500	1200	1.567
4			4.500	1500	1.578
3	0.109	5.00	4.900	1200	1.200
2			4.900	1500	1.215
1			4.900	1200	1.224



Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
37.001	2.527	280.7	225	4.900	3.685	0.990	4.900	3.676	0.999
37.000	4.365	291.0	225	4.900	3.700	0.975	4.900	3.685	0.990
35.001	3.090	280.9	225	4.500	2.933	1.342	4.500	2.922	1.353
35.000	4.811	283.0	225	4.500	2.950	1.325	4.500	2.933	1.342
21.008	5.439	777.1	525	4.550	3.319	0.706	4.500	3.312	0.663
25.006	13.394	230.9	375	4.550	3.527	0.648	4.550	3.469	0.706
21.007	14.926	552.8	375	4.550	3.496	0.679	4.550	3.469	0.706
24.000	4.978	63.0	150	4.550	3.800	0.600	4.550	3.721	0.679
21.006	13.100	422.6	300	4.550	3.602	0.648	4.550	3.571	0.679
21.005	30.072	429.6	300	4.600	3.672	0.628	4.550	3.602	0.648
21.004	33.501	429.5	300	4.650	3.750	0.600	4.600	3.672	0.628
23.001	30.705	122.8	150	4.900	4.150	0.600	4.650	3.900	0.600
21.003	40.811	136.5	225	5.350	4.124	1.001	4.650	3.825	0.600
21.002	14.736	294.7	225	5.475	4.174	1.076	5.350	4.124	1.001
21.001	13.320	177.6	150	5.350	4.324	0.876	5.475	4.249	1.076
22.000	4.530	174.2	150	5.350	4.600	0.600	5.350	4.574	0.626
21.000	17.836	177.1	150	5.175	4.425	0.600	5.350	4.324	0.876
23.000	23.345	126.0	150	5.125	4.375	0.600	4.900	4.150	0.600
25.005	27.394	570.7	375	4.550	3.575	0.600	4.550	3.527	0.648
25.004	18.831	553.8	375	4.600	3.609	0.616	4.550	3.575	0.600
29.000	4.618	288.6	225	4.600	3.775	0.600	4.600	3.759	0.616
25.003	28.099	130.1	300	4.800	3.900	0.600	4.600	3.684	0.616
28.000	26.858	231.5	225	4.700	3.875	0.600	4.600	3.759	0.616
25.002	25.123	243.9	300	5.075	4.003	0.772	4.800	3.900	0.600
26.001	18.176	298.0	225	5.050	4.139	0.686	5.075	4.078	0.772

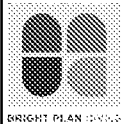
Link	US Node	DS Node
37.001	2	1
37.000	3	2
35.001	5	4
35.000	6	5
21.008	8	7
25.006	21	8
21.007	9	8
24.000	10	9
21.006	11	9
21.005	12	11
21.004	13	12
23.001	19	13
21.003	14	13
21.002	15	14
21.001	16	15
22.000	17	16
21.000	18	16
23.000	20	19
25.005	22	21
25.004	23	22
29.000	31	23
25.003	24	23
28.000	32	23
25.002	25	24
26.001	28	25



Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
25.001	21.292	53.6	150	5.300	4.550	0.600	5.075	4.153	0.772
25.000	26.495	96.3	150	5.575	4.825	0.600	5.300	4.550	0.600
27.000	4.819	56.0	150	5.050	4.300	0.600	5.050	4.214	0.686
26.000	15.293	177.8	150	5.050	4.300	0.600	5.050	4.214	0.686
36.000	7.034	175.8	150	4.900	4.150	0.600	4.900	4.110	0.640
1.021	3.381	845.3	450	5.100	3.933	0.717	5.100	3.929	0.721
12.009	13.988	46.9	225	5.300	4.456	0.619	5.100	4.158	0.717
1.020	16.770	838.5	450	5.100	3.953	0.697	5.100	3.933	0.717
1.019	18.598	845.4	450	5.100	3.975	0.675	5.100	3.953	0.697
1.018	15.658	313.2	450	5.150	4.025	0.675	5.100	3.975	0.675
1.017	27.069	180.5	450	5.300	4.175	0.675	5.150	4.025	0.675
1.016	23.234	430.3	450	5.550	4.229	0.871	5.300	4.175	0.675
1.015	13.222	826.3	450	5.800	4.245	1.105	5.550	4.229	0.871
1.014	2.255	751.5	450	5.800	4.248	1.102	5.800	4.245	1.105
9.005	6.764	135.3	300	5.900	4.950	0.650	5.800	4.900	0.600
1.013	21.199	706.6	450	6.000	4.353	1.197	5.800	4.323	1.027
1.012	10.499	699.9	450	5.800	4.368	0.982	6.000	4.353	1.197
1.011	36.362	713.0	450	6.100	4.419	1.231	5.800	4.368	0.982
8.002	16.469	82.3	225	6.300	5.475	0.600	6.100	5.275	0.600
1.010	16.213	704.9	450	6.000	4.442	1.108	6.100	4.419	1.231
1.009	13.438	709.2	450	5.750	4.468	0.832	6.000	4.442	1.108
1.008	29.889	711.6	450	5.700	4.510	0.740	5.750	4.468	0.832
7.000	6.786	48.5	150	5.700	4.950	0.600	5.700	4.810	0.740
1.007	23.463	572.3	375	5.700	4.626	0.699	5.700	4.585	0.740
1.006	20.403	566.8	375	5.700	4.662	0.663	5.700	4.626	0.699

Link	US Node	DS Node
25.001	26	25
25.000	27	26
27.000	29	28
26.000	30	28
36.000	36	35
1.021	38	37
12.009	82	38
1.020	39	38
1.019	40	39
1.018	41	40
1.017	42	41
1.016	43	42
1.015	44	43
1.014	45	44
9.005	74	45
1.013	46	45
1.012	47	46
1.011	48	47
8.002	71	48
1.010	49	48
1.009	50	49
1.008	51	50
7.000	52	51
1.007	53	51
1.006	54	53



Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.005	25.804	561.0	375	5.700	4.708	0.617	5.700	4.662	0.663
6.000	5.081	297.7	225	5.700	4.875	0.600	5.700	4.858	0.617
4.005	23.635	202.0	300	5.800	4.900	0.600	5.700	4.782	0.617
1.004	32.629	150.4	225	5.900	5.075	0.600	5.700	4.858	0.617
1.003	31.019	103.4	225	6.200	5.375	0.600	5.900	5.075	0.600
1.002	22.024	110.1	225	6.400	5.575	0.600	6.200	5.375	0.600
3.000	15.766	105.1	150	6.550	5.800	0.600	6.400	5.650	0.600
1.001	33.645	152.9	225	6.700	5.795	0.680	6.400	5.575	0.600
2.000	5.185	64.8	150	6.700	5.950	0.600	6.700	5.870	0.680
1.000	23.005	177.0	150	6.750	6.000	0.600	6.700	5.870	0.680
4.004	33.416	417.7	300	5.900	4.980	0.620	5.800	4.900	0.600
5.000	5.895	294.7	225	5.900	5.075	0.600	5.900	5.055	0.620
4.003	9.677	80.6	225	6.000	5.175	0.600	5.900	5.055	0.620
4.002	10.057	100.6	225	6.100	5.275	0.600	6.000	5.175	0.600
4.001	15.360	153.6	225	6.200	5.375	0.600	6.100	5.275	0.600
4.000	11.092	55.5	150	6.400	5.650	0.600	6.200	5.450	0.600
8.001	31.662	105.5	150	6.600	5.850	0.600	6.300	5.550	0.600
8.000	20.120	100.6	150	6.800	6.050	0.600	6.600	5.850	0.600
9.004	8.315	415.8	300	5.900	4.970	0.630	5.900	4.950	0.650
11.000	5.283	176.1	150	5.900	5.150	0.600	5.900	5.120	0.630
9.003	16.503	126.9	225	6.000	5.175	0.600	5.900	5.045	0.630
9.002	16.602	100.6	225	6.200	5.340	0.635	6.000	5.175	0.600
10.000	6.115	174.7	150	6.200	5.450	0.600	6.200	5.415	0.635
9.001	14.276	105.7	150	6.300	5.550	0.600	6.200	5.415	0.635
9.000	18.408	73.6	150	6.550	5.800	0.600	6.300	5.550	0.600

Link	US Node	DS Node
1.005	55	54
6.000	56	55
4.005	64	55
1.004	57	55
1.003	58	57
1.002	59	58
3.000	63	59
1.001	60	59
2.000	61	60
1.000	62	60
4.004	65	64
5.000	66	65
4.003	67	65
4.002	68	67
4.001	69	68
4.000	70	69
8.001	72	71
8.000	73	72
9.004	75	74
11.000	76	75
9.003	77	75
9.002	78	77
10.000	79	78
9.001	80	78
9.000	81	80



Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
15.000	5.686	299.3	225	5.300	4.475	0.600	5.300	4.456	0.619
12.008	12.064	101.4	225	5.400	4.575	0.600	5.300	4.456	0.619
12.007	25.611	128.1	225	5.600	4.775	0.600	5.400	4.575	0.600
12.006	9.912	128.7	225	5.700	4.852	0.623	5.600	4.775	0.600
14.000	6.734	292.8	225	5.700	4.875	0.600	5.700	4.852	0.623
12.005	24.324	109.1	225	5.900	5.075	0.600	5.700	4.852	0.623
12.004	14.826	195.1	225	6.000	5.151	0.624	5.900	5.075	0.600
13.000	7.078	294.9	225	6.000	5.175	0.600	6.000	5.151	0.624
12.003	28.637	104.5	225	6.250	5.425	0.600	6.000	5.151	0.624
12.002	25.160	167.7	225	6.400	5.575	0.600	6.250	5.425	0.600
12.001	17.545	99.1	150	6.600	5.827	0.623	6.400	5.650	0.600
12.000	39.671	177.9	150	6.800	6.050	0.600	6.600	5.827	0.623
30.007	7.078	235.9	375	4.300	3.290	0.635	4.300	3.260	0.665
30.006	6.054	201.8	375	4.300	3.320	0.605	4.300	3.290	0.635
30.005	6.645	221.5	375	4.450	3.350	0.725	4.300	3.320	0.605
30.004	23.725	237.3	375	4.550	3.450	0.725	4.450	3.350	0.725
33.003	13.800	206.0	300	4.450	3.550	0.600	4.450	3.483	0.667
33.002	30.289	151.4	225	4.650	3.825	0.600	4.450	3.625	0.600
33.001	34.800	63.3	225	5.200	4.375	0.600	4.650	3.825	0.600
33.000	30.284	75.7	150	5.600	4.850	0.600	5.200	4.450	0.600
30.003	22.068	84.2	300	4.700	3.787	0.613	4.550	3.525	0.725
30.002	32.110	88.5	225	5.050	4.225	0.600	4.700	3.862	0.613
35.000_1	3.723	286.4	225	4.700	3.875	0.600	4.700	3.862	0.613
32.001	17.199	105.5	225	4.850	4.025	0.600	4.700	3.862	0.613
32.000	31.427	104.8	225	5.150	4.325	0.600	4.850	4.025	0.600

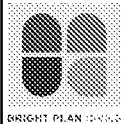
Link	US Node	DS Node
15.000	83	82
12.008	84	82
12.007	85	84
12.006	86	85
14.000	87	86
12.005	88	86
12.004	89	88
13.000	90	89
12.003	91	89
12.002	92	91
12.001	93	92
12.000	94	93
30.007	96	95
30.006	97	96
30.005	98	97
30.004	103	98
33.003	99	98
33.002	100	99
33.001	101	100
33.000	102	101
30.003	104	103
30.002	107	104
35.000_1	104 - PP	104
32.001	105	104
32.000	106	105



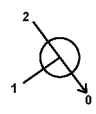
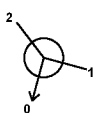
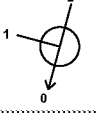
Pipeline Schedule

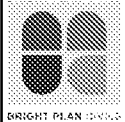
Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
30.001	21.070	105.4	225	5.250	4.425	0.600	5.050	4.225	0.600
31.000	23.976	159.8	150	5.400	4.650	0.600	5.250	4.500	0.600
30.000	33.124	110.4	150	5.550	4.800	0.600	5.250	4.500	0.600
16.011	6.612	220.4	375	4.600	3.280	0.945	4.400	3.250	0.775
16.010	5.572	278.6	375	4.600	3.300	0.925	4.600	3.280	0.945
16.009	7.379	147.6	375	4.650	3.675	0.600	4.600	3.625	0.600
20.002	10.667	213.3	225	4.700	3.875	0.600	4.650	3.825	0.600
16.008	21.266	212.7	300	4.750	3.850	0.600	4.650	3.750	0.600
16.007	16.940	112.9	300	4.900	4.000	0.600	4.750	3.850	0.600
16.006	22.427	202.0	300	5.100	4.111	0.689	4.900	4.000	0.600
19.001	46.159	88.1	225	5.550	4.710	0.615	5.100	4.186	0.689
20.000_1	4.271	284.7	225	5.550	4.725	0.600	5.550	4.710	0.615
16.005	26.389	296.5	225	5.100	4.275	0.600	5.100	4.186	0.689
16.004	21.490	123.7	225	5.300	4.442	0.633	5.100	4.275	0.600
18.000	5.817	176.3	150	5.300	4.550	0.600	5.300	4.517	0.633
16.003	24.966	72.4	150	5.750	5.000	0.600	5.300	4.517	0.633
16.002	37.460	89.6	150	6.200	5.418	0.632	5.750	5.000	0.600
17.000	5.550	173.5	150	6.200	5.450	0.600	6.200	5.418	0.632
16.001	16.851	59.8	150	6.450	5.700	0.600	6.200	5.418	0.632
16.000	26.942	89.8	150	6.750	6.000	0.600	6.450	5.700	0.600
19.000	39.908	96.2	225	5.950	5.125	0.600	5.550	4.710	0.615
20.001	33.918	144.9	225	4.950	4.109	0.616	4.700	3.875	0.600
22.000_1	4.682	292.6	225	4.950	4.125	0.600	4.950	4.109	0.616
20.000	31.158	98.6	150	5.250	4.500	0.600	4.950	4.184	0.616

Link	US Node	DS Node
30.001	108	107
31.000	110	108
30.000	109	108
16.011	112	111
16.010	113	112
16.009	114	113
20.002	128	114
16.008	115	114
16.007	116	115
16.006	117	116
19.001	118	117
20.000_1	118 - PP	118
16.005	120	117
16.004	121	120
18.000	122	121
16.003	123	121
16.002	124	123
17.000	125	124
16.001	126	124
16.000	127	126
19.000	119	118
20.001	129	128
22.000_1	129 - PP	129
20.000	130	129



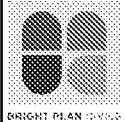
Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
130	5.250	0.750	1200		0	20.000	4.500	150
129 - PP	4.950	0.825	1200		0	22.000_1	4.125	225
129	4.950	0.841	1200		1 22.000_1	4.109	225	
					2	20.000	4.184	150
					0	20.001	4.109	225
128	4.700	0.825	1200		1	20.001	3.875	225
					0	20.002	3.875	225
127	6.750	0.750	1200		0	16.000	6.000	150
126	6.450	0.750	1200		1	16.000	5.700	150
					0	16.001	5.700	150
125	6.200	0.750	1200		0	17.000	5.450	150
124	6.200	0.782	1200		1 2	17.000 16.001	5.418 5.418	150 150
					0	16.002	5.418	150
123	5.750	0.750	1200		1	16.002	5.000	150
					0	16.003	5.000	150
122	5.300	0.750	1200		0	18.000	4.550	150
121	5.300	0.858	1200		1 2	18.000 16.003	4.517 4.517	150 150
					0	16.004	4.442	225
120	5.100	0.825	1200		1	16.004	4.275	225
					0	16.005	4.275	225
119	5.950	0.825	1200		0	19.000	5.125	225



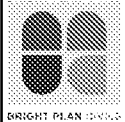
Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
118 - PP	5.550	0.825	1200					
				0	20.000_1	4.725	225	
118	5.550	0.840	1200		1	20.000_1	4.710	225
				2	19.000	4.710	225	
				0	19.001	4.710	225	
117	5.100	0.989	1200		1	19.001	4.186	225
				2	16.005	4.186	225	
				0	16.006	4.111	300	
116	4.900	0.900	1200		1	16.006	4.000	300
				0	16.007	4.000	300	
115	4.750	0.900	1200		1	16.007	3.850	300
				0	16.008	3.850	300	
114	4.650	0.975	1350		1	20.002	3.825	225
				2	16.008	3.750	300	
				0	16.009	3.675	375	
113	4.600	1.300	1350		1	16.009	3.625	375
				0	16.010	3.300	375	
112	4.600	1.320	1350		1	16.010	3.280	375
				0	16.011	3.280	375	
111	4.400	1.150	1350		1	16.011	3.250	375
110	5.400	0.750	1200					
				0	31.000	4.650	150	
109	5.550	0.750	1200					
				0	30.000	4.800	150	
108	5.250	0.825	1200		1	31.000	4.500	150
				2	30.000	4.500	150	
				0	30.001	4.425	225	
107	5.050	0.825	1200		1	30.001	4.225	225
				0	30.002	4.225	225	

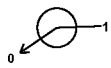


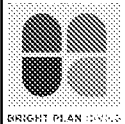
Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
106	5.150	0.825	1200					
				0	32.000	4.325	225	
105	4.850	0.825	1200		1	32.000	4.025	225
				0	32.001	4.025	225	
104 - PP	4.700	0.825	1200					
				0	35.000_1	3.875	225	
104	4.700	0.913	1200		1	35.000_1	3.862	225
				2	32.001	3.862	225	
				3	30.002	3.862	225	
				0	30.003	3.787	300	
103	4.550	1.100	1350		1	30.003	3.525	300
				0	30.004	3.450	375	
102	5.600	0.750	1200					
				0	33.000	4.850	150	
101	5.200	0.825	1200		1	33.000	4.450	150
				0	33.001	4.375	225	
100	4.650	0.825	1200		1	33.001	3.825	225
				0	33.002	3.825	225	
99	4.450	0.900	1200		1	33.002	3.625	225
				0	33.003	3.550	300	
98	4.450	1.100	1350		1	33.003	3.483	300
				2	30.004	3.350	375	
				0	30.005	3.350	375	
97	4.300	0.980	1350		1	30.005	3.320	375
				0	30.006	3.320	375	
96	4.300	1.010	1350		1	30.006	3.290	375
				0	30.007	3.290	375	
95	4.300	1.040	1350		1	30.007	3.260	375



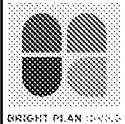
Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
94	6.800	0.750	1200				
				0	12.000	6.050	150
93	6.600	0.773	1200		1	12.000	5.827
				0	12.001	5.827	150
92	6.400	0.825	1200		1	12.001	5.650
				0	12.002	5.575	225
91	6.250	0.825	1200		1	12.002	5.425
				0	12.003	5.425	225
90	6.000	0.825	1200				
				0	13.000	5.175	225
89	6.000	0.849	1200		1	13.000	5.151
				2	12.003	5.151	225
				0	12.004	5.151	225
88	5.900	0.825	1200		1	12.004	5.075
				0	12.005	5.075	225
87	5.700	0.825	1200				
				0	14.000	4.875	225
86	5.700	0.848	1200		1	14.000	4.852
				2	12.005	4.852	225
				0	12.006	4.852	225
85	5.600	0.825	1200		1	12.006	4.775
				0	12.007	4.775	225
84	5.400	0.825	1200		1	12.007	4.575
				0	12.008	4.575	225
83	5.300	0.825	1200				
				0	15.000	4.475	225
82	5.300	0.844	1200		1	15.000	4.456
				2	12.008	4.456	225
				0	12.009	4.456	225



Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
81	6.550	0.750	1200					
				0	9.000	5.800	150	
80	6.300	0.750	1200		1	9.000	5.550	150
				0	9.001	5.550	150	
79	6.200	0.750	1200					
				0	10.000	5.450	150	
78	6.200	0.860	1200		1	10.000	5.415	150
				2	9.001	5.415	150	
				0	9.002	5.340	225	
77	6.000	0.825	1200		1	9.002	5.175	225
				0	9.003	5.175	225	
76	5.900	0.750	1200					
				0	11.000	5.150	150	
75	5.900	0.930	1200		1	11.000	5.120	150
				2	9.003	5.045	225	
				0	9.004	4.970	300	
74	5.900	0.950	1200		1	9.004	4.950	300
				0	9.005	4.950	300	
73	6.800	0.750	1200					
				0	8.000	6.050	150	
72	6.600	0.750	1200		1	8.000	5.850	150
				0	8.001	5.850	150	
71	6.300	0.825	1200		1	8.001	5.550	150
				0	8.002	5.475	225	
70	6.400	0.750	1200					
				0	4.000	5.650	150	
69	6.200	0.825	1200		1	4.000	5.450	150
				0	4.001	5.375	225	



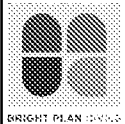
Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
68	6.100	0.825	1200		1 4.001	5.275	225
67	6.000	0.825	1200		0 4.002	5.275	225
66	5.900	0.825	1200		1 4.002	5.175	225
65	5.900	0.920	1200		0 4.003	5.175	225
64	5.800	0.900	1200		0 5.000	5.075	225
63	6.550	0.750	1200		1 5.000	5.055	225
62	6.750	0.750	1200		2 4.003	5.055	225
61	6.700	0.750	1200		0 4.004	4.980	300
60	6.700	0.905	1200		1 4.004	4.900	300
59	6.400	0.825	1200		0 4.005	4.900	300
58	6.200	0.825	1200		0 3.000	5.800	150
57	5.900	0.825	1200		0 1.000	6.000	150
56	5.700	0.825	1200		0 2.000	5.950	150
					1 2.000	5.870	150
					2 1.000	5.870	150
					0 1.001	5.795	225
					1 3.000	5.650	150
					2 1.001	5.575	225
					0 1.002	5.575	225
					1 1.002	5.375	225
					0 1.003	5.375	225
					1 1.003	5.075	225
					0 1.004	5.075	225
					0 6.000	4.875	225

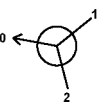


Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
55	5.700	0.992	1350		1 6.000 4.858 225 2 4.005 4.783 300 3 1.004 4.858 225 0 1.005 4.708 375		
54	5.700	1.038	1350		1 1.005 4.662 375 0 1.006 4.662 375		
53	5.700	1.074	1350		1 1.006 4.626 375 0 1.007 4.626 375		
52	5.700	0.750	1200		0 7.000 4.950 150		
51	5.700	1.190	1350		1 7.000 4.810 150 2 1.007 4.585 375 0 1.008 4.510 450		
50	5.750	1.282	1350		1 1.008 4.468 450 0 1.009 4.468 450		
49	6.000	1.558	1350		1 1.009 4.442 450 0 1.010 4.442 450		
48	6.100	1.681	1350		1 8.002 5.275 225 2 1.010 4.419 450 0 1.011 4.419 450		
47	5.800	1.432	1350		1 1.011 4.368 450 0 1.012 4.368 450		
46	6.000	1.647	1350		1 1.012 4.353 450 0 1.013 4.353 450		
45	5.800	1.552	1500		1 9.005 4.900 300 2 1.013 4.323 450 0 1.014 4.248 450		
44	5.800	1.555	1800		1 1.014 4.245 450 0 1.015 4.245 450		
43	5.550	1.321	1500		1 1.015 4.229 450 0 1.016 4.229 450		



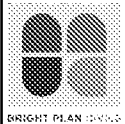
Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
42	5.300	1.125	1500		1 1.016	4.175	450
41	5.150	1.125	1500		0 1.017 1 1.017	4.175 4.025	450 450
40	5.100	1.125	1500		0 1.018 1 1.018	4.025 3.975	450 450
39	5.100	1.147	1500		0 1.019 1 1.019	3.975 3.953	450 450
38	5.100	1.167	1500		1 12.009 2 1.020	4.158 3.933	225 450
37	5.100	1.345	1500		0 1.021 1 1.021	3.933 3.929	450 450
36	4.900	0.750	1200		0 36.000	4.150	150
35	4.900	1.145	1200		1 36.000	4.110	150
32	4.700	0.825	1200		0 28.000	3.875	225
31	4.600	0.825	1200		0 29.000	3.775	225
30	5.050	0.750	1200		0 26.000	4.300	150
29	5.050	0.750	1200		0 27.000	4.300	150
28	5.050	0.911	1200		1 27.000 2 26.000 0 26.001	4.214 4.214 4.139	150 150 225

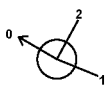
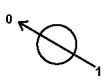
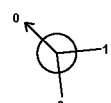
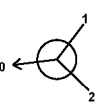


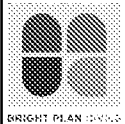
Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
27	5.575	0.750	1200					
				0	25.000	4.825	150	
26	5.300	0.750	1200		1	25.000	4.550	150
				0	25.001	4.550	150	
25	5.075	1.072	1200		1	26.001	4.078	225
				2	25.001	4.153	150	
				0	25.002	4.003	300	
24	4.800	0.900	1200		1	25.002	3.900	300
				0	25.003	3.900	300	
23	4.600	0.991	1350		1	29.000	3.759	225
				2	28.000	3.759	225	
				3	25.003	3.684	300	
				0	25.004	3.609	375	
22	4.550	0.975	1350		1	25.004	3.575	375
				0	25.005	3.575	375	
21	4.550	1.023	1350		1	25.005	3.527	375
				0	25.006	3.527	375	
20	5.125	0.750	1200					
				0	23.000	4.375	150	
19	4.900	0.750	1200		1	23.000	4.150	150
				0	23.001	4.150	150	
18	5.175	0.750	1200					
				0	21.000	4.425	150	
17	5.350	0.750	1200					
				0	22.000	4.600	150	
16	5.350	1.026	1200		1	22.000	4.574	150
				2	21.000	4.324	150	
				0	21.001	4.324	150	
15	5.475	1.301	1200		1	21.001	4.249	150
				0	21.002	4.174	225	



Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
14	5.350	1.226	1200		1 21.002	4.124	225
					0 21.003	4.124	225
13	4.650	0.900	1200		1 23.001	3.900	150
					2 21.003	3.825	225
					0 21.004	3.750	300
12	4.600	0.928	1200		1 21.004	3.672	300
					0 21.005	3.672	300
11	4.550	0.948	1200		1 21.005	3.602	300
					0 21.006	3.602	300
10	4.550	0.750	1200				
					0 24.000	3.800	150
9	4.550	1.054	1350		1 24.000	3.721	150
					2 21.006	3.571	300
					0 21.007	3.496	375
8	4.550	1.231	1500		1 25.006	3.469	375
					2 21.007	3.469	375
					0 21.008	3.319	525
7	4.500	1.534	1500		1 21.008	3.312	525
6	4.500	1.550	1200				
					0 35.000	2.950	225
5	4.500	1.567	1200		1 35.000	2.933	225
					0 35.001	2.933	225
4	4.500	1.578	1500		1 35.001	2.922	225
3	4.900	1.200	1200				
					0 37.000	3.700	225
2	4.900	1.215	1500		1 37.000	3.685	225
					0 37.001	3.685	225



Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	4.900	1.224	1200		1	37.001	225



Node 2 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	3.685	Product Number	CTL-SHE-0092-4000-1215-4000
Design Depth (m)	1.215	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	4.0	Min Node Diameter (mm)	1200

Node 5 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	2.933	Product Number	CTL-SHE-0087-4000-1567-4000
Design Depth (m)	1.567	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	4.0	Min Node Diameter (mm)	1200

Node 96 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	3.290	Product Number	CTL-SHE-0169-1400-1059-1400
Design Depth (m)	1.059	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	14.0	Min Node Diameter (mm)	1200

Node 112 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	3.280	Product Number	CTL-SHE-0157-1200-1058-1200
Design Depth (m)	1.058	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	12.0	Min Node Diameter (mm)	1200

Node 44 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	4.245	Product Number	CTL-SHE-0195-2100-1550-2100
Design Depth (m)	1.550	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	21.0	Min Node Diameter (mm)	1500

Node 10 Online Orifice Control

Flap Valve	x	Invert Level (m)	3.800	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		



Node 31 Online Orifice Control

Flap Valve	x	Invert Level (m)	3.775	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 32 Online Orifice Control

Flap Valve	x	Invert Level (m)	3.875	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 17 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.600	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 18 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.425	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 29 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.300	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 30 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.300	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 83 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.475	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 87 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.875	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 90 Online Orifice Control

Flap Valve	x	Invert Level (m)	5.175	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 76 Online Orifice Control

Flap Valve	x	Invert Level (m)	5.150	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 79 Online Orifice Control

Flap Valve	x	Invert Level (m)	5.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		



Node 81 Online Orifice Control

Flap Valve	x	Invert Level (m)	5.800	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 52 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.950	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 56 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.875	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 66 Online Orifice Control

Flap Valve	x	Invert Level (m)	5.075	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 70 Online Orifice Control

Flap Valve	x	Invert Level (m)	5.650	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 61 Online Orifice Control

Flap Valve	x	Invert Level (m)	5.950	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 62 Online Orifice Control

Flap Valve	x	Invert Level (m)	6.000	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 122 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.550	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 125 Online Orifice Control

Flap Valve	x	Invert Level (m)	5.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 127 Online Orifice Control

Flap Valve	x	Invert Level (m)	6.000	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.060		

Node 106 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.325	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.050		



Node 104 - PP Online Orifice Control

Flap Valve	x	Invert Level (m)	3.875	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.050		

Node 130 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.500	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.050		

Node 129 - PP Online Orifice Control

Flap Valve	x	Invert Level (m)	4.125	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.050		

Node 119 Online Orifice Control

Flap Valve	x	Invert Level (m)	5.125	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.065		

Node 118 - PP Online Orifice Control

Flap Valve	x	Invert Level (m)	4.725	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.065		

Node 3 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	55.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	3.700	Main Channel Slope (1:X)	1000.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.025

Inlets

35	37
----	----

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	550.0	0.0	1.150	1091.3	0.0

Node 6 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	16.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	2.950	Main Channel Slope (1:X)	1000.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.025

Inlets

7

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	175.0	0.0	1.550	474.5	0.0

Node 36 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	4.550
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	



Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	145.0	0.0	0.350	411.9	0.0

Node 45 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	4.250
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	315.0	0.0	0.800	315.0	0.0	0.801	0.0	0.0

Node 97 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	3.320
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	33.0	0.0	0.980	340.0	0.0

Node 113 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	3.300
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	250.0	0.0	0.800	250.0	0.0	0.801	0.0	0.0

Node 10 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	3.800	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.450
Safety Factor	2.0	Width (m)	6.000	Inf Depth (m)	
Porosity	0.32	Length (m)	48.600		

Node 31 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	3.775	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.450
Safety Factor	2.0	Width (m)	6.000	Inf Depth (m)	
Porosity	0.32	Length (m)	48.600		

Node 32 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	3.875	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	61	Depth (m)	0.450
Safety Factor	2.0	Width (m)	6.000	Inf Depth (m)	
Porosity	0.32	Length (m)	48.600		



Node 17 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.600	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	15	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	15.000		

Node 18 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.425	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	15	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	15.000		

Node 29 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.300	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	37	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	20.300		

Node 30 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.300	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	39	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	20.300		

Node 83 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.475	Slope (1:X)	135.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	31	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	68.400		

Node 87 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.875	Slope (1:X)	135.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	33	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	68.400		

Node 90 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	5.175	Slope (1:X)	135.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	32	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	68.400		

Node 76 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	5.150	Slope (1:X)	60.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	60	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	28.500		



Node 79 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	5.450	Slope (1:X)	60.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	41	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	28.500		

Node 81 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	5.800	Slope (1:X)	60.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	40	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	28.500		

Node 52 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.950	Slope (1:X)	254.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	180	Depth (m)	0.550
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	63.600		

Node 56 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.875	Slope (1:X)	254.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	192	Depth (m)	0.550
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	63.600		

Node 66 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	5.075	Slope (1:X)	254.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	140	Depth (m)	0.500
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	63.600		

Node 70 Carpark Storage Structure

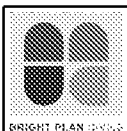
Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	5.650	Slope (1:X)	254.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	43	Depth (m)	0.500
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	63.600		

Node 61 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	5.950	Slope (1:X)	210.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	53.300		

Node 62 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	6.000	Slope (1:X)	210.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	53.300		



Node 122 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.550	Slope (1:X)	90.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	31	Depth (m)	0.500
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	53.300		

Node 125 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	5.450	Slope (1:X)	135.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	16	Depth (m)	0.500
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	53.300		

Node 127 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	6.000	Slope (1:X)	210.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.500
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	53.300		

Node 106 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.325	Slope (1:X)	125.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	156	Depth (m)	0.500
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	64.500		

Node 104 - PP Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	3.875	Slope (1:X)	125.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	214	Depth (m)	0.500
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	64.500		

Node 130 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.500	Slope (1:X)	120.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	83	Depth (m)	0.500
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	33.500		

Node 129 - PP Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.125	Slope (1:X)	120.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	75	Depth (m)	0.500
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	33.500		

Node 119 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	5.125	Slope (1:X)	114.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	64	Depth (m)	0.550
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	47.700		

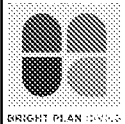


Node 118 - PP Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.725	Slope (1:X)	114.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	65	Depth (m)	0.550
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	47.700		

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	92.521	26.180	30 year 960 minute winter	8.133	3.233
1 year 15 minute winter	64.927	26.180	30 year 1440 minute summer	8.788	2.355
1 year 30 minute summer	60.022	16.984	30 year 1440 minute winter	5.906	2.355
1 year 30 minute winter	42.121	16.984	100 year 15 minute summer	291.766	82.560
1 year 60 minute summer	40.398	10.676	100 year 15 minute winter	204.748	82.560
1 year 60 minute winter	26.839	10.676	100 year 30 minute summer	191.982	54.324
1 year 120 minute summer	24.980	6.602	100 year 30 minute winter	134.724	54.324
1 year 120 minute winter	16.596	6.602	100 year 60 minute summer	129.253	34.158
1 year 180 minute summer	19.271	4.959	100 year 60 minute winter	85.873	34.158
1 year 180 minute winter	12.527	4.959	100 year 120 minute summer	78.836	20.834
1 year 240 minute summer	15.301	4.043	100 year 120 minute winter	52.377	20.834
1 year 240 minute winter	10.165	4.043	100 year 180 minute summer	59.966	15.431
1 year 360 minute summer	11.775	3.030	100 year 180 minute winter	38.980	15.431
1 year 360 minute winter	7.654	3.030	100 year 240 minute summer	46.975	12.414
1 year 480 minute summer	9.342	2.469	100 year 240 minute winter	31.209	12.414
1 year 480 minute winter	6.207	2.469	100 year 360 minute summer	35.264	9.075
1 year 600 minute summer	7.682	2.101	100 year 360 minute winter	22.923	9.075
1 year 600 minute winter	5.249	2.101	100 year 480 minute summer	27.350	7.228
1 year 720 minute summer	6.859	1.838	100 year 480 minute winter	18.171	7.228
1 year 720 minute winter	4.609	1.838	100 year 600 minute summer	22.137	6.055
1 year 960 minute summer	5.653	1.489	100 year 600 minute winter	15.126	6.055
1 year 960 minute winter	3.745	1.489	100 year 720 minute summer	19.562	5.243
1 year 1440 minute summer	4.127	1.106	100 year 720 minute winter	13.147	5.243
1 year 1440 minute winter	2.773	1.106	100 year 960 minute summer	15.851	4.174
30 year 15 minute summer	226.195	64.005	100 year 960 minute winter	10.500	4.174
30 year 15 minute winter	158.733	64.005	100 year 1440 minute summer	11.278	3.023
30 year 30 minute summer	147.452	41.724	100 year 1440 minute winter	7.579	3.023
30 year 30 minute winter	103.475	41.724	100 year +40% CC 15 minute summer	408.473	115.584
30 year 60 minute summer	98.615	26.061	100 year +40% CC 15 minute winter	286.647	115.584
30 year 60 minute winter	65.517	26.061	100 year +40% CC 30 minute summer	268.775	76.054
30 year 120 minute summer	59.946	15.842	100 year +40% CC 30 minute winter	188.614	76.054
30 year 120 minute winter	39.827	15.842	100 year +40% CC 60 minute summer	180.954	47.821
30 year 180 minute summer	45.598	11.734	100 year +40% CC 60 minute winter	120.222	47.821
30 year 180 minute winter	29.640	11.734	100 year +40% CC 120 minute summer	110.370	29.168
30 year 240 minute summer	35.759	9.450	100 year +40% CC 120 minute winter	73.327	29.168
30 year 240 minute winter	23.758	9.450	100 year +40% CC 180 minute summer	83.953	21.604
30 year 360 minute summer	26.939	6.932	100 year +40% CC 180 minute winter	54.572	21.604
30 year 360 minute winter	17.511	6.932	100 year +40% CC 240 minute summer	65.765	17.380
30 year 480 minute summer	20.981	5.545	100 year +40% CC 240 minute winter	43.693	17.380
30 year 480 minute winter	13.940	5.545	100 year +40% CC 360 minute summer	49.370	12.705
30 year 600 minute summer	17.039	4.661	100 year +40% CC 360 minute winter	32.092	12.705
30 year 600 minute winter	11.642	4.661	100 year +40% CC 480 minute summer	38.291	10.119
30 year 720 minute summer	15.093	4.045	100 year +40% CC 480 minute winter	25.439	10.119
30 year 720 minute winter	10.143	4.045	100 year +40% CC 600 minute summer	30.992	8.477
30 year 960 minute summer	12.278	3.233	100 year +40% CC 600 minute winter	21.176	8.477



Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +40% CC 720 minute summer	27.387	7.340	100 year +40% CC 960 minute winter	14.700	5.844
100 year +40% CC 720 minute winter	18.406	7.340	100 year +40% CC 1440 minute summer	15.789	4.232
100 year +40% CC 960 minute summer	22.191	5.844	100 year +40% CC 1440 minute winter	10.611	4.232



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	130	25	4.670	0.170	7.0	3.3347	0.0000	SURCHARGED
30 minute winter	129 - PP	26	4.297	0.172	7.0	3.3739	0.0000	OK
30 minute winter	129	26	4.154	0.045	3.8	0.0509	0.0000	OK
30 minute winter	128	27	3.927	0.052	3.8	0.0583	0.0000	OK
30 minute winter	127	24	6.103	0.103	5.0	2.0552	0.0000	OK
30 minute winter	126	25	5.730	0.030	2.0	0.0336	0.0000	OK
30 minute winter	125	24	5.571	0.121	5.0	1.9191	0.0000	OK
30 minute winter	124	25	5.466	0.048	4.1	0.0548	0.0000	OK
30 minute winter	123	26	5.045	0.045	4.1	0.0514	0.0000	OK
15 minute winter	122	14	4.698	0.148	6.6	1.7191	0.0000	OK
30 minute winter	121	25	4.499	0.057	6.4	0.0644	0.0000	OK
30 minute winter	120	26	4.348	0.073	6.4	0.0821	0.0000	OK
30 minute winter	119	25	5.326	0.201	10.5	4.4894	0.0000	OK
30 minute winter	118 - PP	25	4.928	0.203	10.4	4.5662	0.0000	OK
30 minute winter	118	26	4.764	0.054	6.9	0.0613	0.0000	OK
30 minute winter	117	20	4.212	0.101	17.9	0.2778	0.0000	OK
15 minute winter	116	12	4.093	0.093	19.7	0.1460	0.0000	OK
15 minute winter	115	12	3.964	0.114	21.7	0.1797	0.0000	OK
15 minute winter	114	12	3.787	0.112	26.5	0.2032	0.0000	OK
120 minute winter	113	102	3.448	0.148	18.9	35.4191	0.0000	OK
120 minute winter	112	102	3.446	0.166	11.0	0.2382	0.0000	OK
15 minute summer	111	1	3.250	0.000	6.3	0.0000	0.0000	OK
15 minute winter	110	11	4.719	0.069	6.0	0.1689	0.0000	OK
15 minute winter	109	11	4.861	0.061	6.0	0.1510	0.0000	OK
15 minute winter	108	11	4.519	0.094	17.2	0.2211	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)
30 minute winter	130	20.000	129	1.9	0.662	0.108	0.0908	
30 minute winter	129 - PP	22.000_1	129	1.9	0.358	0.063	0.0247	
30 minute winter	129	20.001	128	3.8	0.614	0.089	0.2114	
30 minute winter	128	20.002	114	3.8	0.574	0.108	0.0709	
30 minute winter	127	16.000	126	2.0	0.728	0.105	0.0732	
30 minute winter	126	16.001	124	2.0	0.542	0.086	0.0622	
30 minute winter	125	17.000	124	2.1	0.469	0.157	0.0250	
30 minute winter	124	16.002	123	4.1	0.868	0.218	0.1764	
30 minute winter	123	16.003	121	4.1	0.914	0.195	0.1559	
15 minute winter	122	18.000	121	2.4	0.556	0.180	0.0251	
30 minute winter	121	16.004	120	6.4	0.684	0.141	0.2033	
30 minute winter	120	16.005	117	6.4	0.627	0.215	0.2709	
30 minute winter	119	19.000	118	3.5	0.598	0.067	0.2387	
30 minute winter	118 - PP	20.000_1	118	3.4	0.458	0.111	0.0317	
30 minute winter	118	19.001	117	6.9	0.954	0.125	0.3355	
30 minute winter	117	16.006	116	17.9	0.917	0.230	0.4385	
15 minute winter	116	16.007	115	19.8	0.919	0.189	0.3648	
15 minute winter	115	16.008	114	21.6	0.911	0.285	0.5046	
15 minute winter	114	16.009	113	26.4	1.036	0.161	0.1884	
120 minute winter	113	16.010	112	11.0	0.279	0.092	0.2443	
120 minute winter	112	Hydro-Brake®	111	11.0				73.0
15 minute winter	110	31.000	108	5.8	0.748	0.412	0.1848	
15 minute winter	109	30.000	108	5.8	0.861	0.341	0.2214	
15 minute winter	108	30.001	107	17.3	1.149	0.342	0.3189	



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	107	11	4.314	0.089	17.3	0.1001	0.0000	OK
60 minute winter	106	47	4.571	0.246	8.3	6.9486	0.0000	SURCHARGED
60 minute winter	105	48	4.059	0.034	2.4	0.0383	0.0000	OK
60 minute winter	104 - PP	47	4.124	0.249	8.4	7.1250	0.0000	SURCHARGED
15 minute winter	104	12	3.874	0.087	21.0	0.0988	0.0000	OK
60 minute winter	103	47	3.588	0.138	14.6	0.2504	0.0000	OK
15 minute winter	102	11	4.917	0.067	8.3	0.1995	0.0000	OK
15 minute winter	101	11	4.450	0.075	16.2	0.2128	0.0000	OK
15 minute winter	100	11	3.950	0.125	24.2	0.3546	0.0000	OK
15 minute winter	99	11	3.695	0.145	32.3	0.4122	0.0000	OK
60 minute winter	98	47	3.587	0.237	33.3	0.4306	0.0000	OK
60 minute winter	97	48	3.587	0.267	32.2	19.3375	0.0000	OK
60 minute winter	96	48	3.586	0.296	14.2	0.4237	0.0000	OK
15 minute summer	95	1	3.260	0.000	13.8	0.0000	0.0000	OK
15 minute winter	94	11	6.116	0.066	5.5	0.1546	0.0000	OK
15 minute winter	93	11	5.914	0.087	10.7	0.2016	0.0000	OK
15 minute winter	92	11	5.656	0.081	10.5	0.0920	0.0000	OK
15 minute winter	91	12	5.493	0.068	10.5	0.0775	0.0000	OK
30 minute winter	90	24	5.335	0.160	6.9	2.9595	0.0000	OK
15 minute winter	89	12	5.243	0.092	12.4	0.1044	0.0000	OK
15 minute winter	88	13	5.152	0.077	12.2	0.0865	0.0000	OK
30 minute winter	87	24	5.036	0.161	6.9	2.9701	0.0000	OK
15 minute winter	86	13	4.945	0.093	14.3	0.1052	0.0000	OK
15 minute winter	85	13	4.864	0.089	14.3	0.1003	0.0000	OK
15 minute winter	84	14	4.661	0.086	14.2	0.0971	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 winter	107	30.002	104	17.2	1.215	0.311	0.4547	
60 minute winter	106	32.000	105	2.4	0.650	0.047	0.1162	
60 minute winter	105	32.001	104	2.4	0.652	0.048	0.0634	
60 minute winter	104 - PP	35.000_1	104	2.4	0.470	0.077	0.0187	
15 minute winter	104	30.003	103	21.0	1.267	0.173	0.3649	
60 minute winter	103	30.004	98	14.6	0.483	0.113	1.3093	
15 minute winter	102	33.000	101	8.0	1.077	0.392	0.2251	
15 minute winter	101	33.001	100	16.0	0.956	0.244	0.5977	
15 minute winter	100	33.002	99	23.7	1.075	0.563	0.6688	
15 minute winter	99	33.003	98	32.3	1.008	0.418	0.4418	
60 minute winter	98	30.005	97	32.2	0.967	0.240	0.5230	
60 minute winter	97	30.006	96	14.2	0.363	0.101	0.5364	
60 minute winter	96	Hydro-Brake®	95	14.0				67.2
15 minute winter	94	12.000	93	5.3	0.597	0.400	0.3564	
15 minute winter	93	12.001	92	10.5	1.026	0.590	0.1798	
15 minute winter	92	12.002	91	10.5	0.912	0.262	0.2895	
15 minute winter	91	12.003	89	10.4	0.831	0.204	0.3654	
30 minute winter	90	13.000	89	2.6	0.420	0.085	0.0790	
15 minute winter	89	12.004	88	12.2	0.901	0.330	0.2017	
15 minute winter	88	12.005	86	12.2	0.902	0.246	0.3329	
30 minute winter	87	14.000	86	2.5	0.356	0.083	0.0787	
15 minute winter	86	12.006	85	14.3	0.953	0.312	0.1487	
15 minute winter	85	12.007	84	14.2	1.003	0.309	0.3624	
15 minute winter	84	12.008	82	14.3	1.118	0.276	0.1539	



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	83	24	4.634	0.159	6.9	2.9180	0.0000	OK
15 minute winter	82	14	4.531	0.075	16.6	0.0850	0.0000	OK
15 minute winter	81	14	5.974	0.174	7.4	1.8786	0.0000	SURCHARGED
15 minute winter	80	15	5.592	0.042	2.8	0.0472	0.0000	OK
15 minute winter	79	14	5.626	0.176	7.4	1.9202	0.0000	SURCHARGED
15 minute winter	78	15	5.390	0.050	5.5	0.0567	0.0000	OK
15 minute winter	77	15	5.229	0.054	5.5	0.0607	0.0000	OK
15 minute winter	76	14	5.326	0.176	7.4	1.9219	0.0000	SURCHARGED
15 minute winter	75	15	5.048	0.078	8.1	0.0882	0.0000	OK
15 minute winter	74	16	5.013	0.063	8.1	0.0714	0.0000	OK
15 minute winter	73	10	6.103	0.053	4.8	0.1155	0.0000	OK
15 minute winter	72	11	5.933	0.083	10.2	0.1969	0.0000	OK
15 minute winter	71	11	5.558	0.083	15.1	0.1857	0.0000	OK
30 minute winter	70	25	5.784	0.134	8.6	4.1640	0.0000	OK
30 minute winter	69	26	5.412	0.037	2.4	0.0423	0.0000	OK
30 minute winter	68	26	5.309	0.034	2.4	0.0383	0.0000	OK
30 minute winter	67	27	5.207	0.032	2.4	0.0362	0.0000	OK
30 minute winter	66	26	5.212	0.137	8.7	4.3110	0.0000	OK
30 minute winter	65	27	5.042	0.062	4.7	0.0700	0.0000	OK
30 minute winter	64	28	4.951	0.051	4.7	0.0572	0.0000	OK
15 minute winter	63	10	5.857	0.057	5.1	0.1293	0.0000	OK
30 minute winter	62	24	6.104	0.104	5.0	2.0906	0.0000	OK
30 minute winter	61	24	6.053	0.103	5.0	2.0431	0.0000	OK
30 minute winter	60	25	5.841	0.046	3.9	0.0521	0.0000	OK
15 minute winter	59	11	5.650	0.075	11.5	0.1400	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)
30 minute winter	83	15.000	82	2.5	0.414	0.084	0.0518	
15 minute winter	82	12.009	38	16.5	1.484	0.217	0.1560	
15 minute winter	81	9.000	80	2.8	0.756	0.134	0.0679	
15 minute winter	80	9.001	78	2.8	0.709	0.161	0.0560	
15 minute winter	79	10.000	78	2.7	0.576	0.201	0.0286	
15 minute winter	78	9.002	77	5.5	0.792	0.106	0.1147	
15 minute winter	77	9.003	75	5.5	0.771	0.118	0.1169	
15 minute winter	76	11.000	75	2.7	0.572	0.202	0.0248	
15 minute winter	75	9.004	74	8.1	0.646	0.151	0.1051	
15 minute winter	74	9.005	45	8.1	0.796	0.085	0.0692	
15 minute winter	73	8.000	72	4.7	0.615	0.265	0.1559	
15 minute winter	72	8.001	71	9.9	1.000	0.573	0.3132	
15 minute winter	71	8.002	48	15.1	1.187	0.264	0.2100	
30 minute winter	70	4.000	69	2.4	0.854	0.100	0.0311	
30 minute winter	69	4.001	68	2.4	0.595	0.057	0.0618	
30 minute winter	68	4.002	67	2.4	0.667	0.046	0.0361	
30 minute winter	67	4.003	65	2.4	0.710	0.041	0.0326	
30 minute winter	66	5.000	65	2.3	0.467	0.077	0.0291	
30 minute winter	65	4.004	64	4.7	0.520	0.087	0.3051	
30 minute winter	64	4.005	55	4.7	0.609	0.060	0.2226	
15 minute winter	63	3.000	59	4.9	0.832	0.285	0.0938	
30 minute winter	62	1.000	60	1.9	0.534	0.144	0.0824	
30 minute winter	61	2.000	60	2.0	0.753	0.090	0.0137	
30 minute winter	60	1.001	59	3.9	0.651	0.093	0.2647	
15 minute winter	59	1.002	58	11.4	0.945	0.231	0.2667	



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	58	11	5.455	0.080	14.1	0.1367	0.0000	OK
15 minute winter	57	11	5.192	0.117	22.1	0.3355	0.0000	OK
30 minute winter	56	26	5.012	0.137	8.7	4.3127	0.0000	OK
15 minute winter	55	12	4.859	0.151	26.8	0.2162	0.0000	OK
15 minute winter	54	13	4.813	0.151	26.4	0.2157	0.0000	OK
15 minute winter	53	13	4.769	0.143	26.2	0.2051	0.0000	OK
30 minute winter	52	25	5.085	0.135	8.7	4.2186	0.0000	OK
15 minute winter	51	14	4.673	0.163	28.0	0.2334	0.0000	OK
15 minute winter	50	14	4.648	0.180	29.9	0.3722	0.0000	OK
15 minute winter	49	14	4.631	0.189	31.7	0.3697	0.0000	OK
15 minute winter	48	14	4.615	0.196	43.2	0.3763	0.0000	OK
30 minute winter	47	21	4.570	0.202	47.2	0.4929	0.0000	OK
30 minute winter	46	22	4.540	0.187	46.8	0.2672	0.0000	OK
240 minute winter	45	176	4.511	0.263	24.9	78.7747	0.0000	OK
240 minute winter	44	176	4.511	0.266	14.0	0.6759	0.0000	OK
240 minute winter	43	172	4.323	0.094	14.6	0.2681	0.0000	OK
240 minute winter	42	168	4.251	0.076	15.0	0.2019	0.0000	OK
15 minute winter	41	11	4.133	0.108	18.8	0.2857	0.0000	OK
15 minute winter	40	12	4.123	0.148	23.8	0.3925	0.0000	OK
15 minute winter	39	12	4.103	0.150	22.7	0.2646	0.0000	OK
15 minute winter	38	13	4.089	0.156	36.7	0.2763	0.0000	OK
960 minute winter	37	885	4.052	0.297	13.1	0.5242	0.0000	OK
15 minute winter	36	10	4.215	0.065	4.8	0.1433	0.0000	OK
960 minute winter	35	870	4.052	0.297	0.3	0.3354	0.0000	OK
30 minute winter	32	25	4.068	0.193	9.1	4.0233	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 winter	58	1.003	57	14.0	0.839	0.273	0.5174	
15 minute winter	57	1.004	55	21.3	1.057	0.504	0.6587	
30 minute winter	56	6.000	55	2.3	0.466	0.077	0.0250	
15 minute winter	55	1.005	54	26.4	0.648	0.316	1.0645	
15 minute winter	54	1.006	53	26.2	0.661	0.314	0.8169	
15 minute winter	53	1.007	51	25.7	0.769	0.311	0.7871	
30 minute winter	52	7.000	51	2.4	0.888	0.094	0.0184	
15 minute winter	51	1.008	50	28.0	0.505	0.233	1.6568	
15 minute winter	50	1.009	49	29.8	0.498	0.248	1.1258	
15 minute winter	49	1.010	48	32.0	0.513	0.266	1.0488	
15 minute winter	48	1.011	47	42.9	0.636	0.358	2.4523	
30 minute winter	47	1.012	46	46.8	0.716	0.387	0.6884	
30 minute winter	46	1.013	45	46.9	0.873	0.389	1.1403	
240 minute winter	45	1.014	44	14.0	0.145	0.120	0.2183	
240 minute winter	44	1.015	43	14.0	0.531	0.126	0.3489	
240 minute winter	43	1.016	42	14.6	0.703	0.094	0.4826	
240 minute winter	42	1.017	41	15.0	0.724	0.063	0.5646	
15 minute winter	41	1.018	40	18.2	0.502	0.100	0.5814	
15 minute winter	40	1.019	39	22.7	0.533	0.207	0.8495	
15 minute winter	39	1.020	38	22.1	0.493	0.200	0.7960	
15 minute winter	38	1.021	37	36.7	0.845	0.334	0.1472	
960 minute winter	37	Flow through pond	3	8.2	0.019	0.000	203.3043	
15 minute winter	36	36.000	35	4.7	0.664	0.349	0.0494	
960 minute winter	35	Flow through pond	3	8.2	0.019	0.000	203.3043	
30 minute winter	32	28.000	23	2.9	0.531	0.085	0.1464	



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	31	25	3.969	0.194	9.1	4.0615	0.0000	OK
30 minute winter	30	23	4.438	0.138	5.2	1.8867	0.0000	OK
30 minute winter	29	23	4.435	0.135	5.2	1.8302	0.0000	OK
30 minute winter	28	24	4.201	0.062	4.7	0.0700	0.0000	OK
15 minute winter	27	10	4.882	0.057	5.7	0.1373	0.0000	OK
15 minute winter	26	11	4.624	0.074	11.3	0.1774	0.0000	OK
15 minute winter	25	11	4.118	0.115	20.7	0.2400	0.0000	OK
15 minute winter	24	11	4.010	0.110	26.5	0.2499	0.0000	OK
15 minute winter	23	12	3.775	0.166	31.1	0.2381	0.0000	OK
15 minute winter	22	12	3.735	0.160	31.0	0.2290	0.0000	OK
15 minute winter	21	12	3.658	0.131	31.0	0.1874	0.0000	OK
15 minute winter	20	10	4.432	0.057	5.0	0.1278	0.0000	OK
15 minute winter	19	11	4.236	0.086	9.8	0.1925	0.0000	OK
15 minute winter	18	14	4.527	0.102	4.4	1.0521	0.0000	OK
15 minute winter	17	14	4.702	0.102	4.4	1.0616	0.0000	OK
15 minute winter	16	15	4.380	0.056	3.8	0.0638	0.0000	OK
15 minute winter	15	11	4.254	0.080	7.5	0.1364	0.0000	OK
15 minute winter	14	11	4.203	0.079	11.7	0.1390	0.0000	OK
15 minute winter	13	11	3.902	0.152	26.1	0.3282	0.0000	OK
15 minute winter	12	12	3.841	0.169	30.7	0.3579	0.0000	OK
15 minute winter	11	12	3.763	0.161	30.2	0.1819	0.0000	OK
30 minute winter	10	25	3.998	0.198	9.6	4.2943	0.0000	SURCHARGED
15 minute winter	9	13	3.655	0.159	32.5	0.2272	0.0000	OK
15 minute winter	8	13	3.518	0.199	63.3	0.3510	0.0000	OK
360 minute winter	7	296	3.399	0.433	16.3	0.7654	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)
30 minute winter	31	29.000	23	2.9	0.498	0.094	0.0267	
30 minute winter	30	26.000	28	2.3	0.559	0.174	0.0631	
30 minute winter	29	27.000	28	2.4	0.832	0.100	0.0139	
30 minute winter	28	26.001	25	4.7	0.573	0.157	0.1491	
15 minute winter	27	25.000	26	5.6	0.762	0.307	0.1943	
15 minute winter	26	25.001	25	11.1	1.319	0.455	0.1786	
15 minute winter	25	25.002	24	20.8	0.858	0.293	0.6082	
15 minute winter	24	25.003	23	26.3	1.153	0.270	0.6399	
15 minute winter	23	25.004	22	31.0	0.682	0.368	0.8663	
15 minute winter	22	25.005	21	31.0	0.785	0.374	1.0828	
15 minute winter	21	25.006	8	30.7	0.944	0.234	0.4350	
15 minute winter	20	23.000	19	4.8	0.603	0.306	0.2331	
15 minute winter	19	23.001	13	9.5	0.934	0.594	0.3125	
15 minute winter	18	21.000	16	1.9	0.400	0.143	0.0855	
15 minute winter	17	22.000	16	1.9	0.519	0.140	0.0164	
15 minute winter	16	21.001	15	3.8	0.637	0.284	0.0787	
15 minute winter	15	21.002	14	7.4	0.594	0.247	0.1845	
15 minute winter	14	21.003	13	11.4	0.931	0.258	0.5017	
15 minute winter	13	21.004	12	25.5	0.673	0.480	1.2827	
15 minute winter	12	21.005	11	30.2	0.763	0.567	1.1913	
15 minute winter	11	21.006	9	29.8	0.872	0.556	0.4479	
30 minute winter	10	24.000	9	3.0	0.847	0.134	0.0176	
15 minute winter	9	21.007	8	32.7	0.837	0.387	0.5833	
15 minute winter	8	21.008	7	63.5	0.955	0.369	0.3623	
360 minute winter	7	Flow through pond	6	9.6	0.033	0.000	96.0663	



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	6	296	3.399	0.449	10.4	0.7802	0.0000	SURCHARGED
360 minute winter	5	296	3.399	0.466	3.6	0.5267	0.0000	SURCHARGED
120 minute winter	4	116	2.970	0.048	3.6	0.0000	0.0000	OK
960 minute winter	3	870	4.052	0.352	9.0	1.0362	0.0000	SURCHARGED
960 minute winter	2	870	4.051	0.366	4.0	0.6467	0.0000	SURCHARGED
960 minute winter	1	870	3.727	0.051	4.0	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)
360 minute winter	6	35.000	5	3.6	0.152	0.118	0.1913	
360 minute winter	5	35.001	4	3.6	0.527	0.117	0.0211	103.5
960 minute winter	3	37.000	2	4.0	0.132	0.132	0.1736	
960 minute winter	2	37.001	1	4.0	0.541	0.129	0.0187	197.4



Results for 30 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	130	49	4.816	0.316	11.5	10.4635	0.0000	SURCHARGED
60 minute winter	129 - PP	49	4.443	0.318	11.5	10.5565	0.0000	SURCHARGED
60 minute winter	129	49	4.163	0.054	5.4	0.0607	0.0000	OK
60 minute winter	128	50	3.937	0.062	5.4	0.0702	0.0000	OK
30 minute winter	127	27	6.186	0.186	12.3	6.3071	0.0000	SURCHARGED
30 minute winter	126	27	5.736	0.036	2.9	0.0404	0.0000	OK
30 minute winter	125	26	5.675	0.225	12.3	6.0571	0.0000	SURCHARGED
30 minute winter	124	27	5.477	0.059	6.0	0.0672	0.0000	OK
30 minute winter	123	28	5.056	0.056	6.0	0.0630	0.0000	OK
30 minute winter	122	25	4.833	0.283	12.3	5.6197	0.0000	SURCHARGED
30 minute winter	121	27	4.512	0.070	9.5	0.0797	0.0000	OK
30 minute winter	120	28	4.365	0.090	9.5	0.1015	0.0000	OK
60 minute winter	119	47	5.496	0.371	17.2	14.0578	0.0000	SURCHARGED
60 minute winter	118 - PP	47	5.098	0.373	17.0	14.1931	0.0000	SURCHARGED
60 minute winter	118	48	4.775	0.065	9.9	0.0736	0.0000	OK
15 minute winter	117	11	4.263	0.152	36.3	0.4166	0.0000	OK
15 minute winter	116	11	4.145	0.145	41.5	0.2277	0.0000	OK
15 minute winter	115	11	4.030	0.180	46.7	0.2841	0.0000	OK
15 minute winter	114	11	3.843	0.168	55.1	0.3056	0.0000	OK
180 minute winter	113	184	3.719	0.419	29.5	100.1364	0.0000	SURCHARGED
180 minute winter	112	184	3.719	0.439	12.1	0.6277	0.0000	SURCHARGED
15 minute summer	111	1	3.250	0.000	11.5	0.0000	0.0000	OK
15 minute winter	110	11	4.781	0.131	14.6	0.3233	0.0000	OK
15 minute winter	109	11	4.908	0.108	14.6	0.2663	0.0000	OK
15 minute winter	108	11	4.593	0.168	42.0	0.3943	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)
60 minute winter	130	20.000	129	2.7	0.731	0.153	0.1168	
60 minute winter	129 - PP	22.000_1	129	2.7	0.393	0.090	0.0323	
60 minute winter	129	20.001	128	5.4	0.676	0.126	0.2736	
60 minute winter	128	20.002	114	5.4	0.633	0.154	0.0917	
30 minute winter	127	16.000	126	2.9	0.809	0.153	0.0955	
30 minute winter	126	16.001	124	2.9	0.597	0.124	0.0817	
30 minute winter	125	17.000	124	3.1	0.515	0.232	0.0336	
30 minute winter	124	16.002	123	6.0	0.961	0.318	0.2331	
30 minute winter	123	16.003	121	6.0	1.015	0.286	0.2058	
30 minute winter	122	18.000	121	3.6	0.618	0.268	0.0337	
30 minute winter	121	16.004	120	9.5	0.754	0.208	0.2723	
30 minute winter	120	16.005	117	9.5	0.698	0.318	0.3606	
60 minute winter	119	19.000	118	5.0	0.657	0.095	0.3076	
60 minute winter	118 - PP	20.000_1	118	4.9	0.502	0.160	0.0415	
60 minute winter	118	19.001	117	9.9	1.055	0.179	0.4336	
15 minute winter	117	16.006	116	36.0	1.043	0.461	0.7767	
15 minute winter	116	16.007	115	41.2	1.059	0.395	0.6591	
15 minute winter	115	16.008	114	46.1	1.098	0.607	0.8953	
15 minute winter	114	16.009	113	55.0	1.255	0.335	0.3235	
180 minute winter	113	16.010	112	12.1	0.278	0.102	0.6146	
180 minute winter	112	Hydro-Brake®	111	12.0				197.5
15 minute winter	110	31.000	108	14.0	0.921	0.997	0.3613	
15 minute winter	109	30.000	108	14.1	1.056	0.833	0.4413	
15 minute winter	108	30.001	107	42.0	1.388	0.830	0.6415	



Results for 30 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	107	11	4.379	0.154	42.0	0.1746	0.0000	OK
60 minute winter	106	58	4.772	0.447	20.3	21.3286	0.0000	SURCHARGED
60 minute winter	105	54	4.065	0.040	3.3	0.0451	0.0000	OK
60 minute winter	104 - PP	58	4.325	0.450	20.4	21.6655	0.0000	SURCHARGED
15 minute winter	104	11	3.924	0.137	47.1	0.1552	0.0000	OK
120 minute winter	103	116	3.910	0.460	21.4	0.8334	0.0000	SURCHARGED
15 minute winter	102	11	4.974	0.124	20.4	0.3728	0.0000	OK
15 minute winter	101	11	4.500	0.125	39.7	0.3521	0.0000	OK
15 minute winter	100	11	4.202	0.377	59.6	1.0648	0.0000	SURCHARGED
120 minute winter	99	116	3.909	0.359	26.3	1.0207	0.0000	SURCHARGED
120 minute winter	98	116	3.909	0.559	46.6	1.0135	0.0000	SURCHARGED
120 minute winter	97	116	3.908	0.588	45.3	70.8057	0.0000	SURCHARGED
120 minute winter	96	116	3.908	0.618	14.5	0.8840	0.0000	SURCHARGED
15 minute summer	95	1	3.260	0.000	14.0	0.0000	0.0000	OK
15 minute winter	94	12	6.273	0.223	13.4	0.5264	0.0000	SURCHARGED
15 minute winter	93	12	6.096	0.269	24.0	0.6238	0.0000	SURCHARGED
15 minute winter	92	12	5.700	0.125	22.3	0.1413	0.0000	OK
15 minute winter	91	12	5.531	0.106	22.4	0.1202	0.0000	OK
30 minute winter	90	27	5.469	0.294	17.0	9.2007	0.0000	SURCHARGED
15 minute winter	89	13	5.291	0.140	25.0	0.1587	0.0000	OK
15 minute winter	88	13	5.193	0.118	25.0	0.1332	0.0000	OK
30 minute winter	87	28	5.170	0.295	17.0	9.2123	0.0000	SURCHARGED
15 minute winter	86	14	4.992	0.140	27.8	0.1587	0.0000	OK
15 minute winter	85	14	4.907	0.132	27.7	0.1496	0.0000	OK
15 minute winter	84	14	4.702	0.127	27.8	0.1441	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 winter	107	30.002	104	42.0	1.496	0.759	0.9007	
60 minute winter	106	32.000	105	3.3	0.722	0.066	0.1468	
60 minute winter	105	32.001	104	3.3	0.716	0.066	0.0910	
60 minute winter	104 - PP	35.000_1	104	3.3	0.516	0.108	0.0243	
15 minute winter	104	30.003	103	47.1	1.504	0.389	0.9287	
120 minute winter	103	30.004	98	19.8	0.429	0.153	2.6168	
15 minute winter	102	33.000	101	19.7	1.288	0.966	0.4795	
15 minute winter	101	33.001	100	39.2	1.116	0.599	1.0840	
15 minute winter	100	33.002	99	55.9	1.412	1.327	1.1559	
120 minute winter	99	33.003	98	25.4	0.901	0.329	0.9718	
120 minute winter	98	30.005	97	45.3	1.009	0.338	0.7329	
120 minute winter	97	30.006	96	14.5	0.357	0.103	0.6677	
120 minute winter	96	Hydro-Brake®	95	14.0				199.6
15 minute winter	94	12.000	93	11.4	0.683	0.858	0.6984	
15 minute winter	93	12.001	92	22.3	1.269	1.251	0.3003	
15 minute winter	92	12.002	91	22.4	1.090	0.560	0.5167	
15 minute winter	91	12.003	89	22.4	1.013	0.440	0.6341	
30 minute winter	90	13.000	89	3.7	0.503	0.124	0.1515	
15 minute winter	89	12.004	88	25.0	1.062	0.675	0.3488	
15 minute winter	88	12.005	86	25.0	1.064	0.503	0.5720	
30 minute winter	87	14.000	86	3.7	0.410	0.121	0.1470	
15 minute winter	86	12.006	85	27.7	1.101	0.605	0.2492	
15 minute winter	85	12.007	84	27.8	1.170	0.605	0.6075	
15 minute winter	84	12.008	82	27.7	1.323	0.538	0.2531	



Results for 30 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	83	27	4.767	0.292	17.0	9.0542	0.0000	SURCHARGED
15 minute winter	82	14	4.564	0.108	30.9	0.1218	0.0000	OK
30 minute winter	81	25	6.140	0.340	13.9	6.2400	0.0000	SURCHARGED
30 minute winter	80	26	5.601	0.051	4.1	0.0580	0.0000	OK
30 minute winter	79	25	5.793	0.343	13.9	6.3356	0.0000	SURCHARGED
30 minute winter	78	26	5.401	0.061	8.1	0.0695	0.0000	OK
30 minute winter	77	26	5.241	0.066	8.1	0.0746	0.0000	OK
30 minute winter	76	25	5.493	0.343	13.9	6.3391	0.0000	SURCHARGED
30 minute winter	75	26	5.065	0.095	12.1	0.1079	0.0000	OK
30 minute winter	74	26	5.028	0.078	12.1	0.0881	0.0000	OK
15 minute winter	73	12	6.189	0.139	11.6	0.3044	0.0000	OK
15 minute winter	72	11	6.123	0.273	23.8	0.6434	0.0000	SURCHARGED
15 minute winter	71	11	5.608	0.133	33.3	0.2989	0.0000	OK
60 minute winter	70	48	5.892	0.242	14.0	12.8092	0.0000	SURCHARGED
60 minute winter	69	49	5.419	0.044	3.4	0.0502	0.0000	OK
60 minute winter	68	49	5.315	0.040	3.4	0.0456	0.0000	OK
60 minute winter	67	50	5.213	0.038	3.4	0.0431	0.0000	OK
60 minute winter	66	49	5.321	0.246	14.2	13.1712	0.0000	SURCHARGED
60 minute winter	65	50	5.054	0.074	6.7	0.0832	0.0000	OK
60 minute winter	64	53	4.960	0.060	6.7	0.0683	0.0000	OK
15 minute winter	63	10	5.899	0.099	12.5	0.2248	0.0000	OK
30 minute winter	62	27	6.187	0.187	12.3	6.3652	0.0000	SURCHARGED
30 minute winter	61	27	6.136	0.186	12.3	6.2883	0.0000	SURCHARGED
30 minute winter	60	35	5.851	0.056	5.7	0.0632	0.0000	OK
15 minute winter	59	11	5.694	0.119	25.0	0.2208	0.0000	OK

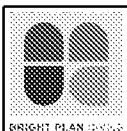
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	83	15.000	82	3.6	0.490	0.122	0.0898	
15 minute winter	82	12.009	38	30.8	1.732	0.405	0.2488	
30 minute winter	81	9.000	80	4.1	0.835	0.197	0.0901	
30 minute winter	80	9.001	78	4.1	0.787	0.237	0.0741	
30 minute winter	79	10.000	78	4.0	0.639	0.299	0.0383	
30 minute winter	78	9.002	77	8.1	0.877	0.156	0.1532	
30 minute winter	77	9.003	75	8.1	0.859	0.175	0.1553	
30 minute winter	76	11.000	75	4.0	0.634	0.300	0.0333	
30 minute winter	75	9.004	74	12.1	0.718	0.223	0.1402	
30 minute winter	74	9.005	45	12.1	0.885	0.127	0.0924	
15 minute winter	73	8.000	72	10.4	0.722	0.590	0.3482	
15 minute winter	72	8.001	71	20.8	1.184	1.204	0.5374	
15 minute winter	71	8.002	48	33.4	1.438	0.583	0.3828	
60 minute winter	70	4.000	69	3.4	0.940	0.142	0.0400	
60 minute winter	69	4.001	68	3.4	0.655	0.081	0.0794	
60 minute winter	68	4.002	67	3.4	0.733	0.065	0.0465	
60 minute winter	67	4.003	65	3.4	0.783	0.058	0.0418	
60 minute winter	66	5.000	65	3.3	0.517	0.110	0.0378	
60 minute winter	65	4.004	64	6.7	0.581	0.124	0.3920	
60 minute winter	64	4.005	55	6.7	0.675	0.086	0.3955	
15 minute winter	63	3.000	59	12.2	1.031	0.703	0.1865	
30 minute winter	62	1.000	60	2.8	0.594	0.211	0.1086	
30 minute winter	61	2.000	60	2.9	0.831	0.130	0.0180	
30 minute winter	60	1.001	59	5.7	0.748	0.136	0.4251	
15 minute winter	59	1.002	58	25.0	1.130	0.506	0.4882	



Results for 30 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	58	11	5.502	0.127	31.6	0.2175	0.0000	OK
15 minute winter	57	12	5.350	0.275	51.4	0.7900	0.0000	SURCHARGED
60 minute winter	56	49	5.121	0.246	14.2	13.1747	0.0000	SURCHARGED
15 minute winter	55	12	4.947	0.239	56.4	0.3418	0.0000	OK
15 minute winter	54	13	4.902	0.240	55.5	0.3431	0.0000	OK
15 minute winter	53	13	4.861	0.235	54.3	0.3360	0.0000	OK
60 minute winter	52	48	5.194	0.244	14.2	12.9619	0.0000	SURCHARGED
15 minute winter	51	13	4.812	0.302	56.6	0.4323	0.0000	OK
180 minute winter	50	172	4.804	0.336	29.6	0.6968	0.0000	OK
180 minute winter	49	172	4.804	0.362	31.8	0.7083	0.0000	OK
180 minute winter	48	172	4.803	0.384	42.9	0.7371	0.0000	OK
180 minute winter	47	172	4.802	0.434	47.1	1.0576	0.0000	OK
180 minute winter	46	172	4.801	0.448	46.2	0.6415	0.0000	OK
180 minute winter	45	172	4.800	0.552	54.2	165.7907	0.0000	SURCHARGED
180 minute winter	44	172	4.800	0.555	21.0	1.4118	0.0000	SURCHARGED
960 minute winter	43	960	4.464	0.235	20.1	0.6728	0.0000	OK
960 minute winter	42	960	4.464	0.289	20.9	0.7688	0.0000	OK
960 minute winter	41	945	4.464	0.439	21.7	1.1670	0.0000	OK
960 minute winter	40	960	4.464	0.489	22.3	1.3000	0.0000	SURCHARGED
960 minute winter	39	945	4.464	0.511	22.0	0.9035	0.0000	SURCHARGED
960 minute winter	38	960	4.464	0.531	27.6	0.9391	0.0000	SURCHARGED
960 minute winter	37	960	4.465	0.710	27.4	1.2541	0.0000	OK
960 minute winter	36	960	4.464	0.314	0.8	0.6896	0.0000	SURCHARGED
960 minute winter	35	960	4.464	0.709	0.8	0.8018	0.0000	OK
60 minute winter	32	47	4.232	0.357	14.9	12.6176	0.0000	SURCHARGED

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 winter	58	1.003	57	31.7	0.946	0.619	0.9747	
15 minute winter	57	1.004	55	48.8	1.244	1.153	1.2158	
60 minute winter	56	6.000	55	3.3	0.516	0.111	0.0325	
15 minute winter	55	1.005	54	55.5	0.764	0.663	1.9134	
15 minute winter	54	1.006	53	54.3	0.780	0.652	1.4992	
15 minute winter	53	1.007	51	53.6	0.829	0.646	1.6701	
60 minute winter	52	7.000	51	3.4	0.975	0.133	0.0237	
15 minute winter	51	1.008	50	57.5	0.507	0.480	3.5349	
180 minute winter	50	1.009	49	29.1	0.461	0.243	2.4311	
180 minute winter	49	1.010	48	31.4	0.465	0.260	2.2753	
180 minute winter	48	1.011	47	42.2	0.589	0.352	5.4693	
180 minute winter	47	1.012	46	46.2	0.656	0.382	1.6536	
180 minute winter	46	1.013	45	45.4	0.779	0.377	3.3572	
180 minute winter	45	1.014	44	21.0	0.151	0.180	0.3573	
180 minute winter	44	1.015	43	21.0	0.616	0.189	0.4799	
960 minute winter	43	1.016	42	20.1	0.782	0.130	2.2268	
960 minute winter	42	1.017	41	20.9	0.745	0.087	3.5895	
960 minute winter	41	1.018	40	21.4	0.545	0.118	2.4733	
960 minute winter	40	1.019	39	22.0	0.485	0.200	2.9467	
960 minute winter	39	1.020	38	21.7	0.497	0.197	2.6571	
960 minute winter	38	1.021	37	27.4	0.747	0.249	0.5357	
960 minute winter	37	Flow through pond	3	15.1	0.027	0.001	533.2372	
960 minute winter	36	36.000	35	0.8	0.411	0.060	0.1238	
960 minute winter	35	Flow through pond	3	15.1	0.027	0.001	533.2372	
60 minute winter	32	28.000	23	4.1	0.585	0.122	0.1899	



Results for 30 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	31	47	4.133	0.358	14.9	12.6912	0.0000	SURCHARGED
30 minute winter	30	26	4.566	0.266	12.8	6.0635	0.0000	SURCHARGED
30 minute winter	29	25	4.564	0.264	12.8	5.9776	0.0000	SURCHARGED
30 minute winter	28	26	4.215	0.076	7.0	0.0863	0.0000	OK
15 minute winter	27	10	4.922	0.097	14.0	0.2346	0.0000	OK
15 minute winter	26	11	4.770	0.220	27.7	0.5312	0.0000	SURCHARGED
15 minute winter	25	11	4.187	0.184	44.6	0.3838	0.0000	OK
15 minute winter	24	11	4.078	0.178	58.7	0.4036	0.0000	OK
480 minute winter	23	472	3.928	0.319	15.5	0.4562	0.0000	OK
480 minute winter	22	472	3.928	0.353	15.5	0.5048	0.0000	OK
480 minute winter	21	472	3.928	0.401	15.4	0.5735	0.0000	SURCHARGED
15 minute winter	20	12	4.560	0.185	12.2	0.4161	0.0000	SURCHARGED
15 minute winter	19	12	4.471	0.321	23.1	0.7215	0.0000	SURCHARGED
30 minute winter	18	24	4.625	0.200	8.3	3.4297	0.0000	SURCHARGED
30 minute winter	17	24	4.801	0.201	8.3	3.4515	0.0000	SURCHARGED
30 minute winter	16	25	4.397	0.073	5.8	0.0822	0.0000	OK
15 minute winter	15	11	4.296	0.122	15.4	0.2087	0.0000	OK
15 minute winter	14	11	4.246	0.122	26.1	0.2135	0.0000	OK
15 minute winter	13	12	4.079	0.329	57.7	0.7087	0.0000	SURCHARGED
15 minute winter	12	12	3.983	0.311	66.4	0.6607	0.0000	SURCHARGED
480 minute winter	11	472	3.928	0.326	10.6	0.3684	0.0000	SURCHARGED
60 minute winter	10	47	4.166	0.366	15.7	13.3741	0.0000	SURCHARGED
480 minute winter	9	472	3.928	0.432	13.4	0.6179	0.0000	SURCHARGED
480 minute winter	8	472	3.928	0.609	28.8	1.0757	0.0000	SURCHARGED
480 minute winter	7	472	3.928	0.962	28.5	1.6995	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)
60 minute winter	31	29.000	23	4.1	0.548	0.135	0.0347	
30 minute winter	30	26.000	28	3.5	0.624	0.261	0.0849	
30 minute winter	29	27.000	28	3.5	0.923	0.149	0.0185	
30 minute winter	28	26.001	25	7.0	0.639	0.234	0.2299	
15 minute winter	27	25.000	26	13.7	0.912	0.758	0.3934	
15 minute winter	26	25.001	25	24.9	1.498	1.023	0.3686	
15 minute winter	25	25.002	24	44.4	1.006	0.627	1.1184	
15 minute winter	24	25.003	23	58.3	1.371	0.600	1.2400	
480 minute winter	23	25.004	22	15.5	0.557	0.184	1.9535	
480 minute winter	22	25.005	21	15.4	0.646	0.186	2.9847	
480 minute winter	21	25.006	8	15.4	0.783	0.118	1.4773	
15 minute winter	20	23.000	19	10.9	0.709	0.688	0.4990	
15 minute winter	19	23.001	13	19.3	1.096	1.206	0.5406	
30 minute winter	18	21.000	16	2.9	0.445	0.221	0.1186	
30 minute winter	17	22.000	16	2.9	0.583	0.217	0.0226	
30 minute winter	16	21.001	15	5.8	0.712	0.440	0.1093	
15 minute winter	15	21.002	14	15.2	0.694	0.506	0.3231	
15 minute winter	14	21.003	13	25.8	0.928	0.581	1.2596	
15 minute winter	13	21.004	12	54.5	0.774	1.025	2.3591	
15 minute winter	12	21.005	11	65.7	0.946	1.236	2.0496	
480 minute winter	11	21.006	9	10.6	0.648	0.198	0.9225	
60 minute winter	10	24.000	9	4.2	0.928	0.189	0.0228	
480 minute winter	9	21.007	8	13.4	0.644	0.159	1.6463	
480 minute winter	8	21.008	7	28.5	0.738	0.166	1.1750	
480 minute winter	7	Flow through pond	6	15.3	0.033	0.001	260.6508	



Results for 30 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute winter	6	472	3.928	0.978	16.8	1.6984	0.0000	SURCHARGED
480 minute winter	5	472	3.927	0.994	3.7	1.1247	0.0000	SURCHARGED
30 minute winter	4	27	2.970	0.048	3.6	0.0000	0.0000	OK
960 minute winter	3	960	4.464	0.764	17.2	2.2520	0.0000	SURCHARGED
960 minute winter	2	960	4.464	0.779	4.1	1.3756	0.0000	SURCHARGED
60 minute summer	1	166	3.727	0.051	4.0	0.0000	0.0000	OK

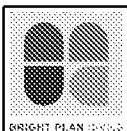
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
480 minute winter	6	35.000	5	3.7	0.237	0.120	0.1913	
480 minute winter	5	35.001	4	3.6	0.527	0.117	0.0211	121.1
960 minute winter	3	37.000	2	4.1	0.124	0.134	0.1736	
960 minute winter	2	37.001	1	4.0	0.541	0.130	0.0187	206.4



Results for 100 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	130	50	4.889	0.389	15.1	14.6360	0.0000	SURCHARGED
60 minute winter	129 - PP	50	4.517	0.392	15.1	14.7348	0.0000	SURCHARGED
60 minute winter	129	51	4.166	0.057	6.1	0.0643	0.0000	OK
60 minute winter	128	52	3.941	0.066	6.1	0.0746	0.0000	OK
60 minute winter	127	47	6.222	0.222	10.8	8.8714	0.0000	SURCHARGED
60 minute winter	126	47	5.738	0.038	3.2	0.0426	0.0000	OK
60 minute winter	125	46	5.717	0.267	10.8	8.4213	0.0000	SURCHARGED
60 minute winter	124	47	5.481	0.063	6.6	0.0712	0.0000	OK
60 minute winter	123	48	5.059	0.059	6.6	0.0668	0.0000	OK
30 minute winter	122	26	4.888	0.338	16.0	7.8681	0.0000	SURCHARGED
30 minute winter	121	28	4.516	0.074	10.6	0.0842	0.0000	OK
30 minute winter	120	29	4.370	0.095	10.6	0.1074	0.0000	OK
60 minute winter	119	48	5.573	0.448	22.5	19.9933	0.0000	SURCHARGED
60 minute winter	118 - PP	48	5.175	0.450	22.3	20.1355	0.0000	SURCHARGED
60 minute winter	118	49	4.779	0.069	11.0	0.0778	0.0000	OK
15 minute winter	117	11	4.284	0.173	44.3	0.4751	0.0000	OK
15 minute winter	116	11	4.166	0.166	51.1	0.2609	0.0000	OK
15 minute winter	115	11	4.059	0.209	58.0	0.3295	0.0000	OK
240 minute winter	114	248	3.909	0.234	32.0	0.4266	0.0000	OK
240 minute winter	113	248	3.909	0.609	32.0	145.4913	0.0000	SURCHARGED
240 minute winter	112	248	3.908	0.628	12.2	0.8994	0.0000	SURCHARGED
15 minute summer	111	1	3.250	0.000	11.8	0.0000	0.0000	OK
15 minute winter	110	11	4.890	0.240	18.8	0.5907	0.0000	SURCHARGED
15 minute winter	109	11	4.955	0.155	18.8	0.3812	0.0000	SURCHARGED
15 minute winter	108	11	4.645	0.220	52.8	0.5154	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)
60 minute winter	130	20.000	129	3.1	0.755	0.172	0.1268	
60 minute winter	129 - PP	22.000_1	129	3.0	0.404	0.101	0.0352	
60 minute winter	129	20.001	128	6.1	0.698	0.142	0.2976	
60 minute winter	128	20.002	114	6.1	0.654	0.173	0.0998	
60 minute winter	127	16.000	126	3.2	0.834	0.170	0.1029	
60 minute winter	126	16.001	124	3.2	0.614	0.138	0.0882	
60 minute winter	125	17.000	124	3.4	0.527	0.257	0.0363	
60 minute winter	124	16.002	123	6.6	0.986	0.353	0.2518	
60 minute winter	123	16.003	121	6.6	1.043	0.317	0.2221	
30 minute winter	122	18.000	121	4.0	0.634	0.298	0.0364	
30 minute winter	121	16.004	120	10.6	0.774	0.231	0.2939	
30 minute winter	120	16.005	117	10.6	0.719	0.352	0.3879	
60 minute winter	119	19.000	118	5.6	0.675	0.105	0.3315	
60 minute winter	118 - PP	20.000_1	118	5.4	0.516	0.177	0.0449	
60 minute winter	118	19.001	117	11.0	1.086	0.198	0.4676	
15 minute winter	117	16.006	116	44.0	1.078	0.565	0.9185	
15 minute winter	116	16.007	115	50.9	1.100	0.487	0.7822	
15 minute winter	115	16.008	114	57.2	1.168	0.754	1.0459	
240 minute winter	114	16.009	113	32.0	1.091	0.195	0.5974	
240 minute winter	113	16.010	112	12.2	0.277	0.102	0.6146	
240 minute winter	112	Hydro-Brake®	111	12.0				271.6
15 minute winter	110	31.000	108	17.1	0.973	1.223	0.4200	
15 minute winter	109	30.000	108	17.5	1.059	1.034	0.5805	
15 minute winter	108	30.001	107	51.4	1.420	1.015	0.7801	



Results for 100 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	107	11	4.408	0.183	51.4	0.2066	0.0000	OK
120 minute winter	106	96	4.858	0.533	16.5	29.9073	0.0000	FLOOD RISK
120 minute winter	105	120	4.075	0.050	3.7	0.0560	0.0000	OK
120 minute winter	104 - PP	100	4.418	0.543	16.6	30.9613	0.0000	FLOOD RISK
120 minute winter	104	120	4.074	0.287	24.5	0.3251	0.0000	OK
120 minute winter	103	120	4.073	0.623	27.0	1.1292	0.0000	SURCHARGED
15 minute winter	102	12	5.181	0.331	26.3	0.9910	0.0000	SURCHARGED
15 minute winter	101	12	4.701	0.326	48.2	0.9219	0.0000	SURCHARGED
15 minute winter	100	12	4.437	0.612	68.8	1.7319	0.0000	FLOOD RISK
120 minute winter	99	120	4.072	0.522	35.1	1.4842	0.0000	SURCHARGED
120 minute winter	98	120	4.072	0.722	61.8	1.3095	0.0000	SURCHARGED
120 minute winter	97	120	4.072	0.752	61.4	108.7409	0.0000	FLOOD RISK
120 minute winter	96	120	4.071	0.781	14.5	1.1180	0.0000	FLOOD RISK
15 minute summer	95	1	3.260	0.000	14.0	0.0000	0.0000	OK
15 minute winter	94	12	6.551	0.501	17.3	1.1809	0.0000	FLOOD RISK
15 minute winter	93	12	6.286	0.459	29.1	1.0661	0.0000	SURCHARGED
15 minute winter	92	12	5.718	0.143	27.6	0.1617	0.0000	OK
15 minute winter	91	12	5.547	0.122	27.6	0.1375	0.0000	OK
60 minute winter	90	47	5.529	0.354	14.9	13.0829	0.0000	SURCHARGED
15 minute winter	89	13	5.312	0.161	30.4	0.1823	0.0000	OK
15 minute winter	88	13	5.209	0.134	30.4	0.1519	0.0000	OK
60 minute winter	87	47	5.230	0.355	14.9	13.1379	0.0000	SURCHARGED
15 minute winter	86	14	5.013	0.161	33.3	0.1820	0.0000	OK
15 minute winter	85	14	4.925	0.150	33.3	0.1698	0.0000	OK
15 minute winter	84	14	4.718	0.143	33.3	0.1622	0.0000	OK

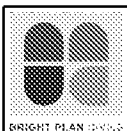
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	107	30.002	104	51.2	1.543	0.925	1.0661	
120 minute winter	106	32.000	105	3.7	0.743	0.072	0.1775	
120 minute winter	105	32.001	104	3.7	0.713	0.073	0.3898	
120 minute winter	104 - PP	35.000_1	104	3.3	0.515	0.108	0.1417	
120 minute winter	104	30.003	103	24.5	1.172	0.202	1.5430	
120 minute winter	103	30.004	98	26.1	0.443	0.202	2.6168	
15 minute winter	102	33.000	101	21.9	1.267	1.071	0.5331	
15 minute winter	101	33.001	100	43.7	1.212	0.667	1.3840	
15 minute winter	100	33.002	99	62.8	1.579	1.490	1.2046	
120 minute winter	99	33.003	98	33.2	0.898	0.430	0.9718	
120 minute winter	98	30.005	97	61.4	1.065	0.458	0.7329	
120 minute winter	97	30.006	96	14.5	0.393	0.103	0.6677	
120 minute winter	96	Hydro-Brake®	95	14.0				260.3
15 minute winter	94	12.000	93	13.6	0.771	1.023	0.6984	
15 minute winter	93	12.001	92	27.6	1.567	1.547	0.3055	
15 minute winter	92	12.002	91	27.6	1.139	0.690	0.6099	
15 minute winter	91	12.003	89	27.5	1.064	0.542	0.7423	
60 minute winter	90	13.000	89	4.1	0.520	0.136	0.1434	
15 minute winter	89	12.004	88	30.4	1.101	0.821	0.4087	
15 minute winter	88	12.005	86	30.4	1.107	0.610	0.6658	
60 minute winter	87	14.000	86	4.0	0.421	0.134	0.1417	
15 minute winter	86	12.006	85	33.3	1.137	0.728	0.2901	
15 minute winter	85	12.007	84	33.3	1.215	0.727	0.7024	
15 minute winter	84	12.008	82	33.2	1.379	0.644	0.2905	



Results for 100 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	83	47	4.827	0.352	14.9	12.9242	0.0000	SURCHARGED
1440 minute winter	82	1410	4.625	0.169	5.5	0.1915	0.0000	OK
30 minute winter	81	26	6.209	0.409	18.1	8.7756	0.0000	SURCHARGED
30 minute winter	80	27	5.604	0.054	4.5	0.0613	0.0000	OK
30 minute winter	79	26	5.862	0.412	18.1	8.8812	0.0000	SURCHARGED
30 minute winter	78	27	5.405	0.065	9.0	0.0734	0.0000	OK
30 minute winter	77	27	5.245	0.070	9.0	0.0788	0.0000	OK
30 minute winter	76	26	5.562	0.412	18.1	8.8851	0.0000	SURCHARGED
30 minute winter	75	27	5.071	0.101	13.4	0.1138	0.0000	OK
30 minute winter	74	27	5.032	0.082	13.4	0.0931	0.0000	OK
15 minute winter	73	12	6.453	0.403	15.0	0.8863	0.0000	SURCHARGED
15 minute winter	72	12	6.354	0.504	27.5	1.1883	0.0000	FLOOD RISK
15 minute winter	71	11	5.626	0.151	40.3	0.3400	0.0000	OK
60 minute winter	70	50	5.941	0.291	18.4	17.9329	0.0000	SURCHARGED
60 minute winter	69	51	5.422	0.047	3.8	0.0529	0.0000	OK
60 minute winter	68	51	5.317	0.042	3.8	0.0480	0.0000	OK
60 minute winter	67	51	5.215	0.040	3.8	0.0455	0.0000	OK
60 minute winter	66	51	5.371	0.296	18.6	18.3542	0.0000	SURCHARGED
60 minute winter	65	53	5.058	0.078	7.4	0.0877	0.0000	OK
180 minute winter	64	180	5.015	0.115	7.1	0.1301	0.0000	OK
15 minute winter	63	10	5.921	0.121	16.2	0.2757	0.0000	OK
60 minute winter	62	47	6.224	0.224	10.8	8.9794	0.0000	SURCHARGED
60 minute winter	61	47	6.172	0.222	10.8	8.8405	0.0000	SURCHARGED
30 minute winter	60	35	5.854	0.059	6.3	0.0668	0.0000	OK
15 minute winter	59	12	5.720	0.145	31.5	0.2688	0.0000	OK

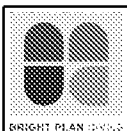
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	83	15.000	82	4.0	0.460	0.135	0.0882	
1440 minute winter	82	12.009	38	5.5	1.092	0.072	0.5023	
30 minute winter	81	9.000	80	4.5	0.857	0.218	0.0972	
30 minute winter	80	9.001	78	4.5	0.808	0.262	0.0798	
30 minute winter	79	10.000	78	4.4	0.656	0.332	0.0414	
30 minute winter	78	9.002	77	9.0	0.900	0.173	0.1653	
30 minute winter	77	9.003	75	9.0	0.883	0.194	0.1674	
30 minute winter	76	11.000	75	4.4	0.651	0.333	0.0360	
30 minute winter	75	9.004	74	13.4	0.738	0.248	0.1512	
30 minute winter	74	9.005	45	13.4	0.909	0.140	0.0996	
15 minute winter	73	8.000	72	11.4	0.730	0.644	0.3544	
15 minute winter	72	8.001	71	24.6	1.398	1.425	0.5478	
15 minute winter	71	8.002	48	40.2	1.492	0.701	0.4432	
60 minute winter	70	4.000	69	3.8	0.967	0.157	0.0431	
60 minute winter	69	4.001	68	3.8	0.675	0.090	0.0855	
60 minute winter	68	4.002	67	3.8	0.753	0.072	0.0501	
60 minute winter	67	4.003	65	3.8	0.806	0.065	0.0451	
60 minute winter	66	5.000	65	3.7	0.531	0.123	0.0410	
60 minute winter	65	4.004	64	7.4	0.600	0.138	0.4211	
180 minute winter	64	4.005	55	7.1	0.583	0.091	0.9829	
15 minute winter	63	3.000	59	15.6	1.075	0.904	0.2303	
60 minute winter	62	1.000	60	3.1	0.612	0.235	0.1176	
60 minute winter	61	2.000	60	3.2	0.855	0.145	0.0194	
30 minute winter	60	1.001	59	6.3	0.772	0.150	0.4951	
15 minute winter	59	1.002	58	30.5	1.142	0.617	0.7350	



Results for 100 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	58	12	5.665	0.290	39.3	0.4973	0.0000	SURCHARGED
15 minute winter	57	12	5.489	0.414	60.3	1.1921	0.0000	SURCHARGED
60 minute winter	56	51	5.171	0.296	18.6	18.3771	0.0000	SURCHARGED
180 minute winter	55	180	5.014	0.306	29.7	0.4384	0.0000	OK
180 minute winter	54	180	5.013	0.351	29.7	0.5024	0.0000	OK
180 minute winter	53	180	5.012	0.386	29.6	0.5522	0.0000	SURCHARGED
60 minute winter	52	50	5.243	0.293	18.6	18.1245	0.0000	SURCHARGED
180 minute winter	51	180	5.010	0.500	32.8	0.7161	0.0000	SURCHARGED
240 minute winter	50	228	5.010	0.542	31.2	1.1215	0.0000	SURCHARGED
240 minute winter	49	228	5.009	0.567	32.9	1.1100	0.0000	SURCHARGED
240 minute winter	48	228	5.008	0.589	44.4	1.1308	0.0000	SURCHARGED
240 minute winter	47	228	5.007	0.639	48.3	1.5569	0.0000	SURCHARGED
240 minute winter	46	228	5.006	0.653	47.1	0.9346	0.0000	SURCHARGED
240 minute winter	45	228	5.005	0.757	55.9	227.4492	0.0000	SURCHARGED
240 minute winter	44	228	5.005	0.760	21.2	1.9331	0.0000	SURCHARGED
1440 minute winter	43	1410	4.625	0.396	19.8	1.1326	0.0000	OK
1440 minute winter	42	1410	4.625	0.450	20.6	1.1963	0.0000	SURCHARGED
1440 minute winter	41	1410	4.625	0.600	21.1	1.5946	0.0000	SURCHARGED
1440 minute winter	40	1410	4.625	0.650	21.7	1.7273	0.0000	SURCHARGED
1440 minute winter	39	1410	4.625	0.672	21.4	1.1880	0.0000	SURCHARGED
1440 minute winter	38	1410	4.625	0.692	26.6	1.2231	0.0000	SURCHARGED
1440 minute winter	37	1440	4.626	0.871	26.5	1.5387	0.0000	OK
1440 minute winter	36	1440	4.625	0.475	1.3	14.0598	0.0000	FLOOD RISK
1440 minute winter	35	1440	4.625	0.870	1.0	0.9837	0.0000	OK
60 minute winter	32	49	4.304	0.429	19.6	17.8779	0.0000	SURCHARGED

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 winter	58	1.003	57	36.6	0.960	0.716	1.2337	
15 minute winter	57	1.004	55	58.2	1.465	1.375	1.2531	
60 minute winter	56	6.000	55	3.7	0.529	0.123	0.0462	
180 minute winter	55	1.005	54	29.7	0.648	0.354	2.6282	
180 minute winter	54	1.006	53	29.6	0.665	0.356	2.2198	
180 minute winter	53	1.007	51	29.5	0.788	0.356	2.5879	
60 minute winter	52	7.000	51	3.8	1.002	0.147	0.0255	
180 minute winter	51	1.008	50	32.0	0.475	0.267	4.7357	
240 minute winter	50	1.009	49	30.0	0.457	0.250	2.9214	
240 minute winter	49	1.010	48	32.0	0.456	0.266	2.5688	
240 minute winter	48	1.011	47	43.1	0.559	0.360	5.7613	
240 minute winter	47	1.012	46	47.1	0.599	0.389	1.6635	
240 minute winter	46	1.013	45	46.2	0.710	0.384	3.3588	
240 minute winter	45	1.014	44	21.2	0.151	0.182	0.3573	
240 minute winter	44	1.015	43	21.0	0.599	0.189	1.2370	
1440 minute winter	43	1.016	42	19.7	0.757	0.127	3.5572	
1440 minute winter	42	1.017	41	20.2	0.716	0.084	4.2874	
1440 minute winter	41	1.018	40	20.8	0.521	0.114	2.4809	
1440 minute winter	40	1.019	39	21.4	0.456	0.195	2.9467	
1440 minute winter	39	1.020	38	21.1	0.468	0.192	2.6571	
1440 minute winter	38	1.021	37	26.5	0.695	0.241	0.5357	
1440 minute winter	37	Flow through pond	3	14.6	0.022	0.001	683.5462	
1440 minute winter	36	36.000	35	-1.0	0.379	-0.074	0.1238	
1440 minute winter	35	Flow through pond	3	14.6	0.022	0.001	683.5462	
60 minute winter	32	28.000	23	4.6	0.602	0.135	0.2770	



Results for 100 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	31	49	4.205	0.430	19.6	17.9918	0.0000	SURCHARGED
30 minute winter	30	26	4.633	0.333	16.6	8.3984	0.0000	SURCHARGED
30 minute winter	29	26	4.630	0.330	16.6	8.3066	0.0000	SURCHARGED
15 minute winter	28	12	4.222	0.083	7.6	0.0944	0.0000	OK
15 minute winter	27	12	5.167	0.342	18.0	0.8237	0.0000	SURCHARGED
15 minute winter	26	12	4.957	0.407	31.8	0.9816	0.0000	SURCHARGED
15 minute winter	25	11	4.213	0.210	53.2	0.4367	0.0000	OK
720 minute winter	24	705	4.126	0.226	9.6	0.5124	0.0000	OK
720 minute winter	23	705	4.126	0.517	15.0	0.7403	0.0000	SURCHARGED
720 minute winter	22	705	4.126	0.551	14.7	0.7889	0.0000	SURCHARGED
720 minute winter	21	705	4.126	0.599	14.3	0.8575	0.0000	SURCHARGED
15 minute winter	20	12	4.899	0.524	15.8	1.1800	0.0000	FLOOD RISK
15 minute winter	19	12	4.774	0.624	25.7	1.4055	0.0000	FLOOD RISK
30 minute winter	18	25	4.677	0.252	10.8	4.8016	0.0000	SURCHARGED
30 minute winter	17	25	4.853	0.253	10.8	4.8264	0.0000	SURCHARGED
30 minute winter	16	26	4.403	0.079	6.7	0.0895	0.0000	OK
15 minute winter	15	12	4.354	0.180	19.1	0.3091	0.0000	OK
15 minute winter	14	12	4.340	0.216	32.8	0.3774	0.0000	OK
15 minute winter	13	11	4.220	0.470	65.0	1.0115	0.0000	SURCHARGED
720 minute winter	12	705	4.126	0.454	10.0	0.9639	0.0000	SURCHARGED
720 minute winter	11	705	4.126	0.524	10.0	0.5929	0.0000	SURCHARGED
60 minute winter	10	49	4.240	0.440	20.5	18.9297	0.0000	SURCHARGED
720 minute winter	9	705	4.126	0.630	12.5	0.9019	0.0000	SURCHARGED
720 minute winter	8	705	4.126	0.807	25.8	1.4264	0.0000	SURCHARGED
720 minute winter	7	705	4.126	1.160	25.2	2.0501	0.0000	OK

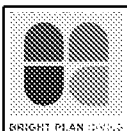
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	31	29.000	23	4.6	0.564	0.150	0.0697	
30 minute winter	30	26.000	28	3.9	0.646	0.297	0.0933	
30 minute winter	29	27.000	28	4.0	0.954	0.169	0.0203	
15 minute winter	28	26.001	25	7.6	0.655	0.255	0.3448	
15 minute winter	27	25.000	26	14.8	0.923	0.818	0.4664	
15 minute winter	26	25.001	25	29.3	1.666	1.206	0.3711	
15 minute winter	25	25.002	24	52.7	1.033	0.744	1.3055	
720 minute winter	24	25.003	23	9.6	0.876	0.098	1.7905	
720 minute winter	23	25.004	22	14.7	0.540	0.175	2.0770	
720 minute winter	22	25.005	21	14.3	0.622	0.173	3.0215	
720 minute winter	21	25.006	8	13.7	0.745	0.104	1.4773	
15 minute winter	20	23.000	19	11.2	0.721	0.711	0.4990	
15 minute winter	19	23.001	13	22.4	1.275	1.403	0.5406	
30 minute winter	18	21.000	16	3.4	0.459	0.254	0.1318	
30 minute winter	17	22.000	16	3.4	0.605	0.250	0.0251	
30 minute winter	16	21.001	15	6.7	0.736	0.506	0.1215	
15 minute winter	15	21.002	14	18.5	0.706	0.616	0.5398	
15 minute winter	14	21.003	13	29.3	0.938	0.660	1.6107	
15 minute winter	13	21.004	12	63.1	0.896	1.187	2.3591	
720 minute winter	12	21.005	11	10.0	0.558	0.188	2.1176	
720 minute winter	11	21.006	9	9.8	0.628	0.183	0.9225	
60 minute winter	10	24.000	9	4.7	0.952	0.209	0.0576	
720 minute winter	9	21.007	8	12.1	0.616	0.144	1.6463	
720 minute winter	8	21.008	7	25.2	0.687	0.146	1.1750	
720 minute winter	7	Flow through pond	6	13.5	0.023	0.001	336.3426	



Results for 100 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
720 minute winter	6	705	4.126	1.176	14.9	2.0431	0.0000	SURCHARGED
720 minute winter	5	705	4.126	1.193	3.7	1.3491	0.0000	SURCHARGED
15 minute summer	4	22	2.970	0.048	3.6	0.0000	0.0000	OK
1440 minute winter	3	1440	4.625	0.925	16.5	2.7258	0.0000	FLOOD RISK
1440 minute winter	2	1440	4.624	0.939	4.1	1.6596	0.0000	FLOOD RISK
30 minute summer	1	140	3.727	0.051	4.0	0.0000	0.0000	OK

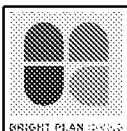
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
720 minute winter	6	35.000	5	3.7	0.167	0.119	0.1913	
720 minute winter	5	35.001	4	3.6	0.527	0.117	0.0211	172.5
1440 minute winter	3	37.000	2	4.1	0.135	0.134	0.1736	
1440 minute winter	2	37.001	1	4.0	0.541	0.130	0.0187	291.0



Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	130	50	5.231	0.731	21.1	21.6841	0.0000	FLOOD RISK
60 minute winter	129 - PP	50	4.912	0.787	21.1	21.7143	0.0000	FLOOD RISK
240 minute winter	129	228	4.603	0.494	6.7	0.5586	0.0000	SURCHARGED
240 minute winter	128	228	4.602	0.727	6.7	0.8218	0.0000	FLOOD RISK
60 minute winter	127	48	6.279	0.279	15.1	13.6769	0.0000	SURCHARGED
60 minute winter	126	49	5.740	0.040	3.6	0.0455	0.0000	OK
60 minute winter	125	48	5.786	0.336	15.1	13.1112	0.0000	SURCHARGED
60 minute winter	124	49	5.486	0.068	7.6	0.0768	0.0000	OK
60 minute winter	123	50	5.064	0.064	7.6	0.0719	0.0000	OK
60 minute winter	122	46	4.975	0.425	15.1	12.1305	0.0000	SURCHARGED
240 minute winter	121	228	4.630	0.188	10.4	0.2121	0.0000	OK
240 minute winter	120	228	4.626	0.351	10.4	0.3975	0.0000	SURCHARGED
60 minute winter	119	44	5.950	0.825	31.5	29.2962	0.6984	FLOOD
60 minute winter	118 - PP	44	5.550	0.825	31.2	29.2764	0.7171	FLOOD
60 minute winter	118	48	4.792	0.082	15.3	0.0928	0.0000	OK
240 minute winter	117	228	4.621	0.510	28.2	1.4031	0.0000	SURCHARGED
240 minute winter	116	228	4.615	0.615	30.0	0.9681	0.0000	FLOOD RISK
240 minute winter	115	228	4.609	0.759	31.9	1.1951	0.0000	FLOOD RISK
240 minute winter	114	228	4.602	0.927	39.7	1.6873	0.0000	FLOOD RISK
240 minute winter	113	228	4.600	1.300	39.7	191.9790	4.7542	FLOOD
240 minute winter	112	228	4.599	1.319	13.4	1.8882	0.0000	FLOOD RISK
15 minute summer	111	1	3.250	0.000	12.0	0.0000	0.0000	OK
15 minute winter	110	12	5.326	0.676	26.3	1.6653	0.0000	FLOOD RISK
15 minute winter	109	12	5.444	0.644	26.3	1.5872	0.0000	FLOOD RISK
15 minute winter	108	12	4.937	0.512	65.0	1.1998	0.0000	SURCHARGED

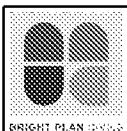
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	130	20.000	129	4.3	0.829	0.241	0.1619	
60 minute winter	129 - PP	22.000_1	129	4.4	0.447	0.147	0.0464	
240 minute winter	129	20.001	128	6.7	0.715	0.156	1.3490	
240 minute winter	128	20.002	114	6.7	0.670	0.190	0.4242	
60 minute winter	127	16.000	126	3.6	0.865	0.193	0.1130	
60 minute winter	126	16.001	124	3.6	0.635	0.157	0.0972	
60 minute winter	125	17.000	124	3.9	0.543	0.294	0.0403	
60 minute winter	124	16.002	123	7.6	1.020	0.403	0.2779	
60 minute winter	123	16.003	121	7.6	1.080	0.362	0.2449	
60 minute winter	122	18.000	121	4.5	0.655	0.339	0.0401	
240 minute winter	121	16.004	120	10.4	0.772	0.228	0.8075	
240 minute winter	120	16.005	117	10.4	0.717	0.349	1.0495	
60 minute winter	119	19.000	118	7.7	0.746	0.146	0.4211	
60 minute winter	118 - PP	20.000_1	118	7.6	0.574	0.248	0.0576	
60 minute winter	118	19.001	117	15.3	1.188	0.276	0.5949	
240 minute winter	117	16.006	116	28.2	1.032	0.362	1.5793	
240 minute winter	116	16.007	115	30.0	1.020	0.287	1.1929	
240 minute winter	115	16.008	114	31.9	1.006	0.420	1.4975	
240 minute winter	114	16.009	113	39.7	1.153	0.242	0.8139	
240 minute winter	113	16.010	112	13.4	0.277	0.112	0.6146	
240 minute winter	112	Hydro-Brake®	111	13.3				289.3
15 minute winter	110	31.000	108	20.8	1.181	1.485	0.4221	
15 minute winter	109	30.000	108	20.4	1.161	1.211	0.5833	
15 minute winter	108	30.001	107	62.1	1.561	1.226	0.8380	



Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	107	12	4.561	0.336	62.1	0.3802	0.0000	SURCHARGED
120 minute winter	106	104	5.008	0.683	23.1	45.5403	0.0000	FLOOD RISK
180 minute winter	105	176	4.291	0.266	4.1	0.3010	0.0000	SURCHARGED
120 minute winter	104 - PP	118	4.595	0.720	23.2	49.3957	0.0000	FLOOD RISK
180 minute winter	104	176	4.290	0.503	25.4	0.5686	0.0000	SURCHARGED
180 minute winter	103	176	4.288	0.838	26.3	1.5187	0.0000	FLOOD RISK
15 minute winter	102	11	5.600	0.750	36.8	2.2485	1.2497	FLOOD
15 minute winter	101	11	5.109	0.734	58.0	2.0753	0.0000	FLOOD RISK
15 minute winter	100	10	4.650	0.825	89.7	2.3331	3.2807	FLOOD
180 minute winter	99	176	4.287	0.737	35.1	2.0952	0.0000	FLOOD RISK
180 minute winter	98	176	4.287	0.937	62.1	1.6987	0.0000	FLOOD RISK
180 minute winter	97	176	4.286	0.966	61.7	170.5749	0.0000	FLOOD RISK
180 minute winter	96	176	4.285	0.995	14.4	1.4246	0.0000	FLOOD RISK
15 minute summer	95	1	3.260	0.000	14.0	0.0000	0.0000	OK
15 minute winter	94	11	6.800	0.750	24.2	1.7685	0.9429	FLOOD
15 minute winter	93	11	6.568	0.741	38.6	1.7192	0.0000	FLOOD RISK
15 minute winter	92	11	5.742	0.167	34.5	0.1891	0.0000	OK
15 minute winter	91	11	5.564	0.139	34.3	0.1574	0.0000	OK
60 minute winter	90	49	5.617	0.442	20.8	20.0773	0.0000	SURCHARGED
15 minute winter	89	13	5.345	0.194	37.7	0.2197	0.0000	OK
15 minute winter	88	13	5.230	0.155	37.4	0.1749	0.0000	OK
60 minute winter	87	49	5.318	0.443	20.8	20.1361	0.0000	SURCHARGED
15 minute winter	86	14	5.044	0.192	40.7	0.2177	0.0000	OK
15 minute winter	85	14	4.950	0.175	40.4	0.1984	0.0000	OK
1440 minute winter	84	1440	4.864	0.289	5.9	0.3265	0.0000	SURCHARGED

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 winter	107	30.002	104	61.9	1.559	1.120	1.2666	
120 minute winter	106	32.000	105	4.2	0.741	0.082	0.7090	
180 minute winter	105	32.001	104	4.1	0.713	0.081	0.6840	
120 minute winter	104 - PP	35.000_1	104	3.3	0.513	0.107	0.1481	
180 minute winter	104	30.003	103	23.7	1.112	0.195	1.5540	
180 minute winter	103	30.004	98	25.5	0.444	0.197	2.6168	
15 minute winter	102	33.000	101	23.1	1.315	1.133	0.5331	
15 minute winter	101	33.001	100	55.0	1.382	0.839	1.3840	
15 minute winter	100	33.002	99	70.5	1.772	1.673	1.2046	
180 minute winter	99	33.003	98	34.5	0.844	0.447	0.9718	
180 minute winter	98	30.005	97	61.7	1.006	0.461	0.7329	
180 minute winter	97	30.006	96	14.4	0.377	0.102	0.6677	
180 minute winter	96	Hydro-Brake®	95	14.0				308.0
15 minute winter	94	12.000	93	15.4	0.877	1.165	0.6984	
15 minute winter	93	12.001	92	34.5	1.959	1.934	0.3058	
15 minute winter	92	12.002	91	34.3	1.198	0.858	0.7225	
15 minute winter	91	12.003	89	34.8	1.122	0.684	0.8878	
60 minute winter	90	13.000	89	4.7	0.546	0.155	0.1794	
15 minute winter	89	12.004	88	37.4	1.132	1.008	0.4859	
15 minute winter	88	12.005	86	37.5	1.154	0.755	0.7930	
60 minute winter	87	14.000	86	4.6	0.437	0.152	0.1769	
15 minute winter	86	12.006	85	40.4	1.166	0.883	0.3440	
15 minute winter	85	12.007	84	40.5	1.257	0.883	0.8247	
1440 minute winter	84	12.008	82	5.9	0.879	0.115	0.4798	



Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	83	49	4.914	0.439	20.8	19.8335	0.0000	SURCHARGED
1440 minute winter	82	1440	4.864	0.408	7.8	0.4611	0.0000	SURCHARGED
60 minute winter	81	46	6.317	0.517	17.0	13.5327	0.0000	FLOOD RISK
240 minute winter	80	232	5.685	0.135	4.3	0.1528	0.0000	OK
60 minute winter	79	46	5.971	0.521	17.0	13.7160	0.0000	FLOOD RISK
240 minute winter	78	232	5.684	0.344	8.6	0.3893	0.0000	SURCHARGED
240 minute winter	77	232	5.684	0.509	8.6	0.5756	0.0000	SURCHARGED
240 minute winter	76	240	5.681	0.531	6.3	14.1687	0.0000	FLOOD RISK
240 minute winter	75	232	5.684	0.714	12.8	0.8070	0.0000	FLOOD RISK
240 minute winter	74	232	5.684	0.734	12.8	0.8296	0.0000	FLOOD RISK
15 minute winter	73	11	6.800	0.750	21.0	1.6485	0.2361	FLOOD
15 minute winter	72	11	6.600	0.750	38.9	1.7685	0.9941	FLOOD
240 minute winter	71	232	5.686	0.211	13.5	0.4749	0.0000	OK
60 minute winter	70	57	6.027	0.377	25.7	26.9660	0.0000	SURCHARGED
240 minute winter	69	232	5.695	0.320	4.1	0.3623	0.0000	SURCHARGED
240 minute winter	68	232	5.694	0.419	4.0	0.4743	0.0000	SURCHARGED
240 minute winter	67	232	5.694	0.519	4.1	0.5866	0.0000	SURCHARGED
240 minute winter	66	232	5.724	0.649	9.7	40.4123	0.0000	FLOOD RISK
240 minute winter	65	232	5.693	0.713	8.0	0.8064	0.0000	FLOOD RISK
240 minute winter	64	232	5.692	0.792	7.8	0.8960	0.0000	FLOOD RISK
15 minute winter	63	12	6.205	0.405	22.6	0.9233	0.0000	SURCHARGED
60 minute winter	62	48	6.280	0.280	15.1	13.7977	0.0000	SURCHARGED
60 minute winter	61	48	6.228	0.278	15.1	13.6428	0.0000	SURCHARGED
15 minute winter	60	13	6.049	0.254	11.8	0.2870	0.0000	SURCHARGED
15 minute winter	59	13	6.034	0.459	37.6	0.8528	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	83	15.000	82	4.6	0.514	0.154	0.1077	
1440 minute winter	82	12.009	38	7.8	1.140	0.103	0.5563	
60 minute winter	81	9.000	80	5.1	0.884	0.247	0.1068	
240 minute winter	80	9.001	78	4.3	0.798	0.249	0.2449	
60 minute winter	79	10.000	78	5.1	0.677	0.378	0.0456	
240 minute winter	78	9.002	77	8.6	0.912	0.165	0.6603	
240 minute winter	77	9.003	75	8.6	0.872	0.186	0.6563	
240 minute winter	76	11.000	75	4.3	0.644	0.319	0.0930	
240 minute winter	75	9.004	74	12.8	0.726	0.236	0.5855	
240 minute winter	74	9.005	45	12.8	0.894	0.134	0.4763	
15 minute winter	73	8.000	72	16.1	0.917	0.912	0.3544	
15 minute winter	72	8.001	71	28.7	1.630	1.661	0.5518	
240 minute winter	71	8.002	48	13.4	1.150	0.234	0.6467	
60 minute winter	70	4.000	69	4.3	1.005	0.181	0.0478	
240 minute winter	69	4.001	68	4.0	0.706	0.097	0.6109	
240 minute winter	68	4.002	67	4.1	0.769	0.078	0.4000	
240 minute winter	67	4.003	65	4.1	0.818	0.070	0.3849	
240 minute winter	66	5.000	65	4.3	0.550	0.143	0.2345	
240 minute winter	65	4.004	64	7.8	0.601	0.144	2.3531	
240 minute winter	64	4.005	55	7.4	0.592	0.094	1.6644	
15 minute winter	63	3.000	59	18.7	1.061	1.078	0.2776	
60 minute winter	62	1.000	60	3.6	0.635	0.269	0.1295	
60 minute winter	61	2.000	60	3.6	0.885	0.165	0.0213	
15 minute winter	60	1.001	59	15.2	0.790	0.362	1.3381	
15 minute winter	59	1.002	58	37.5	1.154	0.757	0.8759	



Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	58	12	5.936	0.561	49.4	0.9603	0.0000	FLOOD RISK
15 minute winter	57	12	5.721	0.646	70.5	1.8567	0.0000	FLOOD RISK
240 minute winter	56	224	5.700	0.825	9.7	46.1004	0.4279	FLOOD
240 minute winter	55	232	5.692	0.984	33.3	1.4076	0.0000	FLOOD RISK
240 minute winter	54	232	5.690	1.028	32.6	1.4715	0.0000	FLOOD RISK
240 minute winter	53	232	5.689	1.063	31.7	1.5215	0.0000	FLOOD RISK
240 minute winter	52	228	5.700	0.750	9.7	46.0154	0.2638	FLOOD
240 minute winter	51	232	5.688	1.178	34.1	1.6857	0.0000	FLOOD RISK
240 minute winter	50	232	5.687	1.219	36.5	2.5252	0.0000	FLOOD RISK
240 minute winter	49	232	5.687	1.245	38.9	2.4373	0.0000	SURCHARGED
240 minute winter	48	232	5.686	1.267	55.0	2.4319	0.0000	SURCHARGED
240 minute winter	47	232	5.685	1.317	60.8	3.2096	0.0000	FLOOD RISK
240 minute winter	46	232	5.684	1.331	60.4	1.9053	0.0000	SURCHARGED
240 minute winter	45	232	5.684	1.436	72.4	242.2358	0.0000	FLOOD RISK
240 minute winter	44	232	5.683	1.438	22.3	3.6599	0.0000	FLOOD RISK
1440 minute winter	43	1440	4.864	0.635	21.4	1.8136	0.0000	SURCHARGED
1440 minute winter	42	1440	4.864	0.689	22.3	1.8294	0.0000	SURCHARGED
1440 minute winter	41	1440	4.864	0.839	23.1	2.2277	0.0000	FLOOD RISK
1440 minute winter	40	1440	4.864	0.889	23.8	2.3604	0.0000	FLOOD RISK
1440 minute winter	39	1440	4.864	0.911	23.5	1.6092	0.0000	FLOOD RISK
1440 minute winter	38	1440	4.864	0.931	31.2	1.6443	0.0000	FLOOD RISK
1440 minute winter	37	1440	4.864	1.109	31.2	1.9596	0.0000	OK
1440 minute winter	36	1440	4.863	0.713	4.5	84.3469	0.0000	FLOOD RISK
1440 minute winter	35	1440	4.863	1.108	3.8	1.2530	0.0000	OK
60 minute winter	32	52	4.411	0.536	27.4	27.2501	0.0000	FLOOD RISK

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 winter	58	1.003	57	41.8	1.051	0.817	1.2337	
15 minute winter	57	1.004	55	69.1	1.738	1.634	1.2977	
240 minute winter	56	6.000	55	-4.3	0.524	-0.144	0.2013	
240 minute winter	55	1.005	54	32.6	0.648	0.389	2.8461	
240 minute winter	54	1.006	53	31.7	0.657	0.381	2.2504	
240 minute winter	53	1.007	51	30.7	0.773	0.370	2.5879	
240 minute winter	52	7.000	51	4.4	0.983	0.174	0.1195	
240 minute winter	51	1.008	50	32.4	0.475	0.270	4.7357	
240 minute winter	50	1.009	49	34.8	0.456	0.289	2.9214	
240 minute winter	49	1.010	48	38.2	0.453	0.317	2.5688	
240 minute winter	48	1.011	47	54.0	0.559	0.450	5.7613	
240 minute winter	47	1.012	46	60.4	0.596	0.499	1.6635	
240 minute winter	46	1.013	45	60.2	0.711	0.500	3.3588	
240 minute winter	45	1.014	44	22.3	0.151	0.191	0.3573	
240 minute winter	44	1.015	43	21.0	0.547	0.189	2.0648	
1440 minute winter	43	1.016	42	21.1	0.781	0.137	3.6813	
1440 minute winter	42	1.017	41	21.9	0.721	0.091	4.2889	
1440 minute winter	41	1.018	40	22.6	0.523	0.124	2.4809	
1440 minute winter	40	1.019	39	23.5	0.461	0.214	2.9467	
1440 minute winter	39	1.020	38	23.4	0.468	0.212	2.6571	
1440 minute winter	38	1.021	37	31.2	0.696	0.283	0.5357	
1440 minute winter	37	Flow through pond	3	16.6	0.023	0.001	928.5807	
1440 minute winter	36	36.000	35	-3.8	0.396	-0.284	0.1238	
1440 minute winter	35	Flow through pond	3	16.6	0.023	0.001	928.5807	
60 minute winter	32	28.000	23	5.3	0.622	0.155	1.0126	



Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	31	705	4.402	0.627	4.3	35.4502	0.0000	FLOOD RISK
60 minute winter	30	46	4.849	0.549	15.6	12.8016	0.0000	FLOOD RISK
60 minute winter	29	46	4.806	0.506	15.6	12.6876	0.0000	FLOOD RISK
720 minute winter	28	705	4.400	0.261	4.6	0.2953	0.0000	SURCHARGED
15 minute winter	27	11	5.575	0.750	25.2	1.8083	0.6034	FLOOD
15 minute winter	26	11	5.300	0.750	40.9	1.8083	0.2835	FLOOD
720 minute winter	25	705	4.400	0.397	11.0	0.8267	0.0000	SURCHARGED
720 minute winter	24	705	4.400	0.500	13.2	1.1321	0.0000	SURCHARGED
720 minute winter	23	705	4.400	0.791	18.9	1.1320	0.0000	FLOOD RISK
720 minute winter	22	705	4.400	0.825	17.9	1.1806	0.0000	FLOOD RISK
720 minute winter	21	705	4.400	0.873	17.2	1.2493	0.0000	FLOOD RISK
15 minute winter	20	11	5.125	0.750	22.1	1.6883	0.5276	FLOOD
15 minute winter	19	10	4.900	0.750	35.4	1.6883	2.7204	FLOOD
30 minute winter	18	26	4.779	0.354	15.1	7.4625	0.0000	SURCHARGED
30 minute winter	17	26	4.949	0.349	15.1	7.3309	0.0000	SURCHARGED
15 minute winter	16	12	4.696	0.372	10.5	0.4210	0.0000	SURCHARGED
15 minute winter	15	12	4.679	0.505	23.8	0.8659	0.0000	SURCHARGED
15 minute winter	14	12	4.651	0.527	39.5	0.9225	0.0000	SURCHARGED
15 minute winter	13	12	4.435	0.685	74.4	1.4756	0.0000	FLOOD RISK
720 minute winter	12	705	4.400	0.728	13.2	1.5450	0.0000	FLOOD RISK
720 minute winter	11	705	4.400	0.798	12.7	0.9026	0.0000	FLOOD RISK
720 minute winter	10	705	4.402	0.602	4.5	33.4310	0.0000	FLOOD RISK
720 minute winter	9	705	4.400	0.904	14.9	1.2936	0.0000	FLOOD RISK
720 minute winter	8	705	4.400	1.081	31.8	1.9101	0.0000	FLOOD RISK
720 minute winter	7	705	4.400	1.434	31.7	2.5338	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)
720 minute winter	31	29.000	23	3.1	0.499	0.101	0.1837	
60 minute winter	30	26.000	28	5.2	0.695	0.394	0.1150	
60 minute winter	29	27.000	28	5.1	1.012	0.213	0.0242	
720 minute winter	28	26.001	25	4.6	0.571	0.155	0.7229	
15 minute winter	27	25.000	26	17.4	0.991	0.964	0.4664	
15 minute winter	26	25.001	25	36.1	2.051	1.484	0.3711	
720 minute winter	25	25.002	24	11.0	0.759	0.155	1.7691	
720 minute winter	24	25.003	23	13.1	0.924	0.135	1.9787	
720 minute winter	23	25.004	22	17.9	0.555	0.212	2.0770	
720 minute winter	22	25.005	21	17.2	0.629	0.208	3.0215	
720 minute winter	21	25.006	8	17.1	0.747	0.131	1.4773	
15 minute winter	20	23.000	19	14.7	0.832	0.928	0.4990	
15 minute winter	19	23.001	13	23.1	1.310	1.441	0.5406	
30 minute winter	18	21.000	16	5.6	0.480	0.420	0.3149	
30 minute winter	17	22.000	16	4.0	0.635	0.301	0.0288	
15 minute winter	16	21.001	15	13.2	0.837	0.996	0.2345	
15 minute winter	15	21.002	14	22.5	0.714	0.748	0.5861	
15 minute winter	14	21.003	13	35.9	0.943	0.807	1.6231	
15 minute winter	13	21.004	12	75.4	1.071	1.419	2.3591	
720 minute winter	12	21.005	11	12.7	0.585	0.240	2.1176	
720 minute winter	11	21.006	9	12.7	0.644	0.236	0.9225	
720 minute winter	10	24.000	9	3.3	0.851	0.145	0.0876	
720 minute winter	9	21.007	8	14.7	0.616	0.174	1.6463	
720 minute winter	8	21.008	7	31.7	0.674	0.184	1.1750	
720 minute winter	7	Flow through pond	6	16.5	0.011	0.001	453.2670	



Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
720 minute winter	6	705	4.400	1.450	18.5	2.5186	0.0000	FLOOD RISK
720 minute winter	5	705	4.399	1.466	3.8	1.6586	0.0000	FLOOD RISK
720 minute winter	4	705	2.972	0.050	3.8	0.0000	0.0000	OK
1440 minute winter	3	1440	4.863	1.163	19.3	3.4282	0.0000	FLOOD RISK
1440 minute winter	2	1440	4.862	1.177	4.1	2.0805	0.0000	FLOOD RISK
15 minute summer	1	122	3.727	0.051	4.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
720 minute winter	6	35.000	5	3.8	0.108	0.124	0.1913	
720 minute winter	5	35.001	4	3.8	0.534	0.124	0.0221	189.2
1440 minute winter	3	37.000	2	4.1	0.117	0.134	0.1736	
1440 minute winter	2	37.001	1	4.0	0.541	0.130	0.0187	321.1

Appendix F Foul Network Models



Design Settings

Frequency of use (kDU)	0.90	Minimum Velocity (m/s)	1.00
Flow per dwelling per day (l/day)	4000	Connection Type	Level Soffits
Domestic Flow (l/s/ha)	225.0	Minimum Backdrop Height (m)	0.500
Industrial Flow (l/s/ha)	225.0	Preferred Cover Depth (m)	0.900
Additional Flow (%)	0	Include Intermediate Ground	✓

Nodes

Name	Dwellings	Cover Level (m)	Manhole Type	Depth (m)
1	10	6.350	Adoptable	1.050
2		6.200	Adoptable	1.050
3		5.775	Adoptable	1.050
4	10	5.100	Adoptable	1.100
5		5.400	Adoptable	1.611
6		6.250	Adoptable	2.785
7		5.350	Adoptable	2.025
8	10	5.475	Adoptable	1.050
9		5.725	Adoptable	2.507
10		5.050	Adoptable	2.154
11		4.900	Adoptable	2.081
12		4.825	Adoptable	2.095
13		5.075	Adoptable	2.535
14		5.400	Adoptable	2.989
15		5.750	Adoptable	3.474
16		6.100	Adoptable	3.955
17		5.650	Adoptable	3.673
18	10	5.800	Adoptable	1.050
19		6.025	Adoptable	1.425
20		6.050	Adoptable	1.507
21		6.750	Adoptable	2.569
22		6.975	Adoptable	2.880
23		6.950	Adoptable	2.963
24	10	6.000	Adoptable	1.350
25		6.300	Adoptable	1.941
26		6.700	Adoptable	2.947
27		6.425	Adoptable	2.903
28	28	5.700	Adoptable	1.050
29		5.700	Adoptable	1.306
30		5.675	Adoptable	1.400
31		5.525	Adoptable	1.388
32		5.200	Adoptable	1.242
33		6.125	Adoptable	2.876
34	10	6.000	Adoptable	1.050
35		6.000	Adoptable	1.296
36		6.000	Adoptable	1.447
37		5.700	Adoptable	1.445
38		6.000	Adoptable	2.868
39		5.800	Adoptable	2.824
40		5.550	Adoptable	3.662
41		5.425	Adoptable	3.605
42		5.025	Adoptable	3.461
43		4.950	Adoptable	3.555
43_OUT		5.000	Adoptable	3.829



Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.018	32.517	149.6	150	4.950	1.395	3.405	5.000	1.171	3.679
1.017	25.327	149.9	150	5.025	1.564	3.311	4.950	1.395	3.405
1.016	38.302	149.6	150	5.425	1.820	3.455	5.025	1.564	3.311
1.015	10.190	149.9	150	5.550	1.888	3.512	5.425	1.820	3.455
1.014	13.322	149.7	150	5.650	1.977	3.523	5.550	1.888	3.512
4.010	34.289	149.7	150	5.800	2.976	2.674	5.550	2.747	2.653
4.009	23.274	149.2	150	6.000	3.132	2.718	5.800	2.976	2.674
4.008	17.498	149.6	150	6.125	3.249	2.726	6.000	3.132	2.718
7.003	54.586	150.0	150	5.700	4.255	1.295	6.000	3.891	1.959
7.002	44.565	149.5	150	6.000	4.553	1.297	5.700	4.255	1.295
7.001	22.637	149.9	150	6.000	4.704	1.146	6.000	4.553	1.297
7.000	36.778	149.5	150	6.000	4.950	0.900	6.000	4.704	1.146
6.004	15.660	149.1	150	5.200	3.958	1.092	6.125	3.853	2.122
4.007	40.891	149.8	150	6.425	3.522	2.753	6.125	3.249	2.726
4.006	34.512	149.4	150	6.700	3.753	2.797	6.425	3.522	2.753
4.005	35.063	149.8	150	6.950	3.987	2.813	6.700	3.753	2.797
5.001	35.145	58.0	150	6.300	4.359	1.791	6.700	3.753	2.797
5.000	42.560	149.7	150	6.000	4.650	1.200	6.300	4.359	1.791
4.004	16.189	149.9	150	6.975	4.095	2.730	6.950	3.987	2.813
4.003	12.877	149.7	150	6.750	4.181	2.419	6.975	4.095	2.730
4.002	54.243	149.8	150	6.050	4.543	1.357	6.750	4.181	2.419
4.001	8.403	147.4	150	6.025	4.600	1.275	6.050	4.543	1.357
4.000	14.250	95.0	150	5.800	4.750	0.900	6.025	4.600	1.275
6.003	26.805	149.7	150	5.525	4.137	1.238	5.200	3.958	1.092
6.002	20.666	149.8	150	5.675	4.275	1.250	5.525	4.137	1.238

Link	US Node	DS Node
1.018	43	43_OUT
1.017	42	43
1.016	41	42
1.015	40	41
1.014	17	40
4.010	39	40
4.009	38	39
4.008	33	38
7.003	37	38
7.002	36	37
7.001	35	36
7.000	34	35
6.004	32	33
4.007	27	33
4.006	26	27
4.005	23	26
5.001	25	26
5.000	24	25
4.004	22	23
4.003	21	22
4.002	20	21
4.001	19	20
4.000	18	19
6.003	31	32
6.002	30	31



Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
6.001	17.803	149.6	150	5.700	4.394	1.156	5.675	4.275	1.250
6.000	38.385	149.9	150	5.700	4.650	0.900	5.700	4.394	1.156
1.013	25.098	149.4	150	6.100	2.145	3.805	5.650	1.977	3.523
1.012	19.649	150.0	150	5.750	2.276	3.324	6.100	2.145	3.805
1.011	20.139	149.2	150	5.400	2.411	2.839	5.750	2.276	3.324
1.010	19.246	149.2	150	5.075	2.540	2.385	5.400	2.411	2.839
1.009	28.459	149.8	150	4.825	2.730	1.945	5.075	2.540	2.385
1.008	13.311	149.6	150	4.900	2.819	1.931	4.825	2.730	1.945
1.007	11.511	149.5	150	5.050	2.896	2.004	4.900	2.819	1.931
1.006	48.255	149.9	150	5.725	3.218	2.357	5.050	2.896	2.004
1.005	16.000	149.5	150	5.350	3.325	1.875	5.725	3.218	2.357
3.000	31.985	116.3	150	5.475	4.425	0.900	5.725	4.150	1.425
1.004	20.866	149.0	150	6.250	3.465	2.635	5.350	3.325	1.875
1.003	48.483	149.6	150	5.400	3.789	1.461	6.250	3.465	2.635
1.002	37.315	99.5	150	5.775	4.725	0.900	5.400	4.350	0.900
2.000	31.511	149.3	150	5.100	4.000	0.950	5.400	3.789	1.461
1.001	43.278	101.8	150	6.200	5.150	0.900	5.775	4.725	0.900
1.000	15.931	106.2	150	6.350	5.300	0.900	6.200	5.150	0.900

Link	US Node	DS Node
6.001	29	30
6.000	28	29
1.013	16	17
1.012	15	16
1.011	14	15
1.010	13	14
1.009	12	13
1.008	11	12
1.007	10	11
1.006	9	10
1.005	7	9
3.000	8	9
1.004	6	7
1.003	5	6
1.002	3	5
2.000	4	5
1.001	2	3
1.000	1	2

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	6.350	1.050	1200		0	1.000	5.300 150
2	6.200	1.050	1200		1	1.000	5.150 150
					0	1.001	5.150 150



Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
3	5.775	1.050	1200		1	1.001	4.725
					0	1.002	4.725
4	5.100	1.100	1200		0	2.000	4.000
					1	2.000	3.789
5	5.400	1.611	1200		2	1.002	4.350
					0	1.003	3.789
6	6.250	2.785	1200		1	1.003	3.465
					0	1.004	3.465
7	5.350	2.025	1200		1	1.004	3.325
					0	1.005	3.325
8	5.475	1.050	1200		0	3.000	4.425
					1	3.000	4.150
9	5.725	2.507	1200		2	1.005	3.218
					0	1.006	3.218
10	5.050	2.154	1200		1	1.006	2.896
					0	1.007	2.896
11	4.900	2.081	1200		1	1.007	2.819
					0	1.008	2.819
12	4.825	2.095	1200		1	1.008	2.730
					0	1.009	2.730
13	5.075	2.535	1200		1	1.009	2.540
					0	1.010	2.540
14	5.400	2.989	1200		1	1.010	2.411
					0	1.011	2.411
15	5.750	3.474	1200		1	1.011	2.276
					0	1.012	2.276

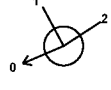
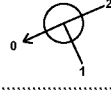


Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
16	6.100	3.955	1200		1	1.012	2.145 150
17	5.650	3.673	1200		0	1.013	2.145 150
18	5.800	1.050	1200		1	1.013	1.977 150
19	6.025	1.425	1200		0	1.014	1.977 150
20	6.050	1.507	1200		0	4.000	4.750 150
21	6.750	2.569	1200		1	4.000	4.600 150
22	6.975	2.880	1200		0	4.001	4.600 150
23	6.950	2.963	1200		1	4.001	4.543 150
24	6.000	1.350	1200		0	4.002	4.543 150
25	6.300	1.941	1200		1	4.002	4.181 150
26	6.700	2.947	1200		0	4.003	4.181 150
27	6.425	2.903	1200		1	4.003	4.095 150
28	5.700	1.050	1200		0	4.004	4.095 150
					1	4.004	3.987 150
					0	4.005	3.987 150
					0	5.000	4.650 150
					1	5.000	4.359 150
					0	5.001	4.359 150
					1	5.001	3.753 150
					2	4.005	3.753 150
					0	4.006	3.753 150
					1	4.006	3.522 150
					0	4.007	3.522 150
					0	6.000	4.650 150



Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
29	5.700	1.306	1200		1	6.000	4.394 150
					0	6.001	4.394 150
30	5.675	1.400	1200		1	6.001	4.275 150
					0	6.002	4.275 150
31	5.525	1.388	1200		1	6.002	4.137 150
					0	6.003	4.137 150
32	5.200	1.242	1200		1	6.003	3.958 150
					0	6.004	3.958 150
33	6.125	2.876	1200		1	6.004	3.853 150
					2	4.007	3.249 150
					0	4.008	3.249 150
34	6.000	1.050	1200		0	7.000	4.950 150
					1	7.000	4.704 150
35	6.000	1.296	1200		0	7.001	4.704 150
					1	7.001	4.553 150
36	6.000	1.447	1200		0	7.002	4.553 150
					1	7.002	4.255 150
37	5.700	1.445	1200		0	7.003	4.255 150
					1	7.003	3.891 150
38	6.000	2.868	1200		2	4.008	3.132 150
					0	4.009	3.132 150
39	5.800	2.824	1200		1	4.009	2.976 150
					0	4.010	2.976 150
40	5.550	3.662	1200		1	4.010	2.747 150
					2	1.014	1.888 150
					0	1.015	1.888 150
41	5.425	3.605	1200		1	1.015	1.820 150
					0	1.016	1.820 150



Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
42	5.025	3.461	1200		1	1.016	1.564
					0	1.017	1.564
43	4.950	3.555	1200		1	1.017	1.395
					0	1.018	1.395
43_OUT	5.000	3.829	1200		1	1.018	1.171



Design Settings

Frequency of use (kDU)	0.90	Minimum Velocity (m/s)	1.00
Flow per dwelling per day (l/day)	4000	Connection Type	Level Soffits
Domestic Flow (l/s/ha)	0.6	Minimum Backdrop Height (m)	0.500
Industrial Flow (l/s/ha)	0.8	Preferred Cover Depth (m)	0.900
Additional Flow (%)	0	Include Intermediate Ground	✓

Nodes

Name	Dwellings	Cover Level (m)	Manhole Type	Depth (m)
✓ 70	15	5.100	Adoptable	1.050
✓ 69		5.500	Adoptable	1.652
✓ 68		5.700	Adoptable	2.024
✓ 67		6.000	Adoptable	2.483
✓ 66		6.300	Adoptable	2.969
✓ 65	15	5.600	Adoptable	1.050
✓ 64		6.200	Adoptable	1.968
✓ 63		6.450	Adoptable	2.329
✓ 62		6.700	Adoptable	3.011
✓ 61		6.400	Adoptable	3.393
✓ 60	15	5.900	Adoptable	1.050
✓ 59	15	5.900	Adoptable	1.050
✓ 58	15	4.750	Adoptable	1.050
✓ 57		4.950	Adoptable	1.470
✓ 56		5.250	Adoptable	1.991
✓ 55		5.700	Adoptable	2.636
✓ 54		5.700	Adoptable	2.932
✓ 53		5.800	Adoptable	3.196
✓ 52		5.800	Adoptable	3.419
✓ 51		6.300	Adoptable	4.118
✓ 50	15	6.150	Adoptable	1.050
✓ 49		6.300	Adoptable	1.338
✓ 48		6.500	Adoptable	1.640
✓ 47		6.650	Adoptable	1.914
✓ 46	15	6.000	Adoptable	1.050
✓ 45	15	5.050	Adoptable	1.050
✓ 44		4.950	Adoptable	1.072
✓ 43	15	5.400	Adoptable	1.050
✓ 42		5.250	Adoptable	1.066
✓ 41		4.750	Adoptable	1.050
✓ 40		4.700	Adoptable	1.150
✓ 39		4.500	Adoptable	1.204
✓ 38		5.100	Adoptable	1.970
✓ 37		5.700	Adoptable	2.811
✓ 36		6.100	Adoptable	3.581
✓ 35		6.300	Adoptable	3.871
✓ 34		6.600	Adoptable	4.308
✓ 33		6.800	Adoptable	4.717
✓ 32		6.900	Adoptable	4.952
✓ 31		7.000	Adoptable	5.134
✓ 30	15	5.600	Adoptable	1.050
✓ 29		5.650	Adoptable	1.272
✓ 28		5.500	Adoptable	1.318
✓ 27	15	5.400	Adoptable	1.050



Nodes

	Name	Dwellings	Cover Level (m)	Manhole Type	Depth (m)
✓	26		5.400	Adoptable	1.182
✓	25		5.400	Adoptable	1.360
✓	24	15	5.200	Adoptable	1.050
✓	23		5.450	Adoptable	1.470
✓	22		5.300	Adoptable	1.427
✓	21	15	5.000	Adoptable	1.050
✓	20		4.800	Adoptable	1.174
✓	19		4.600	Adoptable	1.168
✓	18		4.550	Adoptable	1.332
✓	17		4.600	Adoptable	1.666
✓	16		5.050	Adoptable	2.337
✓	15		4.950	Adoptable	2.392
✓	14	15	5.800	Adoptable	1.050
✓	13		5.600	Adoptable	1.050
✓	12		5.300	Adoptable	1.050
✓	11		5.200	Adoptable	2.769
✓	10		5.300	Adoptable	2.920
✓	9		5.500	Adoptable	3.250
✓	8		5.800	Adoptable	3.710
✓	7		5.900	Adoptable	3.859
✓	6		6.200	Adoptable	4.329
✓	5		6.400	Adoptable	4.661
✓	4		6.600	Adoptable	4.971
✓	3		6.700	Adoptable	5.226
✓	2		6.500	Adoptable	5.117
✓	1		5.000	Adoptable	4.111

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.018	111.176	225.0	225	6.500	1.383	4.892	5.000	0.889	3.886
10.005	19.942	149.9	150	6.300	2.182	3.968	6.500	2.049	4.301
1.017	20.530	225.0	225	6.700	1.474	5.001	6.500	1.383	4.892
6.012	47.462	149.7	150	7.000	1.866	4.984	6.700	1.549	5.001
1.016	22.795	225.0	225	6.600	1.629	4.746	6.700	1.528	4.947
1.015	24.826	225.0	225	6.400	1.739	4.436	6.600	1.629	4.746
1.014	29.605	225.0	225	6.200	1.871	4.104	6.400	1.739	4.436
1.013	38.254	225.0	225	5.900	2.041	3.634	6.200	1.871	4.104
1.012	10.969	225.0	225	5.800	2.090	3.485	5.900	2.041	3.634

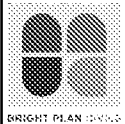
Link	US Node	DS Node
1.018	2	1
10.005	51	2
1.017	3	2
6.012	31	3
1.016	4	3
1.015	5	4
1.014	6	5
1.013	7	6
1.012	8	7



Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.011	35.972	225.0	225	5.500	2.250	3.025	5.800	2.090	3.435
1.010	29.306	225.0	225	5.300	2.380	2.695	5.500	2.250	3.025
1.009	11.548	225.0	225	5.200	2.431	2.544	5.300	2.380	2.695
1.008	28.601	225.0	225	4.950	2.558	2.167	5.200	2.431	2.544
5.002	12.169	121.7	150	5.300	4.250	0.900	5.200	4.150	0.900
5.001	28.059	93.5	150	5.600	4.550	0.900	5.300	4.250	0.900
5.000	23.664	118.3	150	5.800	4.750	0.900	5.600	4.550	0.900
1.007	34.822	225.0	225	5.050	2.713	2.112	4.950	2.558	2.167
3.003	49.932	149.9	150	5.400	4.040	1.210	5.050	3.707	1.193
1.006	49.805	225.0	225	4.600	2.934	1.441	5.050	2.713	2.112
1.005	31.293	149.7	150	4.550	3.218	1.182	4.600	3.009	1.441
1.004	31.957	149.3	150	4.600	3.432	1.018	4.550	3.218	1.182
1.003	28.977	149.4	150	4.800	3.626	1.024	4.600	3.432	1.018
1.002	37.008	149.8	150	5.300	3.873	1.277	4.800	3.626	1.024
2.000	30.222	93.3	150	5.000	3.950	0.900	4.800	3.626	1.024
1.001	15.951	149.1	150	5.450	3.980	1.320	5.300	3.873	1.277
1.000	25.365	149.2	150	5.200	4.150	0.900	5.450	3.980	1.320
4.001	17.931	100.7	150	5.400	4.218	1.032	5.400	4.040	1.210
3.002	21.269	149.8	150	5.500	4.182	1.168	5.400	4.040	1.210
3.001	29.305	149.5	150	5.650	4.378	1.122	5.500	4.182	1.168
3.000	25.663	149.2	150	5.600	4.550	0.900	5.650	4.378	1.122
4.000	19.728	149.5	150	5.400	4.350	0.900	5.400	4.218	1.032
9.003	23.561	149.1	150	6.650	4.736	1.764	7.000	4.578	2.272
6.011	12.219	149.0	150	6.900	1.948	4.802	7.000	1.866	4.984
6.010	20.169	149.4	150	6.800	2.083	4.567	6.900	1.948	4.802

Link	US Node	DS Node
1.011	9	8
1.010	10	9
1.009	11	10
1.008	15	11
5.002	12	11
5.001	13	12
5.000	14	13
1.007	16	15
3.003	25	16
1.006	17	16
1.005	18	17
1.004	19	18
1.003	20	19
1.002	22	20
2.000	21	20
1.001	23	22
1.000	24	23
4.001	26	25
3.002	28	25
3.001	29	28
3.000	30	29
4.000	27	26
9.003	47	31
6.011	32	31
6.010	33	32



Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
6.009	31.209	149.3	150	6.600	2.292	4.158	6.800	2.083	4.567
6.008	20.450	149.3	150	6.300	2.429	3.721	6.600	2.292	4.158
8.000	38.173	149.7	150	6.000	4.950	0.900	6.300	4.695	1.455
6.007	13.421	149.1	150	6.100	2.519	3.431	6.300	2.429	3.721
6.006	55.372	149.7	150	5.700	2.889	2.661	6.100	2.519	3.431
6.005	36.136	149.9	150	5.100	3.130	1.820	5.700	2.889	2.661
6.004	24.848	149.7	150	4.500	3.296	1.054	5.100	3.130	1.820
6.003	37.986	149.6	150	4.700	3.550	1.000	4.500	3.296	1.054
6.002	22.395	149.3	150	4.750	3.700	0.900	4.700	3.550	1.000
6.001	49.868	103.0	150	5.250	4.184	0.916	4.750	3.700	0.900
7.001	13.851	77.8	150	4.950	3.878	0.922	4.750	3.700	0.900
7.000	18.175	149.0	150	5.050	4.000	0.900	4.950	3.878	0.922
6.000	24.815	149.5	150	5.400	4.350	0.900	5.250	4.184	0.916
9.002	18.523	149.4	150	6.500	4.860	1.490	6.650	4.736	1.764
9.001	15.299	150.0	150	6.300	4.962	1.188	6.500	4.860	1.490
9.000	20.615	149.4	150	6.150	5.100	0.900	6.300	4.962	1.188
10.004	63.730	77.3	150	6.400	3.007	3.243	6.300	2.182	3.968
12.006	29.721	149.4	150	5.800	2.381	3.269	6.300	2.182	3.968
12.005	33.437	149.9	150	5.800	2.604	3.046	5.800	2.381	3.269
12.004	24.540	149.6	150	5.700	2.768	2.732	5.800	2.604	3.046
14.000	35.107	149.4	150	5.900	4.350	0.900	5.700	4.615	0.935
12.003	44.356	150.0	150	5.700	3.064	2.436	5.700	2.768	2.732
13.000	29.774	148.9	150	5.900	4.850	0.900	5.700	4.650	0.900
12.002	29.192	149.7	150	5.250	3.259	1.841	5.700	3.064	2.486
12.001	33.057	149.6	150	4.950	3.480	1.320	5.250	3.259	1.841

Link	US Node	DS Node
6.009	34	33
6.008	35	34
8.000	46	35
6.007	36	35
6.006	37	36
6.005	38	37
6.004	39	38
6.003	40	39
6.002	41	40
6.001	42	41
7.001	44	41
7.000	45	44
6.000	43	42
9.002	48	47
9.001	49	48
9.000	50	49
10.004	61	51
12.006	52	51
12.005	53	52
12.004	54	53
14.000	60	54
12.003	55	54
13.000	59	55
12.002	56	55
12.001	57	56



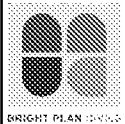
Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
12.000	32.882	149.5	150	4.750	3.700	0.900	4.950	3.480	1.320
11.004	48.452	149.5	150	6.300	3.331	2.819	6.400	3.007	3.243
10.003	40.066	58.7	150	6.700	3.689	2.861	6.400	3.007	3.243
10.002	64.738	149.9	150	6.450	4.121	2.179	6.700	3.689	2.861
10.001	16.610	149.6	150	6.200	4.232	1.818	6.450	4.121	2.179
10.000	47.600	149.7	150	5.600	4.550	0.900	6.200	4.232	1.818
11.003	27.853	149.7	150	6.000	3.517	2.333	6.300	3.331	2.819
11.002	23.731	149.3	150	5.700	3.676	1.874	6.000	3.517	2.333
11.001	25.719	149.5	150	5.500	3.848	1.502	5.700	3.676	1.874
11.000	30.235	149.7	150	5.100	4.050	0.900	5.500	3.848	1.502

Link	US Node	DS Node
12.000	58	57
11.004	66	61
10.003	62	61
10.002	63	62
10.001	64	63
10.000	65	64
11.003	67	66
11.002	68	67
11.001	69	68
11.000	70	69

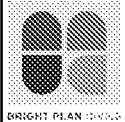
Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
70	5.100	1.050	1200				
					0	11.000	4.050
69	5.500	1.652	1200		1	11.000	3.848
					0	11.001	3.848
68	5.700	2.024	1200		1	11.001	3.676
					0	11.002	3.676
67	6.000	2.483	1200		1	11.002	3.517
					0	11.003	3.517
66	6.300	2.969	1200		1	11.003	3.331
					0	11.004	3.331
65	5.600	1.050	1200				
					0	10.000	4.550

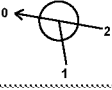
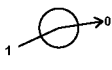
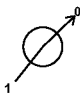
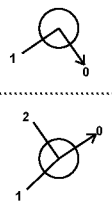
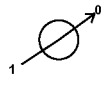
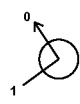


Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
64	6.200	1.968	1200		1	10.000	4.232 150
63	6.450	2.329	1200		0	10.001	4.232 150
					1	10.001	4.121 150
62	6.700	3.011	1200		0	10.002	4.121 150
					1	10.002	3.889 150
					0	10.003	3.889 150
61	6.400	3.393	1200		1	11.004	3.007 150
					2	10.003	3.007 150
					0	10.004	3.007 150
60	5.900	1.050	1200		0	14.000	4.850 150
59	5.900	1.050	1200		0	13.000	4.850 150
58	4.750	1.050	1200		0	12.000	3.700 150
57	4.950	1.470	1200		1	12.000	3.480 150
					0	12.001	3.480 150
56	5.250	1.991	1200		1	12.001	3.259 150
					0	12.002	3.259 150
55	5.700	2.636	1200		1	13.000	4.650 150
					2	12.002	3.064 150
					0	12.003	3.064 150
54	5.700	2.932	1200		1	14.000	4.615 150
					2	12.003	2.768 150
					0	12.004	2.768 150
53	5.800	3.196	1200		1	12.004	2.604 150
					0	12.005	2.604 150
52	5.800	3.419	1200		1	12.005	2.381 150
					0	12.006	2.381 150

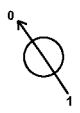
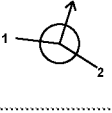
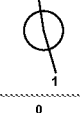
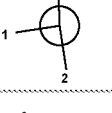
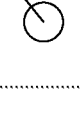
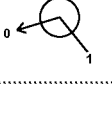
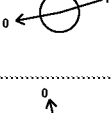
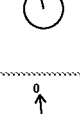


Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
51	6.300	4.118	1200		1	12.006	2.182	150
					2	10.004	2.182	150
					0	10.005	2.182	150
50	6.150	1.050	1200		0	9.000	5.100	150
49	6.300	1.338	1200		1	9.000	4.962	150
0	9.001	4.962	150					
48	6.500	1.640	1200		1	9.001	4.860	150
0	9.002	4.860	150					
47	6.650	1.914	1200		1	9.002	4.736	150
0	9.003	4.736	150					
46	6.000	1.050	1200		0	8.000	4.950	150
45	5.050	1.050	1200		0	7.000	4.000	150
44	4.950	1.072	1200		1	7.000	3.878	150
0	7.001	3.878	150					
43	5.400	1.050	1200		0	6.000	4.350	150
42	5.250	1.066	1200		1	6.000	4.184	150
41	4.750	1.050	1200		0	6.001	4.184	150
					1	7.001	3.700	150
					2	6.001	3.700	150
0	6.002	3.700	150					
40	4.700	1.150	1200		1	6.002	3.550	150
0	6.003	3.550	150					
39	4.500	1.204	1200		1	6.003	3.296	150
					0	6.004	3.296	150



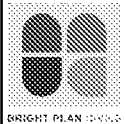
Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
38	5.100	1.970	1200		1	6.004	3.130 150
					0	6.005	3.130 150
37	5.700	2.811	1200		1	6.005	2.889 150
					0	6.006	2.889 150
36	6.100	3.581	1200		1	6.006	2.519 150
					0	6.007	2.519 150
35	6.300	3.871	1200		1	8.000	4.695 150
					2	6.007	2.429 150
					0	6.008	2.429 150
34	6.600	4.308	1200		1	6.008	2.292 150
					0	6.009	2.292 150
33	6.800	4.717	1200		1	6.009	2.083 150
					0	6.010	2.083 150
32	6.900	4.952	1200		1	6.010	1.948 150
					0	6.011	1.948 150
31	7.000	5.134	1200		1	9.003	4.578 150
					2	6.011	1.866 150
					0	6.012	1.866 150
30	5.600	1.050	1200				
					0	3.000	4.550 150
29	5.650	1.272	1200		1	3.000	4.378 150
					0	3.001	4.378 150
28	5.500	1.318	1200		1	3.001	4.182 150
					0	3.002	4.182 150
27	5.400	1.050	1200				
					0	4.000	4.350 150
26	5.400	1.182	1200		1	4.000	4.218 150
					0	4.001	4.218 150

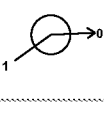
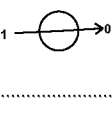
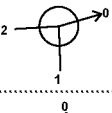
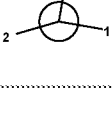


Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
25	5.400	1.360	1200		1	4.001	4.040 150
					2	3.002	4.040 150
					0	3.003	4.040 150
24	5.200	1.050	1200		0	1.000	4.150 150
					1	1.000	3.980 150
23	5.450	1.470	1200		0	1.001	3.980 150
					1	1.001	3.873 150
22	5.300	1.427	1200		0	1.002	3.873 150
					1	1.002	3.873 150
21	5.000	1.050	1200		0	2.000	3.950 150
					1	2.000	3.626 150
20	4.800	1.174	1200		0	1.003	3.626 150
					1	1.003	3.432 150
19	4.600	1.168	1200		0	1.004	3.432 150
					1	1.004	3.218 150
18	4.550	1.332	1200		0	1.005	3.218 150
					1	1.005	3.009 150
17	4.600	1.666	1200		0	1.006	2.934 225
					1	3.003	3.707 150
16	5.050	2.337	1200		0	1.007	2.713 225
					1	1.007	2.558 225
15	4.950	2.392	1200		0	1.008	2.558 225
					1	5.000	4.750 150
14	5.800	1.050	1200		0	5.000	4.550 150
					1	5.001	4.550 150
13	5.600	1.050	1200		0	5.001	4.550 150
					1	5.001	4.550 150



Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
12	5.300	1.050	1200		1 5.001	4.250	150
11	5.200	2.769	1200		0 5.002 4.250 150 1 5.002 4.150 150 2 1.008 2.431 225		
10	5.300	2.920	1200		0 1.009 2.431 225 1 1.009 2.380 225		
9	5.500	3.250	1200		0 1.010 2.380 225 1 1.010 2.250 225		
8	5.800	3.710	1200		0 1.011 2.250 225 1 1.011 2.090 225		
7	5.900	3.859	1200		0 1.012 2.090 225 1 1.012 2.041 225		
6	6.200	4.329	1200		0 1.013 2.041 225 1 1.013 1.871 225		
5	6.400	4.661	1200		0 1.014 1.871 225 1 1.014 1.730 225		
4	6.600	4.971	1200		0 1.015 1.730 225 1 1.015 1.629 225		
3	6.700	5.226	1200		0 1.016 1.629 225 1 6.012 1.540 150 2 1.016 1.528 225		
2	6.500	5.117	1200		0 1.017 1.474 225 1 10.005 2.049 150 2 1.017 1.383 225		
1	5.000	4.111	1200		0 1.018 1.383 225 1 1.018 0.889 225		