ABLEY LETCHFORD PARTNERSHIP
Consulting Engineers

PARCEL R11 – PHASE 2B OF THE SOUTH WOKINGHAM STRATEGIC DEVELOPMENT LOCATION
DRAINAGE STATEMENT

KIER PROPERTY DEVELOPMENTS LIMITED

09 JULY 2025

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1.0 Introduction

Context

1.1. This report has been prepared by Abley Letchford Partnership Limited, on behalf of Kier Property Developments Limited, to support the Reserved Matters application pursuant to Condition 1 attached to planning application 191068, for the erection of 343 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 R11 is located to the west of the Eastern Gateway roundabout and to the south of the South Wokingham Distributor Road.

Report Aims and Formation

1.8. This Reserved Matters Planning Application pertains to the R11 parcel, located towards the eastern end of Phase 2b, to the west of the Eastern Gateway roundabout and south of the South Wokingham Distributor Road. The proposal includes 343 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 R11 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. Abley 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, Abley 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 343 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 R11 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 and 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 development is approximately 16.7ha and the impermeable area of the residential development is approximately 6.99ha.

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 R11 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 and detention basins to provide attenuation storage and high-quality water benefits.

3.15. The R11 parcel has been split into three catchments with each catchment draining by gravity to attenuation basins before discharging into existing watercourse. These basins attenuate the flows prior to discharging at a maximum rate of 4.4l/s/ha, in accordance with the sitewide FRA.

3.16. The catchments are shown on drawing 7371-MJA-SW-XX-DR-C-003 Surface Water Catchment Plan.

R11A Basins Catchment

3.17. R11A catchment drains to two basins situated either side of the Croudace Link road. The majority of the site discharges directly to the western basin with a small section of the road discharging directly to the eastern basin. The two basins are linked with a 450mm diameter pipe beneath the road.

3.18. The R11A basins have a catchment with an impermeable area of approximately 1.86ha. A 10% urban creep is included in these impermeable areas to account for future development of the proposed dwellings.

3.19. A flow control device on the downstream end of the eastern basin will restrict discharge to 8.1l/s prior to discharging to a swale and ultimately the ditch adjacent to the SDR.

3.20. Tree pits within the streets will act as bioretention areas.

3.21. The manhole chambers of the proposed network will utilise strategic catchpits or proprietary devices, to minimize the amount of silt reaching the basins.

3.22. The proposed basin will be lined (geomembrane or clay) and will provide attenuation only and not infiltration.

3.23. The basins have been designed in conjunction with the landscape architects to maximise their amenity value when not in use attenuating water. The western basin will have 1:3 side slopes, in accordance with the SuDS manual, and will incorporate an appropriate freeboard above the maximum water level.

3.24. The eastern basin will have tiered grass steps on its eastern edge, with 1 in 3 side slopes around the rest of the basin. A permanent water body will be present in each basin, formed by local depressions at the inlet and outlet headwalls.

R11B Basin Catchment

3.25. The R11B basin has a catchment with approximately 2.02ha of impermeable area. A 10% urban creep is included in these impermeable areas to account for future development of the proposed dwellings.

3.26. Discharge from Basin R11B will be limited to 8.9l/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.

3.27. Surface water from residential plots will be discharged via gravity towards the basin.

3.28. Tree pits acting as bioretention areas are proposed along streets throughout the development parcel.

3.29. The manhole chambers of the proposed network will utilise strategic catchpits or proprietary devices, to minimize the amount of silt reaching the basin.

3.30. The basin has been designed with 1 in 5 side slopes with permanent bodies of water formed by local depressions within the basin. Timber steps are proposed to facilitate access into the basin in periods of dry weather.

R11C Basin Catchment

3.31. The R11C basin has a catchment with approximately 2.31ha of impermeable area. A 10% urban creep is included in these impermeable areas to account for future development of the proposed dwellings.

3.32. Discharge from Basin R11C will be limited to 10/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.

3.33. Surface water from residential plots will be discharged via gravity towards the basin.

3.34. Three areas of lined permeable paving will be incorporated into parking areas to provide attenuation and water quality improvements.

3.35. Tree pits acting as bioretention areas are proposed along streets throughout the development parcel.

The manhole chambers of the proposed network will utilise strategic catchpits or proprietary devices, to minimize the amount of silt reaching the basin.

3.36. 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.

3.37. Hydraulic calculations for the proposed R11 residential development can be found in **Appendix B**. Hydraulic calculations should be read along with drainage layouts: A389-R11-501 and 502 and 7371 – MJA-SW-XX-DR-C-002-PL1.

3.38. 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

3.39. Basins R11A will discharge to a swale and ultimately to the ditch constructed as part of the SDR works. R11C basin will also discharge to this ditch. This in turn will convey water to the basin within the SANG.

3.40. R11B basin will discharge to the existing ditch to the south of the site.

Exceedance Flood Routing

3.41. 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.

3.42. Refer to drawing 7371-MJA-SW-XX-DR-C-004 for the Exceedance Plan.

Safe Access

3.43. 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 drawings A389-R11-501 and 502 and 7371 – MJA-SW-XX-DR-C-005-PL1 in **Appendix A**.

Existing Drainage Conditions

4.2. No foul network is present in the area that the R11 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 adjacent R10 plot which in turn will discharge to the Thames Water Montague Park SPS located north of the railway line.

4.4. 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

4.5. Foul drainage from the R11 plot will discharge into pump station 1 (PS1) located within parcel R10. This 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.

4.6. R11 also makes allowance for the pumped flows from pump station 2, located further west in between parcels R7 and R13, to be conveyed towards PS1.

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. Each part of the development primarily utilises a detention Basin (TSS:0.5, Metals:0.5, Hydrocarbons:0.6). Directly below it. Further pollution prevention will be achieved with tree pits located along the road corridor (TSS:0.8, Metals:0.8, Hydrocarbons:0.8). In addition , some areas of permeable paving will be provided to reduce pollution (TSS:0.7, Metals:0.6, Hydrocarbons:0.7).

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, which are located the within public open space, will be offered to Wokingham Borough Council for adoption, along with rain gardens and drainage associated with adopted roads.

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 traditional sewers and manholes, and the pump station within Parcel R10, 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 also maintained by Wokingham Borough Council as part of the open space.

6.14. Tables 1 and 2 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 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 courses to the north and to the south of the site.

7.3. The Drainage Strategy encompasses SuDS to mitigate and manage surface water flows from the proposed residential development(Parcel R11).

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. A gravity-based foul water network is proposed as for the site, discharging to the pump station to be situated in parcel R10. 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

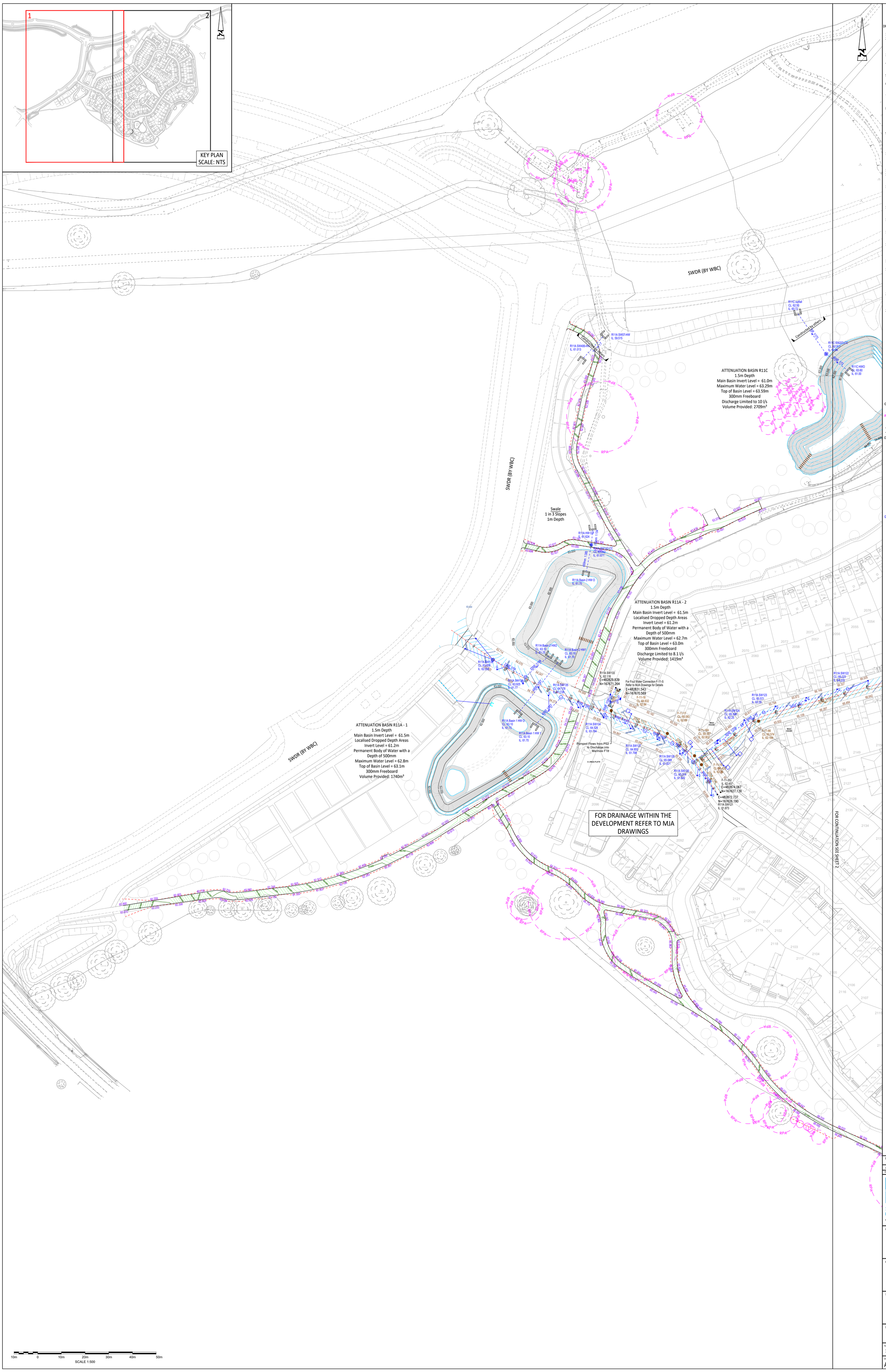
A389-R11-RM-501 and 502 Drainage Layout Sheets 1 and 2

7371-MJA-SW-XX-DR-C-002 – PL4 - Surface Water Drainage Plan

7371-MJA-SW-XX-DR-C-003 – PL4 - Surface Water Catchment Plan

7371-MJA-SW-XX-DR-C-004 – PL4 - Surface Water Exceedance Plan

7371-MJA-SW-XX-DR-C-005 – PL4 – Foul Water Drainage Plan



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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.
3. Site layout shown for context only, refer to other project drawings for details.
4. All adoptable drainage works to be constructed as detailed in design and construction guidance or as stipulated in the water authorities addendum.
5. All public sewers are to be the subject of a section 104 agreement of the water industry act 1991.
6. Invert levels of existing manholes and sewers are to be checked on site before construction commences and results reported to engineers.
7. 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.
8. All drainage ironworks to comply with bs en124, and be stamped with bsi kitemark. covers to suit loading as below;
   - -carriageways and roads - d400
   - -driveways and verges - c250
   - -footways and pedestrian areas - b125
   - -gardens/landscaping - a15
9. All sewer pipes, up to, and including 225mm are to be vitrified clay to BS EN295. All sewer pipes 300mm diameter and above to be concrete pipes to BS EN1916. Where agreed with adopting authority pipes up to and including 600mm diameter can be PVC-U to BS EN1404.
10. All drainage shall be installed and tested strictly in accordance with the manufacturers' printed instructions, bs en 752, bs en 1601, local water authority requirements and the building regulations.
11. All bedding shall be class s unless noted otherwise.
12. All trenches under existing and proposed public highways are to be backfilled with thoroughly compacted type 1 granular sub-base material.
13. Drainage 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 900mm of cover shall be similarly treated.
14. Chambers with outgoing pipes greater than 600mm diameter shall be fitted with guard bars, safety chains or other approved safety devices.
15. The use of precast concrete products made with sulphate resisting cement is mandatory, unless a laboratory report proves such precautions are not necessary.
16. 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.
17. All foul and storm water drains which are not to be adopted as public sewers shall be in accordance with document h of the building regulations, together with nhbc standards chapter 5.3 and bs8301.
18. Where pipes pass through footings, retaining or screen walls, lintels to be provided over drains.
19. Where inverts are less than 0.6m deep inspection chambers (min dia. 190mm) or access fittings (225 x 100mm) to be used, elsewhere proprietary plastic, brick or pcc is to be used and sized in accordance with table 11 of document h of the building regulations [<0.6m to invert min dn300, >0.6m to invert min dn475].
20. Where required 1m deep root barrier of an approved type to be installed vertically along the back edging kerb of all areas of footway/ demarcation to protect from both proposed and future plantation.
21. Construction details subject to refinement through detailed design/technical approval process.

ALL PIPE BEDDING TO BE CLASS 'S' GRANULAR SURROUND UNLESS NOTED OTHERWISE ON THE DRAWING

Manhole cover levels are derived from a 3D digital terrain model, final cover levels to suit finished surfaces onsite.

Manhole covers to be located wholly within one surface i.e grass or hard standing/road. Manhole covers are to be fully accessible to users.

GENERAL KEY:

- Tree root protection area
- Proposed embankment - no steeper than 1:3 slopes

DRAINAGE KEY:

- Proposed headwall
- Bagwork headwall
- 300Ø Culvert Pipe
- Surface water pipe
- Surface water chamber
- Flow control chamber
- Surface water backdrop
- ACO Multdrain M100D Channel Drain or similar approved
- Gully and connection
- Rain garden tree pit and outfall
- Foul water pipe
- Foul water chamber

Rev	Date	Description	Drawn	Checked
B	07.25	LAYOUT UPDATED, DRAINAGE AND REFERENCES REVISED	JJS	RF
A	03.25	FIRST ISSUE	JJS	RF

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Consulting Engineers
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Hungerford, Berkshire RG17 0YT
www.alpce.co.uk Tel: 01488 684390

Client
KIER PROPERTY DEVELOPMENTS LIMITED

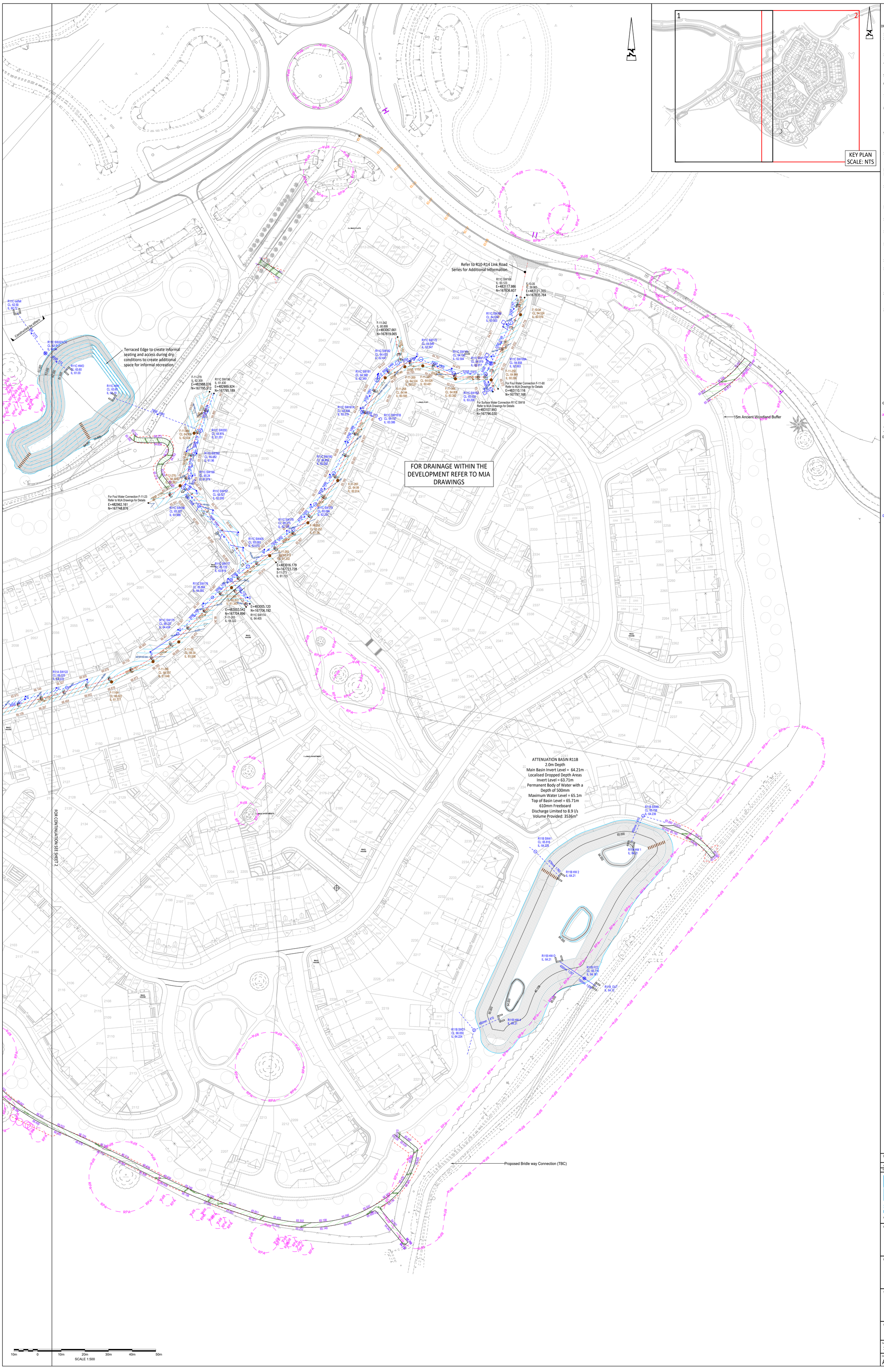
Project
SOUTH WOKINGHAM SDL PHASE 2B R11 RESERVED MATTERS APPLICATION

Title
DRAINAGE LAYOUT SHEET 1

Status

Scale	Date	Drawn	Checked
1:500 @ A0	MARCH 2025	JJS	RF

Drawing No	Revision
A389-R11-RM-501	B



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DRAINAGE NOTES:

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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.
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17. All foul and storm water drains which are not to be adopted as public sewers shall be in accordance with document h of the building regulations, together with nhbc standards chapter 5.3 and bs8301.
18. Where pipes pass through footings, retaining or screen walls, lintels to be provided over drains.
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20. Where required 1m deep root barrier of an approved type to be installed vertically along the back edging kerb of all areas of footway/ demarcation to protect from both proposed and future plantation.
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- Flow control chamber
- Surface water backdrop
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- Gully and connection
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- Foul water pipe
- Foul water chamber

Rev	Date	Description	Drawn	Checked
B	07.25	LAYOUT UPDATED, DRAINAGE AND REFERENCES REVISED	JJS	RF
A	03.25	FIRST ISSUE	JJS	RF

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Client
KIER PROPERTY DEVELOPMENTS LIMITED

Project
SOUTH WOKINGHAM SDL PHASE 2B R11 RESERVED MATTERS APPLICATION

Title
DRAINAGE LAYOUT SHEET 2

Status

Scale	Date	Drawn	Checked
1:500 @ A0	MARCH 2025	JJS	RF

Drawing No: A389-R11-RM-502
Revision: B

Notes:

1. Do not scale from this drawing.
2. All dimensions in metres unless stated otherwise.
3. All levels relate to ordnance datum.
4. This drawing shall be read in conjunction with ALP's surface water drainage design.
5. Any discrepancies with the drawings shall be reported to the Engineer.
6. The surface water drainage strategy is based on the approved site wide Surface Water Drainage and SuDS Strategy.

KEY

- Proposed Surface Water Pipe
- PN 10.01 / 225Ø 1170 — Proposed Surface Water Pipe Annotation
- Proposed Surface Water Chamber
- R11B SW43 CL: 66.78 IL: 65.515 — Proposed Surface Water Chamber Annotation
- Proposed Permeable Paving
- Proposed Rain Garden
- Area designed by ALP. Refer to ALP Design Drawings
- Proposed Attenuation Basin. Refer to ALP Design Drawings

REV. No.	DATE	DESCRIPTION	DRAWN	CHECKED
PL4	04.07.25	Amended to suit revised layout	TSH	KG
PL3	19.03.25	Amended to suit revised layout	TSH	KG
PL2	14.03.25	Amended to suit revised planning layout	TSH	KG

Client: Kier Property Developments Limited

Project: South Wokingham Phase R11

Title: Proposed Surface Water Strategy

MJA CONSULTING
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Scale: 1:500 @ A0			Status: PLANNING
Drawn: TH	Project Engineer: TSH	MJA Project No: 7371	Date: 12/03/2025
Drawing Number: 7371-MJA-SW-XX-DR-C-002			Rev: PL4

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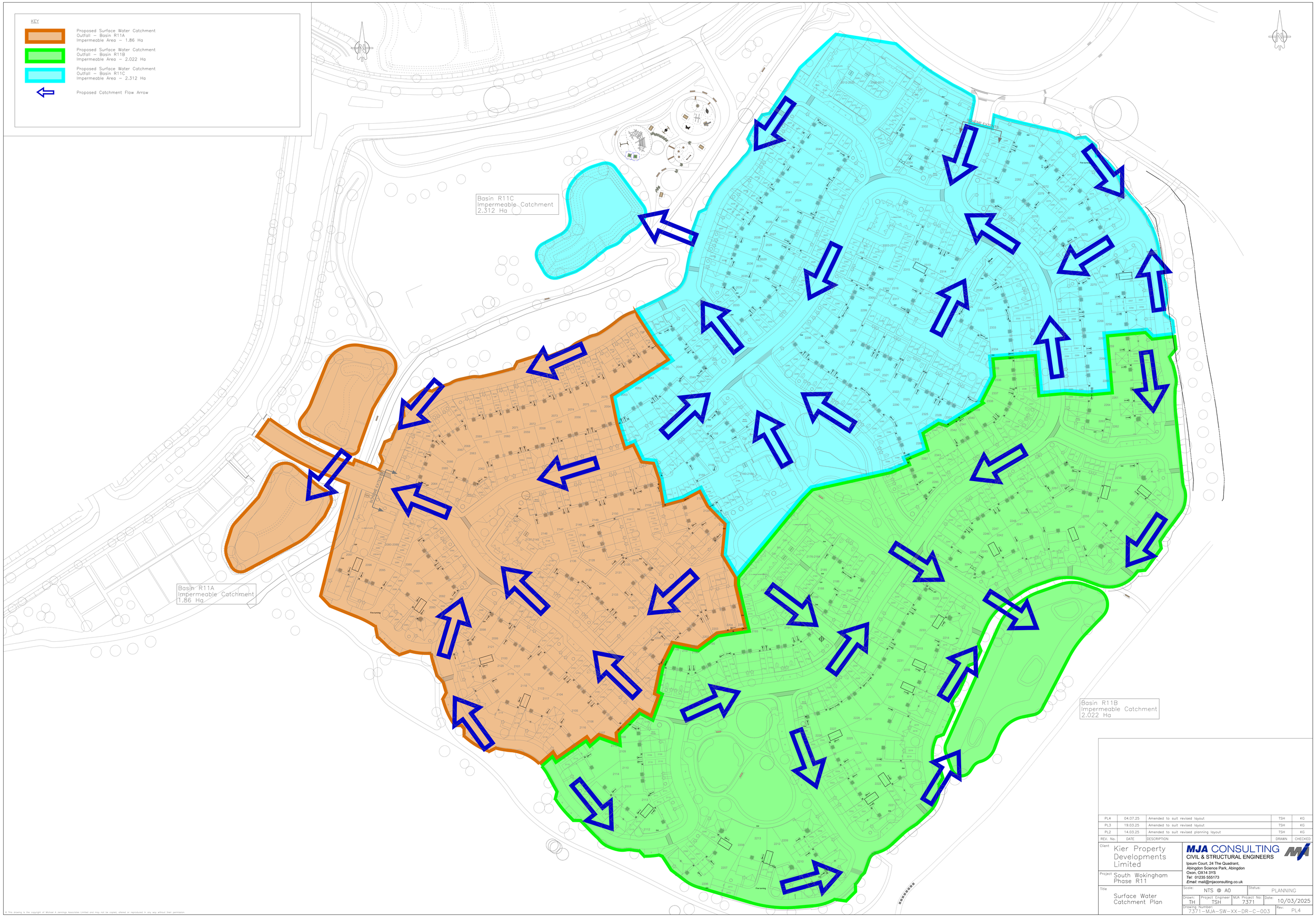

REV. No.	DATE	DESCRIPTION	DRAWN	CHECKED
PL4	04.07.25	Amended to suit revised layout	TSH	KG
PL3	19.03.25	Amended to suit revised layout	TSH	KG
PL2	14.03.25	Amended to suit revised planning layout	TSH	KG

Client: Kier Property Developments Limited

Project: South Wokingham Phase R11

Title: Surface Water Catchment Plan

MJA CONSULTING
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Scale: NTS @ A0
Status: PLANNING
Drawn: TH
Project Engineer: TSH
MJA Project No: 7371
Date: 10/03/2025
Drawing Number: 7371-MJA-SW-XX-DR-C-003
Rev: PL4

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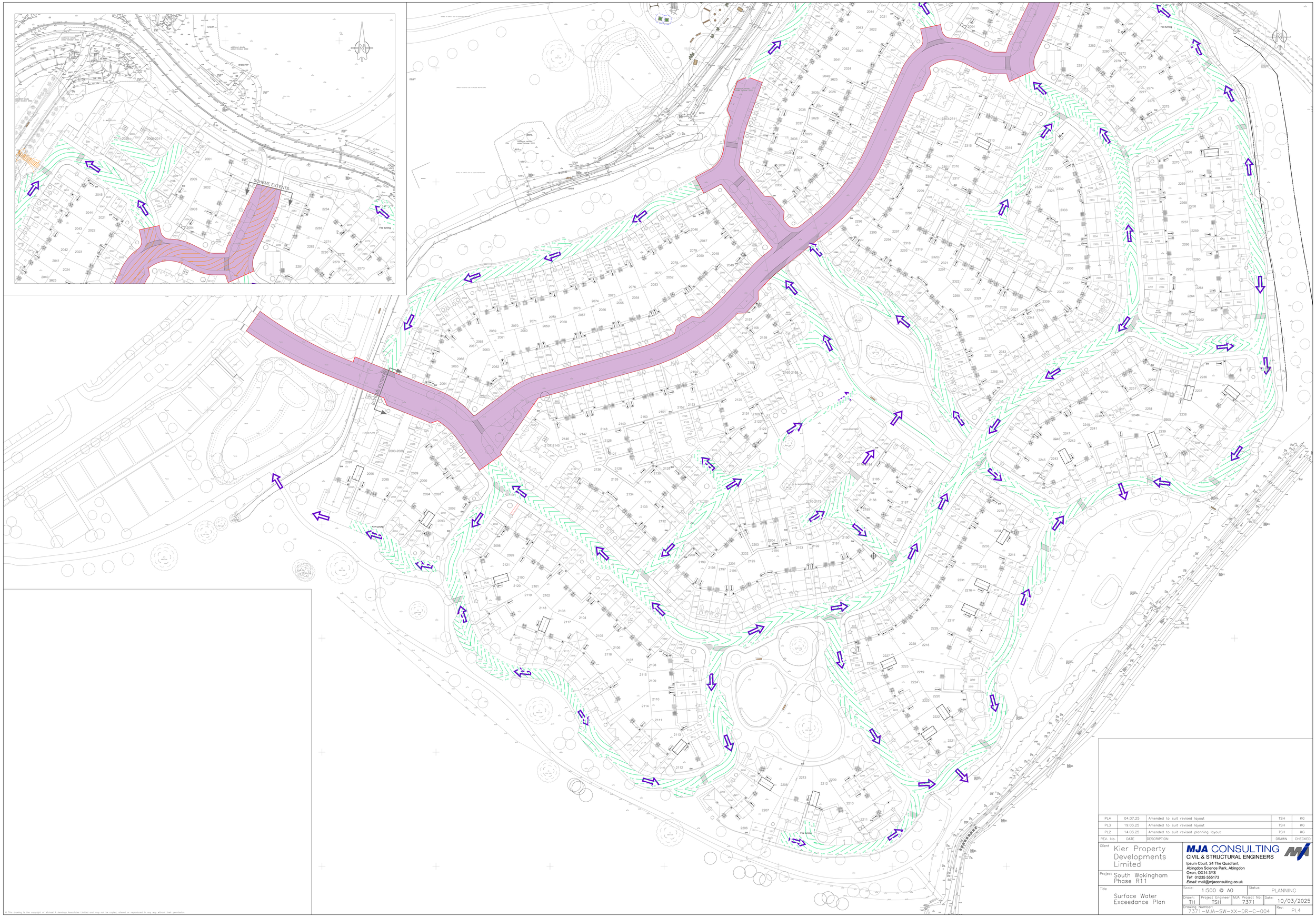

REV. No.	DATE	DESCRIPTION	DRAWN	CHECKED
PL4	04.07.25	Amended to suit revised layout	TSH	KG
PL3	19.03.25	Amended to suit revised layout	TSH	KG
PL2	14.03.25	Amended to suit revised planning layout	TSH	KG

Client: Kier Property Developments Limited

Project: South Wokingham Phase R11

Title: Surface Water Exceedance Plan

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Scale: 1:500 @ A0
Status: PLANNING
Drawn: TH
Project Engineer: TSH
MJA Project No.: 7371
Date: 10/03/2025
Drawing Number: 7371-MJA-SW-XX-DR-C-004
Rev: PL4

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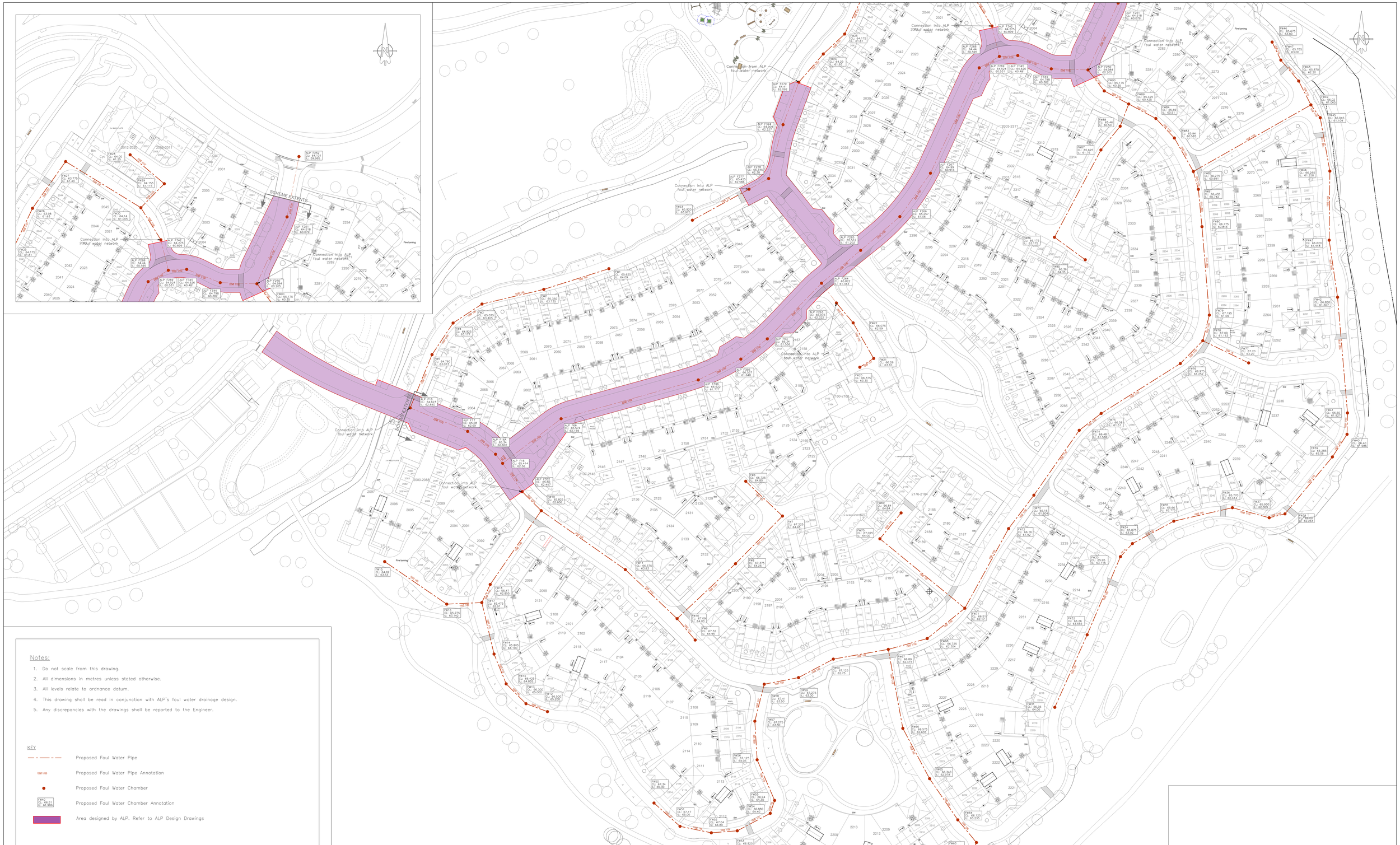

Notes:

1. Do not scale from this drawing.
2. All dimensions in metres unless stated otherwise.
3. All levels relate to ordnance datum.
4. This drawing shall be read in conjunction with ALP's foul water drainage design.
5. Any discrepancies with the drawings shall be reported to the Engineer.

KEY

- Proposed Foul Water Pipe
- 1200 1150 — Proposed Foul Water Pipe Annotation
- Proposed Foul Water Chamber
- FW40 CL: 66.51 IL: 61.966 — Proposed Foul Water Chamber Annotation
- Area designed by ALP. Refer to ALP Design Drawings

REV. No.	DATE	DESCRIPTION	DRAWN	CHECKED
PL4	04.07.25	Amended to suit revised layout	TSH	KG
PL3	19.03.25	Amended to suit revised layout	TSH	KG
PL2	14.03.25	Amended to suit revised planning layout	TSH	KG

Client: Kier Property Developments Limited

Project: South Wokingham Phase R11

Title: Proposed Foul Water Strategy

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CIVIL & STRUCTURAL ENGINEERS
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Scale:	Status:
1:500 @ A0	PLANNING

Drawn:	Project Engineer	MJA Project No:	Date:
TH	TSH	7371	12/03/2025

Drawing Number: 7371-MJA-SW-XX-DR-C-005 Rev: PL4

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Appendix B – Drainage Calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	30	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.950	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
R11A SW1	0.056	5.00	67.360	1200	482946.819	167561.504	1.500
R11A SW2	0.039	5.00	67.140	1200	482988.074	167622.343	1.500
R11A SW3	0.086	5.00	66.750	1200	482964.852	167629.322	1.500
R11A SW4			67.230	1200	482977.658	167616.951	2.085
R11A SW5	0.068	5.00	67.350	1200	482958.243	167596.853	2.369
R11A SW6	0.052	5.00	67.060	1200	482934.335	167573.859	2.349
R11A SW7	0.164	5.00	66.600	1350	482915.769	167592.235	3.308
R11A SW8	0.038	5.00	67.325	1200	482894.782	167532.977	1.800
R11A SW9	0.024	5.00	66.840	1200	482877.963	167536.744	1.830
R11A SW10	0.016	5.00	66.575	1200	482870.372	167541.859	1.722
R11A SW11			66.340	1200	482865.176	167548.232	1.750
R11A SW12	0.028	5.00	66.050	1200	482861.482	167557.609	1.600
R11A SW13	0.103	5.00	65.360	1200	482844.699	167583.037	1.630
R11A SW14	0.038	5.00	65.410	1350	482855.353	167582.959	2.050
R11A SW15	0.048	5.00	65.400	1350	482858.803	167590.293	2.074
R11A SW16	0.058	5.00	65.780	1500	482878.878	167618.495	3.889
R11A SW121	0.049	5.00	65.645	1500	482872.737	167626.190	3.772
R11A SW122	0.175	5.00	66.223	1200	482927.714	167670.729	2.000
R11A SW123	0.015	5.00	65.571	1200	482892.289	167660.888	2.271
R11A SW124	0.041	5.00	65.398	1200	482883.109	167655.538	3.148
R11A SW125	0.033	5.00	65.314	1500	482862.440	167639.988	3.472
R11A SW126	0.034	5.00	65.089	1500	482853.684	167647.749	3.268
R11A SW127	0.076	5.00	64.855	1500	482842.099	167653.049	3.057
R11A SW24	0.069	5.00	65.240	1200	482927.987	167729.862	2.620
R11A SW25	0.069	5.00	65.080	1200	482900.053	167717.616	2.587
R11A SW26	0.027	5.00	64.805	1200	482858.274	167707.320	2.491
R11A SW27	0.040	5.00	64.740	1200	482845.889	167699.806	2.487
R11A SW28	0.012	5.00	64.640	1200	482836.233	167686.817	2.454
R11A SW133	0.030	5.00	64.540	1200	482829.838	167671.264	2.424
R11A SW134	0.023	5.00	64.526	1500	482825.037	167659.739	2.762
R11A SW135	0.023	5.00	64.178	1500	482806.701	167667.227	2.450
R11A Basin 1 HW1	0.147		63.100		482796.112	167655.776	1.400
R11A Basin 1 HW O		5.00	63.100		482789.231	167661.213	1.350
R11A Basin 2 HW1	0.141		63.100		482805.384	167682.018	1.400
R11A Basin 2 HW O		5.00	63.100		482817.459	167720.551	1.400
R11A Basin 2 HW2			63.100		482801.506	167684.647	1.400
R11A SW139	0.022	5.00	63.925	1200	482791.701	167675.882	2.155
R11A SW142			63.262	1200	482819.476	167731.622	1.752
R11A O/F			63.262	1200	482820.137	167737.881	1.858
R11A SW138	0.016	5.00	63.609	1200	482777.951	167683.082	1.553

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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	R11A SW1	R11A SW6	17.565	0.600	65.860	64.786	1.074	16.4	225	5.09	50.0
2.000	R11A SW2	R11A SW4	11.729	0.600	65.640	65.145	0.495	23.7	225	5.07	50.0
3.000	R11A SW3	R11A SW4	17.805	0.600	65.250	65.145	0.105	169.6	225	5.30	50.0
2.001	R11A SW4	R11A SW5	27.944	0.600	65.145	64.981	0.164	170.4	225	5.76	50.0
2.002	R11A SW5	R11A SW6	33.171	0.600	64.981	64.786	0.195	170.1	225	6.32	50.0
1.001	R11A SW6	R11A SW7	26.123	0.600	64.711	63.442	1.269	20.6	300	6.44	50.0
1.002	R11A SW7	R11A SW16	45.283	0.600	63.292	62.041	1.251	36.2	300	6.73	50.0
4.000	R11A SW8	R11A SW9	17.236	0.600	65.525	65.010	0.515	33.5	225	5.13	50.0
4.001	R11A SW9	R11A SW10	9.153	0.600	65.010	64.853	0.157	58.3	225	5.22	50.0
4.002	R11A SW10	R11A SW11	8.223	0.600	64.853	64.590	0.263	31.3	225	5.27	50.0
4.003	R11A SW11	R11A SW12	10.078	0.600	64.590	64.450	0.140	72.0	225	5.38	50.0
4.004	R11A SW12	R11A SW14	26.081	0.600	64.450	63.585	0.865	30.2	225	5.56	50.0
5.000	R11A SW13	R11A SW14	10.654	0.600	63.730	63.585	0.145	73.5	225	5.12	50.0
4.005	R11A SW14	R11A SW15	8.105	0.600	63.360	63.326	0.034	238.4	450	5.67	50.0
4.006	R11A SW15	R11A SW16	34.617	0.600	63.326	62.041	1.285	26.9	450	5.81	50.0
1.003	R11A SW16	R11A SW121	9.846	0.600	61.891	61.873	0.018	547.0	600	6.89	50.0
1.004	R11A SW121	R11A SW125	17.216	0.600	61.873	61.842	0.031	555.4	600	7.17	50.0
6.000	R11A SW122	R11A SW123	36.766	0.600	64.223	63.300	0.923	39.8	300	5.25	50.0
6.001	R11A SW123	R11A SW124	10.625	0.600	63.300	62.250	1.050	10.1	300	5.28	50.0
6.002	R11A SW124	R11A SW125	25.866	0.600	62.250	62.142	0.108	239.5	300	5.71	50.0
1.005	R11A SW125	R11A SW126	11.701	0.600	61.842	61.821	0.021	557.2	600	7.36	50.0
1.006	R11A SW126	R11A SW127	12.740	0.600	61.821	61.798	0.023	553.9	600	7.56	50.0
1.007	R11A SW127	R11A SW134	18.326	0.600	61.798	61.764	0.034	539.0	600	7.86	50.0
7.000	R11A SW24	R11A SW25	30.500	0.600	62.620	62.493	0.127	240.2	300	5.50	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	3.251	129.3	9.6	1.275	2.049	0.056	0.0
2.000	2.699	107.3	6.7	1.275	1.860	0.039	0.0
3.000	1.001	39.8	14.8	1.275	1.860	0.086	0.0
2.001	0.998	39.7	21.5	1.860	2.144	0.125	0.0
2.002	0.999	39.7	33.1	2.144	2.049	0.193	0.0
1.001	3.480	246.0	51.7	2.049	2.858	0.301	0.0
1.002	2.621	185.3	79.8	3.008	3.439	0.465	0.0
4.000	2.269	90.2	6.5	1.575	1.605	0.038	0.0
4.001	1.716	68.2	10.6	1.605	1.497	0.062	0.0
4.002	2.348	93.3	13.4	1.497	1.525	0.078	0.0
4.003	1.543	61.3	13.4	1.525	1.375	0.078	0.0
4.004	2.391	95.1	18.2	1.375	1.600	0.106	0.0
5.000	1.527	60.7	17.7	1.405	1.600	0.103	0.0
4.005	1.312	208.7	42.4	1.600	1.624	0.247	0.0
4.006	3.928	624.8	50.6	1.624	3.289	0.295	0.0
1.003	1.034	292.3	140.4	3.289	3.172	0.818	0.0
1.004	1.026	290.1	148.8	3.172	2.872	0.867	0.0
6.000	2.498	176.6	30.0	1.700	1.971	0.175	0.0
6.001	4.969	351.3	32.6	1.971	2.848	0.190	0.0
6.002	1.011	71.5	39.7	2.848	2.872	0.231	0.0
1.005	1.024	289.6	194.2	2.872	2.668	1.131	0.0
1.006	1.027	290.5	200.0	2.668	2.457	1.165	0.0
1.007	1.042	294.5	213.0	2.457	2.162	1.241	0.0
7.000	1.010	71.4	11.8	2.320	2.287	0.069	0.0

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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)
7.001	R11A SW25	R11A SW26	43.029	0.600	62.493	62.314	0.179	240.4	300	6.21	50.0
7.002	R11A SW26	R11A SW27	14.486	0.600	62.314	62.254	0.060	241.4	300	6.45	50.0
7.003	R11A SW27	R11A SW28	16.185	0.600	62.253	62.186	0.067	241.6	300	6.72	50.0
7.004	R11A SW28	R11A SW133	16.816	0.600	62.186	62.116	0.070	240.2	300	7.00	50.0
7.005	R11A SW133	R11A SW134	12.485	0.600	62.116	62.064	0.052	240.1	300	7.20	50.0
1.008	R11A SW134	R11A SW135	19.806	0.600	61.764	61.728	0.036	550.2	600	8.18	50.0
1.009	R11A SW135	R11A Basin 1 HW1	15.382	0.600	61.728	61.700	0.028	549.4	600	8.43	50.0
1.011	R11A Basin 1 HW O	R11A Basin 2 HW1	26.339	0.600	61.750	61.700	0.050	526.8	450	5.50	50.0
9.001	R11A SW139	R11A Basin 2 HW2	13.152	0.600	61.770	61.700	0.070	187.9	225	5.38	50.0
1.013	R11A SW142	R11A O/F	6.294	0.600	61.510	61.404	0.106	59.4	150	5.15	50.0
1.012	R11A Basin 2 HW O	R11A SW142	11.253	0.600	61.700	61.510	0.190	59.2	450	5.07	50.0
9.000	R11A SW138	R11A SW139	15.521	0.600	62.056	61.770	0.286	54.3	225	5.15	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
7.001	1.009	71.4	23.7	2.287	2.191	0.138	0.0
7.002	1.007	71.2	28.3	2.191	2.186	0.165	0.0
7.003	1.007	71.2	35.2	2.187	2.154	0.205	0.0
7.004	1.010	71.4	37.3	2.154	2.124	0.217	0.0
7.005	1.010	71.4	42.4	2.124	2.162	0.247	0.0
1.008	1.031	291.5	259.4	2.162	1.850	1.511	0.0
1.009	1.032	291.7	263.3	1.850	0.800	1.534	0.0
1.011	0.879	139.7	0.0	0.900	0.950	0.000	0.0
9.001	0.950	37.8	6.5	1.930	1.175	0.038	0.0
1.013	1.307	23.1	0.0	1.602	1.708	0.000	0.0
1.012	2.646	420.8	0.0	0.950	1.302	0.000	0.0
9.000	1.778	70.7	2.7	1.328	1.930	0.016	0.0

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	17.565	16.4	225	1 STANDARD	67.360	65.860	1.275	67.060	64.786	2.049
2.000	11.729	23.7	225	1 STANDARD	67.140	65.640	1.275	67.230	65.145	1.860
3.000	17.805	169.6	225	1 STANDARD	66.750	65.250	1.275	67.230	65.145	1.860
2.001	27.944	170.4	225	1 STANDARD	67.230	65.145	1.860	67.350	64.981	2.144
2.002	33.171	170.1	225	1 STANDARD	67.350	64.981	2.144	67.060	64.786	2.049
1.001	26.123	20.6	300	1 STANDARD	67.060	64.711	2.049	66.600	63.442	2.858
1.002	45.283	36.2	300	1 STANDARD	66.600	63.292	3.008	65.780	62.041	3.439
4.000	17.236	33.5	225	1 STANDARD	67.325	65.525	1.575	66.840	65.010	1.605

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	R11A SW1	1200	Manhole	1 STANDARD	R11A SW6	1200	Manhole	1 STANDARD
2.000	R11A SW2	1200	Manhole	1 STANDARD	R11A SW4	1200	Manhole	1 STANDARD
3.000	R11A SW3	1200	Manhole	1 STANDARD	R11A SW4	1200	Manhole	1 STANDARD
2.001	R11A SW4	1200	Manhole	1 STANDARD	R11A SW5	1200	Manhole	1 STANDARD
2.002	R11A SW5	1200	Manhole	1 STANDARD	R11A SW6	1200	Manhole	1 STANDARD
1.001	R11A SW6	1200	Manhole	1 STANDARD	R11A SW7	1350	Manhole	1 STANDARD
1.002	R11A SW7	1350	Manhole	1 STANDARD	R11A SW16	1500	Manhole	1 STANDARD
4.000	R11A SW8	1200	Manhole	1 STANDARD	R11A SW9	1200	Manhole	1 STANDARD

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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)
4.001	9.153	58.3	225	1 STANDARD	66.840	65.010	1.605	66.575	64.853	1.497
4.002	8.223	31.3	225	1 STANDARD	66.575	64.853	1.497	66.340	64.590	1.525
4.003	10.078	72.0	225	1 STANDARD	66.340	64.590	1.525	66.050	64.450	1.375
4.004	26.081	30.2	225	1 STANDARD	66.050	64.450	1.375	65.410	63.585	1.600
5.000	10.654	73.5	225	1 STANDARD	65.360	63.730	1.405	65.410	63.585	1.600
4.005	8.105	238.4	450	1 STANDARD	65.410	63.360	1.600	65.400	63.326	1.624
4.006	34.617	26.9	450	1 STANDARD	65.400	63.326	1.624	65.780	62.041	3.289
1.003	9.846	547.0	600	1 STANDARD	65.780	61.891	3.289	65.645	61.873	3.172
1.004	17.216	555.4	600	1 STANDARD	65.645	61.873	3.172	65.314	61.842	2.872
6.000	36.766	39.8	300	1 STANDARD	66.223	64.223	1.700	65.571	63.300	1.971
6.001	10.625	10.1	300	1 STANDARD	65.571	63.300	1.971	65.398	62.250	2.848
6.002	25.866	239.5	300	1 STANDARD	65.398	62.250	2.848	65.314	62.142	2.872
1.005	11.701	557.2	600	1 STANDARD	65.314	61.842	2.872	65.089	61.821	2.668
1.006	12.740	553.9	600	1 STANDARD	65.089	61.821	2.668	64.855	61.798	2.457
1.007	18.326	539.0	600	1 STANDARD	64.855	61.798	2.457	64.526	61.764	2.162
7.000	30.500	240.2	300	1 STANDARD	65.240	62.620	2.320	65.080	62.493	2.287
7.001	43.029	240.4	300	1 STANDARD	65.080	62.493	2.287	64.805	62.314	2.191
7.002	14.486	241.4	300	1 STANDARD	64.805	62.314	2.191	64.740	62.254	2.186
7.003	16.185	241.6	300	1 STANDARD	64.740	62.253	2.187	64.640	62.186	2.154
7.004	16.816	240.2	300	1 STANDARD	64.640	62.186	2.154	64.540	62.116	2.124
7.005	12.485	240.1	300	1 STANDARD	64.540	62.116	2.124	64.526	62.064	2.162
1.008	19.806	550.2	600	1 STANDARD	64.526	61.764	2.162	64.178	61.728	1.850
1.009	15.382	549.4	600	1 STANDARD	64.178	61.728	1.850	63.100	61.700	0.800
1.011	26.339	526.8	450	1 STANDARD	63.100	61.750	0.900	63.100	61.700	0.950
9.001	13.152	187.9	225	1 STANDARD	63.925	61.770	1.930	63.100	61.700	1.175

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
4.001	R11A SW9	1200	Manhole	1 STANDARD	R11A SW10	1200	Manhole	1 STANDARD
4.002	R11A SW10	1200	Manhole	1 STANDARD	R11A SW11	1200	Manhole	1 STANDARD
4.003	R11A SW11	1200	Manhole	1 STANDARD	R11A SW12	1200	Manhole	1 STANDARD
4.004	R11A SW12	1200	Manhole	1 STANDARD	R11A SW14	1350	Manhole	1 STANDARD
5.000	R11A SW13	1200	Manhole	1 STANDARD	R11A SW14	1350	Manhole	1 STANDARD
4.005	R11A SW14	1350	Manhole	1 STANDARD	R11A SW15	1350	Manhole	1 STANDARD
4.006	R11A SW15	1350	Manhole	1 STANDARD	R11A SW16	1500	Manhole	1 STANDARD
1.003	R11A SW16	1500	Manhole	1 STANDARD	R11A SW121	1500	Manhole	1 STANDARD
1.004	R11A SW121	1500	Manhole	1 STANDARD	R11A SW125	1500	Manhole	1 STANDARD
6.000	R11A SW122	1200	Manhole	1 STANDARD	R11A SW123	1200	Manhole	1 STANDARD
6.001	R11A SW123	1200	Manhole	1 STANDARD	R11A SW124	1200	Manhole	1 STANDARD
6.002	R11A SW124	1200	Manhole	1 STANDARD	R11A SW125	1500	Manhole	1 STANDARD
1.005	R11A SW125	1500	Manhole	1 STANDARD	R11A SW126	1500	Manhole	1 STANDARD
1.006	R11A SW126	1500	Manhole	1 STANDARD	R11A SW127	1500	Manhole	1 STANDARD
1.007	R11A SW127	1500	Manhole	1 STANDARD	R11A SW134	1500	Manhole	1 STANDARD
7.000	R11A SW24	1200	Manhole	1 STANDARD	R11A SW25	1200	Manhole	1 STANDARD
7.001	R11A SW25	1200	Manhole	1 STANDARD	R11A SW26	1200	Manhole	1 STANDARD
7.002	R11A SW26	1200	Manhole	1 STANDARD	R11A SW27	1200	Manhole	1 STANDARD
7.003	R11A SW27	1200	Manhole	1 STANDARD	R11A SW28	1200	Manhole	1 STANDARD
7.004	R11A SW28	1200	Manhole	1 STANDARD	R11A SW133	1200	Manhole	1 STANDARD
7.005	R11A SW133	1200	Manhole	1 STANDARD	R11A SW134	1500	Manhole	1 STANDARD
1.008	R11A SW134	1500	Manhole	1 STANDARD	R11A SW135	1500	Manhole	1 STANDARD
1.009	R11A SW135	1500	Manhole	1 STANDARD	R11A Basin 1 HW1		Manhole	1 STANDARD
1.011	R11A Basin 1 HW O		Manhole	1 STANDARD	R11A Basin 2 HW1		Manhole	1 STANDARD
9.001	R11A SW139	1200	Manhole	1 STANDARD	R11A Basin 2 HW2		Manhole	1 STANDARD

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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)
1.013	6.294	59.4	150	1 STANDARD	63.262	61.510	1.602	63.262	61.404	1.708
1.012	11.253	59.2	450	1 STANDARD	63.100	61.700	0.950	63.262	61.510	1.302
9.000	15.521	54.3	225	1 STANDARD	63.609	62.056	1.328	63.925	61.770	1.930

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.013	R11A SW142	1200	Manhole	1 STANDARD	R11A O/F	1200	Manhole	1 STANDARD
1.012	R11A Basin 2 HW O		Manhole	1 STANDARD	R11A SW142	1200	Manhole	1 STANDARD
9.000	R11A SW138	1200	Manhole	1 STANDARD	R11A SW139	1200	Manhole	1 STANDARD

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	0.950	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	0.950	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	0	0

Node R11A SW142 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	61.700	Product Number	CTL-SHE-0129-8100-1200-8100
Design Depth (m)	1.200	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	8.1	Min Node Diameter (mm)	1200

Node R11A SW3 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	66.150	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	4	Depth (m)	
Safety Factor	2.0	Width (m)	14.000	Inf Depth (m)	
Porosity	0.30	Length (m)	19.000		

Node R11A SW13 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	64.750	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	
Safety Factor	2.0	Width (m)	9.800	Inf Depth (m)	
Porosity	0.30	Length (m)	55.000		

Node R11A Basin 1 HW O Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	49.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	61.750	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.035

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Inlets

R11A Basin 1 HW1

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	904.0	0.0	1.300	1465.0	0.0

Node R11A Basin 2 HW O Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	40.900
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

R11A Basin 2 HW1 | R11A Basin 2 HW2

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	689.0	0.0	1.300	1416.0	0.0

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.88%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	R11A SW1	34	65.945	0.085	31.2	0.0958	0.0000	OK
60 minute summer	R11A SW2	35	66.371	0.731	21.7	0.8268	0.0000	SURCHARGED
60 minute summer	R11A SW3	37	66.389	1.139	47.9	12.7792	0.0000	SURCHARGED
60 minute summer	R11A SW4	35	66.352	1.207	57.5	1.3646	0.0000	SURCHARGED
60 minute summer	R11A SW5	34	66.278	1.297	81.5	1.4664	0.0000	SURCHARGED
60 minute summer	R11A SW6	34	65.827	1.116	134.0	1.2616	0.0000	SURCHARGED
60 minute summer	R11A SW7	34	65.483	2.191	204.9	3.1358	0.0000	SURCHARGED
60 minute summer	R11A SW8	33	65.599	0.074	21.2	0.0836	0.0000	OK
60 minute summer	R11A SW9	33	65.138	0.128	34.6	0.1451	0.0000	OK
60 minute summer	R11A SW10	33	64.976	0.123	43.5	0.1389	0.0000	OK
60 minute summer	R11A SW11	33	64.749	0.159	43.5	0.1797	0.0000	OK
60 minute summer	R11A SW12	33	64.586	0.136	59.1	0.1540	0.0000	OK
60 minute summer	R11A SW13	34	64.071	0.341	57.4	0.3859	0.0000	SURCHARGED
60 minute summer	R11A SW14	34	63.907	0.547	138.5	0.7824	0.0000	SURCHARGED
60 minute summer	R11A SW15	34	63.881	0.555	159.5	0.7937	0.0000	SURCHARGED
60 minute summer	R11A SW16	34	63.775	1.884	381.5	3.3288	0.0000	SURCHARGED
60 minute summer	R11A SW121	34	63.698	1.825	405.0	3.2253	0.0000	SURCHARGED
60 minute summer	R11A SW122	34	64.410	0.187	97.5	0.2110	0.0000	OK
60 minute summer	R11A SW123	35	64.089	0.789	104.1	0.8926	0.0000	SURCHARGED
60 minute summer	R11A SW124	35	63.958	1.708	119.6	1.9319	0.0000	SURCHARGED
60 minute summer	R11A SW125	35	63.589	1.747	536.9	3.0864	0.0000	SURCHARGED
60 minute summer	R11A SW126	35	63.428	1.607	553.0	2.8397	0.0000	SURCHARGED
60 minute summer	R11A SW127	35	63.250	1.452	591.4	2.5660	0.0000	SURCHARGED
60 minute summer	R11A SW24	34	64.050	1.430	38.5	1.6173	0.0000	SURCHARGED
60 minute summer	R11A SW25	34	64.011	1.518	73.6	1.7169	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	R11A SW1	1.000	R11A SW6	31.1	2.368	0.240	0.4692	
60 minute summer	R11A SW2	2.000	R11A SW4	20.9	0.810	0.195	0.4665	
60 minute summer	R11A SW3	3.000	R11A SW4	50.7	1.274	1.273	0.7081	
60 minute summer	R11A SW4	2.001	R11A SW5	58.2	1.464	1.467	1.1114	
60 minute summer	R11A SW5	2.002	R11A SW6	77.2	1.941	1.943	1.3192	
60 minute summer	R11A SW6	1.001	R11A SW7	118.0	3.088	0.480	1.8396	
60 minute summer	R11A SW7	1.002	R11A SW16	201.8	2.866	1.089	3.1888	
60 minute summer	R11A SW8	4.000	R11A SW9	21.2	1.228	0.235	0.2990	
60 minute summer	R11A SW9	4.001	R11A SW10	34.6	1.520	0.507	0.2083	
60 minute summer	R11A SW10	4.002	R11A SW11	43.5	1.664	0.466	0.2143	
60 minute summer	R11A SW11	4.003	R11A SW12	43.5	1.629	0.709	0.2776	
60 minute summer	R11A SW12	4.004	R11A SW14	59.9	2.423	0.630	0.8156	
60 minute summer	R11A SW13	5.000	R11A SW14	57.4	1.611	0.945	0.4237	
60 minute summer	R11A SW14	4.005	R11A SW15	132.8	1.883	0.636	1.2842	
60 minute summer	R11A SW15	4.006	R11A SW16	152.2	1.720	0.244	5.4848	
60 minute summer	R11A SW16	1.003	R11A SW121	379.1	1.346	1.297	2.7734	
60 minute summer	R11A SW121	1.004	R11A SW125	402.6	1.429	1.388	4.8494	
60 minute summer	R11A SW122	6.000	R11A SW123	95.7	2.634	0.542	2.1408	
60 minute summer	R11A SW123	6.001	R11A SW124	96.7	1.429	0.275	0.7482	
60 minute summer	R11A SW124	6.002	R11A SW125	117.1	1.663	1.638	1.8215	
60 minute summer	R11A SW125	1.005	R11A SW126	535.0	1.900	1.847	3.2959	
60 minute summer	R11A SW126	1.006	R11A SW127	551.4	1.958	1.898	3.5886	
60 minute summer	R11A SW127	1.007	R11A SW134	589.2	2.092	2.001	5.1620	
60 minute summer	R11A SW24	7.000	R11A SW25	35.6	0.714	0.499	2.1478	
60 minute summer	R11A SW25	7.001	R11A SW26	71.2	1.011	0.998	3.0301	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.88%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	R11A SW26	34	63.802	1.488	85.5	1.6827	0.0000	SURCHARGED
60 minute summer	R11A SW27	34	63.678	1.425	105.6	1.6120	0.0000	SURCHARGED
60 minute summer	R11A SW28	35	63.480	1.294	110.7	1.4637	0.0000	SURCHARGED
60 minute summer	R11A SW133	35	63.249	1.133	125.4	1.2817	0.0000	SURCHARGED
60 minute summer	R11A SW134	35	63.008	1.244	725.7	2.1974	0.0000	SURCHARGED
60 minute summer	R11A SW135	35	62.623	0.895	736.5	1.5820	0.0000	SURCHARGED
720 minute winter	R11A Basin 1 HW1	720	62.550	0.850	93.7	0.0000	0.0000	OK
720 minute winter	R11A Basin 1 HW O	720	62.550	0.800	68.3	0.0000	0.0000	SURCHARGED
720 minute winter	R11A Basin 2 HW1	720	62.551	0.851	50.6	0.0000	0.0000	OK
720 minute winter	R11A Basin 2 HW O	720	62.549	0.849	30.8	0.0000	0.0000	SURCHARGED
720 minute winter	R11A Basin 2 HW2	720	62.549	0.849	2.0	0.0000	0.0000	OK
720 minute winter	R11A SW139	720	62.549	0.779	2.1	0.8809	0.0000	SURCHARGED
720 minute winter	R11A SW142	720	62.549	1.039	35.7	1.1750	0.0000	SURCHARGED
180 minute winter	R11A O/F	100	61.465	0.061	8.1	0.0000	0.0000	OK
720 minute winter	R11A SW138	720	62.549	0.493	0.9	0.5573	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	R11A SW26	7.002	R11A SW27	84.4	1.198	1.185	1.0201	
60 minute summer	R11A SW27	7.003	R11A SW28	104.4	1.483	1.467	1.1397	
60 minute summer	R11A SW28	7.004	R11A SW133	109.5	1.555	1.534	1.1842	
60 minute summer	R11A SW133	7.005	R11A SW134	124.3	1.766	1.741	0.8792	
60 minute summer	R11A SW134	1.008	R11A SW135	724.3	2.572	2.485	5.5789	
60 minute summer	R11A SW135	1.009	R11A Basin 1 HW1	735.7	2.614	2.522	4.3328	
720 minute winter	R11A Basin 1 HW1	Flow through Pond	R11A Basin 1 HW O	68.3	0.053	0.002	801.2579	
720 minute winter	R11A Basin 1 HW O	1.011	R11A Basin 2 HW1	42.7	0.288	0.306	4.1732	
720 minute winter	R11A Basin 2 HW1	Flow through Pond	R11A Basin 2 HW O	30.8	0.036	0.001	740.0908	
720 minute winter	R11A Basin 2 HW O	1.012	R11A SW142	35.7	0.287	0.085	1.7830	
720 minute winter	R11A Basin 2 HW2	Flow through Pond	R11A Basin 2 HW O	30.8	0.036	0.001	740.0908	
720 minute winter	R11A SW139	9.001	R11A Basin 2 HW2	2.0	0.050	0.053	0.5231	
720 minute winter	R11A SW142	1.013	R11A O/F	8.1	1.129	0.350	0.0452	351.1
720 minute winter	R11A SW138	9.000	R11A SW139	0.8	0.191	0.011	0.6173	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	30
FEH Rainfall Version	2013
Site Location	GB 482607 167931 SU 82607 67931
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.950
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	18.571	0.109	170.0	0.044	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	14.253	0.135	105.6	0.023	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	17.073	0.150	113.8	0.023	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	15.698	0.120	130.8	0.010	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	10.020	0.059	169.8	0.021	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.005	8.069	0.413	19.5	0.045	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.31	65.821	0.044	0.0	0.0	0.0	1.00	39.8	7.5
S1.001	50.00	5.50	65.712	0.067	0.0	0.0	0.0	1.27	50.6	11.5
S1.002	50.00	5.73	65.577	0.090	0.0	0.0	0.0	1.22	48.7	15.4
S1.003	50.00	5.92	65.352	0.100	0.0	0.0	0.0	1.37	97.1	17.2
S1.004	50.00	6.06	65.232	0.121	0.0	0.0	0.0	1.20	85.1	20.8
S1.005	50.00	6.10	65.173	0.166	0.0	0.0	0.0	3.57	252.6	28.5

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.000	18.660	0.755	24.7	0.081	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.006	8.753	0.022	397.9	0.007	0.00	0.0	0.600	o	450	Pipe/Conduit	
S3.000	6.397	0.800	8.0	0.046	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.007	27.464	0.067	409.9	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.008	29.374	0.122	241.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S4.000	26.375	0.275	95.9	0.042	5.00	0.0	0.600	o	225	Pipe/Conduit	
S4.001	16.240	0.276	58.8	0.041	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.009	21.772	0.053	410.8	0.048	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.010	11.283	0.028	403.0	0.048	0.00	0.0	0.600	o	450	Pipe/Conduit	
S5.000	25.255	0.149	169.5	0.059	5.00	0.0	0.600	o	225	Pipe/Conduit	
S5.001	16.670	0.098	170.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.002	19.013	0.335	56.8	0.025	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.011	10.289	0.025	411.6	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.012	26.858	0.066	410.0	0.024	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.013	21.744	0.053	410.0	0.032	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.000	50.00	5.12	65.590	0.081	0.0	0.0	0.0	2.64	105.1	13.9
S1.006	50.00	6.24	64.610	0.254	0.0	0.0	0.0	1.01	161.1	43.6
S3.000	50.00	5.03	66.500	0.046	0.0	0.0	0.0	3.59	63.4	7.9
S1.007	50.00	6.70	64.588	0.300	0.0	0.0	0.0	1.00	158.7	51.5
S1.008	50.00	7.07	64.521	0.300	0.0	0.0	0.0	1.30	207.5	51.5
S4.000	50.00	5.33	65.175	0.042	0.0	0.0	0.0	1.34	53.1	7.2
S4.001	50.00	5.49	64.900	0.083	0.0	0.0	0.0	1.71	67.9	14.2
S1.009	50.00	7.44	64.399	0.431	0.0	0.0	0.0	1.00	158.5	73.9
S1.010	50.00	7.62	64.346	0.479	0.0	0.0	0.0	1.01	160.1	82.2
S5.000	50.00	5.42	65.125	0.059	0.0	0.0	0.0	1.00	39.8	10.1
S5.001	50.00	5.70	64.976	0.059	0.0	0.0	0.0	1.00	39.7	10.1
S5.002	50.00	5.88	64.878	0.084	0.0	0.0	0.0	1.74	69.2	14.4
S1.011	50.00	7.80	64.318	0.563	0.0	0.0	0.0	1.00	158.4	96.6
S1.012	50.00	8.25	64.293	0.587	0.0	0.0	0.0	1.00	158.7	100.7
S1.013	50.00	8.61	64.227	0.619	0.0	0.0	0.0	1.00	158.7	106.2

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S6.000	9.824	0.326	30.1	0.048	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.014	25.160	0.014	1797.1	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S7.000	13.397	0.135	99.2	0.042	5.00	0.0	0.600	o	225	Pipe/Conduit	
S7.001	17.746	0.696	25.5	0.018	0.00	0.0	0.600	o	225	Pipe/Conduit	
S7.002	28.071	0.117	239.9	0.045	0.00	0.0	0.600	o	300	Pipe/Conduit	
S7.003	14.616	0.036	406.0	0.054	0.00	0.0	0.600	o	450	Pipe/Conduit	
S7.004	15.274	0.037	412.8	0.049	0.00	0.0	0.600	o	450	Pipe/Conduit	
S8.000	12.307	0.051	240.0	0.066	5.00	0.0	0.600	o	300	Pipe/Conduit	
S8.001	16.125	0.067	240.0	0.033	0.00	0.0	0.600	o	300	Pipe/Conduit	
S8.002	23.913	0.100	240.0	0.021	0.00	0.0	0.600	o	300	Pipe/Conduit	
S7.005	28.709	0.070	410.1	0.070	0.00	0.0	0.600	o	450	Pipe/Conduit	
S7.006	26.661	0.065	410.2	0.099	0.00	0.0	0.600	o	450	Pipe/Conduit	
S9.000	10.964	0.706	15.5	0.043	5.00	0.0	0.600	o	225	Pipe/Conduit	
S10.000	21.954	0.731	30.0	0.042	5.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S6.000	50.00	5.07	64.775	0.048	0.0	0.0	0.0	2.39	95.1	8.2
S1.014	50.00	9.50	64.224	0.667	0.0	0.0	0.0	0.47	74.8«	114.4
S7.000	50.00	5.17	65.910	0.042	0.0	0.0	0.0	1.31	52.2	7.2
S7.001	50.00	5.28	65.775	0.060	0.0	0.0	0.0	2.60	103.4	10.3
S7.002	50.00	5.75	65.004	0.105	0.0	0.0	0.0	1.01	71.4	18.0
S7.003	50.00	5.99	64.737	0.159	0.0	0.0	0.0	1.00	159.5	27.3
S7.004	50.00	6.25	64.701	0.208	0.0	0.0	0.0	0.99	158.1	35.7
S8.000	50.00	5.20	65.107	0.066	0.0	0.0	0.0	1.01	71.4	11.3
S8.001	50.00	5.47	65.056	0.099	0.0	0.0	0.0	1.01	71.4	17.0
S8.002	50.00	5.86	64.989	0.120	0.0	0.0	0.0	1.01	71.4	20.6
S7.005	50.00	6.73	64.664	0.398	0.0	0.0	0.0	1.00	158.7	68.3
S7.006	50.00	7.17	64.594	0.497	0.0	0.0	0.0	1.00	158.7	85.2
S9.000	50.00	5.05	65.675	0.043	0.0	0.0	0.0	3.34	132.7	7.4
S10.000	50.00	5.15	65.700	0.042	0.0	0.0	0.0	2.40	95.3	7.2

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S9.001	59.253	0.145	408.6	0.144	0.00	0.0	0.600	o	450	Pipe/Conduit	
S9.002	28.786	0.070	411.2	0.118	0.00	0.0	0.600	o	450	Pipe/Conduit	
S7.007	30.339	0.045	674.2	0.117	0.00	0.0	0.600	o	675	Pipe/Conduit	
S7.008	19.788	0.029	675.0	0.040	0.00	0.0	0.600	o	675	Pipe/Conduit	
S11.000	38.774	0.228	170.1	0.060	5.00	0.0	0.600	o	225	Pipe/Conduit	
S11.001	7.143	0.042	170.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S12.000	12.650	0.031	408.1	0.061	5.00	0.0	0.600	o	450	Pipe/Conduit	
S7.009	71.261	0.018	3958.9	0.008	0.00	0.0	0.600	o	675	Pipe/Conduit	
S13.000	20.651	0.175	118.0	0.046	5.00	0.0	0.600	o	225	Pipe/Conduit	
S13.001	22.735	0.393	57.8	0.021	0.00	0.0	0.600	o	225	Pipe/Conduit	
S14.000	19.029	0.798	23.8	0.047	5.00	0.0	0.600	o	225	Pipe/Conduit	
S13.002	27.076	0.113	239.6	0.034	0.00	0.0	0.600	o	300	Pipe/Conduit	
S13.003	16.229	0.040	405.7	0.004	0.00	0.0	0.600	o	450	Pipe/Conduit	
S13.004	30.196	0.074	408.1	0.055	0.00	0.0	0.600	o	450	Pipe/Conduit	
S13.005	16.723	0.041	407.9	0.009	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S9.001	50.00	6.14	64.744	0.229	0.0	0.0	0.0	1.00	159.0	39.3
S9.002	50.00	6.62	64.599	0.347	0.0	0.0	0.0	1.00	158.5	59.5
S7.007	50.00	7.68	64.304	0.961	0.0	0.0	0.0	1.00	358.5	164.8
S7.008	50.00	8.00	64.259	1.001	0.0	0.0	0.0	1.00	358.3	171.7
S11.000	50.00	5.65	64.950	0.060	0.0	0.0	0.0	1.00	39.7	10.3
S11.001	50.00	5.77	64.722	0.060	0.0	0.0	0.0	1.00	39.8	10.3
S12.000	50.00	5.21	64.486	0.061	0.0	0.0	0.0	1.00	159.1	10.5
S7.009	50.00	10.92	64.228	1.130	0.0	0.0	0.0	0.41	145.6«	193.8
S13.000	50.00	5.29	65.190	0.046	0.0	0.0	0.0	1.20	47.8	7.9
S13.001	50.00	5.51	65.015	0.067	0.0	0.0	0.0	1.72	68.5	11.5
S14.000	50.00	5.12	65.420	0.047	0.0	0.0	0.0	2.69	107.0	8.1
S13.002	50.00	5.95	64.547	0.148	0.0	0.0	0.0	1.01	71.5	25.4
S13.003	50.00	6.22	64.394	0.152	0.0	0.0	0.0	1.00	159.5	26.1
S13.004	50.00	6.73	64.354	0.207	0.0	0.0	0.0	1.00	159.1	35.5
S13.005	50.00	7.00	64.280	0.216	0.0	0.0	0.0	1.00	159.1	37.0

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S13.006	98.190	0.029	3385.9	0.055	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.015	27.004	0.020	1350.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.016	10.398	0.070	148.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S13.006	50.00	11.82	64.239	0.271	0.0	0.0	0.0	0.34	54.1	46.5
S1.015	50.00	13.51	64.210	2.068	0.0	0.0	0.0	0.27	4.7«	354.7
S1.016	50.00	13.73	64.190	2.068	0.0	0.0	0.0	0.82	14.5«	354.7

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.016	S	65.400	64.120	64.120	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.950	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
FEH Rainfall Version	2013
Site Location	GB 482607 167931 SU 82607 67931
Data Type	Point
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.950
Cv (Winter)	0.950
Storm Duration (mins)	30

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: SR11B SW51, DS/PN: S1.016, Volume (m³): 2.2

Unit Reference	MD-SHE-0134-8900-1300-8900
Design Head (m)	1.300
Design Flow (l/s)	8.9
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	134
Invert Level (m)	64.190
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	8.9
Flush-Flo™	0.384	8.9
Kick-Flo®	0.824	7.2
Mean Flow over Head Range	-	7.7

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.8	1.200	8.6	3.000	13.2	7.000	19.8
0.200	8.3	1.400	9.2	3.500	14.2	7.500	20.5
0.300	8.8	1.600	9.8	4.000	15.2	8.000	21.1
0.400	8.9	1.800	10.4	4.500	16.0	8.500	21.7
0.500	8.8	2.000	10.9	5.000	16.9	9.000	22.3
0.600	8.6	2.200	11.4	5.500	17.6	9.500	22.9
0.800	7.5	2.400	11.9	6.000	18.4		
1.000	7.9	2.600	12.3	6.500	19.1		

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Storage Structures for Storm

Tank or Pond Manhole: SR11B Basin, DS/PN: S1.015

Invert Level (m) 64.210

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1420.0	1.500	3206.0

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 482607 167931 SU 82607 67931
Data Type	Point
Cv (Summer)	0.950
Cv (Winter)	0.950

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	SR11B SW1	15 Summer	100	+40%	100/15 Summer			
S1.001	SR11B SW2	15 Summer	100	+40%	100/15 Summer			
S1.002	SR11B SW3	15 Summer	100	+40%	100/15 Summer			
S1.003	SR11B SW4	15 Summer	100	+40%	100/15 Summer			
S1.004	SR11B SW5	15 Summer	100	+40%	100/15 Summer			
S1.005	SR11B SW6	15 Summer	100	+40%	100/15 Summer			
S2.000	SR11B SW7	15 Summer	100	+40%	100/15 Summer			
S1.006	SR11B SW8	15 Summer	100	+40%	100/15 Summer			
S3.000	S9	15 Summer	100	+40%				
S1.007	SR11B SW9	15 Summer	100	+40%	100/15 Summer			
S1.008	SR11B SW9A	15 Summer	100	+40%	100/15 Summer			
S4.000	SR11B SW10	15 Summer	100	+40%	100/15 Summer			
S4.001	SR11B SW11	15 Summer	100	+40%	100/15 Summer			
S1.009	SR11B SW12	15 Summer	100	+40%	100/15 Summer			

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	SR11B SW1	67.193	1.147	0.000	0.75			26.7	FLOOD RISK
S1.001	SR11B SW2	67.115	1.178	0.000	0.86			37.9	FLOOD RISK
S1.002	SR11B SW3	67.009	1.207	0.000	1.14			49.4	FLOOD RISK
S1.003	SR11B SW4	66.851	1.200	0.000	0.58			47.1	FLOOD RISK
S1.004	SR11B SW5	66.741	1.210	0.000	0.90			55.1	FLOOD RISK
S1.005	SR11B SW6	66.658	1.185	0.000	0.49			79.2	FLOOD RISK
S2.000	SR11B SW7	66.667	0.852	0.000	0.60			56.7	SURCHARGED
S1.006	SR11B SW8	66.434	1.374	0.000	1.40			131.6	SURCHARGED
S3.000	S9	66.627	-0.023	0.000	0.71			37.8	FLOOD RISK
S1.007	SR11B SW9	66.401	1.363	0.000	1.18			159.0	FLOOD RISK
S1.008	SR11B SW9A	66.308	1.337	0.000	0.89			158.9	FLOOD RISK
S4.000	SR11B SW10	66.439	1.039	0.000	0.55			26.9	FLOOD RISK
S4.001	SR11B SW11	66.369	1.244	0.000	0.79			47.6	FLOOD RISK
S1.009	SR11B SW12	66.200	1.351	0.000	1.69			219.3	FLOOD RISK

PN	US/MH Name	Level Exceeded
S1.000	SR11B SW1	
S1.001	SR11B SW2	
S1.002	SR11B SW3	
S1.003	SR11B SW4	
S1.004	SR11B SW5	
S1.005	SR11B SW6	
S2.000	SR11B SW7	
S1.006	SR11B SW8	
S3.000	S9	
S1.007	SR11B SW9	
S1.008	SR11B SW9A	
S4.000	SR11B SW10	
S4.001	SR11B SW11	
S1.009	SR11B SW12	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
S1.010	SR11B SW13	15 Summer	100	+40%	100/15 Summer	100/15 Summer	
S5.000	SR11B SW14	15 Summer	100	+40%	100/15 Summer		
S5.001	SR11B SW15	15 Summer	100	+40%	100/15 Summer		
S5.002	SR11B SW16	15 Summer	100	+40%	100/15 Summer		
S1.011	SR11B SW17	15 Summer	100	+40%	100/15 Summer		
S1.012	SR11B SW18	15 Summer	100	+40%	100/15 Summer		
S1.013	SR11B SW19	15 Summer	100	+40%	100/15 Summer		
S6.000	SR11B SW20	15 Summer	100	+40%	100/15 Summer		
S1.014	SR11B SW21	720 Summer	100	+40%	100/15 Summer		
S7.000	SR11B SW22	15 Summer	100	+40%	100/15 Summer		
S7.001	SR11B SW23	15 Summer	100	+40%	100/15 Summer		
S7.002	SR11B SW24	15 Summer	100	+40%	100/15 Summer		
S7.003	SR11B SW25	15 Summer	100	+40%	100/15 Summer		
S7.004	SR11B SW26	15 Summer	100	+40%	100/15 Summer		
S8.000	SR11B SW27	15 Summer	100	+40%	100/15 Summer		
S8.001	SR11B SW28	15 Summer	100	+40%	100/15 Summer		
S8.002	SR11B SW29	15 Summer	100	+40%	100/15 Summer		
S7.005	SR11B SW30	15 Summer	100	+40%	100/15 Summer		
S7.006	SR11B SW31	15 Summer	100	+40%	100/15 Summer		
S9.000	SR11B SW32	15 Summer	100	+40%	100/15 Summer		
S10.000	SR11B SW33	15 Summer	100	+40%	100/15 Summer		
S9.001	SR11B SW34	15 Summer	100	+40%	100/15 Summer		
S9.002	SR11B SW35	15 Summer	100	+40%	100/15 Summer		
S7.007	SR11B SW36	15 Summer	100	+40%	100/15 Summer		
S7.008	SR11B SW37	15 Summer	100	+40%	100/15 Summer		
S11.000	SR11B SW38	15 Summer	100	+40%	100/15 Summer		
S11.001	SR11B SW39	15 Summer	100	+40%	100/15 Summer		
S12.000	SR11B SW40	15 Summer	100	+40%	100/15 Summer		
S7.009	SR11B SW41	15 Summer	100	+40%	100/15 Summer		
S13.000	SR11B SW42	15 Summer	100	+40%	100/15 Summer		
S13.001	SR11B SW43	15 Summer	100	+40%	100/15 Summer		
S14.000	SR11B SW44	15 Summer	100	+40%			
S13.002	SR11B SW45	15 Summer	100	+40%	100/15 Summer		
S13.003	SR11B SW46	15 Summer	100	+40%	100/15 Summer		
S13.004	SR11B SW47	15 Summer	100	+40%	100/15 Summer		
S13.005	SR11B SW48	720 Summer	100	+40%	100/15 Summer		
S13.006	SR11B SW49	720 Summer	100	+40%	100/15 Summer		
S1.015	SR11B Basin	720 Summer	100	+40%	100/15 Summer		
S1.016	SR11B SW51	720 Summer	100	+40%	100/15 Summer		

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
S1.010	SR11B SW13		66.040	1.244	0.208	2.41			239.0
S5.000	SR11B SW14		66.315	0.965	0.000	1.05			38.4
S5.001	SR11B SW15		66.167	0.966	0.000	1.00			35.5

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
S5.002	SR11B SW16		66.064	0.961	0.000	0.73			45.3
S1.011	SR11B SW17		65.871	1.103	0.000	2.99			283.7
S1.012	SR11B SW18		65.624	0.881	0.000	2.17			291.3
S1.013	SR11B SW19		65.314	0.637	0.000	2.32			301.4
S6.000	SR11B SW20		65.085	0.085	0.000	0.47			37.3
S1.014	SR11B SW21		65.085	0.411	0.000	0.98			59.1
S7.000	SR11B SW22		66.752	0.617	0.000	0.71			31.9
S7.001	SR11B SW23		66.670	0.670	0.000	0.48			44.5
S7.002	SR11B SW24		66.560	1.256	0.000	0.97			62.7
S7.003	SR11B SW25		66.447	1.260	0.000	0.91			95.2
S7.004	SR11B SW26		66.414	1.263	0.000	1.19			123.9
S8.000	SR11B SW27		66.641	1.234	0.000	0.79			45.8
S8.001	SR11B SW28		66.582	1.226	0.000	1.06			63.9
S8.002	SR11B SW29		66.506	1.217	0.000	1.17			74.4
S7.005	SR11B SW30		66.370	1.256	0.000	1.73			234.1
S7.006	SR11B SW31		66.154	1.110	0.000	2.17			291.0
S9.000	SR11B SW32		66.272	0.372	0.000	0.30			33.5
S10.000	SR11B SW33		66.303	0.378	0.000	0.38			32.8
S9.001	SR11B SW34		66.223	1.029	0.000	1.07			157.3
S9.002	SR11B SW35		66.049	1.000	0.000	1.77			239.7
S7.007	SR11B SW36		65.826	0.847	0.000	2.19			592.0
S7.008	SR11B SW37		65.588	0.654	0.000	3.06			611.2
S11.000	SR11B SW38		65.724	0.549	0.000	1.10			41.3
S11.001	SR11B SW39		65.431	0.484	0.000	1.37			41.1
S12.000	SR11B SW40		65.359	0.423	0.000	0.42			42.4
S7.009	SR11B SW41		65.346	0.443	0.000	2.45			646.0
S13.000	SR11B SW42		65.803	0.388	0.000	0.78			33.7
S13.001	SR11B SW43		65.699	0.459	0.000	0.75			47.0
S14.000	SR11B SW44		65.568	-0.077	0.000	0.40			38.8
S13.002	SR11B SW45		65.471	0.624	0.000	1.60			103.2
S13.003	SR11B SW46		65.172	0.328	0.000	0.96			106.7
S13.004	SR11B SW47		65.134	0.330	0.000	1.01			138.3
S13.005	SR11B SW48		65.083	0.353	0.000	0.17			19.6
S13.006	SR11B SW49		65.083	0.394	0.000	0.25			24.0
S1.015	SR11B Basin		65.083	0.723	0.000	1.91			9.0
S1.016	SR11B SW51		65.031	0.691	0.000	0.68			8.9

PN	US/MH Name	Status	Level Exceeded
S1.010	SR11B SW13	FLOOD	2
S5.000	SR11B SW14	FLOOD RISK	
S5.001	SR11B SW15	FLOOD RISK	
S5.002	SR11B SW16	FLOOD RISK	
S1.011	SR11B SW17	FLOOD RISK	
S1.012	SR11B SW18	FLOOD RISK	

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PN	US/MH Name	Status	Level Exceeded
S1.013	SR11B SW19	SURCHARGED	
S6.000	SR11B SW20	SURCHARGED	
S1.014	SR11B SW21	SURCHARGED	
S7.000	SR11B SW22	SURCHARGED	
S7.001	SR11B SW23	SURCHARGED	
S7.002	SR11B SW24	SURCHARGED	
S7.003	SR11B SW25	SURCHARGED	
S7.004	SR11B SW26	FLOOD RISK	
S8.000	SR11B SW27	FLOOD RISK	
S8.001	SR11B SW28	SURCHARGED	
S8.002	SR11B SW29	FLOOD RISK	
S7.005	SR11B SW30	FLOOD RISK	
S7.006	SR11B SW31	FLOOD RISK	
S9.000	SR11B SW32	SURCHARGED	
S10.000	SR11B SW33	SURCHARGED	
S9.001	SR11B SW34	SURCHARGED	
S9.002	SR11B SW35	SURCHARGED	
S7.007	SR11B SW36	SURCHARGED	
S7.008	SR11B SW37	FLOOD RISK	
S11.000	SR11B SW38	SURCHARGED	
S11.001	SR11B SW39	SURCHARGED	
S12.000	SR11B SW40	SURCHARGED	
S7.009	SR11B SW41	SURCHARGED	
S13.000	SR11B SW42	SURCHARGED	
S13.001	SR11B SW43	SURCHARGED	
S14.000	SR11B SW44	OK	
S13.002	SR11B SW45	SURCHARGED	
S13.003	SR11B SW46	SURCHARGED	
S13.004	SR11B SW47	SURCHARGED	
S13.005	SR11B SW48	SURCHARGED	
S13.006	SR11B SW49	SURCHARGED	
S1.015	SR11B Basin	SURCHARGED	
S1.016	SR11B SW51	SURCHARGED	

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	30	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.950	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
R11C SW1	0.053	5.00	65.540	1200	483169.949	167823.049	1.440
R11C SW2	0.007	5.00	65.669	1200	483179.559	167814.767	1.644
R11C SW3	0.020	5.00	65.837	1200	483187.658	167801.045	1.906
R11C SW4			65.947	1200	483193.548	167793.348	2.073
R11C SW5	0.053	5.00	66.369	1200	483205.385	167753.995	1.500
R11C SW6	0.034	5.00	66.130	1200	483201.767	167777.287	1.756
R11C SW7	0.041	5.00	66.054	1200	483194.781	167787.098	2.292
R11C SW8	0.034	5.00	66.318	1200	483167.474	167771.369	2.687
R11C SW9	0.108	5.00	67.125	1200	483153.625	167719.287	1.500
R11C SW10	0.025	5.00	66.420	1200	483150.329	167752.908	1.500
R11C SW11	0.042	5.00	66.210	1350	483147.451	167761.552	2.672
R11C SW12	0.070	5.00	65.860	1350	483138.989	167774.549	2.462
R11C SW13	0.064	5.00	66.040	1200	483085.218	167738.117	1.500
R11C SW14	0.063	5.00	66.280	1200	483106.694	167725.632	1.500
R11C SW15	0.074	5.00	66.150	1200	483097.011	167732.448	1.687
R11C SW16	0.010	5.00	65.625	1200	483115.040	167767.490	1.911
R11C SW17	0.014	5.00	65.525	1350	483127.288	167783.171	2.263
R11C SW18	0.029	5.00	65.120	1350	483111.091	167792.117	1.903
R11C SW162	0.044	5.00	65.034	1500	483107.083	167796.959	1.834
R11C SW168	0.031	5.00	64.329	1800	483117.986	167836.607	1.206
R11C SW169	0.058	5.00	64.534	1800	483115.511	167825.156	1.481
R11C SW169A			64.858	1800	483107.103	167807.869	1.995
R11C SW170	0.017	5.00	64.919	1500	483104.900	167803.340	2.302
R11C SW171	0.016	5.00	64.732	1500	483091.381	167803.694	2.148
R11C SW172	0.019	5.00	64.546	1800	483077.479	167809.645	1.999
R11C SW182			64.433	1800	483067.639	167808.079	1.986
R11C SW181	0.163	5.00	64.388	1800	483058.907	167800.864	2.039
R11C SW181A			64.538	1200	483052.576	167787.239	2.219
R11C SW181B	0.030	5.00	64.747	1500	483060.341	167784.372	1.361
R11C SW180	0.055	5.00	64.893	1500	483040.584	167761.432	2.631
R11C SW179	0.045	5.00	65.094	1500	483032.777	167748.223	2.863
R11C SW178	0.199	5.00	65.275	1500	483023.434	167737.626	3.147
R11C SW30	0.074	5.00	66.375	1200	483009.240	167678.077	1.500
R11C SW31			66.365	1200	483020.235	167685.120	1.685
R11C SW174	0.049	5.00	65.977	1200	483005.120	167706.192	1.572
R11C SW175	0.089	5.00	66.237	1200	482974.590	167693.545	1.803
R11C SW176	0.048	5.00	65.894	1200	482989.273	167708.919	1.802
R11C SW177	0.015	5.00	65.725	1350	482997.174	167716.316	1.906
R11C SW405	0.017	5.00	65.621	1500	483004.262	167722.011	3.548
R11C SW197	0.019	5.00	65.793	1500	482983.636	167747.762	3.785
R11C SW198			65.413	1500	482976.929	167755.400	3.425
R11C SW199	0.027	5.00	65.306	1500	482979.749	167759.753	3.332

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Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
R11C SW392	0.038	5.00	65.122	1500	482981.575	167769.653	3.162
R11C SW41	0.103	5.00	63.940	1200	483057.359	167853.399	1.675
R11C SW42	0.039	5.00	64.130	1200	483065.874	167846.663	1.938
R11C SW43	0.080	5.00	64.098	1200	483057.851	167835.064	1.966
R11C SW44	0.019	5.00	63.711	1200	483028.614	167854.079	1.745
R11C SW45	0.036	5.00	63.877	1350	483015.561	167836.762	2.152
R11C SW46	0.037	5.00	64.026	1350	483005.836	167818.977	2.350
R11C SW47	0.047	5.00	64.379	1500	482993.554	167805.288	2.930
R11C SW196			64.475	1500	482989.924	167795.189	3.045
R11C SW200			64.875	1500	482984.371	167779.495	3.624
R11C SW223-CC			62.817	1500	482918.625	167812.200	1.977
R11C outfall			62.500		482906.732	167829.168	1.780
R11C HW1			63.600		482947.555	167793.342	2.510
R11C HWO	0.158	5.00	63.600		482927.834	167805.171	2.600

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	R11C SW1	R11C SW2	12.686	0.600	64.100	64.025	0.075	169.1	225	5.21	50.0
1.001	R11C SW2	R11C SW3	15.935	0.600	64.025	63.931	0.094	169.5	225	5.48	50.0
1.002	R11C SW3	R11C SW4	9.691	0.600	63.931	63.874	0.057	170.0	225	5.64	50.0
1.003	R11C SW4	R11C SW7	6.371	0.600	63.874	63.837	0.037	172.2	225	5.74	50.0
2.000	R11C SW5	R11C SW6	23.571	0.600	64.869	64.449	0.420	56.1	225	5.22	50.0
2.001	R11C SW6	R11C SW7	12.043	0.600	64.374	63.762	0.612	19.7	300	5.28	50.0
1.004	R11C SW7	R11C SW8	31.513	0.600	63.762	63.631	0.131	240.6	300	6.27	50.0
1.005	R11C SW8	R11C SW11	22.300	0.600	63.631	63.538	0.093	239.8	300	6.63	50.0
3.000	R11C SW9	R11C SW10	33.782	0.600	65.625	64.920	0.705	47.9	225	5.30	50.0
3.001	R11C SW10	R11C SW11	9.111	0.600	64.920	63.613	1.307	7.0	225	5.33	50.0
1.006	R11C SW11	R11C SW12	15.509	0.600	63.538	63.473	0.065	238.6	375	6.85	50.0
1.007	R11C SW12	R11C SW17	14.535	0.600	63.398	63.337	0.061	238.3	375	7.06	50.0
4.000	R11C SW13	R11C SW15	13.085	0.600	64.540	64.463	0.077	169.9	225	5.22	50.0
5.000	R11C SW14	R11C SW15	11.841	0.600	64.780	64.463	0.317	37.4	225	5.09	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	1.002	39.8	9.1	1.215	1.419	0.053	0.0
1.001	1.001	39.8	10.3	1.419	1.681	0.060	0.0
1.002	1.000	39.7	13.7	1.681	1.848	0.080	0.0
1.003	0.993	39.5	13.7	1.848	1.992	0.080	0.0
2.000	1.749	69.5	9.1	1.275	1.456	0.053	0.0
2.001	3.560	251.6	14.9	1.456	1.992	0.087	0.0
1.004	1.009	71.3	35.7	1.992	2.387	0.208	0.0
1.005	1.011	71.4	41.5	2.387	2.372	0.242	0.0
3.000	1.894	75.3	18.5	1.275	1.275	0.108	0.0
3.001	4.987	198.3	22.8	1.275	2.372	0.133	0.0
1.006	1.168	129.0	71.6	2.297	2.012	0.417	0.0
1.007	1.169	129.1	83.6	2.087	1.813	0.487	0.0
4.000	1.000	39.8	11.0	1.275	1.462	0.064	0.0
5.000	2.147	85.4	10.8	1.275	1.462	0.063	0.0

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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)
4.001	R11C SW15	R11C SW16	39.407	0.600	64.463	63.789	0.674	58.5	225	5.60	50.0
4.002	R11C SW16	R11C SW17	19.898	0.600	63.714	63.413	0.301	66.1	300	5.77	50.0
1.008	R11C SW17	R11C SW18	18.503	0.600	63.262	63.217	0.045	411.2	375	7.41	50.0
1.009	R11C SW18	R11C SW162	6.285	0.600	63.217	63.200	0.017	369.7	450	7.51	50.0
1.010	R11C SW162	R11C SW170	6.744	0.600	63.200	62.647	0.553	12.2	450	7.53	50.0
6.000	R11C SW168	R11C SW169	11.716	0.600	63.123	63.053	0.070	167.4	225	5.19	50.0
6.001	R11C SW169	R11C SW169A	24.260	0.600	63.053	62.923	0.130	186.6	225	5.62	50.0
6.002	R11C SW169A	R11C SW170	5.036	0.600	62.863	62.842	0.021	239.8	300	5.70	50.0
1.011	R11C SW170	R11C SW171	13.524	0.600	62.617	62.584	0.033	409.8	525	7.73	50.0
1.012	R11C SW171	R11C SW172	15.122	0.600	62.584	62.547	0.037	408.7	525	7.96	50.0
1.013	R11C SW172	R11C SW182	9.964	0.600	62.547	62.522	0.025	398.6	525	8.11	50.0
1.014	R11C SW182	R11C SW181	11.327	0.600	62.447	62.424	0.023	492.5	600	8.28	50.0
1.015	R11C SW181	R11C SW181A	15.024	0.600	62.349	62.319	0.030	500.8	675	8.50	50.0
10.000	R11C SW181B	R11C SW181A	8.277	0.600	63.386	62.769	0.617	13.4	225	5.04	50.0
1.015A	R11C SW181A	R11C SW180	28.457	0.600	62.319	62.262	0.057	499.2	675	8.91	50.0
1.016	R11C SW180	R11C SW179	15.344	0.600	62.262	62.231	0.031	495.0	675	9.12	50.0
1.017	R11C SW179	R11C SW178	14.128	0.600	62.231	62.203	0.028	504.6	675	9.33	50.0
1.018	R11C SW178	R11C SW405	27.283	0.600	62.128	62.073	0.055	496.1	750	9.69	50.0
7.000	R11C SW30	R11C SW31	13.057	0.600	64.875	64.680	0.195	67.0	225	5.14	50.0
7.001	R11C SW31	R11C SW174	25.932	0.600	64.680	64.480	0.200	129.7	225	5.51	50.0
7.002	R11C SW174	R11C SW177	12.870	0.600	64.405	63.894	0.511	25.2	300	5.58	50.0
8.000	R11C SW175	R11C SW176	21.260	0.600	64.434	64.092	0.342	62.2	300	5.18	50.0
8.001	R11C SW176	R11C SW177	10.823	0.600	64.092	63.894	0.198	54.7	300	5.26	50.0
7.003	R11C SW177	R11C SW405	6.536	0.600	63.819	62.448	1.371	4.8	375	5.59	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
4.001	1.713	68.1	34.5	1.462	1.611	0.201	0.0
4.002	1.936	136.9	36.2	1.611	1.812	0.211	0.0
1.008	0.887	98.0	122.2	1.888	1.528	0.712	0.0
1.009	1.051	167.2	127.2	1.453	1.384	0.741	0.0
1.010	5.845	929.6	134.8	1.384	1.822	0.785	0.0
6.000	1.008	40.1	5.3	0.981	1.256	0.031	0.0
6.001	0.954	37.9	15.3	1.256	1.710	0.089	0.0
6.002	1.011	71.4	15.3	1.695	1.777	0.089	0.0
1.011	1.100	238.1	153.0	1.777	1.623	0.891	0.0
1.012	1.101	238.4	155.7	1.623	1.474	0.907	0.0
1.013	1.116	241.5	159.0	1.474	1.386	0.926	0.0
1.014	1.090	308.3	159.0	1.386	1.364	0.926	0.0
1.015	1.164	416.6	186.9	1.364	1.544	1.089	0.0
10.000	3.591	142.8	5.1	1.136	1.544	0.030	0.0
1.015A	1.166	417.2	192.1	1.544	1.956	1.119	0.0
1.016	1.171	419.0	201.5	1.956	2.188	1.174	0.0
1.017	1.160	415.0	209.3	2.188	2.397	1.219	0.0
1.018	1.249	552.0	243.4	2.397	2.798	1.418	0.0
7.000	1.600	63.6	12.7	1.275	1.460	0.074	0.0
7.001	1.146	45.6	12.7	1.460	1.272	0.074	0.0
7.002	3.145	222.3	21.1	1.272	1.531	0.123	0.0
8.000	1.997	141.2	15.3	1.503	1.502	0.089	0.0
8.001	2.131	150.6	23.5	1.502	1.531	0.137	0.0
7.003	8.344	921.5	47.2	1.531	2.798	0.275	0.0

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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)
1.019	R11C SW405	R11C SW197	32.562	0.600	62.073	62.008	0.065	501.0	750	10.13	50.0
1.020	R11C SW197	R11C SW198	9.961	0.600	62.008	61.988	0.020	498.1	750	10.26	50.0
1.021	R11C SW198	R11C SW199	7.241	0.600	61.988	61.974	0.014	517.2	750	10.36	50.0
1.022	R11C SW199	R11C SW392	10.066	0.600	61.974	61.960	0.014	719.0	750	10.52	50.0
1.023	R11C SW392	R11C SW200	10.232	0.600	61.960	61.251	0.709	14.4	750	10.54	50.0
9.000	R11C SW41	R11C SW42	10.857	0.600	62.265	62.192	0.073	148.7	300	5.14	50.0
9.001	R11C SW42	R11C SW43	14.103	0.600	62.192	62.132	0.060	235.1	300	5.37	50.0
9.002	R11C SW43	R11C SW44	34.877	0.600	62.132	61.966	0.166	210.1	300	5.91	50.0
9.003	R11C SW44	R11C SW45	21.685	0.600	61.966	61.875	0.091	238.3	300	6.27	50.0
9.004	R11C SW45	R11C SW46	20.271	0.600	61.725	61.676	0.049	413.7	450	6.61	50.0
9.005	R11C SW46	R11C SW47	18.391	0.600	61.676	61.599	0.077	238.8	450	6.84	50.0
9.006	R11C SW47	R11C SW196	10.731	0.600	61.449	61.430	0.019	564.8	600	7.02	50.0
9.007	R11C SW196	R11C SW200	16.648	0.600	61.430	61.401	0.029	574.1	600	7.29	50.0
1.024	R11C SW200	R11C HW1	46.946	0.600	61.251	61.190	0.061	769.6	750	11.33	50.0
1.025	R11C HWO	R11C SW223-CC	27.247	0.600	61.000	60.840	0.160	170.3	600	5.24	50.0
1.026	R11C SW223-CC	R11C outfall	20.303	0.600	60.840	60.720	0.120	169.2	225	5.58	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.019	1.243	549.2	293.5	2.798	3.035	1.710	0.0
1.020	1.247	550.8	296.8	3.035	2.675	1.729	0.0
1.021	1.223	540.4	296.8	2.675	2.582	1.729	0.0
1.022	1.036	457.5	301.4	2.582	2.412	1.756	0.0
1.023	7.387	3263.6	308.0	2.412	2.874	1.794	0.0
9.000	1.287	91.0	17.7	1.375	1.638	0.103	0.0
9.001	1.021	72.2	24.4	1.638	1.666	0.142	0.0
9.002	1.081	76.4	38.1	1.666	1.445	0.222	0.0
9.003	1.014	71.7	41.4	1.445	1.702	0.241	0.0
9.004	0.993	157.9	47.6	1.702	1.900	0.277	0.0
9.005	1.311	208.5	53.9	1.900	2.330	0.314	0.0
9.006	1.017	287.6	62.0	2.330	2.445	0.361	0.0
9.007	1.009	285.3	62.0	2.445	2.874	0.361	0.0
1.024	1.001	442.1	369.9	2.874	1.660	2.155	0.0
1.025	1.863	526.7	27.1	2.000	1.377	0.158	0.0
1.026	1.002	39.8	27.1	1.752	1.555	0.158	0.0

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	12.686	169.1	225	1 STANDARD	65.540	64.100	1.215	65.669	64.025	1.419
1.001	15.935	169.5	225	1 STANDARD	65.669	64.025	1.419	65.837	63.931	1.681
1.002	9.691	170.0	225	1 STANDARD	65.837	63.931	1.681	65.947	63.874	1.848
1.003	6.371	172.2	225	1 STANDARD	65.947	63.874	1.848	66.054	63.837	1.992

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	R11C SW1	1200	Manhole	1 STANDARD	R11C SW2	1200	Manhole	1 STANDARD
1.001	R11C SW2	1200	Manhole	1 STANDARD	R11C SW3	1200	Manhole	1 STANDARD
1.002	R11C SW3	1200	Manhole	1 STANDARD	R11C SW4	1200	Manhole	1 STANDARD
1.003	R11C SW4	1200	Manhole	1 STANDARD	R11C SW7	1200	Manhole	1 STANDARD

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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)
2.000	23.571	56.1	225	1 STANDARD	66.369	64.869	1.275	66.130	64.449	1.456
2.001	12.043	19.7	300	1 STANDARD	66.130	64.374	1.456	66.054	63.762	1.992
1.004	31.513	240.6	300	1 STANDARD	66.054	63.762	1.992	66.318	63.631	2.387
1.005	22.300	239.8	300	1 STANDARD	66.318	63.631	2.387	66.210	63.538	2.372
3.000	33.782	47.9	225	1 STANDARD	67.125	65.625	1.275	66.420	64.920	1.275
3.001	9.111	7.0	225	1 STANDARD	66.420	64.920	1.275	66.210	63.613	2.372
1.006	15.509	238.6	375	1 STANDARD	66.210	63.538	2.297	65.860	63.473	2.012
1.007	14.535	238.3	375	1 STANDARD	65.860	63.398	2.087	65.525	63.337	1.813
4.000	13.085	169.9	225	1 STANDARD	66.040	64.540	1.275	66.150	64.463	1.462
5.000	11.841	37.4	225	1 STANDARD	66.280	64.780	1.275	66.150	64.463	1.462
4.001	39.407	58.5	225	1 STANDARD	66.150	64.463	1.462	65.625	63.789	1.611
4.002	19.898	66.1	300	1 STANDARD	65.625	63.714	1.611	65.525	63.413	1.812
1.008	18.503	411.2	375	1 STANDARD	65.525	63.262	1.888	65.120	63.217	1.528
1.009	6.285	369.7	450	1 STANDARD	65.120	63.217	1.453	65.034	63.200	1.384
1.010	6.744	12.2	450	1 STANDARD	65.034	63.200	1.384	64.919	62.647	1.822
6.000	11.716	167.4	225	1 STANDARD	64.329	63.123	0.981	64.534	63.053	1.256
6.001	24.260	186.6	225	1 STANDARD	64.534	63.053	1.256	64.858	62.923	1.710
6.002	5.036	239.8	300	1 STANDARD	64.858	62.863	1.695	64.919	62.842	1.777
1.011	13.524	409.8	525	1 STANDARD	64.919	62.617	1.777	64.732	62.584	1.623
1.012	15.122	408.7	525	1 STANDARD	64.732	62.584	1.623	64.546	62.547	1.474
1.013	9.964	398.6	525	1 STANDARD	64.546	62.547	1.474	64.433	62.522	1.386
1.014	11.327	492.5	600	1 STANDARD	64.433	62.447	1.386	64.388	62.424	1.364
1.015	15.024	500.8	675	1 STANDARD	64.388	62.349	1.364	64.538	62.319	1.544
10.000	8.277	13.4	225	1 STANDARD	64.747	63.386	1.136	64.538	62.769	1.544
1.015A	28.457	499.2	675	1 STANDARD	64.538	62.319	1.544	64.893	62.262	1.956

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.000	R11C SW5	1200	Manhole	1 STANDARD	R11C SW6	1200	Manhole	1 STANDARD
2.001	R11C SW6	1200	Manhole	1 STANDARD	R11C SW7	1200	Manhole	1 STANDARD
1.004	R11C SW7	1200	Manhole	1 STANDARD	R11C SW8	1200	Manhole	1 STANDARD
1.005	R11C SW8	1200	Manhole	1 STANDARD	R11C SW11	1350	Manhole	1 STANDARD
3.000	R11C SW9	1200	Manhole	1 STANDARD	R11C SW10	1200	Manhole	1 STANDARD
3.001	R11C SW10	1200	Manhole	1 STANDARD	R11C SW11	1350	Manhole	1 STANDARD
1.006	R11C SW11	1350	Manhole	1 STANDARD	R11C SW12	1350	Manhole	1 STANDARD
1.007	R11C SW12	1350	Manhole	1 STANDARD	R11C SW17	1350	Manhole	1 STANDARD
4.000	R11C SW13	1200	Manhole	1 STANDARD	R11C SW15	1200	Manhole	1 STANDARD
5.000	R11C SW14	1200	Manhole	1 STANDARD	R11C SW15	1200	Manhole	1 STANDARD
4.001	R11C SW15	1200	Manhole	1 STANDARD	R11C SW16	1200	Manhole	1 STANDARD
4.002	R11C SW16	1200	Manhole	1 STANDARD	R11C SW17	1350	Manhole	1 STANDARD
1.008	R11C SW17	1350	Manhole	1 STANDARD	R11C SW18	1350	Manhole	1 STANDARD
1.009	R11C SW18	1350	Manhole	1 STANDARD	R11C SW162	1500	Manhole	1 STANDARD
1.010	R11C SW162	1500	Manhole	1 STANDARD	R11C SW170	1500	Manhole	1 STANDARD
6.000	R11C SW168	1800	Manhole	1 STANDARD	R11C SW169	1800	Manhole	1 STANDARD
6.001	R11C SW169	1800	Manhole	1 STANDARD	R11C SW169A	1800	Manhole	1 STANDARD
6.002	R11C SW169A	1800	Manhole	1 STANDARD	R11C SW170	1500	Manhole	1 STANDARD
1.011	R11C SW170	1500	Manhole	1 STANDARD	R11C SW171	1500	Manhole	1 STANDARD
1.012	R11C SW171	1500	Manhole	1 STANDARD	R11C SW172	1800	Manhole	1 STANDARD
1.013	R11C SW172	1800	Manhole	1 STANDARD	R11C SW182	1800	Manhole	1 STANDARD
1.014	R11C SW182	1800	Manhole	1 STANDARD	R11C SW181	1800	Manhole	1 STANDARD
1.015	R11C SW181	1800	Manhole	1 STANDARD	R11C SW181A	1200	Manhole	1 STANDARD
10.000	R11C SW181B	1500	Manhole	1 STANDARD	R11C SW181A	1200	Manhole	1 STANDARD
1.015A	R11C SW181A	1200	Manhole	1 STANDARD	R11C SW180	1500	Manhole	1 STANDARD

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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)
1.016	15.344	495.0	675	1 STANDARD	64.893	62.262	1.956	65.094	62.231	2.188
1.017	14.128	504.6	675	1 STANDARD	65.094	62.231	2.188	65.275	62.203	2.397
1.018	27.283	496.1	750	1 STANDARD	65.275	62.128	2.397	65.621	62.073	2.798
7.000	13.057	67.0	225	1 STANDARD	66.375	64.875	1.275	66.365	64.680	1.460
7.001	25.932	129.7	225	1 STANDARD	66.365	64.680	1.460	65.977	64.480	1.272
7.002	12.870	25.2	300	1 STANDARD	65.977	64.405	1.272	65.725	63.894	1.531
8.000	21.260	62.2	300	1 STANDARD	66.237	64.434	1.503	65.894	64.092	1.502
8.001	10.823	54.7	300	1 STANDARD	65.894	64.092	1.502	65.725	63.894	1.531
7.003	6.536	4.8	375	1 STANDARD	65.725	63.819	1.531	65.621	62.448	2.798
1.019	32.562	501.0	750	1 STANDARD	65.621	62.073	2.798	65.793	62.008	3.035
1.020	9.961	498.1	750	1 STANDARD	65.793	62.008	3.035	65.413	61.988	2.675
1.021	7.241	517.2	750	1 STANDARD	65.413	61.988	2.675	65.306	61.974	2.582
1.022	10.066	719.0	750	1 STANDARD	65.306	61.974	2.582	65.122	61.960	2.412
1.023	10.232	14.4	750	1 STANDARD	65.122	61.960	2.412	64.875	61.251	2.874
9.000	10.857	148.7	300	1 STANDARD	63.940	62.265	1.375	64.130	62.192	1.638
9.001	14.103	235.1	300	1 STANDARD	64.130	62.192	1.638	64.098	62.132	1.666
9.002	34.877	210.1	300	1 STANDARD	64.098	62.132	1.666	63.711	61.966	1.445
9.003	21.685	238.3	300	1 STANDARD	63.711	61.966	1.445	63.877	61.875	1.702
9.004	20.271	413.7	450	1 STANDARD	63.877	61.725	1.702	64.026	61.676	1.900
9.005	18.391	238.8	450	1 STANDARD	64.026	61.676	1.900	64.379	61.599	2.330
9.006	10.731	564.8	600	1 STANDARD	64.379	61.449	2.330	64.475	61.430	2.445
9.007	16.648	574.1	600	1 STANDARD	64.475	61.430	2.445	64.875	61.401	2.874
1.024	46.946	769.6	750	1 STANDARD	64.875	61.251	2.874	63.600	61.190	1.660
1.025	27.247	170.3	600	1 STANDARD	63.600	61.000	2.000	62.817	60.840	1.377
1.026	20.303	169.2	225	1 STANDARD	62.817	60.840	1.752	62.500	60.720	1.555

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.016	R11C SW180	1500	Manhole	1 STANDARD	R11C SW179	1500	Manhole	1 STANDARD
1.017	R11C SW179	1500	Manhole	1 STANDARD	R11C SW178	1500	Manhole	1 STANDARD
1.018	R11C SW178	1500	Manhole	1 STANDARD	R11C SW405	1500	Manhole	1 STANDARD
7.000	R11C SW30	1200	Manhole	1 STANDARD	R11C SW31	1200	Manhole	1 STANDARD
7.001	R11C SW31	1200	Manhole	1 STANDARD	R11C SW174	1200	Manhole	1 STANDARD
7.002	R11C SW174	1200	Manhole	1 STANDARD	R11C SW177	1350	Manhole	1 STANDARD
8.000	R11C SW175	1200	Manhole	1 STANDARD	R11C SW176	1200	Manhole	1 STANDARD
8.001	R11C SW176	1200	Manhole	1 STANDARD	R11C SW177	1350	Manhole	1 STANDARD
7.003	R11C SW177	1350	Manhole	1 STANDARD	R11C SW405	1500	Manhole	1 STANDARD
1.019	R11C SW405	1500	Manhole	1 STANDARD	R11C SW197	1500	Manhole	1 STANDARD
1.020	R11C SW197	1500	Manhole	1 STANDARD	R11C SW198	1500	Manhole	1 STANDARD
1.021	R11C SW198	1500	Manhole	1 STANDARD	R11C SW199	1500	Manhole	1 STANDARD
1.022	R11C SW199	1500	Manhole	1 STANDARD	R11C SW392	1500	Manhole	1 STANDARD
1.023	R11C SW392	1500	Manhole	1 STANDARD	R11C SW200	1500	Manhole	1 STANDARD
9.000	R11C SW41	1200	Manhole	1 STANDARD	R11C SW42	1200	Manhole	1 STANDARD
9.001	R11C SW42	1200	Manhole	1 STANDARD	R11C SW43	1200	Manhole	1 STANDARD
9.002	R11C SW43	1200	Manhole	1 STANDARD	R11C SW44	1200	Manhole	1 STANDARD
9.003	R11C SW44	1200	Manhole	1 STANDARD	R11C SW45	1350	Manhole	1 STANDARD
9.004	R11C SW45	1350	Manhole	1 STANDARD	R11C SW46	1350	Manhole	1 STANDARD
9.005	R11C SW46	1350	Manhole	1 STANDARD	R11C SW47	1500	Manhole	1 STANDARD
9.006	R11C SW47	1500	Manhole	1 STANDARD	R11C SW196	1500	Manhole	1 STANDARD
9.007	R11C SW196	1500	Manhole	1 STANDARD	R11C SW200	1500	Manhole	1 STANDARD
1.024	R11C SW200	1500	Manhole	1 STANDARD	R11C HW1		Junction	
1.025	R11C HWO		Junction		R11C SW223-CC	1500	Manhole	1 STANDARD
1.026	R11C SW223-CC	1500	Manhole	1 STANDARD	R11C outfall		Manhole	1 STANDARD

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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	0.950	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	0.950	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	0	0

Node R11C SW223-CC Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	60.840	Product Number	CTL-SHE-0138-1000-1500-1000
Design Depth (m)	1.500	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	10.0	Min Node Diameter (mm)	1200

Node R11C SW1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	64.900	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	8	Depth (m)	
Safety Factor	2.0	Width (m)	9.600	Inf Depth (m)	
Porosity	0.30	Length (m)	40.000		

Node R11C SW13 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	65.440	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	5	Depth (m)	
Safety Factor	2.0	Width (m)	11.000	Inf Depth (m)	
Porosity	0.30	Length (m)	18.300		

Node R11C HWO Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	45.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	61.000	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.035

Inlets

R11C HW1

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	684.1	0.0	2.600	1799.4	0.0

Node R11C SW181B Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	64.011	Slope (1:X)	55.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	
Safety Factor	2.0	Width (m)	18.700	Inf Depth (m)	
Porosity	1.00	Length (m)	15.000		

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.79%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	R11C SW1	38	65.286	1.186	67.5	22.8064	0.0000	FLOOD RISK
60 minute summer	R11C SW2	35	65.302	1.277	58.7	1.4438	0.0000	SURCHARGED
60 minute summer	R11C SW3	35	65.386	1.455	61.9	1.6454	0.0000	SURCHARGED
60 minute summer	R11C SW4	35	65.413	1.539	63.0	1.7407	0.0000	SURCHARGED
60 minute summer	R11C SW5	35	65.544	0.675	31.4	0.7633	0.0000	SURCHARGED
60 minute summer	R11C SW6	35	65.464	1.090	48.9	1.2325	0.0000	SURCHARGED
60 minute summer	R11C SW7	35	65.433	1.671	85.0	1.8896	0.0000	SURCHARGED
60 minute summer	R11C SW8	35	65.369	1.738	93.1	1.9659	0.0000	SURCHARGED
60 minute summer	R11C SW9	34	66.072	0.447	63.9	0.5054	0.0000	SURCHARGED
60 minute summer	R11C SW10	34	65.548	0.628	76.7	0.7107	0.0000	SURCHARGED
60 minute summer	R11C SW11	34	65.278	1.740	163.5	2.4895	0.0000	SURCHARGED
60 minute summer	R11C SW12	34	65.132	1.734	194.6	2.4809	0.0000	SURCHARGED
60 minute summer	R11C SW13	37	65.759	1.219	51.7	15.1164	0.0000	FLOOD RISK
60 minute summer	R11C SW14	36	65.781	1.001	37.3	1.1324	0.0000	SURCHARGED
60 minute summer	R11C SW15	36	65.736	1.273	84.6	1.4402	0.0000	SURCHARGED
60 minute summer	R11C SW16	35	65.024	1.310	87.8	1.4820	0.0000	SURCHARGED
60 minute summer	R11C SW17	35	64.917	1.655	269.0	2.3685	0.0000	SURCHARGED
60 minute summer	R11C SW18	34	64.427	1.210	283.8	1.7311	0.0000	SURCHARGED
60 minute summer	R11C SW162	34	64.297	1.097	307.2	1.9378	0.0000	SURCHARGED
60 minute summer	R11C SW168	34	64.329	1.206	18.3	3.0693	1.0464	FLOOD
60 minute summer	R11C SW169	34	64.328	1.275	45.6	3.2440	0.0000	FLOOD RISK
60 minute summer	R11C SW169A	34	64.154	1.291	45.1	3.2852	0.0000	SURCHARGED
60 minute summer	R11C SW170	34	64.140	1.523	360.1	2.6907	0.0000	SURCHARGED
60 minute summer	R11C SW171	34	63.999	1.415	369.8	2.5000	0.0000	SURCHARGED
60 minute summer	R11C SW172	34	63.842	1.295	380.9	3.2961	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	R11C SW1	1.000	R11C SW2	58.0	1.459	1.456	0.5045	
60 minute summer	R11C SW2	1.001	R11C SW3	60.0	1.508	1.507	0.6338	
60 minute summer	R11C SW3	1.002	R11C SW4	63.0	1.584	1.585	0.3854	
60 minute summer	R11C SW4	1.003	R11C SW7	64.7	1.626	1.637	0.2534	
60 minute summer	R11C SW5	2.000	R11C SW6	28.8	1.514	0.415	0.9374	
60 minute summer	R11C SW6	2.001	R11C SW7	46.7	0.785	0.185	0.8481	
60 minute summer	R11C SW7	1.004	R11C SW8	87.6	1.244	1.228	2.2191	
60 minute summer	R11C SW8	1.005	R11C SW11	96.3	1.367	1.348	1.5704	
60 minute summer	R11C SW9	3.000	R11C SW10	61.9	2.295	0.822	1.3435	
60 minute summer	R11C SW10	3.001	R11C SW11	72.5	2.328	0.366	0.3624	
60 minute summer	R11C SW11	1.006	R11C SW12	155.4	1.409	1.205	1.7106	
60 minute summer	R11C SW12	1.007	R11C SW17	193.1	1.751	1.496	1.6032	
60 minute summer	R11C SW13	4.000	R11C SW15	63.2	1.589	1.589	0.5204	
60 minute summer	R11C SW14	5.000	R11C SW15	36.3	0.912	0.425	0.4709	
60 minute summer	R11C SW15	4.001	R11C SW16	86.1	2.166	1.265	1.5673	
60 minute summer	R11C SW16	4.002	R11C SW17	89.3	1.358	0.653	1.4012	
60 minute summer	R11C SW17	1.008	R11C SW18	269.1	2.440	2.747	2.0408	
60 minute summer	R11C SW18	1.009	R11C SW162	284.8	2.262	1.704	0.9958	
60 minute summer	R11C SW162	1.010	R11C SW170	308.3	1.946	0.332	1.0685	
60 minute summer	R11C SW168	6.000	R11C SW169	17.6	0.480	0.439	0.4660	
60 minute summer	R11C SW169	6.001	R11C SW169A	45.1	1.134	1.189	0.9648	
60 minute summer	R11C SW169A	6.002	R11C SW170	50.9	0.723	0.712	0.3546	
60 minute summer	R11C SW170	1.011	R11C SW171	363.6	1.683	1.527	2.9216	
60 minute summer	R11C SW171	1.012	R11C SW172	373.4	1.729	1.566	3.2668	
60 minute summer	R11C SW172	1.013	R11C SW182	385.7	1.786	1.597	2.1526	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.79%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	R11C SW182	34	63.707	1.260	385.7	3.2079	0.0000	SURCHARGED
60 minute summer	R11C SW181	34	63.630	1.281	464.4	3.2596	0.0000	SURCHARGED
60 minute summer	R11C SW181A	34	63.551	1.232	484.7	1.3930	0.0000	SURCHARGED
60 minute summer	R11C SW181B	34	63.559	0.173	17.7	0.3050	0.0000	OK
60 minute summer	R11C SW180	34	63.431	1.169	513.7	2.0657	0.0000	SURCHARGED
60 minute summer	R11C SW179	34	63.334	1.103	538.1	1.9495	0.0000	SURCHARGED
60 minute summer	R11C SW178	34	63.232	1.104	645.1	1.9503	0.0000	SURCHARGED
60 minute summer	R11C SW30	33	65.034	0.159	43.8	0.1797	0.0000	OK
60 minute summer	R11C SW31	33	64.871	0.191	43.8	0.2157	0.0000	OK
60 minute summer	R11C SW174	33	64.536	0.131	72.6	0.1486	0.0000	OK
60 minute summer	R11C SW175	33	64.567	0.133	52.7	0.1499	0.0000	OK
60 minute summer	R11C SW176	33	64.274	0.181	81.1	0.2053	0.0000	OK
60 minute summer	R11C SW177	33	63.934	0.115	162.5	0.1651	0.0000	OK
60 minute summer	R11C SW405	34	63.104	1.031	812.0	1.8213	0.0000	SURCHARGED
60 minute summer	R11C SW197	34	62.880	0.872	822.7	1.5407	0.0000	SURCHARGED
600 minute winter	R11C SW198	600	62.805	0.817	122.2	1.4434	0.0000	SURCHARGED
600 minute winter	R11C SW199	600	62.805	0.831	126.3	1.4681	0.0000	SURCHARGED
600 minute winter	R11C SW392	600	62.805	0.845	125.3	1.4929	0.0000	SURCHARGED
60 minute summer	R11C SW41	34	63.592	1.327	60.9	1.5012	0.0000	SURCHARGED
60 minute summer	R11C SW42	34	63.544	1.352	81.5	1.5292	0.0000	SURCHARGED
60 minute summer	R11C SW43	34	63.434	1.302	126.4	1.4720	0.0000	SURCHARGED
60 minute summer	R11C SW44	34	62.886	0.920	136.6	1.0407	0.0000	SURCHARGED
600 minute winter	R11C SW45	600	62.805	1.080	19.5	1.5457	0.0000	SURCHARGED
600 minute winter	R11C SW46	600	62.805	1.129	39.6	1.6156	0.0000	SURCHARGED
600 minute winter	R11C SW47	600	62.805	1.356	28.9	2.3959	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	R11C SW182	1.014	R11C SW181	390.8	1.388	1.268	3.1906	
60 minute summer	R11C SW181	1.015	R11C SW181A	466.9	1.308	1.121	5.3632	
60 minute summer	R11C SW181A	1.015A	R11C SW180	486.1	1.362	1.165	10.1585	
60 minute summer	R11C SW181B	10.000	R11C SW181A	17.8	1.960	0.125	0.2999	
60 minute summer	R11C SW180	1.016	R11C SW179	515.5	1.444	1.230	5.4775	
60 minute summer	R11C SW179	1.017	R11C SW178	539.8	1.512	1.301	5.0434	
60 minute summer	R11C SW178	1.018	R11C SW405	645.1	1.466	1.169	12.0078	
60 minute summer	R11C SW30	7.000	R11C SW31	43.8	1.349	0.688	0.4300	
60 minute summer	R11C SW31	7.001	R11C SW174	43.6	1.270	0.956	0.8907	
60 minute summer	R11C SW174	7.002	R11C SW177	72.5	2.635	0.326	0.3543	
60 minute summer	R11C SW175	8.000	R11C SW176	52.7	1.412	0.373	0.7927	
60 minute summer	R11C SW176	8.001	R11C SW177	81.1	1.994	0.538	0.4400	
60 minute summer	R11C SW177	7.003	R11C SW405	162.4	4.347	0.176	0.4544	
60 minute summer	R11C SW405	1.019	R11C SW197	812.0	1.845	1.478	14.3312	
60 minute summer	R11C SW197	1.020	R11C SW198	822.7	1.869	1.494	4.3840	
600 minute winter	R11C SW198	1.021	R11C SW199	124.4	1.035	0.230	3.1869	
600 minute winter	R11C SW199	1.022	R11C SW392	122.6	1.746	0.268	4.4303	
600 minute winter	R11C SW392	1.023	R11C SW200	217.2	1.047	0.067	4.5033	
60 minute summer	R11C SW41	9.000	R11C SW42	58.4	0.830	0.642	0.7645	
60 minute summer	R11C SW42	9.001	R11C SW43	80.6	1.144	1.117	0.9931	
60 minute summer	R11C SW43	9.002	R11C SW44	125.9	1.787	1.648	2.4560	
60 minute summer	R11C SW44	9.003	R11C SW45	136.7	1.941	1.907	1.5270	
600 minute winter	R11C SW45	9.004	R11C SW46	30.2	0.637	0.191	3.2118	
600 minute winter	R11C SW46	9.005	R11C SW47	20.4	0.757	0.098	2.9139	
600 minute winter	R11C SW47	9.006	R11C SW196	57.3	0.491	0.199	3.0227	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.79%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute winter	R11C SW196	600	62.805	1.375	57.3	2.4294	0.0000	SURCHARGED
600 minute winter	R11C SW200	600	62.805	1.554	281.7	2.7457	0.0000	SURCHARGED
600 minute winter	R11C SW223-CC	600	62.805	1.965	48.3	3.4723	0.0000	FLOOD RISK
600 minute winter	R11C outfall	600	60.801	0.081	11.1	0.0000	0.0000	OK
600 minute winter	R11C HW1	600	62.805	1.715	155.3	0.0000	0.0000	OK
600 minute winter	R11C HWO	600	62.805	1.805	121.5	0.0000	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
600 minute winter	R11C SW196	9.007	R11C SW200	64.5	0.586	0.226	4.6894	
600 minute winter	R11C SW200	1.024	R11C HW1	155.3	0.795	0.351	20.6619	
600 minute winter	R11C SW223-CC	1.026	R11C outfall	11.1	0.847	0.279	0.2667	487.7
600 minute winter	R11C HW1	Flow through Pond	R11C HWO	110.3	0.051	0.001	1869.6689	
600 minute winter	R11C HWO	1.025	R11C SW223-CC	48.3	0.515	0.092	7.6749	

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