

PARCEL RIO – PHASE 2B OF THE SOUTH WOKINGHAM STRATEGIC
DEVELOPMENT LOCATION
DRAINAGE STATEMENT

MILLER HOMES

14 FEBRUARY 2025



Abley Letchford Partnership Limited
3 Tealgate
Charnham Park
Hungerford
RG17 0YT

T: 01488 684390
E: contact@alpce.co.uk
W: www.alpce.co.uk

Quality Management:

Prepared by:	Rebecca Fletcher
Authorised by:	Leigh Abley
Date:	14 February 2025
Document Reference:	A389-R015

COPYRIGHT © ABLEY LETCHFORD PARTNERSHIP LIMITED
The material presented in this report is confidential. This report has been prepared for the exclusive use of MILLER HOMES within the terms of the contract and shall not be distributed or made available to any other company or person without the knowledge and written consent of Abley Letchford Partnership Limited.
Any such party relies on the report at their own risk.



Contents

1.0	Introduction	1
2.0	Surface Water Drainage Strategy	4
3.0	Foul Water Drainage Strategy	8
4.0	Water Quality Enhancement	9
5.0	Adoption, Maintenance and Management.....	11
6.0	Summary	iii

Appendices

Appendix A – Proposed Drawings

Appendix B – Hydraulic Calculations



1.0 Introduction

Context

- 1.1. This report has been prepared by Abley Letchford Partnership Limited, on behalf of Miller Homes, to support the Reserved Matters application pursuant to Condition 1 attached to planning application 191068, for the erection of 215 dwellings.

Planning Context

- 1.2. The SDL site is an urban extension of Wokingham in Berkshire and is bisected by an existing railway line linking Wokingham and Bracknell. The SDL proposals comprise of approximately 2,500 homes, a new South Wokingham Distributor Road and other facilities such as two primary schools and a community centre.
- 1.3. Planning permission for the South Wokingham SDL has been granted by Wokingham District Council at different times for the various phases of the SDL.
- 1.4. The first phase of the South Wokingham SDL is located at Montague Park located in the north-east area of the South Wokingham SDL. This phase of development was granted planning permission (ref: O/2010/1712) and has been subsequently constructed and includes approximately 620 dwellings. A section of road between Montague Park heading south over the railway line to a new four arm roundabout with Waterloo Road was subsequently approved in 2019 (WBC Planning Reference: 172934) and constructed. The road over the railway line is named William Heelas Way and the new roundabout junction with Waterloo Road is known as the Eastern Gateway roundabout.
- 1.5. The second phase of the South Wokingham SDL is split into Phase 2a (WBC Planning Reference: 190914) and Phase 2b (WBC Planning Reference: 191068) and they are both located south of the railway line and include proposals for 215 and 1,434 dwellings respectively.
- 1.6. The new South Wokingham Distributor Road was approved in 2021 (WBC Planning Reference: 192928). It routes east to west through the larger Phase 2b parcel and will ultimately connect Finchampstead Road at the west to the Eastern Gateway roundabout.
- 1.7. Parcel R10 is located at the eastern end of Phase 2b, adjacent to the Eastern Gateway roundabout.

Report Aims and Formation

- 1.8. This Reserved Matters Planning Application pertains to the R10 parcel, located at the eastern end of Phase 2b, adjacent to the Eastern Gateway roundabout. The proposal includes 215 residential dwellings, comprising a mix of 1 and 2-bedroom flats, as well as 2, 3, and 4-bedroom houses together with associated access and parking.
- 1.9. This report has taken cognisance from the original Flood Risk Assessment (FRA) carried out by WSP in August 2020, Ref: 70001684-FRA-SDL-001, and the Technical Note produced by ALP in January 2025 (A389-TN004E) submitted to discharge Condition 29, and presents a detailed drainage design to ensure that the guiding principles are upheld.



1.10. The aim of this Report is to propose a suitable drainage system for the R10 residential development parcel, to demonstrate compliance and discharge the conditions listed below:

1.10.1. *Condition 30 – Reserved matters for each phase shall include details of SuDS to serve the phase, based on the approved SuDS strategy). SuDS shall be provided before occupation of the development it is to serve in accordance with the approved details and the phasing details pursuant to condition 3 and retained thereafter.*

Reason: to prevent increased flood risk from surface water run-off in accordance with NPPF Section 14 (Meeting the Challenge of Climate Change, Flooding and Coastal Change); Core Strategy policy CP1; and Managing Development Delivery Local Plan policies CC09 and CC10 and Design principles 1d(ii) of the South Wokingham SDP SPD.

1.10.2. *Condition 32 – Development shall not commence in each phase until details of any proposed points of connection, including connection into a drainage system or ordinary watercourse or third party land, have been submitted to and approved in writing by the Local Planning Authority and no discharge of surface water from the site shall be accepted into the public system until the drainage works have been completed in accordance with the approved details. The details shall demonstrate any connections onto third party land have the approval of the third party landowner and that the system immediately downstream is clear from obstruction.*

Reason: to prevent increased risk of flooding, and to protect water quality in accordance with NPPF Section 14 (Meeting the Challenge of Climate Change, Flooding and Coastal Change), Technical guidance on the NPPF (Flood Risk), Core strategy policies CP1 & CP21; Managing Development Delivery Local plan policies CC09 & CC10; and the South Wokingham SDL SPD.

1.10.3. *Condition 33 – Reserved matters for each phase of the development shall include measures for effective water quality treatment (using the methodology set out in the SuDS Strategy and Section 26.7 of the CIRIA SuDS Manual(C753) or any guidance that supersedes it) including phasing and measures shall be provided in accordance with the approved details.*

Reason: to protect water quality in accordance with NPPF Section 14 (Meeting the Challenge of Climate Change, Flooding and Coastal Change, Technical Guidance on the NPPF (Flood Risk), Core Strategy policies CP1 & CP21; and the South Wokingham SDP SPD.

1.10.4. *Condition 34 (ii)– Reserved matters shall be accompanied by a detailed exceedance flow routing plan consistent with the approved strategy.*



2.0

Report Structure

2.1. This report addresses the following aspects:

- Section 2: Surface Water Strategy
- Section 3: Foul Water Strategy
- Section 4: Water Quality and enhancement
- Section 5: Adoption, Maintenance and Management
- Section 6: Summary

Basis of Report

2.2. Able Letchford Partnership Ltd follows accepted procedure in providing professional services, but given the residual risk associated with any prediction and the variability which can be experienced in flood condition, Able Letchford Partnership Ltd takes no liability for and gives no warranty against actual flooding of any property (client's or third party) or the consequences of flooding in relation to the performance of the service. This report has been prepared for the purposes of planning approval only and is to assist our client and the Local Planning Authority (LPA) to make an informed decision on the flood risks associated with the development of the Site under consideration.



3.0 Surface Water Drainage Strategy

Introduction

- 3.1. This chapter provides details on the proposed surface water drainage strategy and measures to drain the proposed 215 residential dwellings.

Methodology

- 3.2. The proposed drainage strategy has been designed to meet the requirements of the NPPF by providing a drainage system which embraces the SuDS philosophy and key principals. The utilisation of Sustainable Drainage Systems (SuDS) not only provides the benefit of controlling waters at source and online treatment of collected surface water, but also allows enhanced aesthetics through improved landscaping, biodiversity, and ecological opportunities.
- 3.3. Additionally, the Drainage Strategy meets the requirements of Wokingham Borough Council's Standards and Guidance documents. References to how the scheme reflects the relevant individual National and Local Standards is included where appropriate.

Existing Drainage Conditions

- 3.4. The R10 parcel is predominantly a greenfield area which currently drains via infiltration and overland flows.

Sustainable Drainage Systems (SuDS)

- 3.5. Sustainable water management measures should be used to control the surface water runoff from the proposed development site therefore, managing the flood risk to the site and surrounding areas from surface water runoff.
- 3.6. Current guidance, CIRIA (2004) Report C609, provides that a hierarchy of techniques should be identified, namely:
- **Prevention** – the use of good site design and housekeeping measures on individual sites to prevent runoff and pollution (e.g., minimise areas of hard standing).
 - **Source Control** – control of runoff at or very near its source (such as the use of rainwater harvesting).
 - **Site Control** – management of water from several sub-catchments (including routing water from roofs and car parks to one/several large soakaways for the whole site).
 - **Regional Control** – management of runoff from several sites, typically in a detention pond or wetland.
- 3.7. In 2015, CIRIA published The SuDS Manual (C753) providing best practice guidance on the planning, design, construction, operation and maintenance of SuDS.
- 3.8. The SuDS Manual provides guidance to ensure SuDS are planned and designed to maximise the opportunities and benefits of surface water management.



3.9. The four main categories of benefits that can be achieved by SuDS, referred to as the four pillars of SuDS design, are:

- **Water quantity** – control the quantity of runoff to support the management of flood risk and maintain and protect the natural water cycle.
- **Water quality** – manage the quality of the runoff to prevent pollution.
- **Amenity** – create and sustain better places for people.
- **Biodiversity** – Create and sustain better places for nature.

Post Development Areas & Rates

- 3.10. To quantify any potential increase in surface water runoff, the existing Greenfield/Pre-Development runoff rate from the site must be determined. The rates of runoff have been established as part of the original Flood Risk Assessment (FRA) carried out by WSP in August 2020, Ref: 70001684-FRA-SDL-001. Therefore, the proposed greenfield runoff rate (QBAR) is 4.4l/ha/s.
- 3.11. The total area of the proposed residential development is approximately 6.846ha and the impermeable area of the residential development is approximately 3.1ha.
- 3.12. To comply with best practice as stipulated in EA Report SC030219 'Rainfall Runoff Management for Developments', proposed discharge rates should be restricted for all storms up to and including the 1 in a 100-year storm event (1% AEP) plus a 40% allowance for climate change.

Surface Water Proposals and Rationale

- 3.13. As part of the Outline Permission, the approved Flood Risk Assessment (FRA) dated August 2020 by WSP (Ref: 70001684-FRA-SDL-001) provided a surface water drainage strategy dependant on a discharge rate of 4.4l/ha/s.
- 3.14. As part of the drainage strategy for R10 parcel, it is proposed to provide a network of pipes and Sustainable Drainage (SuDS) features to collect and attenuate the surface water runoff from the impermeable areas. The conventional drainage system will work in combination with SuDS such as rain garden/tree pits, permeable paving, swales, attenuation crates and detention basins to provide attenuation storage and high-quality water benefits.
- 3.15. The R10 parcel is splits into two distinct catchments by the existing ditch running east to west through the plot and it is served by two basins close to each other. Basin R10a is the southern basin and basin R10b is located to the north. These basins attenuate the flows prior to discharging at a rate of 4/4l/s/ha, in accordance with the sitewide FRA.
- 3.16. The catchments are shown on drawing A389-R10-505 Surface Water Catchment Plan.

R10a Basin Catchment

- 3.17. The R10a basin has a catchment of approximately 4.42ha, with an impermeable area of approximately 2.219ha. A 10% urban creep is included in these impermeable areas to account for future development of the proposed dwellings. The Link Road forms part of this catchment.



- 3.18. The discharge from Basin R10a will be restricted to 9.67l/s prior to discharging to the existing ditch in the west of the development parcel.
- 3.19. Two areas of lined permeable paving have been incorporated in the design in the western part of the catchment.
- 3.20. Surface water from residential plots will be discharged via gravity towards the basin.
- 3.21. Tree pits within the streets and along the Link Road will act as bioretention areas.
- 3.22. The manhole chambers of the proposed network will utilise strategic catchpits or proprietary devices, to minimize the amount of silt reaching the basins.
- 3.23. A small section of below ground attenuation crates has been included in the design close to the attenuation basin to provide additional attenuation.
- 3.24. The proposed basin will be lined (geomembrane or clay) and will provide attenuation only and not infiltration.
- 3.25. The banks of the basin will be designed in accordance with the SuDS Manual C753 in respect to having a maximum gradient of 1 in 3 and an appropriate freeboard above the maximum water level. This allows landscaping of both wetland and wildflower mixes to provide an appropriate landscape context in the vicinity of the features through the provision of an aquatic shelf.

R10b Basin Catchment

- 3.26. The R10b basin has a catchment of approximately 2.14ha, with an impermeable area of approximately 1.03ha. A 10% urban creep is included in these impermeable areas to account for future development of the proposed dwellings.
- 3.27. Discharge from Basin R10b will be limited to 4.5l/s in accordance with the approved Flood Risk Assessment (FRA) dated August 2020 by WSP (Ref: 70001684-FRA-SDL-001) which stated a discharge rate of 4.4l/s/ha.
- 3.28. Two areas of lined permeable paving have been incorporated into the design in the northern part of the catchment to provide some attenuation storage and water quality improvements from parking area.
- 3.29. Surface water from residential plots will be discharged via gravity towards the basin.
- 3.30. Tree pits acting as bioretention areas are proposed along streets throughout the development parcel.
- 3.31. A number of below ground attenuation crates have been incorporated into the design to provide additional attenuation in order to achieve the proposed discharge rates. Attenuation crates are located beneath parking areas and around the edge of the attenuation basin, within the open space.
- 3.32. The manhole chambers of the proposed network will utilise strategic catchpits or proprietary devices, to minimize the amount of silt reaching the basin.
- 3.33. All conveyance systems will be designed to cater for the 1 in 30-year storm event (3.3% AEP), in accordance with industry standard, with all attenuation features designed to allow for the 1 in 100-year storm event (1% AEP) plus 40% climate change allowance.



- 3.34. Hydraulic calculations for the proposed R10 residential development can be found in **Appendix B**. The drainage modelling includes the Link Road catchment that drains towards basin R10a. Hydraulic calculations should be read along with the A389-R10-501 Drainage Strategy drawing.
- 3.35. The proposals draw reference to the DEFRA document Sustainable Drainage Systems, Non-statutory technical standards for sustainable drainage systems March 2015, as well as CIRIA C753 The SuDS Manual.

Points of Connection

- 3.36. Basins R10a and R10b will discharge into the existing ditch along the western edge of the development. This ditch flows from east to west through the development parcel then through a culvert below the Eastern Gateway before ultimately joining the Emm Brook watercourse.

Exceedance Flood Routing

- 3.37. Storms in excess of the 1 in 100-year storm event (1% AEP) plus 40% climate change may flood from the network and will be kept within the internal road network, until such time as they can be directed into adjacent landscaping areas or existing vegetation/woodland.
- 3.38. Refer to drawing A389-R10-507 for the Exceedance Plan.

Safe Access

- 3.39. The site is located outside of the fluvial and surface water flood extents. Continuous safe access is therefore available during a flood event.



4.0 Foul Water Drainage Strategy

Introduction

- 4.1. This chapter provides details on the proposed foul water drainage strategy and measures to convey effluent. Refer to drawing A389-R10-501 Drainage Strategy in **Appendix A**.

Existing Drainage Conditions

- 4.2. No foul network is present in the area that the R10 residential development is proposed to be built.

Foul Water Drainage Strategy

- 4.3. Foul water from each residential plot will discharge via a gravity network to a pump station located within the R10 plot.
- 4.4. This pump station will take flows from R10 and the wider development and will discharge via a rising main to the Thames Water Montague Park SPS located north of the railway line. The route of the rising main through the development and into William Heelas way is shown on drawing A389-R10-501 Drainage Strategy in **Appendix A**.
- 4.5. The proposed foul water sewers and pump station have been designed in accordance with the new Sewerage Sector Guidance (SSG), British Standards and Building Regulations, and will be offered to a NAV (IWNL) for adoption under Section 104 Agreement of the Water Industry Act.

Point of connection

- 4.6. Foul drainage from the R10 and the wider development will discharge to the Thames Water pumping station in Montague Park. The route of the rising main from the site will be in public highway.

5.0 Water Quality Enhancement

- 5.1. CIRIA report C753 The SuDS Manual outlines the methodology for assessing water quality risks associated with new development. This is a simple index approach which provides a high-level scoping analysis of the land usage and gives guidelines for appropriate treatment stages.
- 5.2. This process identifies features necessary to provide adequate substance removal in line with Environment Agency requirements. This is a three-step process of Allocation, Mitigation and Review.
- 5.3. Surfaces generating runoff are 'graded' on their potential to contribute to various harmful pollutants and gives each surface a risk of pollution from each element. An extract of Table 26.2 within the SuDS Manual is set out in **Figure 1**.

Figure 1 – Extract from Table 26.2 SuDS Manual

Land Use	Pollution Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
Residential Roofs	Very Low	0.2	0.2	0.05
Other Roofs	Low	0.3	0.2-0.8	0.05
Low traffic residential roads and non-residential parking with infrequent change.	Low	0.5	0.4	0.4
Commercial yard, parking with frequent change, other roads,	Medium	0.7	0.6	0.7
Sites with heavy pollution	High	0.8	0.8	0.9

- 5.4. Historically, PPG3 documentation would recommend that pollutants were removed utilising oil separators, but since its superseding, more recent guidance has shifted to the use of SuDS features to remove pollutants; thereby providing significant improvements in treatment.
- 5.5. The use of non-mechanical features decreases the requirements for maintenance and increase natural biodiversity. That said, the SuDS Manual does not remove the possibility of utilising separators, so long as they are considered in partnership with a comprehensive overall SuDS regime.
- 5.6. Without adequate treatment, the pollutants would cause damage if they were to enter the watercourse or water table in large volumes. The use of SuDS features to slow down and degrade these pollutants is critical to the provision of an acceptable discharge.
- 5.7. The proposed residential development is classified between "Low" and "Medium" in accordance with the Pollution Hazard Level, which equals to Total Suspended Solids: 0.7, Metals: 0.6 and Hydrocarbons: 0.7 for "Medium" and Total Suspended Solids: 0.5, Metals: 0.4 and Hydrocarbons: 0.4 for "Low".
- 5.8. The respective cleansing abilities of common SuDS features are given by corresponding mitigation indices within the SuDS Manual. An extract of Table 26.3 is set out below and is set out in **Figure 2**.

Figure 2 – Extract from Table 26.3 SuDS Manual

Type of SuDS component	Total Suspended Solids	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter Drain	0.4	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable Paving	0.7	0.6	0.7
Detention Basin	0.5	0.5	0.6
Pond	0.7	0.7	0.5
Wetland	0.8	0.8	0.8

- 5.9. For the purposes of the water quality assessment, benefits drawn from the inclusion of rain garden/tree pits along the Link Road and other streets within the development, as they are classified as bioretention areas.
- 5.10. The northern part of the proposed development primarily utilises a detention Basin R10b (TSS:0.5, Metals:0.5, Hydrocarbons:0.6). Directly below it, detention Basin R10a (TSS:0.5, Metals:0.5, Hydrocarbons:0.6) is located and along with the tree pits/bioretention area (TSS:0.8, Metals:0.8, Hydrocarbons:0.8) area along the Link Road and streets, they together offer adequate pollution mitigation measures for the remaining residential development and the Link Road.



6.0 Adoption, Maintenance and Management

- 6.1. This section of the strategy considers the maintenance requirements of the drainage provisions during the construction phase and post construction phase of the development lifecycle.

Construction Phase

- 6.2. To supplement the Construction Management Plan document, the requirement to manage surface water during the construction phase of the development requires mitigation to protect against adverse effects on surface water quality and to provide pollution control.
- 6.3. CIRIA C532 Control of Water Pollution from Construction Sites and CIRIA C753 The SuDS Manual provide specific measures for the protection of surface water quality during construction activities, including:
- Management of construction works to comply with the necessary surface water quality standards and any consent conditions from planning approval.
 - Surface water run-off from the road will be managed through a temporary and/or permanent drainage infrastructure, including measures for removing suspended solids and potential contaminants.
 - Plant machinery and vehicles to be maintained in a good working condition, with wheel washing and dust suppression measures at all entry and exit points used to prevent the migration of pollutants (particularly in relation to works using concrete and with areas where dust and mud can build up);
 - Areas at risk of spillage will be carefully sited and protected (e.g., bunds and impervious walls and floor) to minimise the risk of hazardous substances affecting surface water quality – this may include vehicle maintenance and storage areas for hazardous materials.
 - The movement of plant machinery and vehicles and the storage of materials during the construction works will be limited near to surface water features.
 - Excavation activities will carefully be monitored and coordinated with forecasted dry periods, where possible, with excavation works covered during periods of heavy rain to minimise the entry and collection of rainwater and transport of pollutants; and
 - The movement of plant and machinery over bare soil areas will be limited to avoid soil compaction and smearing, with suitable preparatory works included where this cannot be avoided so as to minimise effects on the surface water runoff regime.
- 6.4. Temporary onsite drainage facilities will be provided during the construction phase to ensure the controlled discharge of surface water run-off, until such a time as the permanent surface water drainage strategy is implemented.
- 6.5. During the construction phase, the Developer will be responsible for all surface water matters especially water quality and pollution control. They or their Principal Contractor will undertake all necessary maintenance until such time as the assets are passed over for adoption or management.



Post Construction Phase

- 6.6. Whilst the drainage system has been designed to the appropriate standards including Design and Construction Guidance for foul and surface water sewers offered for adoption under the Code for adoption agreements for water and sewerage companies operating wholly or mainly in England ("the Code", 2021), the Building Regulations and the requirement of the National Planning Policy Framework, ongoing maintenance will be required to all drainage elements.

Surface Water Adoption

- 6.7. The onsite main drainage provision including traditional sewers and manholes are expected to be offered to IWNL for adoption under Section 104 of the Water Industry Act. Ultimately these assets will become owned and maintained in perpetuity by IWNL upon vesting.
- 6.8. The basins and the geo-cellular tanks within the open space will be offered to Wokingham Borough Council for adoption, along with rain gardens and drainage associated with the Link Road.
- 6.9. Smaller private drains and manholes within dwelling curtilages will be conveyed to purchasers, wherein responsibility for ongoing maintenance will lie with the homeowner.

Foul Water Adoption

- 6.10. The onsite main drainage provision including the pumping station traditional sewers and manholes are expected to be offered to IWNL for adoption under Section 104 of the Water Industry Act. Ultimately these assets will become owned and maintained in perpetuity by Thames Water upon vesting.
- 6.11. Smaller private drains and manholes within dwelling curtilages will be conveyed to purchasers, wherein responsibility for ongoing maintenance will lie with the homeowner.

SuDS Feature Maintenance

- 6.12. Regular maintenance/replacement of the fundamental SuDS features and associated drainage assets requires careful consideration.
- 6.13. Rain garden/tree pits/bioretention areas will be maintained by Wokingham Borough Council as highway features with the SUDS basins and attenuation crates also maintained by Wokingham Borough Council as part of the open space.
- 6.14. Tables 1 – 3 identify the recommended maintenance schedule for the various SUDS features.

Table 1: Maintenance Schedule for Detention Basins

Maintenance Schedule	Required action	Frequency
Regular Maintenance	Remove litter and debris	Monthly
	Cut grass – for spillways and access routes	Monthly (during growing season), or as required
	Cut grass – meadow grass in and around basin	Half yearly (spring – before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets, and overflows for blockages, and clear if required	Monthly
	Inspect bank sides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies	Monthly (for first year) then annually or as required
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlets, and forebays	Annually (or as required)
	Manage wetland plants in outlet pool – where provided	Annually
Occasional Maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every two years, or as required
	Remove sediment from inlets, outlets, forebays, and main basin when required.	Every five years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Realignment of rip-rap	As required
	Repair/rehabilitation of inlets, outlets, and overflows	As required
	Re-level uneven surfaces and reinstate design levels	As required
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly/after large storms.
	Inspect bank sides, structures, pipework etc for evidence of physical damage.	Monthly/after large storms.
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.
	Check penstocks and other mechanical devices.	Half yearly.



Table 2: Maintenance Schedule for Geo-cellular Crates

Maintenance Schedule	Maintenance Requirement	Frequency Details
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for three months then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae, or other matter; remove and replace surface infiltration medium as necessary	Annually
	Remove sediment from pretreatment structures and/or internal forebays	Annually, or as required
Remedial Actions	Repair/rehabilitate inlets, outlets, overflows, and vents	As required
Monitoring	Inspect/check all inlets, outlets, overflows, and vents to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment buildup and remove if necessary	Every five years or as required

Table 3: Maintenance Schedule for Tree Pits/Bio-retention Areas

Maintenance Schedule	Required action	Frequency
Regular Inspections	Inspect infiltration surface for silting and ponding, record dewatering time of the facility and assess standing water levels in under-drain (if appropriate) to determine if maintenance is necessary	Quarterly
	Check operation of under-drains by inspection of flows after rain	Annually
	Assess plants for disease infection, poor growth, invasive species etc. and replace as necessary	Quarterly
	Inspect inlets and outlets for blockages	Quarterly
Regular Maintenance	Remove litter and surface debris and weeds	Quarterly (or more frequently for tidiness or aesthetic reasons)
	Replace any plants, to maintain planting density	As required
	Remove sediment, litter, and debris buildup from around inlets or from forebays	Quarterly to biannually
Occasional Maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required	As required
	Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch	As required
Remedial actions	Remove and replace filter medium and vegetation above	As required
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly/after large storms
	Inspect infiltration surfaces for ponding. Record dewatering time of the facility to determine if maintenance is necessary.	Monthly, or when required
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly
	Test planting soil for pH – if adjustment is necessary, amalgamate with appropriate substances.	Annually



7.0 Summary

- 7.1. The discharge rate of 4.4l/ha/s is proposed in this surface water drainage strategy, which has been established by the Flood Risk Assessment (FRA) dated August 2020 and produced by WSP (Ref: 70001684-FRA-SDL-001), as part of the Outline Permission.
- 7.2. Discharge points from the site are into the existing water course on the western edge of the proposed development.
- 7.3. The Drainage Strategy encompasses SuDS to mitigate and manage surface water flows from the proposed residential development(Parcel R10).
- 7.4. The proposed surface water drainage strategy will manage the flood risk posed by uncontrolled surface water runoff from the residential development. Any increase in surface water run-off can be managed using SuDS as well as attenuation features to provide storage in extreme storm events.
- 7.5. The site is located outside of the fluvial and surface water flood extents. Continuous safe access is therefore available during a flood event.
- 7.6. All the water quality parameters have been considered to enhance the water quality of the proposed surface water network in accordance with The SuDS Manual 2015 (C753).
- 7.7. Surface water attenuation for all storm events is provided within the proposed surface water drainage network for all storm events up to and including the 1 in 100-year storm event (1% AEP) plus the allowance for a 40% increase in rainfall intensities as a result of climate change.
- 7.8. An gravity-based foul water network is proposed as for the site, discharging to a new pump station to be situated on the west side of the site, to the north of Basin R10a. This pump station will also take flows from the wider site and will discharge them via a rising main to the existing Thames Water Montague Park SPS. Both the network and the foul pumping station are anticipated to be offered for adoption by IWNL.
- 7.9. The proposed residential development complies with national and local planning policy in response to flood risk. The risk of flooding is adequately managed, and the offsite flood risk is not increase.
- 7.10. The proposed residential development is therefore deemed appropriate in this location in terms of flood risk and drainage.



Appendices



Appendix A – Proposed Drawings

A389-R10-RM-501 Drainage Strategy

A389-R10-RM-505 Surface Water Catchment Plan

A389-R10-RM-506 Foul Water Catchment Plan

A389-R10-507 Exceedance Route Plan

DRAINAGE NOTES:

1. Do not scale.
2. This drawing is to be read in conjunction with and checked against all other drawings, Engineering details, Specification and any structural, Geotechnical or other specialist document provided. Site layout shown for context only, refer to other project drawings for details.
3. All adoptable drainage works to be constructed as detailed in design and construction guidance or as stipulated in the water authorities addendum.
4. All public sewers are to be the subject of a section 104 agreement of the water industry act 1991.
5. Invert levels of existing manholes and sewers are to be checked on site before construction commences and results reported to engineers.
6. The contractor is responsible for maintaining continuity of flow for all existing sewers within the site boundary and limit of works for the duration of the project.
7. All drainage works to comply with BS EN124, and be stamped with the Watermark covers to suit loading as below:
- carriageways and roads - >400
- footways and pedestrian areas - b125
- gardens/landscaping - a15
8. All sewer pipes, up to, and including 225mm are to be verified clay to BS EN205. All sewer pipes 300mm diameter and above to be concrete pipes to BS EN595. Where agreed with adopting authority pipes up to and including 600mm diameter can be PVC-U to BS EN438.
9. All drainage shall be installed and tested strictly in accordance with the manufacturer's printed instructions, to BS 752, as an 1001, local water authority requirements and the building regulations.
10. All bedding shall be class 5 unless noted otherwise.
11. All trenches under existing and proposed public highways are to be backfilled with thoroughly compacted Type 1 granular sub-base material.
12. Draining laid beneath roads and areas of vehicular access (car parking etc) with less than 1200mm of cover shall be encased in concrete bed and surround with associated movement joints. drainage laid beneath paths, footways and pedestrian areas with less than 500mm of cover shall be similarly treated.
13. Chambers with outgoing pipes greater than 600mm diameter shall be fitted with guard bars, safety chains or other approved safety devices.
14. The use of precast concrete products made with sulphate resisting cement is mandatory, unless a laboratory report proves such precautions are not necessary.
15. All sewers to be abandoned must be surveyed to identify any lateral connections that are still live with any found to be reported to the engineer.
16. All foul and storm water drains which are not to be adopted as public sewers shall be in accordance with document 8 of the building regulations, together with other standards chapter 5.3 and BS8101.
17. Where pipes pass through footings, retaining or screen walls, limits to be provided over drains.
18. Where sewers are less than 1.5m deep inspection chambers (min dia. 150mm) or access fittings (125 x 100mm) to be used, elsewhere proprietary plastic brick or pot in to be used and used in accordance with table 11 of document 8 of the building regulations (1.0m to invert min dia300, 1.0m to invert min dia75).
19. Where required a deep roof barrier of an approved type to be installed vertically along the back edge of all areas of footway/demarcation to protect from both proposed and future plantations.
20. Construction details subject to refinement through detailed design/technical approval process.

KEY

- FOUL
- Proposed adoptable sewer & MH
 - Highway gully and 150mmØ connection
 - Proposed Control Manhole
 - Proposed Catchpit Manhole
 - Proposed Foul Water Rising Main
 - Proposed H50C Headwall
 - Proposed H50C Headwall
 - Cellular Storage
 - Proposed Permeable Paving
 - Proposed Rain Garden Tree Pit and Outfall
 - Proposed Finished Floor Level
 - Proposed Garage Slab Level
 - Embankment, typically 1 in 3, No steeper than 1 in 2.

Rev	Description	Iss	Rev
A	02-25 FIRST ISSUE	JAS	RF

ABLEY LETCHFORD PARTNERSHIP
CONSULTING ENGINEERS

3 Tealgate, Chatham Park
Hungerford, Berkshire RG17 0YT
www.abley.co.uk Tel: 01488 684390

Client
MILLER HOMES

Project
**SOUTH WOKINGHAM SDL
PHASE 28 R10 RESERVED
MATTERS APPLICATION**

Title
DRAINAGE STRATEGY

Status

Scale
1:500 @ A0

Date
FEB 2025

Drawn
JJS

Checked
RF

Project No
A389-R10-RM-501

Revision
A



© ABLEY LETCHFORD PARTNERSHIP LTD.
This drawing should not be reproduced without consent.

SURFACE WATER CATCHMENT NOTES:

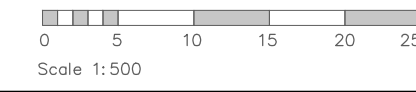
1. Do not scale.
2. This drawing is to be read in conjunction with and checked against all other drawings, Engineering details, Specification and any structural, Geotechnical or other specialist document provided. Total catchment areas shown do not include urban creep. Refer to drainage calculations.
3. Catchment areas refer only to parcels under current RM application. Coefficient of discharge (Cv) has been modelled at 1.0 for robustness.

- RMV**
- Network 1 Catchment area
 - Network 2 Catchment area
 - R10-R14 Link Road - Draining to Basin R10a and included in calculations
- STORM**
- Proposed adoptable sewer & MH
 - Highway gully and 150mmØ connection
 - Proposed Control Manhole
 - Proposed Catchpit Manhole
 - Headwall
 - Cellular Storage
 - Proposed Permeable Paving
 - Proposed Rain Garden Tree Pit and Outfall

Rev	Date	Description	Drawn	Checked
A	02/25	FIRST ISSUE	JAS	RF

ABLEY LETCHFORD PARTNERSHIP
Consulting Engineers
3 Tealgate, Channham Park
Hungerford, Berkshire RG17 0YT
www.alpce.co.uk Tel: 01488 684390

Client MILLER HOMES			
Project SOUTH WOKINGHAM SDL PHASE 2B R10 RESERVED MATTERS APPLICATION			
Title SURFACE WATER CATCHMENT PLAN			
Status			
Scale 1:500 @ A0	Date FEB 2025	Drawn JJS	Checked RF
Drawing No. A389-R10-RM-505			Revision A





© ABLEY LETCHFORD PARTNERSHIP LTD.
This drawing should not be reproduced without consent.

- FOUL WATER CATCHMENT NOTES:**
1. Do not scale.
 2. This drawing is to be read in conjunction with and checked against all other drawings, Engineering details, Specification and any structural, Geotechnical or other specialist document provided.
 3. Foul water discharge is based on 40000l per plot.
 4. Catchment numbers refer only to parcels under current RM application.

Key

- Foul Sewer and Manhole
- Foul Water Rising Main

Rev	Date	Description	Drawn	Checked
A	02-20	FIRST ISSUE	JAS	RF

ABLEY LETCHFORD PARTNERSHIP
Consulting Engineers
3 Tealgate, Chatham Park
Hungerford, Berkshire RG17 0YT
www.alpce.co.uk Tel: 01488 684390

Client
MILLER HOMES

Project
**SOUTH WOKINGHAM SDL
PHASE 2B R10 RESERVED
MATTERS APPLICATION**

File
**FOUL WATER
CATCHMENT PLAN**

Status

Scale	Date	Drawn	Checked
3:500 @ A0	FEB 2025	JJS	RF
Drawing No.	A389-R10-RM-506		
Revision	A		

Scale 1:500
0 5 10 15 20 25m

- FINISANCE KEY**
- 24.00 Finished Floor Level
 - Embankment
 - Proposed Contours (major at 100mm intervals, minor at 25mm intervals)
 - Overland Flow Route Arrow
 - Overland Flow Route High Point
 - Overland Flow Route Low Point
- MANAGE KEY**
- Proposed Surface Water Sewer and Manhole
 - Proposed Control Manhole
 - Proposed Catchpit Manhole
 - Proposed Highway Gully
 - Proposed Cellular Storage
 - Proposed Permeable Paving

A		02-25	FIRST ISSUE	JAS	RF
Rev	Desc	Drawn	Checked	Drawn	Checked
 3 Tealgate, Chatham Park Hungerford, Berkshire RG17 0YT www.alpce.co.uk Tel: 01488 684390					
Client					
MILLER HOMES					
Project					
SOUTH WOKINGHAM SDL PHASE 2B R10 RESERVED MATTERS APPLICATION					
Title					
EXCEEDANCE ROUTE PLAN					
Status					
Scale	Date	Drawn	Checked	Drawn	Checked
1:500 @ A0	FEB 2025	JJS	RF		
Drawing No					Project
A389-R10-RM-507					A

Scale 1:500
0 5 10 15 20 25m



Appendix B – Drainage Calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.600
CV	1.000	Preferred Cover Depth (m)	1.250
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	550.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S-77			66.740	1200	483299.018	167912.690	2.279
S-78	0.047	5.00	66.643	1200	483304.135	167928.778	2.376
S-79	0.016	5.00	66.807	1200	483309.236	167917.027	2.487
S-80	0.080	5.00	67.307	1200	483325.765	167880.450	1.475
S-81	0.076	5.00	67.060	1200	483343.595	167841.395	1.525
S-82	0.030	5.00	67.212	1200	483338.580	167851.981	1.821
S-83	0.050	5.00	66.829	1200	483313.641	167840.873	1.550
S-84	0.100	5.00	66.250	1350	483279.435	167848.708	1.625
S-85	0.038	5.00	65.890	1350	483261.404	167860.881	1.682
S-86	0.109	5.00	65.484	1350	483246.136	167881.801	1.730
S-87	0.094	5.00	64.861	1500	483214.715	167897.379	1.775
S-88			64.672	1500	483205.940	167903.928	1.814
S-42	0.038	5.00	66.391	1200	483294.435	167956.469	2.244
S-43	0.043	5.00	65.838	1350	483273.875	167947.582	1.858
S-44	0.020	5.00	65.154	1350	483231.871	167930.114	1.700
S-45	0.006	5.00	64.918	1350	483215.014	167922.066	1.700
S-46	0.013	5.00	64.730	1350	483202.729	167912.264	1.700
S-47	0.016	5.00	64.636	1500	483196.830	167905.781	2.159
S-48	0.125	5.00	64.403	1500	483169.842	167931.848	2.077
S-49	0.052	5.00	64.925	1200	483226.120	167944.966	1.475
S-50	0.149	5.00	64.633	1350	483216.968	167967.518	1.725
S-51	0.049	5.00	65.251	1200	483241.874	168012.922	1.499
S-51A	0.072	5.00	65.539	600	483247.465	168001.480	1.439
S-52	0.024	5.00	65.366	1200	483246.715	168030.983	1.475
S-53	0.046	5.00	65.256	1200	483235.178	168024.780	1.660
S-54	0.052	5.00	64.819	1350	483198.104	168004.383	2.114
S-55	0.040	5.00	63.778	1500	483127.803	167976.798	1.765
S-56	0.106	5.00	63.700	1500	483131.728	167959.089	1.724
S-HEADWALL 8	0.193	0.00	63.700		483124.236	167935.210	1.940
S-58	0.097	5.00	66.453	1200	483301.137	167788.063	1.563
S-59	0.066	5.00	65.823	1200	483250.580	167799.855	1.550
S-60	0.040	5.00	65.568	1200	483230.322	167811.816	1.550
S-61	0.046	5.00	65.239	1350	483213.127	167832.913	1.681
S-62			65.312	1350	483207.571	167830.542	1.773
S-63	0.030	5.00	64.814	1350	483169.354	167854.339	1.885
S-64	0.014	5.00	64.500	1200	483188.850	167892.490	1.538
S-65	0.053	5.00	64.366	1200	483177.371	167878.497	1.511
S-66	0.034	5.00	64.594	1350	483162.451	167865.536	2.081
S-67	0.044	5.00	64.009	1350	483143.875	167885.320	1.837
S-68	0.042	5.00	63.628	1350	483120.565	167892.414	1.704
S-HEADWALL 5			63.700		483113.394	167898.592	1.940
S-HEADWALL 6		5.00	63.700		483100.020	167906.475	2.000

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S-71			63.700	1500	483083.802	167909.439	2.165
S-72			63.070		483080.169	167910.048	1.600
S-HEADWALL 7			63.700		483122.161	167950.510	1.940
S-74			63.618	1200	483122.826	167895.037	1.448
S-75		5.00	63.768		483124.261	167897.952	1.578
S-82A	0.022	5.00	67.320	1200	483335.075	167861.256	1.475
S-77A			66.656	600	483294.722	167911.001	2.074
S-76	0.047	5.00	66.180		483271.214	167903.043	1.352

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S-76	S-77A	24.818	0.600	64.828	64.582	0.246	100.9	150	5.41	53.9
1.001	S-77A	S-77	4.616	0.600	64.582	64.536	0.046	100.3	150	5.49	53.6
1.002	S-77	S-79	11.100	0.600	64.461	64.395	0.066	168.2	225	5.67	52.9
2.000	S-80	S-79	40.138	0.600	65.832	65.332	0.500	80.3	225	5.46	53.7
1.003	S-79	S-78	12.810	0.600	64.320	64.267	0.053	241.7	300	5.89	52.0
1.004	S-78	S-42	29.341	0.600	64.267	64.147	0.120	244.5	300	6.38	50.2
1.005	S-42	S-43	22.398	0.600	64.147	64.055	0.092	243.5	300	6.75	48.8
1.006	S-43	S-44	45.491	0.600	63.980	63.529	0.451	100.9	375	7.17	47.4
1.007	S-44	S-45	18.680	0.600	63.454	63.218	0.236	79.2	450	7.30	47.0
1.008_1	S-45	S-46	15.716	0.600	63.218	63.030	0.188	83.6	450	7.42	46.6
1.009	S-46	S-47	8.765	0.600	63.030	62.552	0.478	18.3	450	7.45	46.5
3.000	S-81	S-82	11.714	0.600	65.535	65.466	0.069	169.8	225	5.20	54.8
4.000	S-82A	S-82	9.915	0.600	65.845	65.466	0.379	26.2	225	5.06	55.3
3.001	S-82	S-83	27.301	0.600	65.391	65.279	0.112	243.8	300	5.65	53.0
3.002	S-83	S-84	35.092	0.600	65.279	64.700	0.579	60.6	300	5.94	51.8
3.003	S-84	S-85	21.755	0.600	64.625	64.208	0.417	52.1	375	6.08	51.3
3.004	S-85	S-86	25.899	0.600	64.208	63.829	0.378	68.5	375	6.28	50.6

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.000	17.7	9.2	1.202	1.924	0.047	0.0	76	1.008
1.001	1.003	17.7	9.1	1.924	2.054	0.047	0.0	76	1.011
1.002	1.005	40.0	9.0	2.054	2.187	0.047	0.0	73	0.815
2.000	1.460	58.1	15.6	1.250	1.250	0.080	0.0	80	1.244
1.003	1.007	71.2	26.9	2.187	2.076	0.143	0.0	127	0.938
1.004	1.001	70.7	34.4	2.076	1.944	0.190	0.0	147	0.994
1.005	1.003	70.9	40.1	1.944	1.483	0.227	0.0	161	1.032
1.006	1.804	199.2	46.2	1.483	1.250	0.270	0.0	122	1.476
1.007	2.286	363.6	49.2	1.250	1.250	0.290	0.0	111	1.619
1.008_1	2.224	353.8	49.8	1.250	1.250	0.296	0.0	113	1.589
1.009	4.765	757.8	51.9	1.250	1.634	0.309	0.0	79	2.775
3.000	1.000	39.8	15.1	1.300	1.521	0.076	0.0	96	0.934
4.000	2.568	102.1	4.4	1.250	1.521	0.022	0.0	31	1.281
3.001	1.002	70.9	24.6	1.521	1.250	0.128	0.0	122	0.913
3.002	2.023	143.0	33.4	1.250	1.250	0.179	0.0	98	1.659
3.003	2.514	277.6	51.6	1.250	1.307	0.278	0.0	109	1.939
3.004	2.192	242.1	57.8	1.307	1.280	0.316	0.0	124	1.811

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
3.005	S-86	S-87	35.071	0.600	63.754	63.161	0.593	59.1	450	6.50	49.7
1.008	S-87	S-88	10.949	0.600	63.086	62.858	0.228	47.9	525	6.56	49.5
3.007	S-88	S-47	9.297	0.600	62.858	62.477	0.381	24.4	525	6.59	49.4
1.010	S-47	S-48	37.521	0.600	62.477	62.401	0.076	493.7	525	8.08	44.5
1.011	S-48	S-HEADWALL 8	45.730	0.600	62.326	61.950	0.376	121.6	600	8.42	43.6
5.000	S-58	S-59	51.914	0.600	64.890	64.348	0.542	95.8	225	5.65	53.0
5.001	S-59	S-60	23.526	0.600	64.273	64.018	0.255	92.3	300	5.89	52.0
5.002	S-60	S-61	27.217	0.600	64.018	63.633	0.385	70.7	300	6.13	51.1
5.003	S-61	S-62	6.041	0.600	63.558	63.539	0.019	317.9	375	6.23	50.7
5.004	S-62	S-63	45.020	0.600	63.539	62.929	0.610	73.8	375	6.58	49.4
5.005	S-63	S-66	13.154	0.600	62.929	62.588	0.341	38.6	375	6.66	49.2
6.000	S-64	S-65	18.099	0.600	62.962	62.855	0.107	169.1	225	5.30	54.4
6.001	S-65	S-66	19.763	0.600	62.855	62.738	0.117	168.9	225	5.63	53.1
5.006	S-66	S-67	27.138	0.600	62.513	62.172	0.341	79.6	450	6.86	48.4
5.007	S-67	S-68	24.366	0.600	62.172	61.924	0.248	98.2	450	7.06	47.7
7.000	S-75	S-74	3.249	0.600	62.190	62.170	0.020	162.5	225	5.05	55.4
7.001	S-74	S-68	3.463	0.600	62.170	62.149	0.021	164.9	225	5.11	55.1
5.008	S-68	S-HEADWALL 5	9.465	0.600	61.924	61.900	0.024	394.4	450	7.21	47.3
9.001_1	S-51A	S-51	12.735	0.600	64.100	63.827	0.273	46.6	150	5.14	55.0
9.000	S-51	S-53	13.618	0.600	63.752	63.671	0.081	168.1	225	5.37	54.7
9.000_1	S-52	S-53	13.099	0.600	63.891	63.671	0.220	59.5	225	5.13	55.1
8.002	S-53	S-54	42.315	0.600	63.596	62.855	0.741	57.1	300	5.71	52.7
10.000	S-49	S-50	24.338	0.600	63.450	63.058	0.392	62.0	225	5.24	54.6
10.001	S-50	S-54	41.411	0.600	62.908	62.780	0.128	323.5	375	5.93	51.8

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
3.005	2.648	421.2	76.5	1.280	1.250	0.425	0.0	129	2.031
1.008	3.241	701.5	93.0	1.250	1.289	0.519	0.0	128	2.282
3.007	4.545	983.9	92.8	1.289	1.634	0.519	0.0	107	2.904
1.010	1.001	216.7	136.0	1.634	1.477	0.845	0.0	302	1.055
1.011	2.206	623.9	152.9	1.477	1.150	0.970	0.0	201	1.839
5.000	1.336	53.1	18.6	1.338	1.250	0.097	0.0	92	1.221
5.001	1.637	115.7	30.6	1.250	1.250	0.163	0.0	105	1.387
5.002	1.872	132.4	37.4	1.250	1.306	0.203	0.0	109	1.617
5.003	1.010	111.6	45.7	1.306	1.398	0.249	0.0	167	0.961
5.004	2.111	233.2	44.5	1.398	1.510	0.249	0.0	110	1.640
5.005	2.923	322.8	49.6	1.510	1.631	0.279	0.0	99	2.138
6.000	1.002	39.8	2.7	1.313	1.286	0.014	0.0	40	0.579
6.001	1.003	39.9	12.8	1.286	1.631	0.067	0.0	87	0.895
5.006	2.279	362.5	66.4	1.631	1.387	0.379	0.0	130	1.754
5.007	2.052	326.3	73.0	1.387	1.254	0.423	0.0	144	1.666
7.000	1.023	40.7	0.0	1.353	1.223	0.000	0.0	0	0.000
7.001	1.015	40.4	0.0	1.223	1.254	0.000	0.0	0	0.000
5.008	1.017	161.8	79.4	1.254	1.350	0.465	0.0	223	1.013
9.001_1	1.477	26.1	14.3	1.289	1.274	0.072	0.0	79	1.511
9.000	1.005	40.0	23.9	1.274	1.360	0.121	0.0	125	1.048
9.000_1	1.698	67.5	4.7	1.250	1.360	0.024	0.0	40	0.984
8.002	2.085	147.4	36.4	1.360	1.664	0.191	0.0	101	1.736
10.000	1.663	66.1	10.2	1.250	1.350	0.052	0.0	59	1.212
10.001	1.002	110.6	37.6	1.350	1.664	0.201	0.0	151	0.909

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
8.003	S-54	S-55	75.519	0.600	62.705	62.088	0.617	122.5	450	6.62	49.3
8.004	S-55	S-56	18.139	0.600	62.013	61.976	0.037	490.2	525	6.92	48.2
8.005	S-56	S-HEADWALL 7	12.850	0.600	61.976	61.950	0.026	494.2	525	7.13	47.5
11.000	S-HEADWALL 6	S-71	16.487	0.600	61.700	61.535	0.165	99.9	225	5.21	54.7
11.001	S-71	S-72	3.684	0.600	61.535	61.470	0.065	56.7	225	5.25	54.6

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
8.003	1.836	291.9	79.1	1.664	1.240	0.444	0.0	160	1.571
8.004	1.005	217.5	84.3	1.240	1.199	0.484	0.0	226	0.943
8.005	1.001	216.6	101.2	1.199	1.225	0.590	0.0	252	0.984
11.000	1.308	52.0	0.0	1.775	1.940	0.000	0.0	0	0.000
11.001	1.740	69.2	0.0	1.940	1.375	0.000	0.0	0	0.000

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	24.818	100.9	150	Circular	66.180	64.828	1.202	66.656	64.582	1.924
1.001	4.616	100.3	150	Circular	66.656	64.582	1.924	66.740	64.536	2.054
1.002	11.100	168.2	225	Circular	66.740	64.461	2.054	66.807	64.395	2.187
2.000	40.138	80.3	225	Circular	67.307	65.832	1.250	66.807	65.332	1.250
1.003	12.810	241.7	300	Circular	66.807	64.320	2.187	66.643	64.267	2.076
1.004	29.341	244.5	300	Circular	66.643	64.267	2.076	66.391	64.147	1.944
1.005	22.398	243.5	300	Circular	66.391	64.147	1.944	65.838	64.055	1.483
1.006	45.491	100.9	375	Circular	65.838	63.980	1.483	65.154	63.529	1.250
1.007	18.680	79.2	450	Circular	65.154	63.454	1.250	64.918	63.218	1.250
1.008_1	15.716	83.6	450	Circular	64.918	63.218	1.250	64.730	63.030	1.250
1.009	8.765	18.3	450	Circular	64.730	63.030	1.250	64.636	62.552	1.634
3.000	11.714	169.8	225	Circular	67.060	65.535	1.300	67.212	65.466	1.521
4.000	9.915	26.2	225	Circular	67.320	65.845	1.250	67.212	65.466	1.521
3.001	27.301	243.8	300	Circular	67.212	65.391	1.521	66.829	65.279	1.250
3.002	35.092	60.6	300	Circular	66.829	65.279	1.250	66.250	64.700	1.250

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S-76		Junction		S-77A	600	Manhole	Adoptable
1.001	S-77A	600	Manhole	Adoptable	S-77	1200	Manhole	Adoptable
1.002	S-77	1200	Manhole	Adoptable	S-79	1200	Manhole	Adoptable
2.000	S-80	1200	Manhole	Adoptable	S-79	1200	Manhole	Adoptable
1.003	S-79	1200	Manhole	Adoptable	S-78	1200	Manhole	Adoptable
1.004	S-78	1200	Manhole	Adoptable	S-42	1200	Manhole	Adoptable
1.005	S-42	1200	Manhole	Adoptable	S-43	1350	Manhole	Adoptable
1.006	S-43	1350	Manhole	Adoptable	S-44	1350	Manhole	Adoptable
1.007	S-44	1350	Manhole	Adoptable	S-45	1350	Manhole	Adoptable
1.008_1	S-45	1350	Manhole	Adoptable	S-46	1350	Manhole	Adoptable
1.009	S-46	1350	Manhole	Adoptable	S-47	1500	Manhole	Adoptable
3.000	S-81	1200	Manhole	Adoptable	S-82	1200	Manhole	Adoptable
4.000	S-82A	1200	Manhole	Adoptable	S-82	1200	Manhole	Adoptable
3.001	S-82	1200	Manhole	Adoptable	S-83	1200	Manhole	Adoptable
3.002	S-83	1200	Manhole	Adoptable	S-84	1350	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
3.003	21.755	52.1	375	Circular	66.250	64.625	1.250	65.890	64.208	1.307
3.004	25.899	68.5	375	Circular	65.890	64.208	1.307	65.484	63.829	1.280
3.005	35.071	59.1	450	Circular	65.484	63.754	1.280	64.861	63.161	1.250
1.008	10.949	47.9	525	Circular	64.861	63.086	1.250	64.672	62.858	1.289
3.007	9.297	24.4	525	Circular	64.672	62.858	1.289	64.636	62.477	1.634
1.010	37.521	493.7	525	Circular	64.636	62.477	1.634	64.403	62.401	1.477
1.011	45.730	121.6	600	Circular	64.403	62.326	1.477	63.700	61.950	1.150
5.000	51.914	95.8	225	Circular	66.453	64.890	1.338	65.823	64.348	1.250
5.001	23.526	92.3	300	Circular	65.823	64.273	1.250	65.568	64.018	1.250
5.002	27.217	70.7	300	Circular	65.568	64.018	1.250	65.239	63.633	1.306
5.003	6.041	317.9	375	Circular	65.239	63.558	1.306	65.312	63.539	1.398
5.004	45.020	73.8	375	Circular	65.312	63.539	1.398	64.814	62.929	1.510
5.005	13.154	38.6	375	Circular	64.814	62.929	1.510	64.594	62.588	1.631
6.000	18.099	169.1	225	Circular	64.500	62.962	1.313	64.366	62.855	1.286
6.001	19.763	168.9	225	Circular	64.366	62.855	1.286	64.594	62.738	1.631
5.006	27.138	79.6	450	Circular	64.594	62.513	1.631	64.009	62.172	1.387
5.007	24.366	98.2	450	Circular	64.009	62.172	1.387	63.628	61.924	1.254
7.000	3.249	162.5	225	Circular	63.768	62.190	1.353	63.618	62.170	1.223
7.001	3.463	164.9	225	Circular	63.618	62.170	1.223	63.628	62.149	1.254
5.008	9.465	394.4	450	Circular	63.628	61.924	1.254	63.700	61.900	1.350
9.001_1	12.735	46.6	150	Circular	65.539	64.100	1.289	65.251	63.827	1.274
9.000	13.618	168.1	225	Circular	65.251	63.752	1.274	65.256	63.671	1.360
9.000_1	13.099	59.5	225	Circular	65.366	63.891	1.250	65.256	63.671	1.360
8.002	42.315	57.1	300	Circular	65.256	63.596	1.360	64.819	62.855	1.664
10.000	24.338	62.0	225	Circular	64.925	63.450	1.250	64.633	63.058	1.350

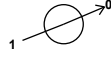
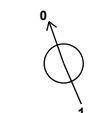
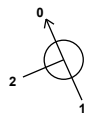
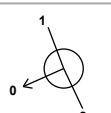
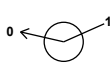
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
3.003	S-84	1350	Manhole	Adoptable	S-85	1350	Manhole	Adoptable
3.004	S-85	1350	Manhole	Adoptable	S-86	1350	Manhole	Adoptable
3.005	S-86	1350	Manhole	Adoptable	S-87	1500	Manhole	Adoptable
1.008	S-87	1500	Manhole	Adoptable	S-88	1500	Manhole	Adoptable
3.007	S-88	1500	Manhole	Adoptable	S-47	1500	Manhole	Adoptable
1.010	S-47	1500	Manhole	Adoptable	S-48	1500	Manhole	Adoptable
1.011	S-48	1500	Manhole	Adoptable	S-HEADWALL 8		Junction	
5.000	S-58	1200	Manhole	Adoptable	S-59	1200	Manhole	Adoptable
5.001	S-59	1200	Manhole	Adoptable	S-60	1200	Manhole	Adoptable
5.002	S-60	1200	Manhole	Adoptable	S-61	1350	Manhole	Adoptable
5.003	S-61	1350	Manhole	Adoptable	S-62	1350	Manhole	Adoptable
5.004	S-62	1350	Manhole	Adoptable	S-63	1350	Manhole	Adoptable
5.005	S-63	1350	Manhole	Adoptable	S-66	1350	Manhole	Adoptable
6.000	S-64	1200	Manhole	Adoptable	S-65	1200	Manhole	Adoptable
6.001	S-65	1200	Manhole	Adoptable	S-66	1350	Manhole	Adoptable
5.006	S-66	1350	Manhole	Adoptable	S-67	1350	Manhole	Adoptable
5.007	S-67	1350	Manhole	Adoptable	S-68	1350	Manhole	Adoptable
7.000	S-75		Junction		S-74	1200	Manhole	Adoptable
7.001	S-74	1200	Manhole	Adoptable	S-68	1350	Manhole	Adoptable
5.008	S-68	1350	Manhole	Adoptable	S-HEADWALL 5		Junction	
9.001_1	S-51A	600	Manhole	Adoptable	S-51	1200	Manhole	Adoptable
9.000	S-51	1200	Manhole	Adoptable	S-53	1200	Manhole	Adoptable
9.000_1	S-52	1200	Manhole	Adoptable	S-53	1200	Manhole	Adoptable
8.002	S-53	1200	Manhole	Adoptable	S-54	1350	Manhole	Adoptable
10.000	S-49	1200	Manhole	Adoptable	S-50	1350	Manhole	Adoptable

Pipeline Schedule

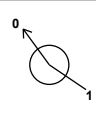
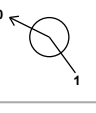
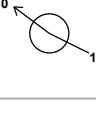
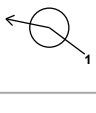
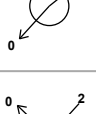
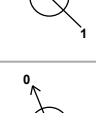
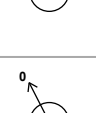
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
10.001	41.411	323.5	375	Circular	64.633	62.908	1.350	64.819	62.780	1.664
8.003	75.519	122.5	450	Circular	64.819	62.705	1.664	63.778	62.088	1.240
8.004	18.139	490.2	525	Circular	63.778	62.013	1.240	63.700	61.976	1.199
8.005	12.850	494.2	525	Circular	63.700	61.976	1.199	63.700	61.950	1.225
11.000	16.487	99.9	225	Circular	63.700	61.700	1.775	63.700	61.535	1.940
11.001	3.684	56.7	225	Circular	63.700	61.535	1.940	63.070	61.470	1.375

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
10.001	S-50	1350	Manhole	Adoptable	S-54	1350	Manhole	Adoptable
8.003	S-54	1350	Manhole	Adoptable	S-55	1500	Manhole	Adoptable
8.004	S-55	1500	Manhole	Adoptable	S-56	1500	Manhole	Adoptable
8.005	S-56	1500	Manhole	Adoptable	S-HEADWALL 7		Junction	
11.000	S-HEADWALL 6		Junction		S-71	1500	Manhole	Adoptable
11.001	S-71	1500	Manhole	Adoptable	S-72		Junction	

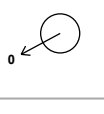
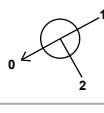
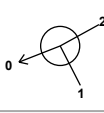
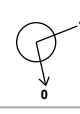
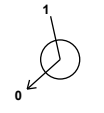
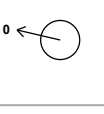
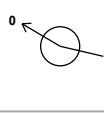
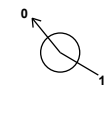
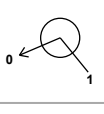
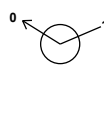
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S-77	483299.018	167912.690	66.740	2.279	1200		1	1.001	64.536	150
						0	1.002	64.461	225	
S-78	483304.135	167928.778	66.643	2.376	1200		1	1.003	64.267	300
						0	1.004	64.267	300	
S-79	483309.236	167917.027	66.807	2.487	1200		1	2.000	65.332	225
							2	1.002	64.395	225
							0	1.003	64.320	300
S-80	483325.765	167880.450	67.307	1.475	1200		0	2.000	65.832	225
S-81	483343.595	167841.395	67.060	1.525	1200		0	3.000	65.535	225
S-82	483338.580	167851.981	67.212	1.821	1200		1	4.000	65.466	225
							2	3.000	65.466	225
							0	3.001	65.391	300
S-83	483313.641	167840.873	66.829	1.550	1200		1	3.001	65.279	300
							0	3.002	65.279	300
S-84	483279.435	167848.708	66.250	1.625	1350		1	3.002	64.700	300
							0	3.003	64.625	375

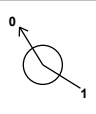
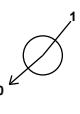
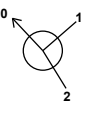
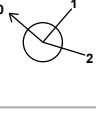
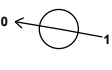
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S-85	483261.404	167860.881	65.890	1.682	1350	 1	3.003	64.208	375
						0	3.004	64.208	375
S-86	483246.136	167881.801	65.484	1.730	1350	 1	3.004	63.829	375
						0	3.005	63.754	450
S-87	483214.715	167897.379	64.861	1.775	1500	 1	3.005	63.161	450
						0	1.008	63.086	525
S-88	483205.940	167903.928	64.672	1.814	1500	 1	1.008	62.858	525
						0	3.007	62.858	525
S-42	483294.435	167956.469	66.391	2.244	1200	 1	1.004	64.147	300
						0	1.005	64.147	300
S-43	483273.875	167947.582	65.838	1.858	1350	 1	1.005	64.055	300
						0	1.006	63.980	375
S-44	483231.871	167930.114	65.154	1.700	1350	 1	1.006	63.529	375
						0	1.007	63.454	450
S-45	483215.014	167922.066	64.918	1.700	1350	 1	1.007	63.218	450
						0	1.008_1	63.218	450
S-46	483202.729	167912.264	64.730	1.700	1350	 1	1.008_1	63.030	450
						0	1.009	63.030	450
S-47	483196.830	167905.781	64.636	2.159	1500	 1	3.007	62.477	525
						2	1.009	62.552	450
						0	1.010	62.477	525
S-48	483169.842	167931.848	64.403	2.077	1500	 1	1.010	62.401	525
						0	1.011	62.326	600
S-49	483226.120	167944.966	64.925	1.475	1200	 0	10.000	63.450	225
S-50	483216.968	167967.518	64.633	1.725	1350	 1	10.000	63.058	225
						0	10.001	62.908	375

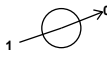
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S-51	483241.874	168012.922	65.251	1.499	1200	 1	9.001_1	63.827	150
						0	9.000	63.752	225
S-51A	483247.465	168001.480	65.539	1.439	600	 0			
						0	9.001_1	64.100	150
S-52	483246.715	168030.983	65.366	1.475	1200	 0			
						0	9.000_1	63.891	225
S-53	483235.178	168024.780	65.256	1.660	1200	 1 2	9.000_1 9.000	63.671 63.671	225 225
						0	8.002	63.596	300
S-54	483198.104	168004.383	64.819	2.114	1350	 1 2	10.001 8.002	62.780 62.855	375 300
						0	8.003	62.705	450
S-55	483127.803	167976.798	63.778	1.765	1500	 1 0	8.003 8.004	62.088 62.013	450 525
S-56	483131.728	167959.089	63.700	1.724	1500	 1 0	8.004 8.005	61.976 61.976	525 525
S-HEADWALL 8	483124.236	167935.210	63.700	1.940		 1	1.011	61.950	600
S-58	483301.137	167788.063	66.453	1.563	1200	 0			
						0	5.000	64.890	225
S-59	483250.580	167799.855	65.823	1.550	1200	 1 0	5.000 5.001	64.348 64.273	225 300
S-60	483230.322	167811.816	65.568	1.550	1200	 1 0	5.001 5.002	64.018 64.018	300 300
S-61	483213.127	167832.913	65.239	1.681	1350	 1 0	5.002 5.003	63.633 63.558	300 375
S-62	483207.571	167830.542	65.312	1.773	1350	 1 0	5.003 5.004	63.539 63.539	375 375

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S-63	483169.354	167854.339	64.814	1.885	1350	 1	5.004	62.929	375
						0	5.005	62.929	375
S-64	483188.850	167892.490	64.500	1.538	1200	 0	6.000	62.962	225
S-65	483177.371	167878.497	64.366	1.511	1200	 1	6.000	62.855	225
						0	6.001	62.855	225
S-66	483162.451	167865.536	64.594	2.081	1350	 1 2	6.001	62.738	225
						0	5.005	62.588	375
						0	5.006	62.513	450
S-67	483143.875	167885.320	64.009	1.837	1350	 1	5.006	62.172	450
						0	5.007	62.172	450
S-68	483120.565	167892.414	63.628	1.704	1350	 1 2	7.001	62.149	225
						0	5.007	61.924	450
						0	5.008	61.924	450
S-HEADWALL 5	483113.394	167898.592	63.700	1.940		 1	5.008	61.900	450
S-HEADWALL 6	483100.020	167906.475	63.700	2.000		 0	11.000	61.700	225
S-71	483083.802	167909.439	63.700	2.165	1500	 1	11.000	61.535	225
						0	11.001	61.535	225
S-72	483080.169	167910.048	63.070	1.600		 1	11.001	61.470	225
S-HEADWALL 7	483122.161	167950.510	63.700	1.940		 1	8.005	61.950	525
S-74	483122.826	167895.037	63.618	1.448	1200	 1	7.000	62.170	225
						0	7.001	62.170	225
S-75	483124.261	167897.952	63.768	1.578		 0	7.000	62.190	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S-82A	483335.075	167861.256	67.320	1.475	1200		0	4.000	65.845	225
S-77A	483294.722	167911.001	66.656	2.074	600		1	1.000	64.582	150
							0	1.001	64.582	150
S-76	483271.214	167903.043	66.180	1.352			0	1.000	64.828	150

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	5	0

Node S-HEADWALL 8 Online Orifice Control

Flap Valve	x	Invert Level (m)	61.760	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.600		

Node S-HEADWALL 5 Online Orifice Control

Flap Valve	x	Invert Level (m)	61.760	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

Node S-71 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	61.535	Product Number	CTL-SHE-0133-1000-1850-1000
Design Depth (m)	1.850	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	10.0	Min Node Diameter (mm)	1500

Node S-HEADWALL 7 Online Orifice Control

Flap Valve	x	Invert Level (m)	61.760	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.525		

Node S-74 Online Orifice Control

Flap Valve	x	Invert Level (m)	62.170	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Diameter (m)	0.450		

Node S-75 Online Orifice Control

Flap Valve	x	Invert Level (m)	62.190	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Diameter (m)	0.450		

Node S-76 Offline Depth/Flow Control

Flap Valve	x	Loop to Node	S-77A	Invert Level (m)	64.828
------------	---	--------------	-------	------------------	--------

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.010	0.000	0.240	0.000	0.470	0.000	0.700	0.000	0.930	1.554	1.160	3.109
0.020	0.000	0.250	0.000	0.480	0.000	0.710	0.068	0.940	1.622	1.170	3.176
0.030	0.000	0.260	0.000	0.490	0.000	0.720	0.135	0.950	1.690	1.180	3.244
0.040	0.000	0.270	0.000	0.500	0.000	0.730	0.203	0.960	1.757	1.190	3.311
0.050	0.000	0.280	0.000	0.510	0.000	0.740	0.270	0.970	1.825	1.200	3.379
0.060	0.000	0.290	0.000	0.520	0.000	0.750	0.338	0.980	1.892	1.210	3.447
0.070	0.000	0.300	0.000	0.530	0.000	0.760	0.405	0.990	1.960	1.220	3.514
0.080	0.000	0.310	0.000	0.540	0.000	0.770	0.473	1.000	2.027	1.230	3.582
0.090	0.000	0.320	0.000	0.550	0.000	0.780	0.541	1.010	2.095	1.240	3.649
0.100	0.000	0.330	0.000	0.560	0.000	0.790	0.608	1.020	2.163	1.250	3.717
0.110	0.000	0.340	0.000	0.570	0.000	0.800	0.676	1.030	2.230	1.260	3.784
0.120	0.000	0.350	0.000	0.580	0.000	0.810	0.743	1.040	2.298	1.270	3.852
0.130	0.000	0.360	0.000	0.590	0.000	0.820	0.811	1.050	2.365	1.280	3.920
0.140	0.000	0.370	0.000	0.600	0.000	0.830	0.879	1.060	2.433	1.290	3.987
0.150	0.000	0.380	0.000	0.610	0.000	0.840	0.946	1.070	2.500	1.300	4.055
0.160	0.000	0.390	0.000	0.620	0.000	0.850	1.014	1.080	2.568	1.310	4.122
0.170	0.000	0.400	0.000	0.630	0.000	0.860	1.081	1.090	2.636	1.320	4.190
0.180	0.000	0.410	0.000	0.640	0.000	0.870	1.149	1.100	2.703	1.330	4.258
0.190	0.000	0.420	0.000	0.650	0.000	0.880	1.216	1.110	2.771	1.340	4.325
0.200	0.000	0.430	0.000	0.660	0.000	0.890	1.284	1.120	2.838	1.350	0.000
0.210	0.000	0.440	0.000	0.670	0.000	0.900	1.352	1.130	2.906	1.360	0.000
0.220	0.000	0.450	0.000	0.680	0.000	0.910	1.419	1.140	2.974		
0.230	0.000	0.460	0.000	0.690	0.000	0.920	1.487	1.150	3.041		

Node S-76 Offline Weir Control

Flap Valve	x	Invert Level (m)	66.128	Discharge Coefficient	0.590
Loop to Node	S-77A	Width (m)	0.100		

Node S-51A Online Depth/Flow Control

Flap Valve	x	Replaces Downstream Link	✓	Invert Level (m)	64.100
------------	---	--------------------------	---	------------------	--------

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.010	0.000	0.060	0.000	0.110	0.000	0.160	0.000	0.210	0.000	0.260	0.000
0.020	0.000	0.070	0.000	0.120	0.000	0.170	0.000	0.220	0.000	0.270	0.000
0.030	0.000	0.080	0.000	0.130	0.000	0.180	0.000	0.230	0.000	0.280	0.000
0.040	0.000	0.090	0.000	0.140	0.000	0.190	0.000	0.240	0.000	0.290	0.000
0.050	0.000	0.100	0.000	0.150	0.000	0.200	0.000	0.250	0.000	0.300	0.000

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.310	0.000	0.500	0.000	0.690	0.000	0.880	0.390	1.070	0.960	1.260	1.530
0.320	0.000	0.510	0.000	0.700	0.000	0.890	0.420	1.080	0.990	1.270	1.560
0.330	0.000	0.520	0.000	0.710	0.000	0.900	0.450	1.090	1.020	1.280	1.590
0.340	0.000	0.530	0.000	0.720	0.000	0.910	0.480	1.100	1.050	1.290	1.620
0.350	0.000	0.540	0.000	0.730	0.000	0.920	0.510	1.110	1.080	1.300	1.650
0.360	0.000	0.550	0.000	0.740	0.000	0.930	0.540	1.120	1.110	1.310	1.680
0.370	0.000	0.560	0.000	0.750	0.000	0.940	0.570	1.130	1.140	1.320	1.710
0.380	0.000	0.570	0.000	0.760	0.030	0.950	0.600	1.140	1.170	1.330	1.740
0.390	0.000	0.580	0.000	0.770	0.060	0.960	0.630	1.150	1.200	1.340	1.770
0.400	0.000	0.590	0.000	0.780	0.090	0.970	0.660	1.160	1.230	1.350	1.800
0.410	0.000	0.600	0.000	0.790	0.120	0.980	0.690	1.170	1.260	1.360	1.830
0.420	0.000	0.610	0.000	0.800	0.150	0.990	0.720	1.180	1.290	1.370	1.860
0.430	0.000	0.620	0.000	0.810	0.180	1.000	0.750	1.190	1.320	1.380	1.890
0.440	0.000	0.630	0.000	0.820	0.210	1.010	0.780	1.200	1.350	1.390	1.920
0.450	0.000	0.640	0.000	0.830	0.240	1.020	0.810	1.210	1.380	1.400	1.950
0.460	0.000	0.650	0.000	0.840	0.270	1.030	0.840	1.220	1.410	1.410	0.000
0.470	0.000	0.660	0.000	0.850	0.300	1.040	0.870	1.230	1.440		
0.480	0.000	0.670	0.000	0.860	0.330	1.050	0.900	1.240	1.470		
0.490	0.000	0.680	0.000	0.870	0.360	1.060	0.930	1.250	1.500		

Node S-51A Online Weir Control

Flap Valve	x	Invert Level (m)	65.400	Discharge Coefficient	0.590
Replaces Downstream Link	✓	Width (m)	0.100		

Node S-75 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	62.190
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	69.0	0.0	1.200	69.0	0.0	1.201	0.0	0.0

Node S-76 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	65.528	Slope (1:X)	53.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	13.365	Inf Depth (m)	
Porosity	0.30	Length (m)	26.592		

Node S-51A Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	64.850	Slope (1:X)	155.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.450
Safety Factor	2.0	Width (m)	14.670	Inf Depth (m)	
Porosity	0.30	Length (m)	35.000		

Node S-HEADWALL 6 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)	61.700	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.035

Inlets

S-HEADWALL 7 | S-HEADWALL 8 | S-HEADWALL 5

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	762.4	0.0	2.000	1686.8	0.0

Results for 100 year +40% CC +5% A Critical Storm Duration. Lowest mass balance: 99.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S-77	35	65.339	0.878	29.8	0.9934	0.0000	SURCHARGED
60 minute summer	S-78	35	65.226	0.959	110.6	1.0843	0.0000	SURCHARGED
60 minute summer	S-79	35	65.316	0.996	80.9	1.1262	0.0000	SURCHARGED
60 minute summer	S-80	33	66.008	0.176	52.5	0.1995	0.0000	OK
60 minute summer	S-81	33	65.857	0.322	49.7	0.3644	0.0000	SURCHARGED
60 minute summer	S-82	33	65.707	0.316	83.8	0.3572	0.0000	SURCHARGED
60 minute summer	S-83	33	65.501	0.222	116.6	0.2508	0.0000	OK
60 minute summer	S-84	35	65.042	0.417	181.3	0.5964	0.0000	SURCHARGED
60 minute summer	S-85	35	64.830	0.622	203.9	0.8907	0.0000	SURCHARGED
60 minute summer	S-86	35	64.520	0.766	268.3	1.0959	0.0000	SURCHARGED
60 minute summer	S-87	35	64.245	1.158	314.5	2.0471	0.0000	SURCHARGED
60 minute summer	S-88	35	64.152	1.294	307.6	2.2868	0.0000	SURCHARGED
60 minute summer	S-42	35	64.917	0.770	134.5	0.8705	0.0000	SURCHARGED
60 minute summer	S-43	35	64.553	0.573	161.9	0.8198	0.0000	SURCHARGED
60 minute summer	S-44	35	64.258	0.804	166.0	1.1500	0.0000	SURCHARGED
60 minute summer	S-45	35	64.187	0.969	162.0	1.3862	0.0000	SURCHARGED
60 minute summer	S-46	35	64.120	1.090	173.2	1.5594	0.0000	SURCHARGED
60 minute summer	S-47	35	64.066	1.589	482.8	2.8072	0.0000	SURCHARGED
60 minute summer	S-48	35	63.566	1.240	555.4	2.1912	0.0000	SURCHARGED
60 minute summer	S-49	35	63.585	0.135	33.9	0.1525	0.0000	OK
60 minute summer	S-50	34	63.515	0.608	131.4	0.8694	0.0000	SURCHARGED
60 minute summer	S-51	33	63.921	0.169	32.7	0.1913	0.0000	OK
240 minute winter	S-51A	172	65.460	1.360	12.2	52.3830	0.0000	FLOOD RISK
60 minute summer	S-52	33	63.968	0.077	15.5	0.0870	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	S-77	1.002	S-79	31.4	0.840	0.785	0.4415	
60 minute summer	S-78	1.004	S-42	109.9	1.561	1.553	2.0662	
60 minute summer	S-79	1.003	S-78	80.1	1.137	1.126	0.9021	
60 minute summer	S-80	2.000	S-79	52.5	1.621	0.903	1.2979	
60 minute summer	S-81	3.000	S-82	49.7	1.249	1.248	0.4659	
60 minute summer	S-82	3.001	S-83	83.7	1.311	1.181	1.7233	
60 minute summer	S-83	3.002	S-84	116.1	2.181	0.812	2.1389	
60 minute summer	S-84	3.003	S-85	179.1	2.082	0.645	2.3995	
60 minute summer	S-85	3.004	S-86	197.0	2.309	0.814	2.8566	
60 minute summer	S-86	3.005	S-87	253.0	2.538	0.601	5.5568	
60 minute summer	S-87	1.008	S-88	307.6	2.616	0.439	2.3653	
60 minute summer	S-88	3.007	S-47	304.7	1.411	0.310	2.0085	
60 minute summer	S-42	1.005	S-43	134.0	1.904	1.890	1.5773	
60 minute summer	S-43	1.006	S-44	152.9	1.906	0.767	5.0175	
60 minute summer	S-44	1.007	S-45	158.6	1.757	0.436	2.9597	
60 minute summer	S-45	1.008_1	S-46	169.3	2.334	0.479	2.4901	
60 minute summer	S-46	1.009	S-47	178.5	1.156	0.236	1.3888	
60 minute summer	S-47	1.010	S-48	483.2	2.237	2.230	8.1058	
60 minute summer	S-48	1.011	S-HEADWALL 8	553.3	1.964	0.887	12.8811	
60 minute summer	S-49	10.000	S-50	33.9	1.417	0.513	0.7862	
60 minute summer	S-50	10.001	S-54	125.9	1.297	1.138	4.5675	
60 minute summer	S-51	9.000	S-53	32.7	1.081	0.818	0.4117	
240 minute winter	S-51A	Depth/Flow	S-51	1.8				
240 minute winter	S-51A	Weir	S-51	2.7				
60 minute summer	S-52	9.000_1	S-53	15.5	1.284	0.230	0.1659	

Results for 100 year +40% CC +5% A Critical Storm Duration. Lowest mass balance: 99.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S-53	32	63.755	0.159	78.3	0.1797	0.0000	OK
600 minute winter	S-54	600	63.412	0.707	30.2	1.0115	0.0000	SURCHARGED
720 minute winter	S-55	720	63.415	1.402	28.7	2.4778	0.0000	SURCHARGED
600 minute winter	S-56	615	63.415	1.439	40.4	2.5420	0.0000	FLOOD RISK
600 minute winter	S-HEADWALL 8	615	63.418	1.658	86.7	0.0000	0.0000	OK
60 minute summer	S-58	33	65.301	0.411	63.4	0.4650	0.0000	SURCHARGED
60 minute summer	S-59	33	64.533	0.260	104.6	0.2939	0.0000	OK
60 minute summer	S-60	34	64.299	0.281	130.3	0.3173	0.0000	OK
60 minute summer	S-61	33	63.888	0.330	159.3	0.4723	0.0000	OK
60 minute summer	S-62	33	63.778	0.239	159.1	0.3417	0.0000	OK
600 minute winter	S-63	600	63.422	0.494	21.7	0.7066	0.0000	SURCHARGED
600 minute winter	S-64	600	63.426	0.464	1.1	0.5245	0.0000	SURCHARGED
600 minute winter	S-65	615	63.418	0.563	5.2	0.6370	0.0000	SURCHARGED
720 minute winter	S-66	720	63.422	0.909	25.4	1.3003	0.0000	SURCHARGED
720 minute winter	S-67	720	63.418	1.246	27.1	1.7833	0.0000	SURCHARGED
720 minute winter	S-68	720	63.423	1.499	29.7	2.1448	0.0000	FLOOD RISK
600 minute winter	S-HEADWALL 5	600	63.414	1.654	33.2	0.0000	0.0000	OK
720 minute winter	S-HEADWALL 6	720	63.412	1.712	274.6	0.0000	0.0000	FLOOD RISK
720 minute winter	S-71	720	63.404	1.869	16.3	3.3034	0.0000	FLOOD RISK
60 minute summer	S-72	1	61.470	0.000	10.0	0.0000	0.0000	OK
600 minute winter	S-HEADWALL 7	600	63.420	1.660	40.2	0.0000	0.0000	OK
480 minute winter	S-74	480	63.419	1.249	22.3	1.4131	0.0000	FLOOD RISK
600 minute winter	S-75	600	63.423	1.233	17.2	78.6928	0.0000	SURCHARGED
60 minute summer	S-82A	33	65.902	0.057	14.3	0.0641	0.0000	OK
60 minute summer	S-77A	35	65.422	0.840	28.5	0.2377	0.0000	SURCHARGED

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	S-53	8.002	S-54	78.4	2.023	0.532	2.2558	
60 minute summer	S-54	8.003	S-55	224.2	1.546	0.768	11.9655	
60 minute summer	S-55	8.004	S-56	246.7	1.142	1.134	3.9186	
60 minute summer	S-56	8.005	S-HEADWALL 7	310.1	1.435	1.432	2.7760	
60 minute summer	S-HEADWALL 8	Flow through pond	S-HEADWALL 6	597.9	0.140	0.007	1328.4935	
60 minute summer	S-58	5.000	S-59	61.7	1.552	1.161	2.0071	
60 minute summer	S-59	5.001	S-60	104.1	1.575	0.899	1.5677	
60 minute summer	S-60	5.002	S-61	129.5	1.981	0.979	1.8033	
60 minute summer	S-61	5.003	S-62	159.1	1.779	1.425	0.5340	
60 minute summer	S-62	5.004	S-63	159.1	2.111	0.682	3.7851	
60 minute summer	S-63	5.005	S-66	174.1	2.475	0.539	1.3723	
60 minute summer	S-64	6.000	S-65	8.3	0.340	0.208	0.7198	
60 minute summer	S-65	6.001	S-66	41.1	1.151	1.031	0.7860	
60 minute summer	S-66	5.006	S-67	230.7	1.746	0.636	4.2998	
60 minute summer	S-67	5.007	S-68	256.6	1.620	0.786	3.8606	
60 minute summer	S-68	5.008	S-HEADWALL 5	177.7	1.177	1.098	1.4997	
60 minute summer	S-HEADWALL 5	Flow through pond	S-HEADWALL 6	597.9	0.140	0.007	1328.4935	
60 minute summer	S-HEADWALL 6	11.000	S-71	17.1	0.715	0.329	0.6557	
720 minute winter	S-71	Hydro-Brake®	S-72	10.0				526.3
60 minute summer	S-HEADWALL 7	Flow through pond	S-HEADWALL 6	597.9	0.140	0.007	1328.4935	
180 minute summer	S-74	Orifice	S-68	16.7				
60 minute summer	S-75	Orifice	S-74	13.2				
60 minute summer	S-82A	4.000	S-82	14.3	1.094	0.140	0.2360	
60 minute summer	S-77A	1.001	S-77	29.8	1.695	1.684	0.0813	

Results for 100 year +40% CC +5% A Critical Storm Duration. Lowest mass balance: 99.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S-76	36	65.697	0.869	30.8	2.7504	0.0000	SURCHARGED

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	S-76	1.000	S-77A	27.9	1.588	1.581	0.4369	
60 minute summer	S-76	Depth/Flow	S-77A	1.1				0.5
60 minute summer	S-76	Weir	S-77A	0.0				0.0

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	9.990
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	550.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S-1	0.037	5.00	68.437	600	483208.638	168169.039	1.173
S-2	0.051	5.00	68.223	1200	483182.910	168162.799	1.588
S-3	0.012	5.00	68.299	1200	483191.711	168164.804	1.718
S-4	0.047	5.00	67.772	1200	483203.125	168116.164	2.539
S-7	0.050	5.00	66.762	1200	483250.544	168094.936	1.425
S-8	0.032	5.00	67.106	1200	483219.247	168089.962	1.430
S-9	0.038	5.00	67.201	1350	483201.276	168094.455	2.132
S-10	0.078	5.00	66.894	1350	483198.412	168082.754	1.863
S-11	0.053	5.00	66.111	1350	483186.969	168053.835	1.575
S-12	0.099	5.00	66.774	2400	483144.388	168083.161	2.774
S-13	0.015	5.00	66.417	1200	483140.162	168068.972	2.505
S-14	0.019	5.00	65.845	1200	483131.566	168048.102	2.141
S-15	0.016	5.00	65.833	1350	483184.236	168042.731	1.575
S-16	0.021	5.00	65.478	1350	483185.972	168028.151	1.575
S-17	0.020	5.00	65.226	1350	483190.612	168018.751	2.155
S-18	0.031	5.00	64.712	1500	483161.088	168001.092	1.812
S-19		5.00	65.243	1200	483138.120	168023.247	1.425
S-20	0.058	5.00	65.409	1350	483123.702	168032.399	1.852
S-21	0.033	5.00	65.107	1350	483117.624	168021.822	1.588
S-HEADWALL 1	0.052	5.00	64.250		483111.620	168005.466	1.768
S-HEADWALL 3			64.250		483116.535	167992.779	1.768
S-HEADWALL 2		5.00	64.250		483098.913	167987.326	1.800
S-22			64.879		483079.286	167971.228	2.533
S-23			68.143		483080.843	167966.856	5.825
S-24	0.021	5.00	65.181	1350	483176.623	168013.013	2.148
S-25	0.022	5.00	64.879	1500	483159.178	168005.844	1.968
S-26A	0.018	5.00	68.086	1200	483190.745	168138.201	2.536
S-26	0.066	5.00	68.143	2400	483197.723	168139.171	2.813
S-27			64.250	1200	483100.604	168002.616	1.425
S-HEADWALL 4			64.250		483106.424	167998.654	1.768
S-28	0.008	5.00	65.577	1200	483257.137	168058.789	2.033
S-29	0.041	5.00	64.900	1350	483242.470	168041.922	1.575
S-30			65.350	1350	483198.769	168018.620	2.178
S-31			64.638	1500	483154.899	167998.681	1.752
S-32			64.240	1500	483127.236	167987.368	1.608
S-33			64.356	1500	483119.257	167986.167	1.741
S-34		5.00	64.378	1200	483122.136	168000.691	1.362
S-35	0.072	5.00	66.231	1200	483166.669	168060.394	1.425
S-36		5.00	64.282	1200	483101.325	167980.153	1.255

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S-37		5.00	65.388	1200	483143.400	168026.416	1.425
S-38		5.00	64.915	1200	483112.412	168019.958	1.710
S-39		5.00	64.250	1200	483090.653	167988.000	1.185
S-40		5.00	64.863	1200	483138.895	168006.518	1.425
S-41			64.488	1500	483143.965	167994.157	1.725
S-1A	0.020	5.00	68.401	1200	483204.177	168167.923	1.350

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S-1	S-1A	4.598	0.600	67.264	67.051	0.213	21.6	150	5.04	55.4
1.001	S-1A	S-3	12.850	0.600	67.051	66.656	0.395	32.5	150	5.16	55.0
2.000	S-2	S-3	9.026	0.600	66.635	66.581	0.054	167.2	225	5.15	55.0
1.002	S-3	S-26	26.329	0.600	66.581	65.405	1.176	22.4	225	5.31	54.3
3.000	S-26A	S-26	7.045	0.600	65.550	65.480	0.070	100.6	150	5.12	55.1
1.003	S-26	S-4	23.633	0.600	65.330	65.233	0.097	243.6	300	5.71	52.7
1.004	S-4	S-9	21.788	0.600	65.233	65.144	0.089	244.8	300	6.07	51.3
1.005	S-9	S-10	12.046	0.600	65.069	65.031	0.038	317.0	375	6.27	50.6
1.006	S-10	S-11	31.101	0.600	65.031	64.536	0.495	62.8	375	6.49	49.8
1.007	S-11	S-15	11.435	0.600	64.536	64.258	0.278	41.1	375	6.56	49.5
1.008	S-15	S-16	14.683	0.600	64.258	63.903	0.355	41.4	375	6.65	49.2
1.009	S-16	S-17	10.483	0.600	63.903	63.146	0.757	13.8	375	6.68	49.1
4.000	S-8	S-7	31.690	0.600	65.676	65.337	0.339	93.5	225	5.39	54.0
4.001	S-7	S-28	36.743	0.600	65.337	63.619	1.718	21.4	225	5.61	53.2
4.002	S-28	S-29	22.352	0.600	63.544	63.400	0.144	155.2	300	5.90	52.0
4.003	S-29	S-30	49.525	0.600	63.325	63.172	0.153	323.7	375	6.73	48.9
4.004	S-30	S-17	8.158	0.600	63.172	63.146	0.026	313.8	375	6.86	48.4
1.010	S-17	S-24	15.120	0.600	63.071	63.033	0.038	397.9	450	7.11	47.6

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	2.177	38.5	7.4	1.023	1.200	0.037	0.0	44	1.681
1.001	1.771	31.3	11.3	1.200	1.493	0.057	0.0	62	1.631
2.000	1.008	40.1	10.1	1.363	1.493	0.051	0.0	77	0.843
1.002	2.777	110.4	23.5	1.493	2.513	0.120	0.0	70	2.213
3.000	1.001	17.7	3.6	2.386	2.513	0.018	0.0	45	0.783
1.003	1.003	70.9	38.7	2.513	2.239	0.203	0.0	158	1.025
1.004	1.000	70.7	46.3	2.239	1.757	0.250	0.0	177	1.064
1.005	1.012	111.8	52.7	1.757	1.488	0.288	0.0	181	0.998
1.006	2.289	252.8	65.8	1.488	1.200	0.366	0.0	130	1.936
1.007	2.832	312.8	75.1	1.200	1.200	0.420	0.0	124	2.340
1.008	2.824	311.9	77.4	1.200	1.200	0.435	0.0	127	2.362
1.009	4.890	540.1	81.0	1.200	1.705	0.457	0.0	97	3.550
4.000	1.352	53.8	6.2	1.205	1.200	0.032	0.0	51	0.908
4.001	2.841	113.0	15.8	1.200	1.733	0.082	0.0	57	2.021
4.002	1.259	89.0	16.9	1.733	1.200	0.090	0.0	88	0.975
4.003	1.001	110.6	23.2	1.200	1.803	0.131	0.0	116	0.798
4.004	1.017	112.4	23.0	1.803	1.705	0.131	0.0	115	0.805
1.010	1.013	161.1	104.5	1.705	1.698	0.608	0.0	265	1.076

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.011	S-24	S-25	18.861	0.600	63.033	62.986	0.047	401.3	450	7.42	46.6
1.012	S-25	S-18	5.121	0.600	62.911	62.900	0.011	465.6	525	7.50	46.3
1.013	S-18	S-31	6.642	0.600	62.900	62.886	0.014	474.4	525	7.61	46.0
5.000	S-37	S-31	30.024	0.600	63.963	63.186	0.777	38.6	225	5.24	54.6
1.014	S-31	S-41	11.833	0.600	62.886	62.763	0.123	96.2	525	7.70	45.7
6.000	S-40	S-41	13.360	0.600	63.438	63.063	0.375	35.6	225	5.10	55.2
1.015	S-41	S-32	18.054	0.600	62.763	62.632	0.131	137.8	525	7.86	45.2
7.000	S-34	S-32	14.266	0.600	63.016	62.932	0.084	169.8	225	5.24	54.6
1.016	S-32	S-33	8.069	0.600	62.632	62.615	0.017	474.6	525	7.99	44.8
8.000	S-36	S-33	18.914	0.600	63.027	62.915	0.112	168.9	225	5.31	54.3
1.017	S-33	S-HEADWALL 3	7.150	0.600	62.615	62.600	0.015	476.7	525	8.10	44.5
9.000	S-35	S-13	27.860	0.600	64.806	63.912	0.894	31.2	225	5.20	54.8
10.000	S-12	S-13	14.805	0.600	64.000	63.912	0.088	168.2	225	5.25	54.6
9.001	S-13	S-14	22.571	0.600	63.912	63.779	0.133	169.7	225	5.62	53.1
9.002	S-14	S-20	17.562	0.600	63.704	63.632	0.072	243.9	300	5.91	51.9
11.000	S-19	S-20	17.077	0.600	63.818	63.707	0.111	153.9	225	5.27	54.5
9.003	S-20	S-21	12.199	0.600	63.557	63.519	0.038	321.0	375	6.12	51.2
9.004	S-21	S-HEADWALL 1	17.423	0.600	63.519	62.675	0.844	20.6	375	6.19	50.9
13.000	S-HEADWALL 2	S-22	25.384	0.600	62.450	62.346	0.104	244.1	300	5.42	53.9
13.001	S-22	S-23	4.641	0.600	62.346	62.318	0.028	165.8	225	5.50	53.6
13.000_1	S-38	S-27	20.980	0.600	63.205	62.825	0.380	55.2	225	5.20	54.8
14.000	S-39	S-27	17.682	0.600	63.065	62.825	0.240	73.7	225	5.19	54.8
13.001_1	S-27	S-HEADWALL 4	7.041	0.600	62.825	62.783	0.042	167.6	225	5.31	54.3

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.011	1.008	160.4	106.0	1.698	1.443	0.629	0.0	268	1.075
1.012	1.031	223.2	109.0	1.443	1.287	0.651	0.0	259	1.025
1.013	1.021	221.1	113.3	1.287	1.227	0.682	0.0	266	1.027
5.000	2.111	83.9	0.0	1.200	1.227	0.000	0.0	0	0.000
1.014	2.284	494.3	112.6	1.227	1.200	0.682	0.0	169	1.866
6.000	2.199	87.4	0.0	1.200	1.200	0.000	0.0	0	0.000
1.015	1.906	412.6	111.4	1.200	1.083	0.682	0.0	185	1.629
7.000	1.000	39.8	0.0	1.137	1.083	0.000	0.0	0	0.000
1.016	1.021	221.1	110.4	1.083	1.216	0.682	0.0	262	1.021
8.000	1.003	39.9	0.0	1.030	1.216	0.000	0.0	0	0.000
1.017	1.019	220.6	109.6	1.216	1.125	0.682	0.0	261	1.017
9.000	2.352	93.5	14.3	1.200	2.280	0.072	0.0	59	1.715
10.000	1.005	40.0	19.6	2.549	2.280	0.099	0.0	111	1.000
9.001	1.001	39.8	35.8	2.280	1.841	0.187	0.0	167	1.128
9.002	1.002	70.8	38.6	1.841	1.477	0.206	0.0	158	1.023
11.000	1.051	41.8	0.0	1.200	1.477	0.000	0.0	0	0.000
9.003	1.006	111.1	48.8	1.477	1.213	0.264	0.0	174	0.974
9.004	4.003	442.1	54.5	1.213	1.200	0.296	0.0	88	2.757
13.000	1.002	70.8	0.0	1.500	2.233	0.000	0.0	0	0.000
13.001	1.013	40.3	0.0	2.308	5.600	0.000	0.0	0	0.000
13.000_1	1.764	70.1	0.0	1.485	1.200	0.000	0.0	0	0.000
14.000	1.525	60.6	0.0	0.960	1.200	0.000	0.0	0	0.000
13.001_1	1.007	40.0	0.0	1.200	1.242	0.000	0.0	0	0.000

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	4.598	21.6	150	Circular	68.437	67.264	1.023	68.401	67.051	1.200
1.001	12.850	32.5	150	Circular	68.401	67.051	1.200	68.299	66.656	1.493
2.000	9.026	167.2	225	Circular	68.223	66.635	1.363	68.299	66.581	1.493
1.002	26.329	22.4	225	Circular	68.299	66.581	1.493	68.143	65.405	2.513
3.000	7.045	100.6	150	Circular	68.086	65.550	2.386	68.143	65.480	2.513
1.003	23.633	243.6	300	Circular	68.143	65.330	2.513	67.772	65.233	2.239
1.004	21.788	244.8	300	Circular	67.772	65.233	2.239	67.201	65.144	1.757
1.005	12.046	317.0	375	Circular	67.201	65.069	1.757	66.894	65.031	1.488
1.006	31.101	62.8	375	Circular	66.894	65.031	1.488	66.111	64.536	1.200
1.007	11.435	41.1	375	Circular	66.111	64.536	1.200	65.833	64.258	1.200
1.008	14.683	41.4	375	Circular	65.833	64.258	1.200	65.478	63.903	1.200
1.009	10.483	13.8	375	Circular	65.478	63.903	1.200	65.226	63.146	1.705
4.000	31.690	93.5	225	Circular	67.106	65.676	1.205	66.762	65.337	1.200
4.001	36.743	21.4	225	Circular	66.762	65.337	1.200	65.577	63.619	1.733
4.002	22.352	155.2	300	Circular	65.577	63.544	1.733	64.900	63.400	1.200
4.003	49.525	323.7	375	Circular	64.900	63.325	1.200	65.350	63.172	1.803
4.004	8.158	313.8	375	Circular	65.350	63.172	1.803	65.226	63.146	1.705
1.010	15.120	397.9	450	Circular	65.226	63.071	1.705	65.181	63.033	1.698
1.011	18.861	401.3	450	Circular	65.181	63.033	1.698	64.879	62.986	1.443
1.012	5.121	465.6	525	Circular	64.879	62.911	1.443	64.712	62.900	1.287
1.013	6.642	474.4	525	Circular	64.712	62.900	1.287	64.638	62.886	1.227
5.000	30.024	38.6	225	Circular	65.388	63.963	1.200	64.638	63.186	1.227
1.014	11.833	96.2	525	Circular	64.638	62.886	1.227	64.488	62.763	1.200
6.000	13.360	35.6	225	Circular	64.863	63.438	1.200	64.488	63.063	1.200
1.015	18.054	137.8	525	Circular	64.488	62.763	1.200	64.240	62.632	1.083

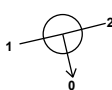
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S-1	600	Manhole	Adoptable	S-1A	1200	Manhole	Adoptable
1.001	S-1A	1200	Manhole	Adoptable	S-3	1200	Manhole	Adoptable
2.000	S-2	1200	Manhole	Adoptable	S-3	1200	Manhole	Adoptable
1.002	S-3	1200	Manhole	Adoptable	S-26	2400	Manhole	Adoptable
3.000	S-26A	1200	Manhole	Adoptable	S-26	2400	Manhole	Adoptable
1.003	S-26	2400	Manhole	Adoptable	S-4	1200	Manhole	Adoptable
1.004	S-4	1200	Manhole	Adoptable	S-9	1350	Manhole	Adoptable
1.005	S-9	1350	Manhole	Adoptable	S-10	1350	Manhole	Adoptable
1.006	S-10	1350	Manhole	Adoptable	S-11	1350	Manhole	Adoptable
1.007	S-11	1350	Manhole	Adoptable	S-15	1350	Manhole	Adoptable
1.008	S-15	1350	Manhole	Adoptable	S-16	1350	Manhole	Adoptable
1.009	S-16	1350	Manhole	Adoptable	S-17	1350	Manhole	Adoptable
4.000	S-8	1200	Manhole	Adoptable	S-7	1200	Manhole	Adoptable
4.001	S-7	1200	Manhole	Adoptable	S-28	1200	Manhole	Adoptable
4.002	S-28	1200	Manhole	Adoptable	S-29	1350	Manhole	Adoptable
4.003	S-29	1350	Manhole	Adoptable	S-30	1350	Manhole	Adoptable
4.004	S-30	1350	Manhole	Adoptable	S-17	1350	Manhole	Adoptable
1.010	S-17	1350	Manhole	Adoptable	S-24	1350	Manhole	Adoptable
1.011	S-24	1350	Manhole	Adoptable	S-25	1500	Manhole	Adoptable
1.012	S-25	1500	Manhole	Adoptable	S-18	1500	Manhole	Adoptable
1.013	S-18	1500	Manhole	Adoptable	S-31	1500	Manhole	Adoptable
5.000	S-37	1200	Manhole	Adoptable	S-31	1500	Manhole	Adoptable
1.014	S-31	1500	Manhole	Adoptable	S-41	1500	Manhole	Adoptable
6.000	S-40	1200	Manhole	Adoptable	S-41	1500	Manhole	Adoptable
1.015	S-41	1500	Manhole	Adoptable	S-32	1500	Manhole	Adoptable

Pipeline Schedule

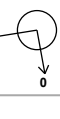
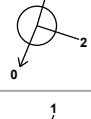
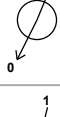
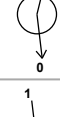
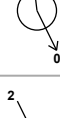
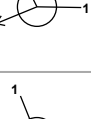
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
7.000	14.266	169.8	225	Circular	64.378	63.016	1.137	64.240	62.932	1.083
1.016	8.069	474.6	525	Circular	64.240	62.632	1.083	64.356	62.615	1.216
8.000	18.914	168.9	225	Circular	64.282	63.027	1.030	64.356	62.915	1.216
1.017	7.150	476.7	525	Circular	64.356	62.615	1.216	64.250	62.600	1.125
9.000	27.860	31.2	225	Circular	66.231	64.806	1.200	66.417	63.912	2.280
10.000	14.805	168.2	225	Circular	66.774	64.000	2.549	66.417	63.912	2.280
9.001	22.571	169.7	225	Circular	66.417	63.912	2.280	65.845	63.779	1.841
9.002	17.562	243.9	300	Circular	65.845	63.704	1.841	65.409	63.632	1.477
11.000	17.077	153.9	225	Circular	65.243	63.818	1.200	65.409	63.707	1.477
9.003	12.199	321.0	375	Circular	65.409	63.557	1.477	65.107	63.519	1.213
9.004	17.423	20.6	375	Circular	65.107	63.519	1.213	64.250	62.675	1.200
13.000	25.384	244.1	300	Circular	64.250	62.450	1.500	64.879	62.346	2.233
13.001	4.641	165.8	225	Circular	64.879	62.346	2.308	68.143	62.318	5.600
13.000_1	20.980	55.2	225	Circular	64.915	63.205	1.485	64.250	62.825	1.200
14.000	17.682	73.7	225	Circular	64.250	63.065	0.960	64.250	62.825	1.200
13.001_1	7.041	167.6	225	Circular	64.250	62.825	1.200	64.250	62.783	1.242

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
7.000	S-34	1200	Manhole	Adoptable	S-32	1500	Manhole	Adoptable
1.016	S-32	1500	Manhole	Adoptable	S-33	1500	Manhole	Adoptable
8.000	S-36	1200	Manhole	Adoptable	S-33	1500	Manhole	Adoptable
1.017	S-33	1500	Manhole	Adoptable	S-HEADWALL 3		Junction	
9.000	S-35	1200	Manhole	Adoptable	S-13	1200	Manhole	Adoptable
10.000	S-12	2400	Manhole	Adoptable	S-13	1200	Manhole	Adoptable
9.001	S-13	1200	Manhole	Adoptable	S-14	1200	Manhole	Adoptable
9.002	S-14	1200	Manhole	Adoptable	S-20	1350	Manhole	Adoptable
11.000	S-19	1200	Manhole	Adoptable	S-20	1350	Manhole	Adoptable
9.003	S-20	1350	Manhole	Adoptable	S-21	1350	Manhole	Adoptable
9.004	S-21	1350	Manhole	Adoptable	S-HEADWALL 1		Junction	
13.000	S-HEADWALL 2		Junction		S-22		Junction	
13.001	S-22		Junction		S-23		Junction	
13.000_1	S-38	1200	Manhole	Adoptable	S-27	1200	Manhole	Adoptable
14.000	S-39	1200	Manhole	Adoptable	S-27	1200	Manhole	Adoptable
13.001_1	S-27	1200	Manhole	Adoptable	S-HEADWALL 4		Junction	

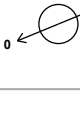
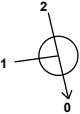
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S-1	483208.638	168169.039	68.437	1.173	600				
						0	1.000	67.264	150
S-2	483182.910	168162.799	68.223	1.588	1200				
						0	2.000	66.635	225
S-3	483191.711	168164.804	68.299	1.718	1200				
						1	2.000	66.581	225
						2	1.001	66.656	150
						0	1.002	66.581	225

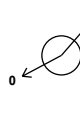
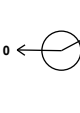
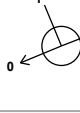
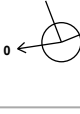
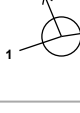
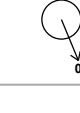
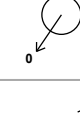
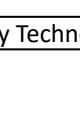
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S-4	483203.125	168116.164	67.772	2.539	1200		1	1.003	65.233	300
						0	1.004	65.233	300	
S-7	483250.544	168094.936	66.762	1.425	1200		1	4.000	65.337	225
						0	4.001	65.337	225	
S-8	483219.247	168089.962	67.106	1.430	1200		0	4.000	65.676	225
						1	1.004	65.144	300	
S-9	483201.276	168094.455	67.201	2.132	1350		1	1.004	65.144	300
						0	1.005	65.069	375	
S-10	483198.412	168082.754	66.894	1.863	1350		1	1.005	65.031	375
						0	1.006	65.031	375	
S-11	483186.969	168053.835	66.111	1.575	1350		1	1.006	64.536	375
						0	1.007	64.536	375	
S-12	483144.388	168083.161	66.774	2.774	2400		0	10.000	64.000	225
						1	10.000	63.912	225	
S-13	483140.162	168068.972	66.417	2.505	1200		2	9.000	63.912	225
						0	9.001	63.912	225	
S-14	483131.566	168048.102	65.845	2.141	1200		1	9.001	63.779	225
						0	9.002	63.704	300	
S-15	483184.236	168042.731	65.833	1.575	1350		1	1.007	64.258	375
						0	1.008	64.258	375	
S-16	483185.972	168028.151	65.478	1.575	1350		1	1.008	63.903	375
						0	1.009	63.903	375	
S-17	483190.612	168018.751	65.226	2.155	1350		1	4.004	63.146	375
						2	1.009	63.146	375	
S-18	483161.088	168001.092	64.712	1.812	1500		0	1.010	63.071	450
						1	1.012	62.900	525	
						0	1.013	62.900	525	

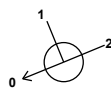
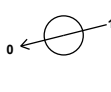
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S-19	483138.120	168023.247	65.243	1.425	1200		0	11.000	63.818	225
S-20	483123.702	168032.399	65.409	1.852	1350		1 2 0	11.000 9.002	63.707 63.632	225 300
S-21	483117.624	168021.822	65.107	1.588	1350		1 0	9.003	63.519	375
S-HEADWALL 1	483111.620	168005.466	64.250	1.768			1	9.004	62.675	375
S-HEADWALL 3	483116.535	167992.779	64.250	1.768			1	1.017	62.600	525
S-HEADWALL 2	483098.913	167987.326	64.250	1.800			0	13.000	62.450	300
S-22	483079.286	167971.228	64.879	2.533			1 0	13.000	62.346	300
S-23	483080.843	167966.856	68.143	5.825			1	13.001	62.318	225
S-24	483176.623	168013.013	65.181	2.148	1350		1 0	1.010	63.033	450
S-25	483159.178	168005.844	64.879	1.968	1500		1 0	1.011	63.033	450
S-26A	483190.745	168138.201	68.086	2.536	1200		0	1.012	62.986	450
S-26	483197.723	168139.171	68.143	2.813	2400		1 2 0	3.000 1.002	65.550 65.405	150 225
S-27	483100.604	168002.616	64.250	1.425	1200		1 2 0	14.000 13.000_1	62.825 62.825	225 225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S-HEADWALL 4	483106.424	167998.654	64.250	1.768		 1	13.001_1	62.783	225
S-28	483257.137	168058.789	65.577	2.033	1200	 1 0	4.001	63.619	225
S-29	483242.470	168041.922	64.900	1.575	1350	 1 0	4.002	63.400	300
S-30	483198.769	168018.620	65.350	2.178	1350	 1 0	4.003	63.172	375
S-31	483154.899	167998.681	64.638	1.752	1500	 1 0	5.000	63.186	225
S-32	483127.236	167987.368	64.240	1.608	1500	 1 0	1.013	62.886	525
S-33	483119.257	167986.167	64.356	1.741	1500	 1 0	1.014	62.886	525
S-34	483122.136	168000.691	64.378	1.362	1200	 1 0	7.000	62.932	225
S-35	483166.669	168060.394	66.231	1.425	1200	 1 0	1.015	62.632	525
S-36	483101.325	167980.153	64.282	1.255	1200	 1 0	1.016	62.632	525
S-37	483143.400	168026.416	65.388	1.425	1200	 1 0	8.000	62.915	225
S-38	483112.412	168019.958	64.915	1.710	1200	 1 0	1.016	62.615	525
S-39	483090.653	167988.000	64.250	1.185	1200	 1 0	1.017	62.615	525
						 1 0	7.000	63.016	225
						1 0	9.000	64.806	225
						1 0	8.000	63.027	225
						1 0	5.000	63.963	225
						1 0	13.000_1	63.205	225
						1 0	14.000	63.065	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S-40	483138.895	168006.518	64.863	1.425	1200		0	6.000	63.438	225
S-41	483143.965	167994.157	64.488	1.725	1500		1 2 0	6.000 1.014 1.015	63.063 62.763 62.763	225 525 525
S-1A	483204.177	168167.923	68.401	1.350	1200		1 0	1.000 1.001	67.051 67.051	150 150

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume
Winter CV	1.000	Additional Storage (m³/ha)	0.0	x

Storm Durations

60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	5	0

Node S-22 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	62.346	Product Number	CTL-SHE-0105-5200-1200-5200
Design Depth (m)	1.200	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.2	Min Node Diameter (mm)	1200

Node S-HEADWALL 1 Online Orifice Control

Flap Valve	x	Invert Level (m)	62.482	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.375		

Node S-26 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	65.330	Product Number	CTL-SHE-0075-3700-2374-3700
Design Depth (m)	2.374	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	3.7	Min Node Diameter (mm)	1200

Node S-26 Online Weir Control

Flap Valve	x	Invert Level (m)	66.750	Discharge Coefficient	0.590
Replaces Downstream Link	x	Width (m)	2.400		

Node S-HEADWALL 4 Online Orifice Control

Flap Valve	x	Invert Level (m)	62.482	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.150		

Node S-HEADWALL 3 Online Orifice Control

Flap Valve	x	Invert Level (m)	62.482	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.525		

Node S-26A Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	65.550
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	130.5	0.0	1.200	130.5	0.0	1.201	0.0	0.0

Node S-31 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	62.886
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	151.5	0.0	0.800	151.5	0.0	0.801	0.0	0.0

Node S-27 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	62.825
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	72.0	0.0	0.401	32.0	0.0	0.801	0.0	0.0
0.400	72.0	0.0	0.800	32.0	0.0			

Node S-22 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	62.346
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	63.0	0.0	1.200	63.0	0.0	1.201	0.0	0.0

Node S-32 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	62.632
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	104.0	0.0	0.401	30.0	0.0	0.801	0.0	0.0
0.400	104.0	0.0	0.800	30.0	0.0			

Node S-33 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	62.615
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	87.5	0.0	0.401	47.5	0.0	0.801	0.0	0.0
0.400	87.5	0.0	0.800	47.5	0.0			

Node S-41 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	62.763
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	91.5	0.0	0.800	91.5	0.0	0.801	0.0	0.0

Node S-1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	68.075	Slope (1:X)	78.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	2.0	Width (m)	9.960	Inf Depth (m)	
Porosity	0.30	Length (m)	37.000		

Node S-HEADWALL 2 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)	62.450	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.035

Inlets

S-HEADWALL 1	S-HEADWALL 3	S-HEADWALL 4
--------------	--------------	--------------

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	127.3	0.0	1.800	531.2	0.0

Results for 100 year +40% CC +5% A Critical Storm Duration. Lowest mass balance: 99.08%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S-1	35	68.118	0.854	24.1	0.4301	0.0000	SURCHARGED
60 minute summer	S-2	34	67.483	0.848	33.1	0.9586	0.0000	SURCHARGED
60 minute summer	S-3	34	67.432	0.851	72.8	0.9620	0.0000	SURCHARGED
60 minute summer	S-4	33	65.580	0.347	91.6	0.3923	0.0000	SURCHARGED
60 minute summer	S-7	33	65.446	0.109	53.7	0.1228	0.0000	OK
60 minute summer	S-8	33	65.775	0.099	20.8	0.1116	0.0000	OK
60 minute summer	S-9	33	65.372	0.303	115.6	0.4341	0.0000	OK
60 minute summer	S-10	34	65.270	0.239	165.2	0.3414	0.0000	OK
60 minute summer	S-11	34	64.809	0.273	198.9	0.3904	0.0000	OK
60 minute summer	S-12	35	65.595	1.595	64.9	7.2146	0.0000	SURCHARGED
60 minute summer	S-13	35	65.355	1.443	107.7	1.6326	0.0000	SURCHARGED
60 minute summer	S-14	34	64.164	0.460	118.1	0.5208	0.0000	SURCHARGED
60 minute summer	S-15	34	64.534	0.276	209.9	0.3955	0.0000	OK
60 minute summer	S-16	34	64.217	0.314	223.3	0.4492	0.0000	OK
60 minute summer	S-17	34	64.024	0.953	313.3	1.3637	0.0000	SURCHARGED
720 minute winter	S-18	720	63.849	0.949	33.0	1.6774	0.0000	SURCHARGED
60 minute summer	S-19	34	63.881	0.063	1.1	0.0707	0.0000	OK
60 minute summer	S-20	34	63.880	0.323	153.9	0.4622	0.0000	OK
720 minute winter	S-21	720	63.849	0.330	19.9	0.4723	0.0000	OK
720 minute winter	S-HEADWALL 1	720	63.850	1.368	23.4	0.0000	0.0000	OK
720 minute winter	S-HEADWALL 3	720	63.848	1.366	13.6	0.0000	0.0000	OK
720 minute winter	S-HEADWALL 2	720	63.849	1.399	21.3	0.0000	0.0000	SURCHARGED
720 minute winter	S-22	720	63.848	1.502	10.7	71.8499	0.0000	SURCHARGED
720 minute winter	S-23	720	62.375	0.057	5.7	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	S-1	1.000	S-1A	22.3	1.389	0.580	0.0809	
60 minute summer	S-2	2.000	S-3	32.1	0.944	0.801	0.3590	
60 minute summer	S-3	1.002	S-26	72.8	1.830	0.659	1.0471	
60 minute summer	S-4	1.004	S-9	91.9	1.335	1.300	1.4149	
60 minute summer	S-7	4.001	S-28	53.7	2.692	0.475	1.0790	
60 minute summer	S-8	4.000	S-7	20.8	1.166	0.387	0.5657	
60 minute summer	S-9	1.005	S-10	116.1	1.368	1.039	1.0199	
60 minute summer	S-10	1.006	S-11	165.7	2.071	0.656	2.4858	
60 minute summer	S-11	1.007	S-15	200.0	2.323	0.640	0.9890	
60 minute summer	S-12	10.000	S-13	57.4	1.444	1.437	0.5888	
60 minute summer	S-13	9.001	S-14	107.3	2.697	2.696	0.8977	
60 minute summer	S-14	9.002	S-20	118.0	1.680	1.667	1.1930	
60 minute summer	S-15	1.008	S-16	210.2	2.735	0.674	1.3628	
60 minute summer	S-16	1.009	S-17	221.7	2.157	0.411	1.0947	
60 minute summer	S-17	1.010	S-24	312.4	1.972	1.939	2.3957	
60 minute summer	S-18	1.013	S-31	354.2	2.009	1.602	1.4299	
60 minute summer	S-19	11.000	S-20	-1.1	-0.098	-0.025	0.3565	
60 minute summer	S-20	9.003	S-21	153.4	1.955	1.381	0.9996	
60 minute summer	S-21	9.004	S-HEADWALL 1	172.7	2.776	0.391	1.5101	
60 minute summer	S-HEADWALL 1	Flow through pond	S-HEADWALL 2	179.3	0.103	0.006	220.5437	
60 minute summer	S-HEADWALL 3	Flow through pond	S-HEADWALL 2	179.3	0.103	0.006	220.5437	
60 minute summer	S-HEADWALL 2	13.000	S-22	55.6	1.232	0.785	1.7875	
720 minute winter	S-22	13.001	S-23	5.7	0.726	0.141	0.0363	275.3

Results for 100 year +40% CC +5% A Critical Storm Duration. Lowest mass balance: 99.08%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	S-24	720	63.852	0.819	30.4	1.1713	0.0000	SURCHARGED
720 minute winter	S-25	705	63.849	0.938	31.4	1.6573	0.0000	SURCHARGED
240 minute winter	S-26A	228	66.758	1.208	30.3	150.1985	0.0000	SURCHARGED
60 minute summer	S-26	33	66.807	1.477	114.8	6.6799	0.0000	SURCHARGED
720 minute winter	S-27	720	63.849	1.024	5.3	40.7123	0.0000	SURCHARGED
720 minute winter	S-HEADWALL 4	720	63.849	1.367	5.3	0.0000	0.0000	OK
60 minute summer	S-28	34	64.215	0.671	58.7	0.7594	0.0000	SURCHARGED
60 minute summer	S-29	34	64.143	0.818	80.7	1.1712	0.0000	SURCHARGED
60 minute summer	S-30	34	64.050	0.878	79.8	1.2568	0.0000	SURCHARGED
720 minute winter	S-31	720	63.851	0.965	35.1	116.9170	0.0000	SURCHARGED
720 minute winter	S-32	705	63.849	1.217	20.4	53.1204	0.0000	SURCHARGED
720 minute winter	S-33	720	63.848	1.233	17.5	53.5210	0.0000	SURCHARGED
720 minute winter	S-34	720	63.851	0.835	0.9	0.9449	0.0000	SURCHARGED
60 minute summer	S-35	34	65.578	0.772	47.3	0.8727	0.0000	SURCHARGED
720 minute winter	S-36	705	63.851	0.824	1.0	0.9321	0.0000	SURCHARGED
60 minute summer	S-37	1	63.963	0.000	0.0	0.0000	0.0000	OK
720 minute winter	S-38	720	63.849	0.644	0.3	0.7287	0.0000	SURCHARGED
720 minute winter	S-39	720	63.849	0.784	0.2	0.8862	0.0000	SURCHARGED
720 minute winter	S-40	720	63.852	0.414	0.6	0.4683	0.0000	SURCHARGED
720 minute winter	S-41	705	63.850	1.087	25.7	71.5040	0.0000	SURCHARGED
60 minute summer	S-1A	34	68.012	0.961	34.5	1.0874	0.0000	SURCHARGED
Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	S-24	1.011	S-25	324.8	2.050	2.025	2.9884	
60 minute summer	S-25	1.012	S-18	337.2	1.562	1.511	1.1026	
60 minute summer	S-26A	3.000	S-26	-54.5	-3.096	-3.080	0.1240	
60 minute summer	S-26	1.003	S-4	62.4	0.886	0.880	1.6642	
60 minute summer	S-27	13.001_1	S-HEADWALL 4	-25.7	-1.050	-0.641	0.2800	
60 minute summer	S-HEADWALL 4	Flow through pond	S-HEADWALL 2	179.3	0.103	0.006	220.5437	
60 minute summer	S-28	4.002	S-29	55.0	1.176	0.617	1.5740	
60 minute summer	S-29	4.003	S-30	79.8	0.724	0.722	5.4625	
60 minute summer	S-30	4.004	S-17	79.9	0.724	0.711	0.8998	
60 minute summer	S-31	1.014	S-41	297.4	1.859	0.602	2.5556	
60 minute summer	S-32	1.016	S-33	184.7	1.509	0.836	1.7432	
60 minute summer	S-33	1.017	S-HEADWALL 3	126.2	0.813	0.572	1.5446	
60 minute summer	S-34	7.000	S-32	-3.6	-0.271	-0.089	0.5674	
60 minute summer	S-35	9.000	S-13	44.2	1.117	0.473	1.1080	
60 minute summer	S-36	8.000	S-33	-7.8	-0.293	-0.197	0.7522	
60 minute summer	S-37	5.000	S-31	0.0	0.000	0.000	0.5968	
60 minute summer	S-38	13.000_1	S-27	-1.8	-0.067	-0.026	0.8165	
60 minute winter	S-39	14.000	S-27	-1.9	-0.049	-0.031	0.7032	
360 minute winter	S-40	6.000	S-41	1.6	0.041	0.019	0.5313	
60 minute summer	S-41	1.015	S-32	240.7	1.652	0.583	3.9003	
60 minute summer	S-1A	1.001	S-3	34.4	1.955	1.100	0.2262	