



LODDON GARDEN VILLAGE / THAMES VALLEY SCIENCE PARK LINK ROAD
FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY

UNIVERSITY OF READING

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1.0 Introduction

1.1 Context

- 1.1.1 This Flood Risk Assessment (FRA) has been prepared by Abley Letchford, on behalf of the University of Reading to support a full planning application seeking planning permission for the construction of a Spine Road servicing Thames Valley Science Park. The site is located in Shinfield, Wokingham.

1.2 Development Proposals

- 1.2.1 The development proposals comprise full planning permission for the construction of a Spine Road between the Thames Valley Science Park (Application Ref: 232995) and Loddon Garden Village (Application Ref: 252498) to support delivery of Local Plan Update Policy SS13, landscaping, surface water attenuation and other associated works.
- 1.2.2 Development proposals are further illustrated within the Highway Alignment Drawing within **Appendix A**.

1.3 Requirement for a Flood Risk Assessment

- 1.3.1 The requirement for a FRA is set out in Section 14 of the National Planning Policy Framework (NPPF) as revised in February 2025.
- 1.3.2 The footnote accompanying Paragraph 181 states:

'A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.'

- 1.3.3 The site is a greenfield site that comprises land currently used for agricultural purposes. The area of the site is approximately 5 hectares. As the site area extends greater than 1 hectare, a site-specific flood risk assessment is required. To comply with the requirements of the NPPF, matters related to flood risk and drainage are addressed within this report.

1.4 Report Aim and Format

- 1.4.1 The principal aims of this report are to demonstrate that the proposed development complies with national and local planning policy with respect to flood risk and to demonstrate that a suitable drainage strategy can be provided as part of development.
- 1.4.2 This report will also summarise the impacts the development could have on flood risk to the surrounding area and outlines the mitigation strategies that will be implemented to minimise this risk.
- 1.4.3 The drainage design embraces the guiding principles of Sustainable Drainage Systems (SuDS) which are central to the design of the surface water drainage strategy for the proposed development.



1.5 Report Structure

1.5.1 This report addresses the requirements of revised NPPF and considers the following aspects:

- **Section 2: Policy and Sources of Information** – a review of policy relevant to the assessment and sources of information used to inform the assessment.
- **Section 3: Site Setting** – a description of the site location, topography, geology and hydrology.
- **Section 4: Overview of Flood Risk** – a review of data for flooding from all sources to determine the baseline flood risk to the site and an assessment of the impacts of the development on flood risk.
- **Section 5: Sequential Test and Exception Test** – a description of the proposed development and a classification of the vulnerability in the context of the Sequential Test and Exception Test.
- **Section 6: Flood Risk Mitigation** – the mitigation measures implemented to manage the potential flood risk to the development.
- **Sections 7 and 8: Drainage Strategy** – a summary of appropriate strategies to manage the surface water and foul water from the site in the post development scenario.
- **Section 9: Conclusion** – a summary of the development proposals in the context of site vulnerability and the requirements of the NPPF.



2.0 Policy and Sources of Information

2.1 Introduction

- 2.1.1 This chapter provides a review of policy relevant to the assessment and the available information on all sources of flood risk.

2.2 National Planning Policy

- 2.2.1 National Policy in relation to flood risk is set out in Section 14 of the National Planning Policy Framework (NPPF), February 2025 and Planning Practice Guidance (PPG) ID: 7 for Flood Risk and Coastal Change, September 2025. Flood Risk is discussed at Paragraphs 170 to 182 of the NPPF.

- 2.2.2 Paragraphs 172 to 177 discuss the sequential approach with respect to individual applications. Paragraph 174 refers to the Strategic Flood Risk Assessment (SFRA) that would form the basis of applying the Sequential Test for local authorities to allocate developments, whilst Paragraphs 178 to 179 relate to Exception Tests.

- 2.2.3 Paragraph 181 discusses the determination of planning applications stating:

'When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

- *Within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location.*
- *The development is appropriately flood resistant and resilient, such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment.*
- *It incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate.*
- *Any residual risk can be safely managed; and*
- *Safe access and escape routes are included where appropriate, as part of an agreed emergency plan.'*

- 2.2.4 The proposed development is for the construction of an access road. The site covers approximately 5 hectares. As the site is greater than 1 hectare, it is classed as major development.

- 2.2.5 Paragraph 182 states:

'Sustainable drainage systems provided as part of proposals for major development should:

- *Take account of advice from the Lead Local Flood Authority.*
- *Have appropriate proposed minimum operational standards; and*
- *Have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development.'*

- 2.2.6 The PPG sets out more specific guidance on how to apply and implement the NPPF policies. This includes guidance on when a Sequential Test is required and considerations on how to apply the



test. In Paragraph 023 of the PPG the aim of the sequential approach is clarified and includes the following:

‘The approach is designed to ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk.’

- 2.2.7 In applying the Sequential Test to planning applications, NPPF Paragraph 175 confirms specific development cases when the test is not applicable:

‘The sequential test should be used in areas known to be at risk now or in the future from any form of flooding, except in situations where a site-specific flood risk assessment demonstrates that no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements, would be located on an area that would be at risk of flooding from any source, now and in the future (having regard to potential changes in flood risk).’

- 2.2.8 The PPG goes on to state when and how to apply the Sequential Test to planning applications and in Paragraph 027 states:

‘...In applying paragraph 175 a proportionate approach should be taken. Where a site-specific flood risk assessment demonstrates clearly that the proposed layout, design and mitigation measures would ensure that occupiers and users would remain safe from current and future surface water flood risk for the lifetime of the development (therefore addressing the risks identified e.g. by Environment Agency flood risk mapping), without increasing flood risk elsewhere, then the Sequential Test need not be applied...’

2.3 Environment Agency

- 2.3.1 The Flood and Water Management Act (2010) provides the Environment Agency (EA) a strategic overview role for all forms of flooding and coastal erosion. They also have direct responsibility for the prevention, mitigation and remediation of flood damage for main rivers and coastal areas. The EA is a statutory consultee in relation to flood risk and planning dependent upon criteria.
- 2.3.2 The EA Flood Map for Planning, EA Long Term Flood Risk Mapping and the Catchment Data Explorer websites have been interrogated in respect to flood risk extents and sources.

2.4 Local Authorities

- 2.4.1 The site lies within the administrative area of Wokingham Borough Council (WBC). WBC is both the Local Planning Authority (LPA) and Lead Local Flood Authority (LLFA).
- 2.4.2 Planning guidance published by WBC regarding the flood risk was referred to in order to assess the methodology best suited to the local area. The following key documents were reviewed:
- WBC Local Development Framework, Core Strategy, Core Policy CP1 ‘Sustainable Development’ (adopted January 2010);
 - WBC Local Plan Update 2023-2040, Strategic Policy FD1 ‘Development and flood risk (from all sources) (dated 2023);
 - WBC Local Plan Update 2023-2040, Strategic Policy FD2 ‘Sustainable Drainage’ (dated 2023);
 - WBC Local Plan Update 2023-2040, Strategic Policy FD3 ‘River corridors and watercourses’ (dated 2023);
 - WBC Shinfield Neighbourhood Plan, Policy 8, ‘Flooding’ (February 2017);



- WBC Local Flood Risk Management Strategy (dated April 2015);
 - WBC Preliminary Flood Risk Assessment (PFRA) (dated June 2011);
 - WBC PFRA Addendum (dated December 2017);
 - WBC Level 1 Strategic Flood Risk Assessment (SFRA) (dated May 2023); and
 - WBC Level 2 SFRA (dated August 2023).
- 2.4.3 WBC became the LLFA under the Flood and Water Management Act 2010. WBC provide guidance to assess, manage and inform flood risk.
- 2.4.4 As LLFA, WBC's Flood and Water Management Team provide a Planning Application Drainage Checklist to assist developers seeking planning permission for new sites by setting criteria to be met as part of the design of the drainage strategy and a list of documentation to be presented in the associated Flood Risk Assessment. A completed Planning Application Drainage Checklist is included within **Appendix B**.
- 2.4.5 WBC has permissive rights over any Ordinary Watercourses including land drainage ditches. If any work is required within the watercourse (improvements or crossings) then approval from the LLFA is required under the Flood and Water Management Act 1991.
- 2.5 Local Water Authority**
- 2.5.1 Thames Water is responsible for both the supply of clean water and the disposal of wastewater in the Shinfield area.
- 2.5.2 Information with regards to sewer and water main flooding contained within the SFRA has been reviewed as part of this FRA. All Water Companies have a statutory obligation to maintain a register of properties and areas which are at risk of flooding from the public sewerage system and is shown on the DG5 Flood Register.
- 2.6 Other Sources of Information**
- 2.6.1 A desktop study of the site was carried out using the following websites to ascertain local features, hydrology and soil characteristics:
- DEFRA's Magic Map portal;
 - British Geological Survey (BGS) 'Geology of Britain' online viewer;
 - Cranfield University 'Soilscapes' portal; and
- 2.6.2 Guidance with respect to Sustainable Drainage Systems (SuDS) is contained within DEFRA document Sustainable Drainage Systems, Non-statutory technical standards for sustainable drainage systems March 2015, Construction Industry Research and Information Association (CIRIA) C753 The SuDS Manual and within the NPPF PPG – 'Flood Risk and Coastal Change'.
- 2.6.3 Additional guidance on development and flood risk is contained within CIRIA C624 Development and Flood Risk – Guidance for the Construction Industry which identifies several key aims for a development to ensure it is sustainable in flood risk terms.

3.0 Site Setting

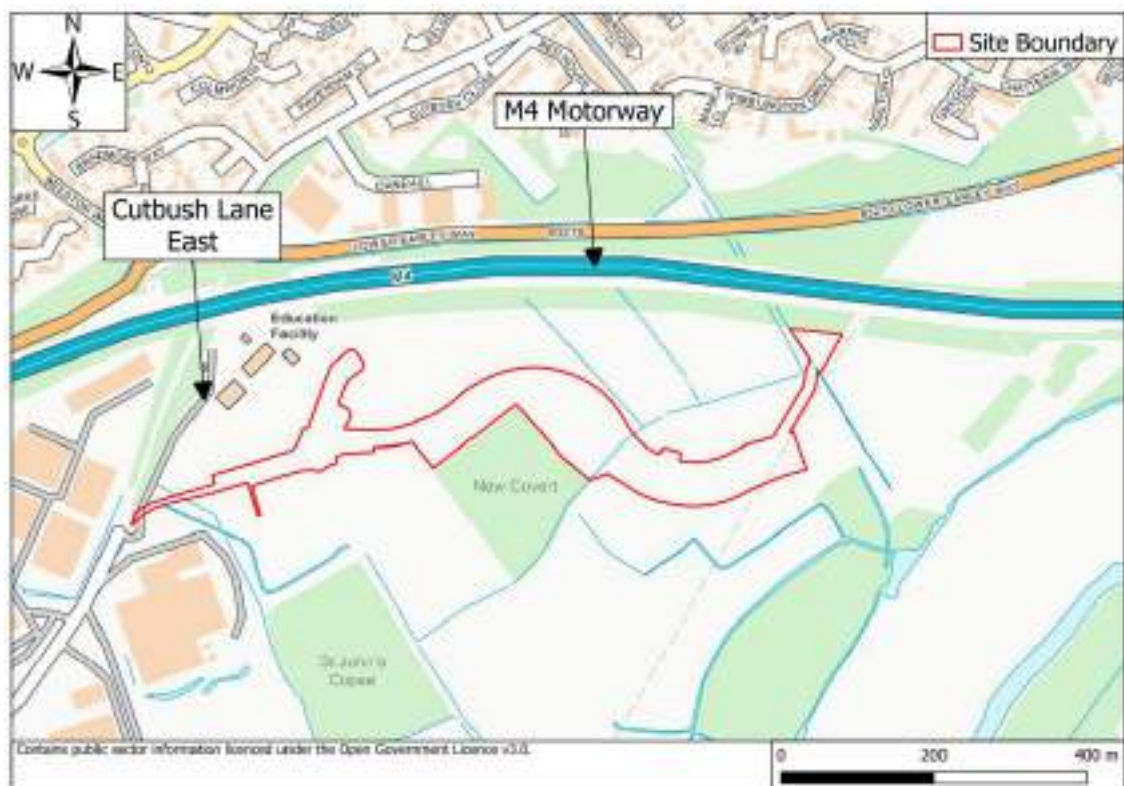
3.1 Introduction

3.1.1 This chapter provides a description of the site location, its topography, hydrological context, geology and hydrogeology.

3.2 Site Location

3.2.1 The site is located to the east of Cutbush Lane East and to the south of the M4. The nearest postcode is RG2 9LH. The site centre grid reference is SU 74859 69449. The site location is shown in **Figure 3.1**.

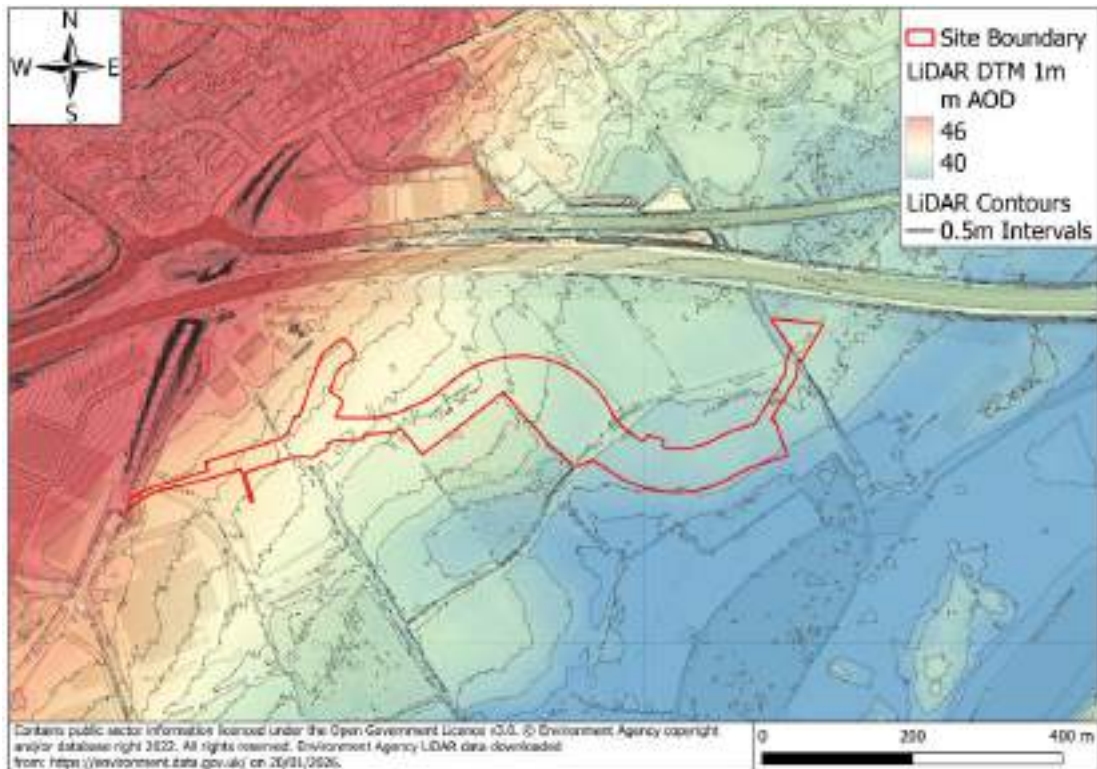
Figure 3.1: Site Location



3.3 Topography

3.3.1 The ground levels across the site are shown by LiDAR in **Figure 3.2**.

Figure 3.2: Site Topography

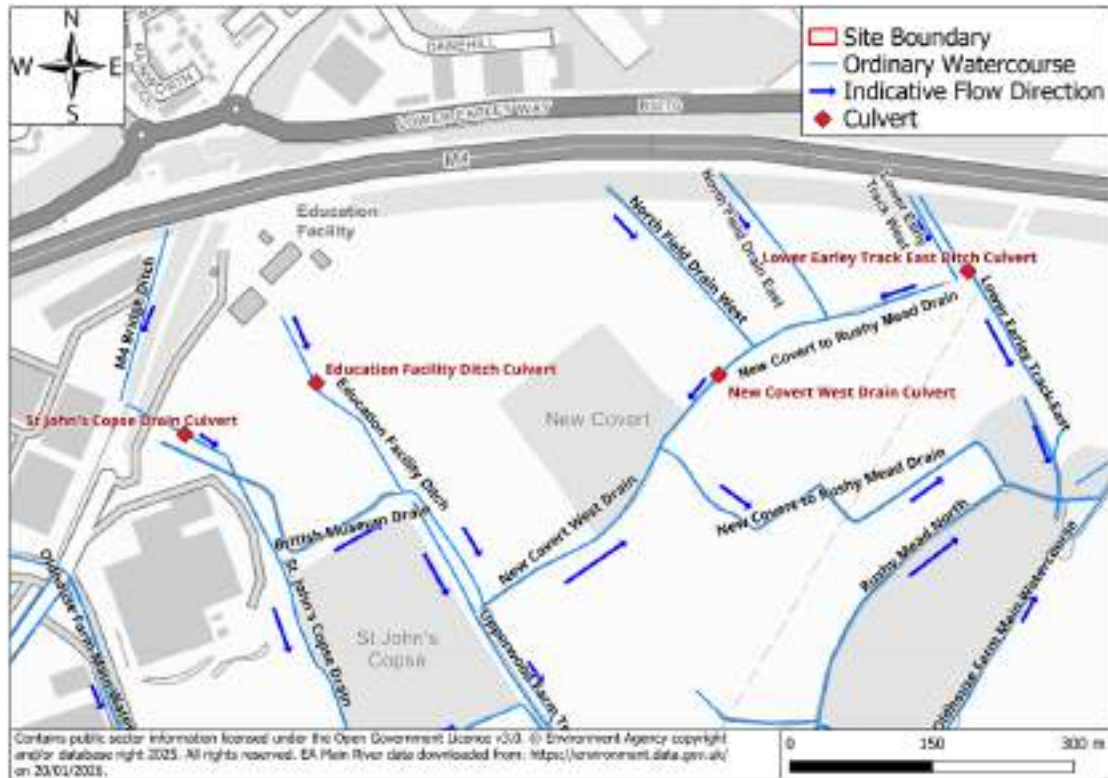


3.3.2 The LiDAR data presented in **Figure 3.2** shows that ground levels across the site slope from west to southeast. Ground levels are highest at the western corner of the site, with an elevation of approximately 46m AOD. Ground levels are lowest at the southeast corner of the site boundary with an elevation of approximately 40m AOD.

3.4 Watercourses and Ditches

- 3.4.1 There are several Ordinary Watercourses within and surrounding the site, as shown in **Figure 3.3**. **Figure 3.3** also shows the locations of key culverts within the watercourse network, under the current access road.

Figure 3.3: Watercourse Location



- 3.5 The figure shows a network of Ordinary Watercourses which flow in a southerly direction towards the River Loddon.
- 3.5.1 The M4 Bridge Ditch flows in a southerly direction. It is culverted under Cutbush Lane East. It is culverted under the temporary access road, which will be made permanent as part of this application. The M4 Bridge Ditch becomes St John's Copse Drain and flows in a southerly direction to the western side of St John's Copse where it continues in a southerly direction through the network of western watercourse ditches into the River Loddon.
- 3.5.2 The education facility ditch flows in a southerly direction. It is culverted under the current access track where it continues to flow in a southerly direction through the network of western watercourse ditches into the River Loddon.
- 3.5.3 The British Museum Drain begins at the temporary access track and flows along the northern and eastern edge of St John's Copse woodland. It continues in a southerly direction through the network of western watercourse ditches into the River Loddon.
- 3.5.4 New Covert to Rushy Mead Drain flows from west of the pumping station in a south westerly direction. It is culverted under the temporary access road. The New Covert to Rushy Mead Drain joins the British Museum drain to the east of St John's Copse. The New Covert to Rushy Mead Drain



has three tributaries; Lower Earley Track West, North Field Drain East and North Field Drain West. All three flow in a south easterly direction into New Covert to Rushy Mead Drain.

- 3.5.5 Lower Earley Track East flows in a south-easterly direction. It is culverted under the temporary access track in the eastern part of the site. It joins Rushy Mead North to the south of the site and continues in a southerly direction through the network of western watercourse ditches into the River Loddon.
- 3.5.6 A site walkover identified open field ditches and manmade ditches parallel to Cutbush Lane East. Ditches were also observed to the northwest of Cutbush Lane East. All the ditches parallel to Cutbush Lane East are directed and outfall to the east.
- 3.5.7 **Figure 3.3** shows the location of key culverts. There are three culverts under the temporary access road. These three culverts will be retained when the temporary access road is made permanent.

3.6 Surface and Foul Water Sewers

- 3.6.1 Thames Water Asset Location Plans (ALS/ALS/24/2020_4176313) provide sewer asset maps for the western part of the site. They show that the western part of the site is void of any surface water sewers. There is a foul sewer running across Cutbush Lane East. A copy of the Thames Water Asset Plans is included within **Appendix A**. Mapping was not available for the central and eastern part of the site at the time of writing.
- 3.6.2 The site visit identified a few gullies between the kerbs of Cutbush Lane East that serve the road and discharge to the ditches that run parallel to the road. Details of the highway drainage network are unknown, but it is anticipated that this highway drainage system discharges directly into the watercourses adjacent to the southeast.

3.7 Geology and Hydrogeology

- 3.7.1 The British Geological Survey (BGS) 'Geology of Britain' online viewer illustrates the geology underlying the site.
- 3.7.2 The site is underlain by the following geological formations:
- The bedrock geology of 'London Clay Formation – Clay, silt and sand' across the whole site.
 - Superficial geology of 'Fluvio-Aeolian deposits – Clay, silt and sand' across the majority of the site; and
 - Superficial geology of 'River Terrace Deposits – 4 - Sand and gravel in the easternmost part of the site.'
- 3.7.3 The Cranfield University 'Soilscapes' online viewer indicates that the whole site is underlain by 'loamy soils with naturally high groundwater'.
- 3.7.4 The DEFRA Magic Map online viewer indicates that the site lies outside of any groundwater Source Protection Zone (SPZ), Principal Aquifer designation or Groundwater Vulnerability area. The site is not underlain by a bedrock aquifer designation or a superficial aquifer designation.

4.0 Overview of Flood Risk

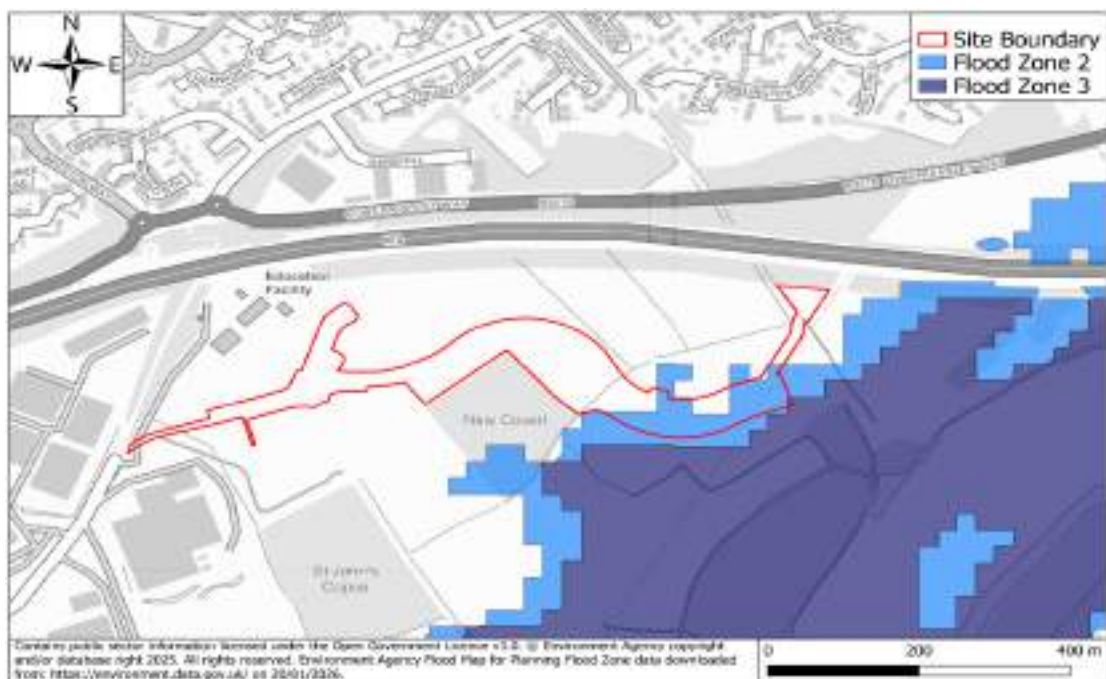
4.1 EA Flood Zone Map

4.1.1 The EA Flood Map for Planning provides an initial indication of the extent of Flood Zones. In the NPPF, Flood Zones are defined as follows:

- Flood Zone 1 'Low Probability' – Land less than 1 in 1,000 (0.1%) annual probability of river or sea flooding.
- Flood Zone 2 'Medium Probability' – Land between 1 in 100 (1%) and 1 in 1,000 (0.1%) annual probability of river flooding, or between 1 in 200 (0.5%) and 1 in 1,000 (0.1%) annual probability of sea flooding.
- Flood Zone 3 'High Probability' – Land at 1 in 100 (1%) or greater annual probability of river flooding, or 1 in 200 (0.5%) or greater annual probability of sea flooding.

4.1.2 **Figure 4.1** shows the EA Flood Zone mapping.

Figure 4.1: EA Flood Zone Mapping



4.1.3 **Figure 4.1** shows that most of the site is located within Flood Zone 1, where the probability of fluvial flood risk is 'Low'.

4.1.4 Areas in the east of the site lie within Flood Zone 2, where the probability of fluvial flood risk is 'Medium'.

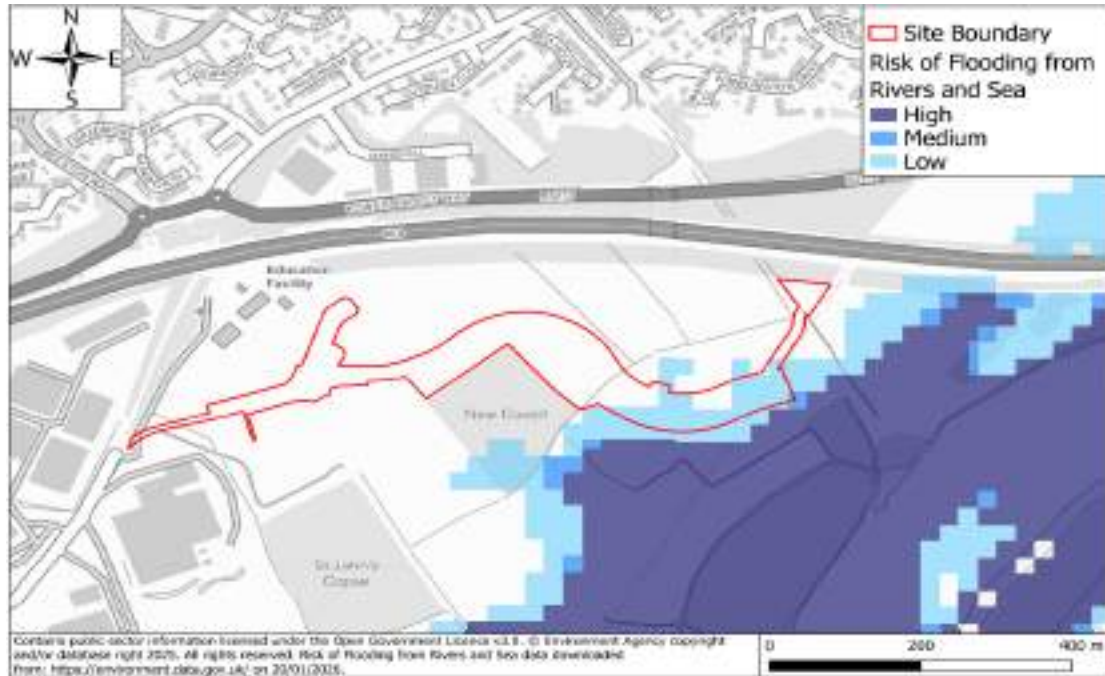
4.1.5 A small area of the site at the southeast corner lies within Flood Zone 3, where the probability of fluvial flood risk is 'High'.

4.2 Flood Risk from Fluvial Sources

EA Mapping of Risk of Flooding from Rivers and Sea

- 4.2.1 The EA produces mapping of flooding from river and sea as part of the NaFRA project, as shown in **Figure 4.2**.

Figure 4.2: EA NaFRA Risk of Flooding from Rivers and Sea

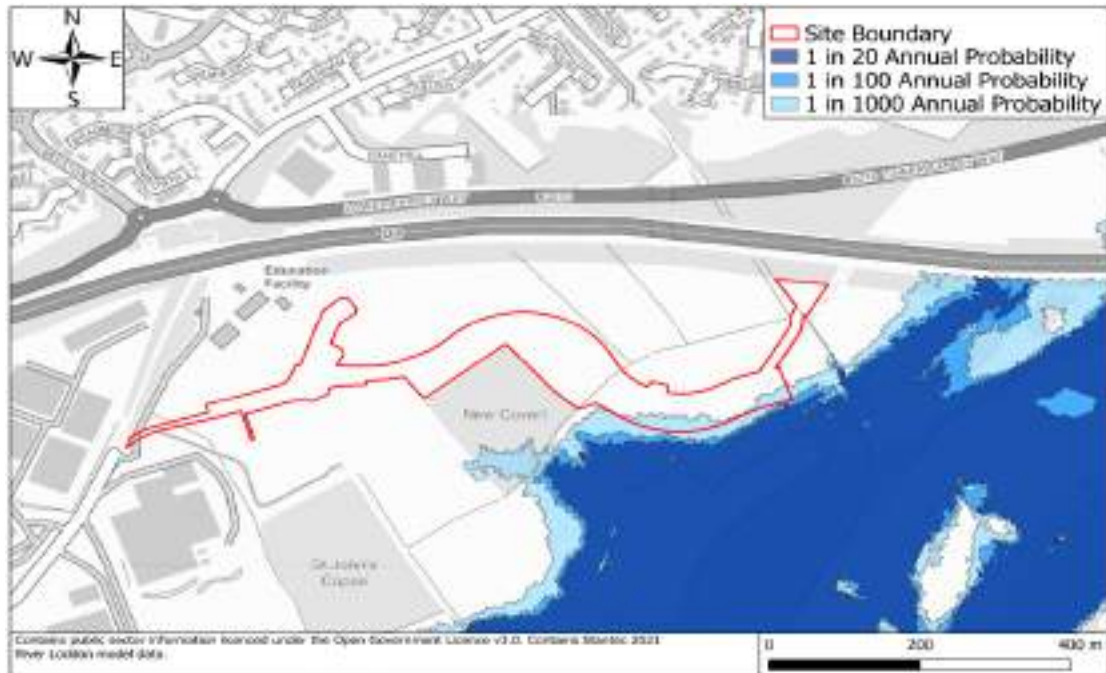


- 4.2.2 The EA NaFRA Risk of Flooding from Rivers and Sea mapping shown in **Figure 4.2** indicates that the majority of the site is not at risk of flooding from rivers and sea. However, an area at the east of the site is at a 'Low' risk of flooding from rivers and sea and a small area at the southeastern corner of the site encroaches into an area of 'Low' and 'Medium' risk of fluvial flooding from the River Loddon and its tributaries.

Detailed Flood Modelling of the River Loddon (Stantec 2021)

- 4.2.3 Stantec undertook detailed modelling of the River Loddon in 2021 to support the WBC Level 1 SFRA. Abley Letchford has rerun the model in the latest software version and using updated LiDAR data obtained in May 2025 to ensure that the model is reflective of the current topography of the site.
- 4.2.4 **Figure 4.3** shows the River Loddon (Stantec 2021) baseline modelled flood extents.

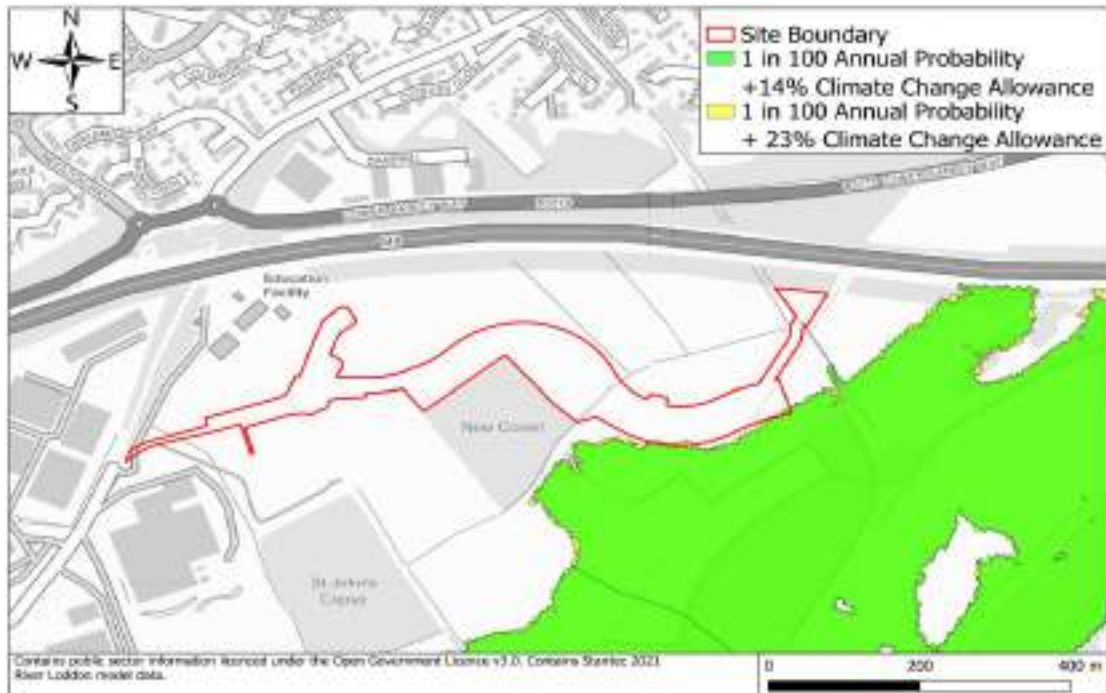
Figure 4.3: River Loddon (Stantec 2021) Modelled Baseline Flood Extents



- 4.2.5 The modelled flood extents shown in **Figure 4.3** indicate that the majority of the site is not at risk of fluvial flooding under all annual probability scenarios. A small area in the southeastern part of the site lies within an area at risk of fluvial flooding under a 1 in 1000 annual probability scenario.
- 4.2.6 The River Loddon (Stantec 2021) modelled flood extents have been used to define the Flood Zone outlines for this assessment. The modelled data is considered to be the best available information on the River Loddon flood extents in this area as it includes structures along the River Loddon, recent LiDAR data and recent development including the eastern relief road.
- 4.2.7 The 1 in 100 annual probability flood extent is the equivalent of Flood Zone 3. The site is located entirely outside of Flood Zone 3.
- 4.2.8 The 1 in 1000 annual probability flood extent is the equivalent of Flood Zone 2. The majority of the site is located entirely outside of Flood Zone 2. A small area along the southern and southeastern boundary of the site is located within Flood Zone 2.

4.2.9 **Figure 4.4** shows the River Loddon (Stantec 2021) 1 in 100 annual probability scenario modelled flood extents with a +14% and +23% climate change allowance.

Figure 4.4: River Loddon (Stantec 2021) Modelled Climate Change Flood Extents



4.2.10 The modelled flood extents shown in **Figure 4.4** indicate that the majority of the site is located outside the 1 in 100 annual probability flood outlines for both the +14% and +23% climate change allowances. The design flood event in line with the site's vulnerability and corresponding climate change allowance, as outlined within the NPPF and WBC Level 1 SFRA, is a 1 in 100-year event with a 14% climate change allowance, which is the 'Central' allowance for the Loddon and Tributaries Management Catchment. This is the 'total potential change anticipated for 2080s (2070-2115)' as outlined in the WBC Level 2 SFRA. The Spine Road has been designed whilst considering a 1 in 100 annual probability event with climate change. A small area along the southern boundary falls within the 1 in 100 annual probability flood extent when applying both the +14% and +23% allowance. In addition, the southeastern corner of the site encroaches slightly into the flood extents associated with the 1 in 100 annual probability event under both the +14% and +23% climate change scenarios.

4.2.11 Overall, given the EA NaFRA Risk of Flooding from Rivers and Sea mapping presented in **Figure 4.2** and the River Loddon (Stantec 2021) modelled flood extents shown in **Figure 4.3** and **Figure 4.4**, fluvial flood risk across the site is deemed low.

4.3 Flood Risk from Surface Water

4.3.1 The EA's Risk of Flooding from Surface Water mapping indicates areas that could be susceptible to surface water flooding during extreme rainfall events. The EA surface water mapping defines rainfall events based on the following:

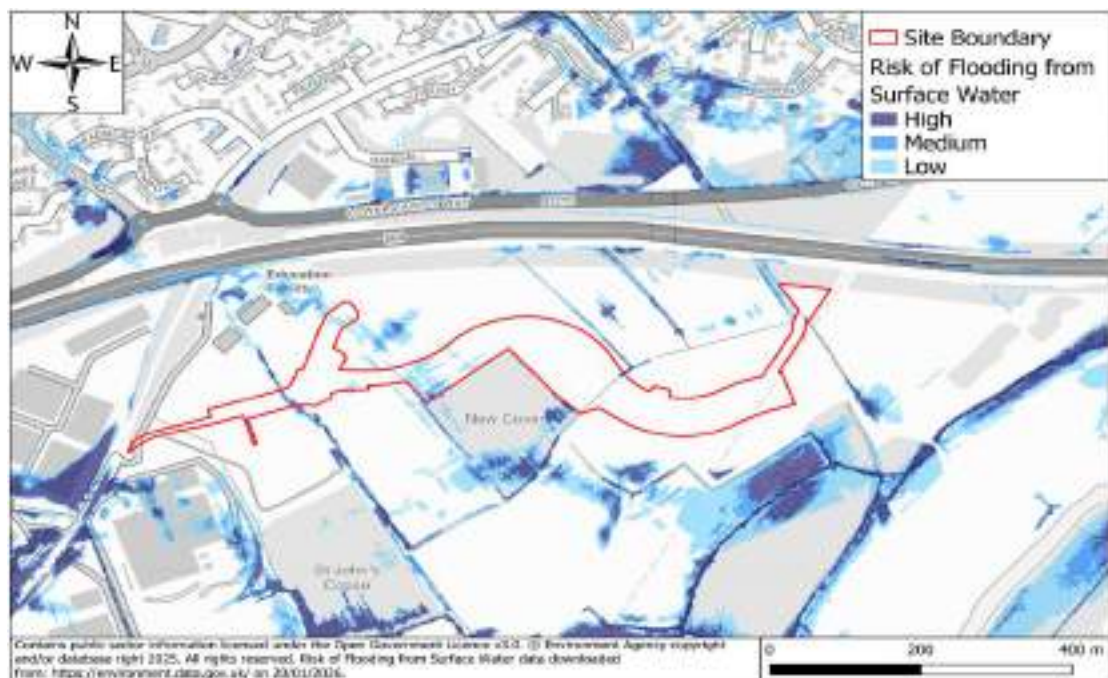
- 1 in 30 (3.3%) annual probability 'High Risk'

- 1 in 100 (1%) annual probability 'Medium Risk'
- 1 in 1,000 (0.1%) annual probability 'Low Risk'.

4.3.2 The NPPF PPG – 'Flood Risk and Coastal Change' includes the 1 in 100 annual probability of surface water flood (including climate change) within the definition of the design flood event to be used to inform a FRA.

4.3.3 **Figure 4.5** shows the potential flood risk from surface water.

Figure 4.5: EA NaFRA Risk of Flooding from Surface Water



4.3.4 The EA NaFRA Risk of Flooding from Surface Water mapping shown in **Figure 4.5** indicates that most of the site is not at risk from surface water flooding.

4.3.5 A surface water flow route is evident at the west of the site. This surface water flow route is associated with the education facility ditch. The watercourse flows in a southeast direction through the network of western watercourses towards the River Loddon. There is an existing culvert under the temporary access road in this location. The culvert was sized as part of the previous access road application to convey flows from north to south of the access road. This culvert will be retained.

4.3.6 Areas of 'Low' risk of surface water flooding are present at the centre of the site. They are associated with localised low points in the topography.

4.3.7 Overall, the risk of flooding from surface water is deemed low.

4.4 Flood Risk from Groundwater

4.4.1 In general, groundwater flooding may occur after prolonged periods of unusually high rainfall. During such periods, more water than usual infiltrates through the ground, raising the water table above its normal depth below the surface. Where the water table is at a shallow depth in any case,



the water table can reach the surface. This can cause groundwater to merge with rainfall and cause localised flooding.

- 4.4.2 The WBC Level 1 SFRA assesses the area for susceptibility to groundwater flooding. A copy of the WBC Level 1 SFRA groundwater mapping is included with **Appendix C**. This comprises of the EA Areas Susceptible to Groundwater Flooding mapping, alongside the JBA Groundwater Emergence mapping, both presented within the WBC Level 1 SFRA.
- 4.4.3 The EA Areas Susceptible to Groundwater Flooding mapping shows that most of the site (western and central parts) lie in a 1km² grid square of which less than 25% of the grid square is susceptible to groundwater flooding. The eastern part of the site is located within a 1km² grid square of which greater than 75% of the grid square is susceptible to groundwater flooding. This is likely due to the proximity of the western part of the site to the River Loddon floodplain.
- 4.4.4 The JBA Groundwater Emergence mapping does not include data for the site. The area with no data corresponds with the area shown in the EA Areas Susceptible to Groundwater Flooding mapping as being at a risk of less than 25% of the 1km² grid square.
- 4.4.5 Considering that the proposed development comprises a Spine Road, implications as a result of groundwater flooding are therefore limited.
- 4.4.6 On the basis of the WBC Level 1 SFRA mapping, the potential for groundwater emergence is limited to the eastern part of the site, with groundwater risk remaining low across the remainder of the area. Overall, the likelihood of groundwater flooding affecting the site is therefore considered to be low.

4.5 Flood Risk from Sewers

- 4.5.1 In general, when exceeded, surcharged sewer networks can lead to flooding from backed up manholes and gully connections.
- 4.5.2 Thames Water Asset Location Plans (ALS/ALS/24/2020_4176313) provide sewer information for the western part of the site. The mapping does not show any surface water sewers within the site for the area it covers. The mapping shows a foul sewer running across Cutbush Lane is present. A copy of the Thames Water Asset Plans is included within **Appendix A**. At the time of writing this FRA, sewer asset data was not available for the central and eastern part of the site.
- 4.5.3 DG5 records in the WBC Level 1 SFRA suggest that there have been 18 recorded incidents of sewer flooding in the RG2 9 postcode, where the site is located, between 2020 and 2022. However, these records are inclusive of the entirety of the RG2 9 postcode and are not reflective of the site specifically. There is no evidence that these incidents impacted the site.
- 4.5.4 The risk of flooding from sewers is deemed to be low.

4.6 Flood Risk from Reservoirs

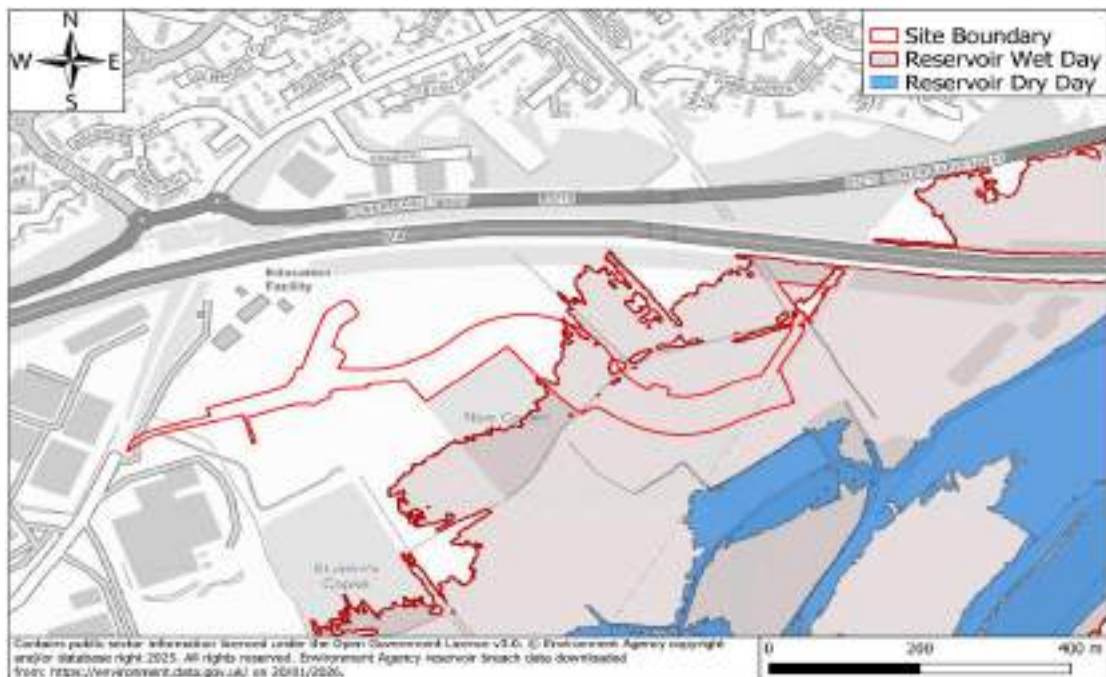
- 4.6.1 The EA Risk of Flooding from Reservoirs mapping indicates areas that would be at risk of flooding in the event of a reservoir breach. The flood extents are shown for both the 'dry day' scenario and the 'wet day' scenario.
- 4.6.2 'Dry day' is defined by the EA as '*...the individual flood extent for all large, raised reservoirs in the event that they were to fail and release the water on a 'dry day' when local rivers are at normal*

levels. It represents a prediction of a credible worst case scenario, however it's unlikely that any actual flood would be this large'.

- 4.6.3 'Wet day' is defined by the EA as '...the individual flood extents for all large, raised reservoirs in the event that they were to fail and release the water held on a 'wet day' when local rivers had already overflowed their banks. It represents a prediction of a credible worst case scenario, however it's unlikely that any actual flood would be this large'.

- 4.6.4 **Figure 4.6** shows the flood risk from reservoirs.

Figure 4.6: EA Risk of Flooding from Reservoirs

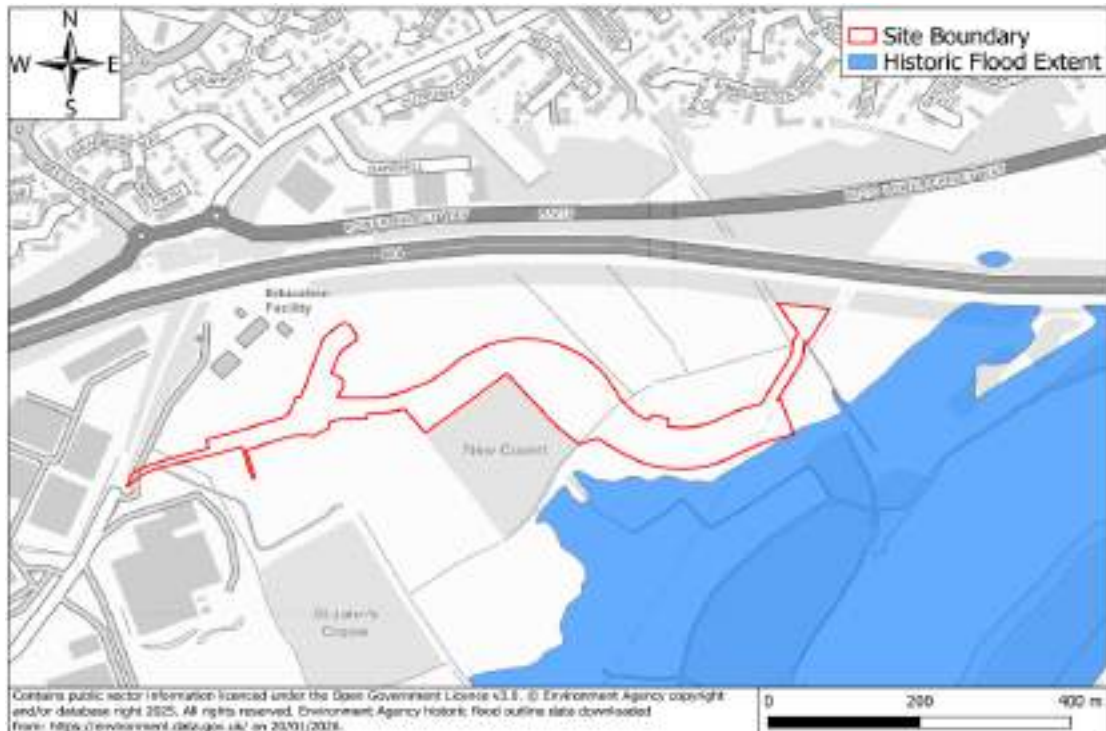


- 4.6.5 The reservoir flood risk mapping shown in **Figure 4.6** shows that the site is not at risk of flooding from reservoirs in the 'dry day' scenario.
- 4.6.6 The reservoir flood risk mapping shows that the eastern part of the site is impacted by flooding in the 'wet day' scenario.
- 4.6.7 The reservoir flooding potential comes from Bearwood Lake, located approximately 2.3 kilometres to the southeast of the site. It is understood that Bearwood Lake is a Category A Reservoir under the 1975 Reservoir Act and as such, is highly regulated. It has been subject to recent upgrades and is deemed to have the capacity to withstand a 1 in 10,000-year event. Uncontrolled breaches of regulated reservoirs are very rare and as such the probability of such a scenario is extremely rare.
- 4.6.8 Overall, despite the reservoir flood risk mapping shown in **Figure 4.6**, the flood risk from reservoirs is low across the site given the reservoir flood potential associated with Bearwood Lake to the southeast of the site.
- 4.7 Flood Risk from Other Sources**
- 4.7.1 The EA flood risk maps, WBC PFRA and WBC Level 1 and Level 2 SFRA indicate that the site is not at risk from other sources.

4.8 Historic Flooding

- 4.8.1 **Figure 4.7** shows the historic flood extent records held by the EA. The EA Historic Flood Map shows the maximum extent of recorded flood events.

Figure 4.7: EA Historic Flood Extents



- 4.8.2 The EA Historic Flood mapping shown in **Figure 4.7** shows that the majority of the site has not been impacted by flooding. A small area along the southeastern boundary of the site is shown to have been impacted by a historic flood extent. The historic flood mapping data shows that this is from flooding of the River Loddon.
- 4.8.3 The historic flood extent mapping shown in **Figure 4.7** can be attributed to the July 2007 flood event and from the data presented above, the site was unaffected.



4.9 Flood Risk Summary

4.9.1 A summary of flooding from all sources is provided in **Table 4.1**.

Table 4.1 : Summary of Flood Risk

Source of Flooding	High	Medium	Low	Comments
Fluvial			✓	The EA Flood Map for Planning shows that the majority of the site is located within Flood Zone 1. Part of the site is located within Flood Zone 2. The River Loddon (Stantec 2021) modelled flood extents have been used to refine the Flood Zones across the site. The majority of the site is located with Flood Zone 1. A small area along the southeastern boundary is located with Flood Zone 2.
Pluvial			✓	The majority of the site has a low risk of surface water flooding. A surface water flow route is present in the western part of this site, associated with the flow route of a watercourse. There is an area of ponding in the centre of the site. Overall the risk of flooding from surface water is considered to be low.
Groundwater			✓	EA Areas Susceptible to Groundwater Flooding mapping shows that most of the site lies within a 1km² grid square of which <25% is susceptible to groundwater flooding. The eastern part of the site is located within a 1km² grid square of which ≥75% is susceptible to groundwater flooding. The JBA Groundwater Emergence mapping does not provide groundwater flood risk mapping for the site. The western and central parts of the site is deemed to be at low risk of groundwater flooding. The eastern part of the site is deemed to be at medium to high risk of groundwater flooding. Considering that the proposed development comprises a Spine Road, implications as a result of groundwater flooding are therefore limited. The risk of groundwater flooding is therefore low.
Sewers			✓	The DG5 sewer records show that there have been 18 incidents of sewer flooding within the RG2 9 postcode area. There is no evidence of these impacting the site. The risk of sewer flooding at the site is therefore considered to be low.
Reservoirs			✓	The EA Risk of Flooding from Reservoirs mapping shows that the site is not at risk of flooding from reservoirs in the 'dry day' scenario. The east of the site is at risk of flooding in the event of a reservoir breach in a 'wet day' scenario. The likelihood of a reservoir breach is low. The risk of flooding from reservoirs is therefore considered to be low.
Reservoirs, canals and other artificial sources.			✓	The WBC Level 1 and Level 2 SFRA, and WBC PFRA do not indicate that the site is at risk of flooding from other sources.

4.9.2 For the purposes of this FRA, the fluvial flooding design flood event should be taken as the floodplain extent and flood levels derived in the fluvial 1 in 100 annual probability scenario plus an



allowance for climate change. In this instance, given that the proposed Spine Road is classed as 'Less Vulnerable' within the NPPF, the relevant fluvial climate change allowance is 14% which is the 'Central' allowance for the Loddon and Tributaries Management Catchment. This is the 'total potential change anticipated for 2080s (2070-2115)' as outlined in the WBC Level 2 SFRA, which was used based on the vulnerability classification, alongside the lifetime of the proposed development.



5.0 Sequential Test and Exception Test

5.1 NPPF Sequential Test and Exception Test

- 5.1.1 The NPPF states that Local Planning Authorities allocating land for development should apply the Sequential Test to demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate to the type of development or land use proposed.
- 5.1.2 The proposed development comprises of the formalisation of a preexisting access road. There are no other suitable locations for development due to the nature of the development formalising an existing structure. The proposed development also lies within Loddon Garden Village – a site allocated within the WBC Local Plan, and the site allocation was sequentially tested as part of the Local Plan.
- 5.1.3 Given that there are no alternative locations that can provide this proposed development, the Sequential Test cannot be applied.
- 5.1.4 In any case, the flood risk is low.



6.0 Flood Mitigation Strategy

6.1 Sequential Approach

- 6.1.1 The NPPF encourages a 'sequential approach' in master planning for new development: locating the more vulnerable uses of the development in the areas of lowest flood risk from all sources.
- 6.1.2 The masterplan reflects this sequential approach with the access road located outside of the design 1 in 100 annual probability +14% climate change allowance extent.

6.2 Floodplain Storage and Flow Routing

- 6.2.1 The proposed Spine Road is located outside of the fluvial flood extent for the design event. There is therefore no impact on fluvial floodplain storage or conveyance as a result of the proposed Spine Road.
- 6.2.2 There is a surface water flow route at 'High', 'Medium' and 'Low' risk of flooding from surface water at the western part of the site. There is an existing culvert in this location designed as part of the initial access road application to convey surface water flows from north to south of the access road. This culvert will be retained, and the surface water flow route will be maintained.
- 6.2.3 Runoff reaching the carriageway will be adequately managed within the surface water drainage strategy through the use of SuDS features.
- 6.2.4 There will therefore be no negative impact on floodplain storage or flow routing.

6.3 Residual Risk

- 6.3.1 The NPPF PPG – 'Flood Risk and Coastal Change' defines residual risk as coming from '*flood risk management infrastructure*' and the '*residual risk to a development once any site-specific flood mitigation measures are taken into account*'.
- 6.3.2 Residual risk to the site includes a breach in the raised flood defences, the failure of a reservoir and a flood event greater than the designed standards.
- 6.3.3 The residual risk to the site is low. The EA AIMS dataset which contains information of flood defences indicates that the site does not benefit from raised flood defences. The EA mapping for reservoir breaches indicates that most of the site is not at risk of flooding in the event of a reservoir breach.



7.0 Surface Water Drainage

7.1 Introduction

- 7.1.1 This chapter provides details on the proposed surface water drainage strategy and measures to drain the proposed Access Road, Foul Pumping Station and associated Access Track.

7.2 Methodology

- 7.2.1 The proposed drainage strategy has been designed to meet the requirements of the NPPF by providing a drainage system which embraces the Sustainable Drainage Systems (SuDS) philosophy and key principles. The utilisation of 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.
- 7.2.2 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 are included where appropriate.

7.3 Existing Drainage Conditions

- 7.3.1 The area for the development of the Access Road, Pumping Station and associated Access Track at present drains via infiltration and overland flows towards the boundaries.

7.4 Sustainable Drainage Systems (SuDS)

- 7.4.1 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.
- 7.4.2 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.
- 7.4.3 In 2015, CIRIA published The SuDS Manual (C753) providing best practice guidance on the planning, design, construction, operation and maintenance of SuDS.
- 7.4.4 The SuDS Manual provides guidance to ensure SuDS are planned and designed to maximise the opportunities and benefits of surface water management.
- 7.4.5 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.

7.4.6 Supplemental to CIRIA guidance, Document H of the Building Regulations 2015 sets out three possible options to discharge surface water runoff. Rainwater shall discharge to one of the following, listed in order of priority:

- An adequate soakaway or some other adequate infiltration system; or where that is not reasonably practicable,
- A watercourse; or where that is not reasonably practicable
- A sewer.

7.4.7 Due to the likelihood of clay within the site the surface water drainage proposals will be designed to attenuate runoff with controlled discharge to the existing local watercourses, i.e. the existing open field ditch on site, which would be a feasible point of discharge.

7.4.8 However, a ground investigation and groundwater monitoring should be conducted to determine the feasibility of infiltration drainage techniques within the site and if determined to be feasible and practical the method of infiltration as a disposal technique should be explored.

7.4.9 Implementation of SuDS will ensure that flood risk downstream is not increased due to the proposed development. These features will also provide positive improvements to the quality of surface water runoff.

7.4.10 The following SuDS components are deemed applicable to the site:

- Conveyance systems – components that convey flows to downstream storage systems, e.g. swales and filter drains.
- Storage systems – components that control flow, and possibly volumes, by storing water and releasing it slowly, e.g. permeable paving, attenuation basins and wetlands.
- Treatment systems – components that remove or facilitate the degradation of contaminants present in runoff, e.g. permeable paving filter strips and proprietary treatment systems.

Pre and Post Development Areas/Rates

7.4.11 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 determined using the current 'industry best practice' guidelines as outlined in the Interim Code of Practice for SuDS.

7.4.12 An assessment of existing surface water runoff has been undertaken, to determine the potential surface water options and attenuation requirements for the site utilising the following parameters taken from the UK Centre for Ecology & Hydrology Flood Estimation Handbook Web Service:

- NGR: SU 74779 694999
- BFIHOST: 0.560
- BFIHOST19: 0.641



- PROPWET: 0.29
- SAAR6190: 641mm

- 7.4.13 Based on the road plan area, the initial contribution area of the roads of the site has been calculated at a total of 1.95ha increasing to 12.6ha in the fully developed situation as illustrated in the catchment drawings HD169-TVSP-0504 included in **Appendix D**.
- 7.4.14 The calculated Greenfield run off discharge rates using FEH 2025, are as presented in **Table 7.1**. The corresponding runoff outputs created with HR Wallingford Greenfield runoff rate estimation tool can be found within **Appendix D**.

Table 7.1: Pre-Development Runoff Rates/Volumes per Hectare

Annual Exceedance Probability	Greenfield/Pre-Development Runoff Rate and Storage Volume per hectare
1 in 1 year event (l/s)	1.2
QBar (l/s)	1.4
1 in 30 year event (l/s)	3.2
1 in 100 year event (l/s)	4.5

- 7.4.15 Based on the low discharge rates emanating from the site it is proposed to restrict all flows from the access road only situation to a maximum 3 l/s/ha or 5.9l /s in line with HR Wallingford Guidance. If future developments are to be tied in to the proposed drainage system, the maximum total discharge should be limited to a maximum of 3 l/s/ha for the proposed contributing catchment.

Surface Water Proposals

- 7.4.16 It is proposed to provide a network of trapped gullies, pipes and Sustainable Drainage (SuDS) features to collect the surface water runoff from impermeable areas such as roads, roofs and driveways. The traditional system will work in combination with such features as, roadside filter drains, to filtrate, store and transport water to attenuation basins to provide attenuation storage and high-quality water benefits.
- 7.4.17 The final attenuation basins will drain, with a controlled discharge rate of 3l/s/ha into the existing ordinary watercourses.
- 7.4.18 Drawings HD168-TVSP-501 Drainage Strategy Sheet 1, HD168-TVSP-501 Drainage Strategy Sheet 2 & HD168-TVSP-501 Drainage Strategy Sheet 3 provide an overview to the surface water proposals together with the estimated requirements for the storage and SuDS features for the parcels within the various zones of the proposed development and can be found within **Appendix D** together with the accompanying calculations.
- 7.4.19 The banks of the SuDS basins will be designed in accordance with the SuDS Manual C753 in respect to having a maximum gradient of 1 in 3 to accommodate the 1 in 100 year storage level and an appropriate 300mm freeboard above the maximum water level. However, the proposed SuDS



basins have been reduced to 1 in 5 to allow easy access to the basins so that for the majority of their lifespan, they can be utilised as green space.

- 7.4.20 This allows landscaping of both wetland and wildflower mixes to be provided with an appropriate landscape context in the vicinity of the features.
- 7.4.21 Open SuDS features will be designed so as not to compromise the safety of the public. Generally open boundaries are provided, and perimeter planting could be utilised to define the extents of the features.
- 7.4.22 Proposed discharge rates will be restricted to a maximum of 3 l/s/ha for all storm events up to and including the 1 in 100 year storm event plus 40% allowance for climate change and for a maximum 3 l/s/ha should additional surface water systems within the total catchment be attached. Flows would be attenuated on site and discharged utilising an on-site flow control device such as a Hydrobrake, which will need to be upsized appropriately if needed.
- 7.4.23 All conveyance systems will be designed to cater for the 1:30 year storm event, in accordance with industry standard, with all attenuation features designed to allow for the 1 in 100 year storm event plus 40% climate change allowance. These 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.
- 7.4.24 Current uncontrolled pluvial runoff exhibited onsite during high rainfall events will be mitigated as a result of the Development. This will occur by virtue of the change in surface from greenfield to positively drained impermeable areas, which will serve to capture, attenuate and delay surface water runoff. This will be a benefit to downstream receptors.
- 7.4.25 There is scope to utilise source control techniques (such as swale granular strips and permeable paving) that will assist with the volume reduction of the basins, which are the largest attenuation storage features for this development. This should be embraced and investigated as the project progresses.
- 7.4.26 To provide a robust drainage strategy and ensure the development does not contribute to off-site flooding, the attenuation basins have been designed to accommodate all excess surface water flows generated by the 1 in 100-year storm event, including a 40% allowance for climate change, even under surcharged conditions at the outfall – this is in the event that the outfall—located within Flood Zones—becomes submerged due to the 1 in 100-year fluvial flooding of the discharging ditch. Discharge from the basins will be delayed until water levels within the basins exceed the river flood level. During such periods, discharges will be limited to the proposed controlled rates. This situation also applies to a slow flowing ditch, whereby if the ditch is not flowing as freely as expected, surcharging of the outfall will not affect the storage capability of the upstream drainage network.
- 7.4.27 Subject to the provision of additional geotechnical information, the attenuation basins may require partial lining (clay layer or impermeable liners) to protect against the ingress of natural groundwater. Such lining provides the ability to create localised, small permanent bodies of water which adds landscaping and biodiversity opportunities to the scheme.



7.5 Exceedance Flood Routing

- 7.5.1 Flows in excess of the above design storms, which may flood from the network for storms in excess of the 1 in 100 year storm plus 40% climate change, will be kept within the internal road network, until such time as they can be directed into adjacent landscaping areas or existing vegetation/woodland. This ensures that no onsite development structure or offsite residential units can be threatened by flood waters.
- 7.5.2 The attenuation basins are designed to provide 300mm freeboard and therefore can accept additional flood water from manholes upstream.

7.6 Water Quality Improvements

- 7.6.1 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.
- 7.6.2 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.
- 7.6.3 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 7.1**.

Figure 7.1: 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

- 7.6.4 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.
- 7.6.5 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.
- 7.6.6 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.
- 7.6.7 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 in **Figure 7.2**.



Figure 7.2: 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

7.6.8 The individual pollution indices are totalled, with the first SuDS component utilising its full value and subsequent downstream SuDS features acting with 50% efficiency. This provides a realistic strategy which mimics the reduced cleansing effectiveness as the concentration of a pollutant decreases along the SuDS train.

7.6.9 All catchments incorporate a basin and a series of filter drains and swales until the surface water eventually reaches the watercourse. Even though the “Tank Catchment” does not utilise a basin, it utilises a series of swales until the surface water reaches the nearby watercourse. Therefore, all catchments provide adequate pollution treatment via proposed and existing SuDS features.

7.6.10 In line with Environment Agency guidance, before the design phase is concluded, the proposals are reviewed and analysed in order to identify potential shortcomings and to ensure that adequate volume of SuDS features are provided to mitigate the risk of pollution from each source.

7.7 SuDS Maintenance Strategy

7.7.1 For the water treatment effects of SuDS features to remain effective, a comprehensive maintenance strategy should be implemented.

7.7.2 During construction, maintenance of SuDS features should be undertaken by the Contractor. Upon completion, the assets should be passed back to the Client to maintain the features in perpetuity or ultimate adoption.

7.7.3 As part of the strategy, a regular maintenance regime will be created, which consists of several primary measures required to ensure the longevity of the system. These should be undertaken on a regular basis to ensure consistent performance. Typical maintenance activities consist of:

7.7.4 Inspecting and reporting; relatively regular review of the condition identifying issues and providing resolutions. Periodic review from the maintenance contractor;

- Litter and debris removal;
- Grass trimming, overall cutting and localised strimming preventing blockages;
- Weed and evasive plant control;
- Shrub management;
- Aquatic and shoreline vegetation management;
- Sweeping pervious surfaces; and
- Oil removal from proprietary systems.



7.7.5 A remedial maintenance schedule would be recommended as part of the handover of the SuDS features, remedial maintenance is required to provide repairs to the system and monitor long term damage ensuring the system remains consistently productive. the schedule could consist of;

- Structure rehabilitation and repair;
- Infiltration surface rehabilitation;
- Scarifying to remove “Thatch”;
- Spiking or Tining the soil;
- Air pressure treatment.

7.7.6 The maintenance schedule contents, and timing will depend upon multiple factors including usage, contents of water utilising the system, location and biology. To this end, it is suggested that the schedule be finalised as part of detailed design; ensuring the most comprehensive maintenance schedule is incorporated for the phase in hand.

7.8 Adoption and Ownership

7.8.1 The drainage system is designed to the appropriate standards including the new Sewerage Sector Guidance (SSG), the Building Regulations and the requirement of the National Planning Policy Framework

7.8.2 The intention of adoption and ownership of drainage and SuDS is as follows:

- Surface water sewers, highway drains and gullies to remain within Client control.
- Above ground attenuation (i.e., filter drains, basins) to be maintained by the Client.



8.0 Foul Water Drainage

8.1 Introduction

8.1.1 This chapter provides details on the foul water drainage strategy and measures to convey effluent.

8.2 Existing Drainage Conditions

8.2.1 As part of the Natural History Museum (NHM) Access Road works a small length of foul water sewer is currently under construction. This terminates at the associated works foul water chamber F10 shown in **Appendix D**.

8.3 Foul Water Drainage Strategy

8.3.1 The application includes the provision of new foul sewers emanating from the Spine Road which lies to the west of the site. These sewers terminate at a new foul pumping station adjacent to the M4 Motorway.

8.3.2 These new sewers will serve new and future parcels but also provides an opportunity to relieve known capacity issues within the public sewer system near this part of the Thames network.

8.3.3 Thames Water has been working with Shinfield Studio to facilitate a new 225dia foul sewer from their public assets adjacent to Pearman's Lane, through the Studio demise to Cutbush Lane which lies to the east. The intention is that this new sewer provides an overflow when the existing public network is surcharged.

8.3.4 The existing public sewer that runs west to east beyond the current British Museum facility to an M4 Motorway crossing point suffers from a lack of hydraulic capacity due to its gradient and diameter. By interception of both the new 225dia sewer exiting the Studio demise, and the existing public sewer near the proposed NHM parcel, additional capacity can be afforded to the public network, which will mitigate existing flooding issues Thames are encountering.

8.3.5 Once built, foul effluent will be conveyed via a series of traditional gravity pipes and manholes to a new Foul Pumping Station proposed adjacent to the M4 Motorway. The associated sewers, Pumping Station Compound and access road can be seen in drawing HD169-TVSP-0503 Foul Pumping Station Access Track General Arrangement in **Appendix D**.

8.3.6 Discussions are ongoing with Thames Water in respect to the final form of connection and works beyond the application boundary, however, such sewers will be designed in collaboration with Thames Water as approving body in accordance with the new Sewerage Sector Guidance (SSG) and will be offered to Thames Water for adoption under S104 Agreement of the Water Industry Act.



9.0 Conclusion

9.1 Flood Risk

9.1.1 The EA Flood Risk mapping has been reviewed alongside the Wokingham Borough Council (WBC) Preliminary Flood Risk Assessment (PFRA) and Wokingham Borough Council (WBC) Level 1 and Level 2 Strategic Flood Risk Assessment (SFRA).

9.1.2 This Flood Risk Assessment (FRA) concludes that:

- The EA Flood Map for Planning shows that the majority of the site is located within Flood Zone 1. A small area of the site is located within Flood Zone 2, in the southeastern part of the site. The River Loddon (Stantec 2021) modelled flood extents have been used to refine the Flood Zones at the site. The majority of the site is located within Flood Zone 1, as defined by the River Loddon modelling, with a small area along the southern boundary located in Flood Zone 2.
- The River Loddon (Stantec 2021) modelled 1 in 100 annual probability +14% climate change allowance has been used as the design event for the development. The Spine Road is entirely located outside of the 1 in 100 annual probability +14% climate change flow extent, and has considered a 1 in 100 annual probability event, with climate change, within its design.
- A surface water flow route is present within the western part of the site, associated with St John's Copse Drain. The watercourse is culverted under the existing access road. The culvert was designed to convey the flow of St John's Copse Ditch and will be retained. There is an area of surface water ponding in the centre of the site associated with localised low lying areas in the topography.
- Groundwater emergence mapping presented within the WBC Level 1 SFRA show that the site is generally not at risk of flooding from groundwater. The EA risk of groundwater emergence mapping shows that the western and central parts of the site are located in a 1km² grid square of which <25% is susceptible to groundwater flooding and that the eastern part of the site is located within a 1km² grid square of which ≥75% of the grid square is susceptible to groundwater flooding. Based on the information provided within the groundwater mapping, alongside the underlying geology of the site, groundwater flood risk at the site is medium.
- Whilst the DG5 sewer records included within the WBC Level 1 SFRA identify 18 recorded instances of sewer flooding within the site's postcode, there are no records of these sewer flooding incidents impacting the site. Therefore, the flood risk from sewers is considered to be low.
- The EA Risk of Flooding from Reservoirs mapping shows that the entire site is located outside of the reservoir breach 'dry day' scenario. The eastern part of the site is at risk of flooding in the event of a reservoir breach in a 'wet day' scenario. The risk of a reservoir breach occurring is low therefore the risk of flooding from reservoirs is considered to be low.
- The WBC Level 1 and Level 2 SFRA, alongside the WBC PFRA do not indicate that the site is at risk of flooding from other sources.

9.1.3 In summary, the flood risk across the site is low.



9.2 Sequential Test and Exception Test

- 9.2.1 The NPPF states that Local Planning Authorities allocating land for development should apply the Sequential Test to demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate to the type of development or land use proposed.
- 9.2.2 The proposed development comprises of the formalisation of a preexisting access road and there are therefore no other suitable locations for development due to the nature of the development formalising an existing structure. The proposed development also lies within Loddon Garden Village – a site allocated within the WBC Local Plan, and the site allocation was sequentially tested as part of the Local Plan.
- 9.2.3 Given that there are no alternative locations that can provide this proposed development, the Sequential Test and subsequent Exception Test cannot be applied.

9.3 Mitigation Strategy

- 9.3.1 The proposed Spine Road is located outside of the fluvial flood extent for the design event. There is therefore no impact on fluvial floodplain storage or conveyance as a result of the proposed Spine Road.
- 9.3.2 The Spine Road has been designed with a culvert under it at St John's Copse Drain to maintain the surface water flow route along the watercourse.
- 9.3.3 Runoff reaching the carriageway will be adequately managed within the surface water drainage strategy through the use of SuDS features.
- 9.3.4 There will therefore be no negative impact on floodplain storage or flow routing.
- 9.3.5 The proposed surface water drainage strategy will manage the flood risk posed by uncontrolled surface water runoff from the site. Any increase in surface water run-off can be managed using SuDS source control techniques as well as attenuation features to provide storage in extreme storm events. This provides the minimum of two treatment storage stages which is in accordance with the recommendations of CIRIA C753. All surface water drainage systems will be designed to restrict drainage discharge rates to QBAR runoff rates and store the balance of water for all events up to and including the 1 in 100 year event including an allowance for a 40% increase in rainfall intensities as a result of climate change and urban creep.

9.4 Summary

- 9.4.1 This FRA demonstrates that the proposed development complies with national and local planning policy with respect to flood risk and drainage. The risk of flooding is adequately managed, and, with the implementation of a suitable surface water drainage strategy, the offsite flood risk is not increased.



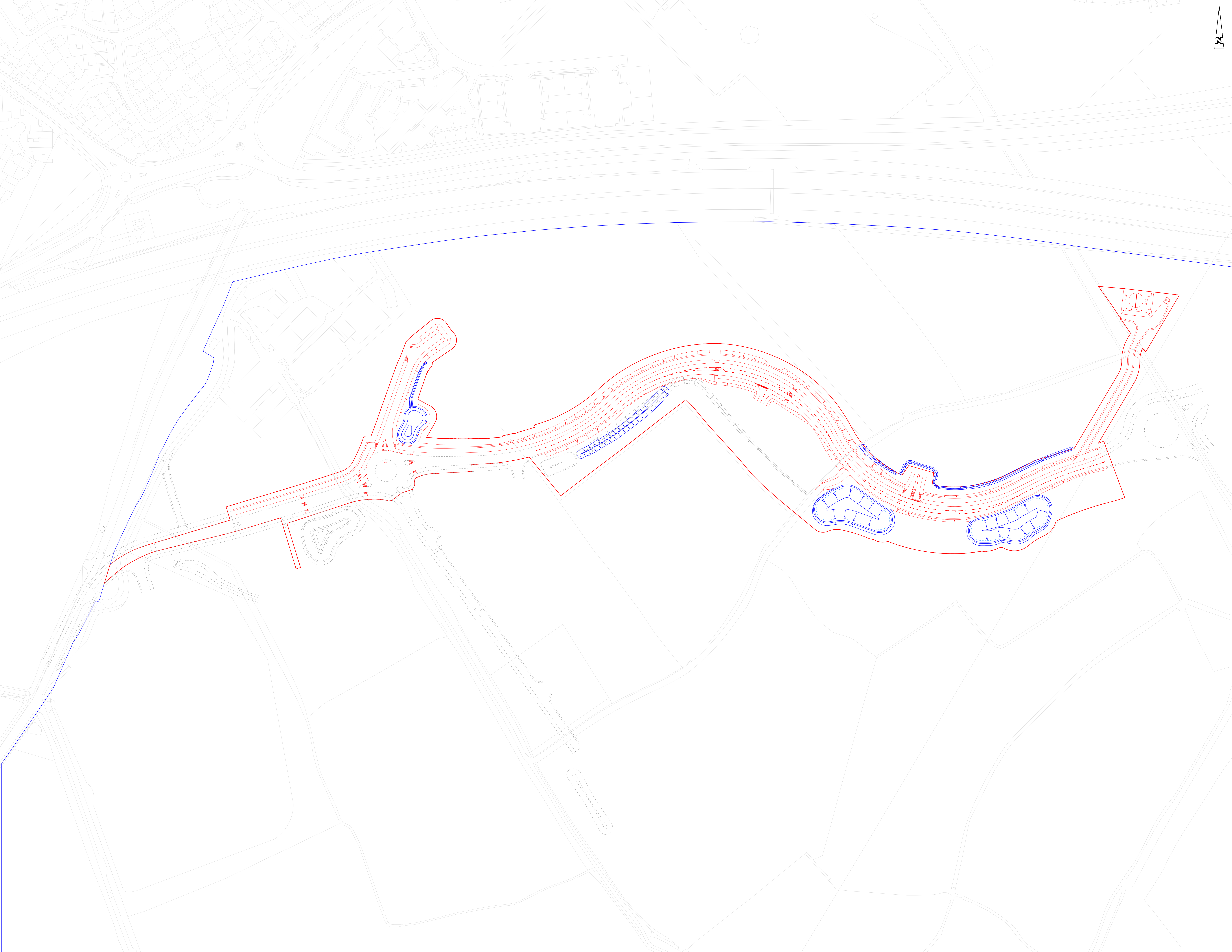
APPENDICES



Appendix A – Plans

Highway Alignment Drawing

Thames Water Asset Plans



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KEY	
	APPLICATION BOUNDARY TOTAL AREA: 53,817m ²
	LAND UNDER UNIVERSITY OF READING CONTROL

C	02/26	UPDATED BASIN LAYOUT	CS	PJ
B	02/26	UPDATED HIGHWAY LAYOUT	CS	PJ
A	02/26	ISSUE FOR REVIEW	CS	PJ
Rev	Drawn	Amended	Drawn	Checked

www.ableyletchford.co.uk

Client
**C
UNIVERSITY OF READING**

Project
**THAMES VALLEY
SCIENCE PARK
LINK ROAD**

Title
HIGHWAY ALIGNMENT

Status				
Scale	Date	Drawn	Checked	Revision
1:1000 @ A0	FEB 2026	CS	PJ	
Drawing No				Sheet
HD169-TVSP-SK001				C

Abley Letchford Partnership Ltd
3 Tealgate
Charnham Park
HUNGERFORD
RG17 0YT

Search address supplied Thames Valley Science Park
3
Collegiate Square
South Avenue
Reading
RG2 9LH

Your reference A119-07

Our reference ALS/ALS/24/2020_4176313

Search date 23 March 2020

Knowledge of features below the surface is essential for every development

The benefits of this knowledge not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility of any development.

Did you know that Thames Water Property Searches can also provide a variety of utility searches including a more comprehensive view of utility providers' assets (across up to 35-45 different providers), as well as more focused searches relating to specific major utility companies such as National Grid (gas and electric).

Contact us to find out more.



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk



0845 070 9148

Search address supplied: Thames Valley Science Park, 3, Collegiate Square, South Avenue, Reading, RG2 9LH

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This search provides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0845 070 9148, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk

Web: www.thameswater-propertysearches.co.uk

Waste Water Services

Please provide a copy extract from the public sewer map.

The following quartiles have been printed as they fall within Thames' sewerage area:

SU7468NW
SU7469SW
SU7368NE
SU7369SE

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an 'as constructed' record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

The following quartiles have been printed as they fall within Thames' water area:

SU7468NW
SU7469SW
SU7368NE
SU7369SE

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and pressure test to be carried out for a fee.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk



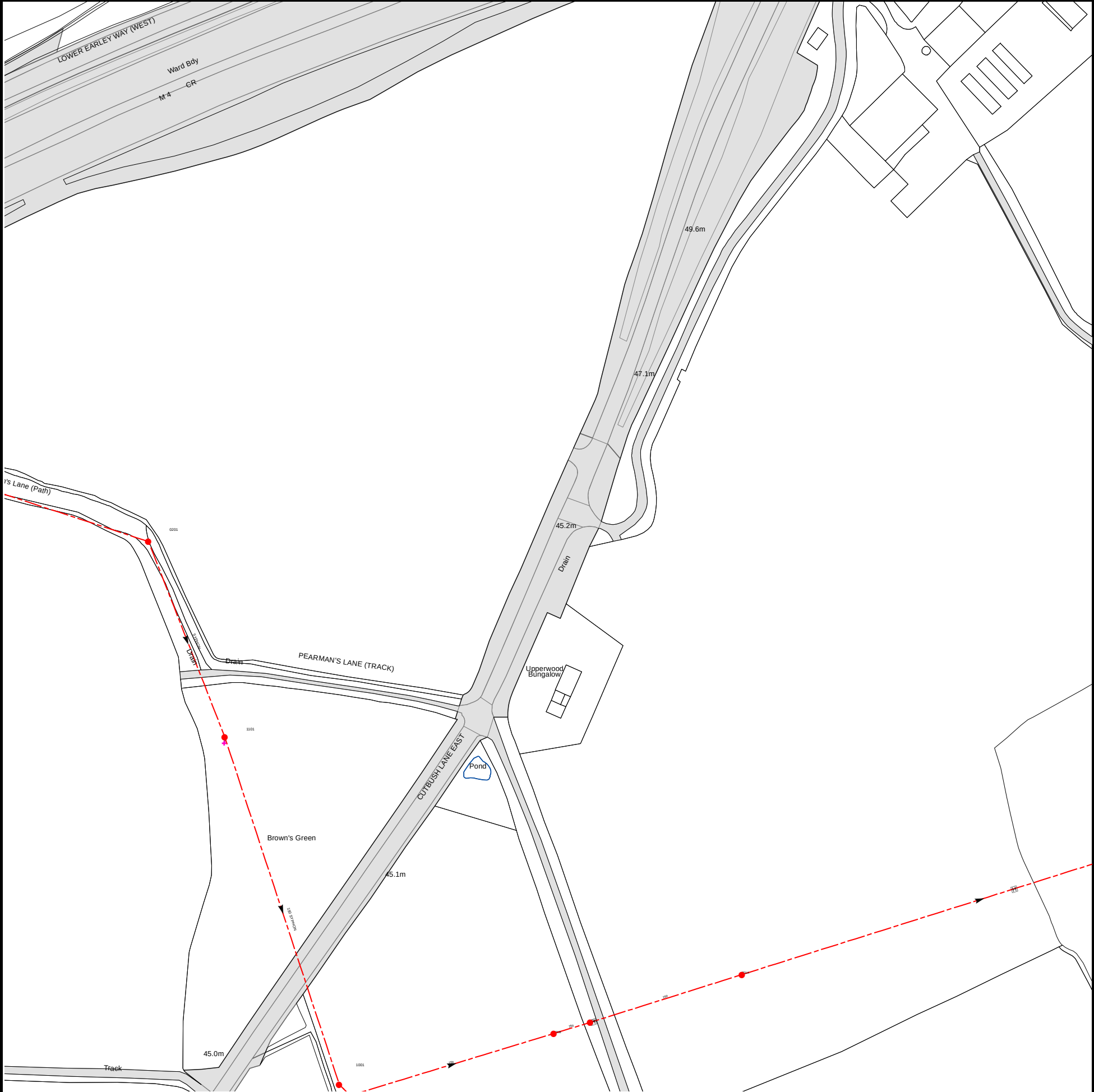
The width of the displayed area is 500m and the centre of the map is located at OS coordinates 474250,168750

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
0901	n/a	n/a
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.		



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NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
0201	n/a	n/a
1101	n/a	n/a
1001	n/a	n/a
201B	n/a	n/a
201C	n/a	n/a
301A	n/a	n/a
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.		



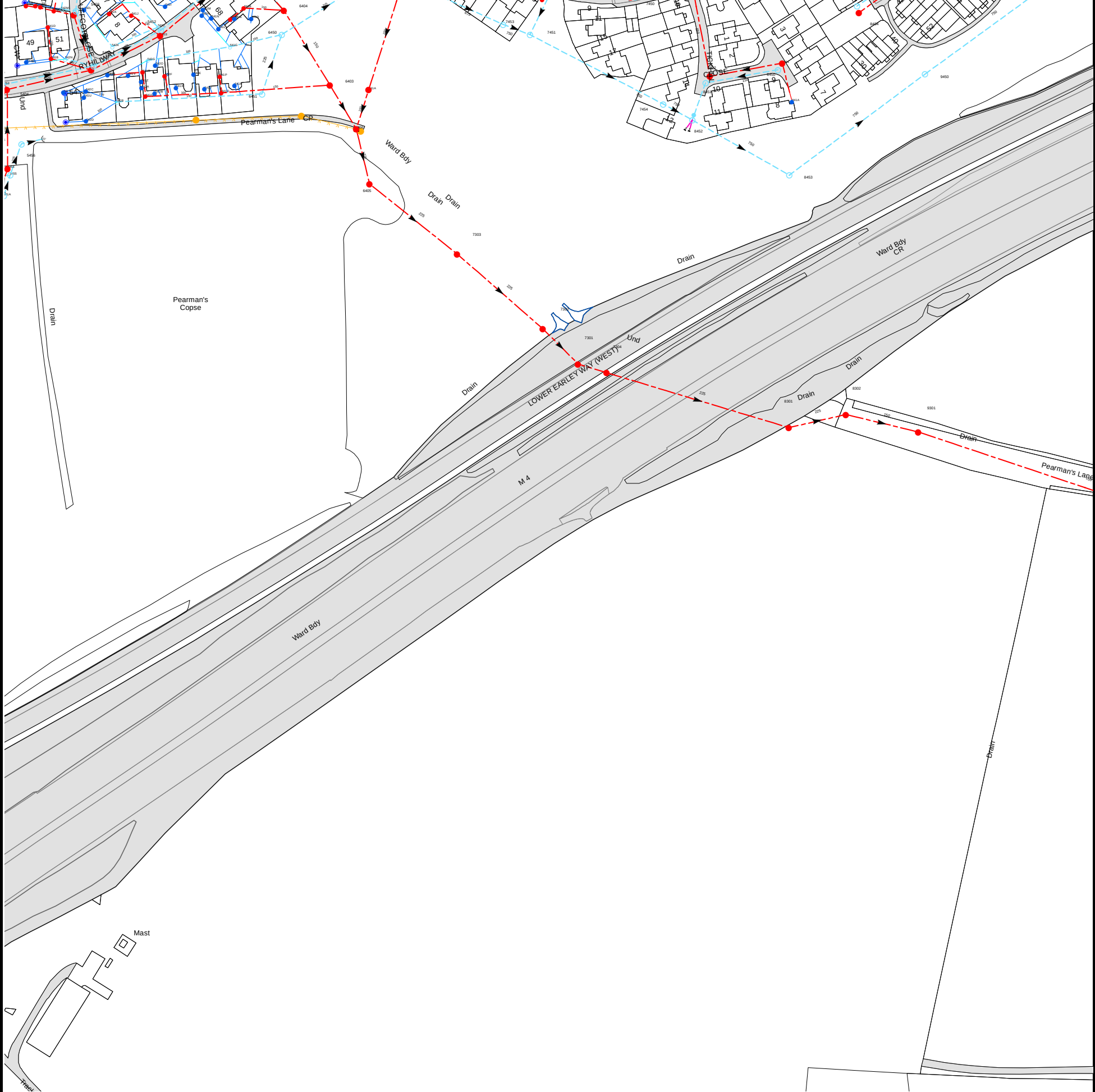
The width of the displayed area is 500m and the centre of the map is located at OS coordinates 473750,168750

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NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
9801	n/a	n/a
651A	52.78	49.55
561A	56.75	55.9
5601	57.46	55.14
6601	53.34	51.97
5608	57.55	55.58
661A	53.26	51.05
6602	51.48	n/a
661B	51.56	49.64
7601	n/a	n/a
5602	58.65	56.3
5607	58.56	56.85
5603	58.97	56.89
5606	58.99	57.44
5605	59.53	58.01
5604	59.57	57.54
5704	60.27	58.75
5701	60.2	58.23
5702	60.52	58.54
5703	60.61	59.11
8701	n/a	n/a
5501	56.89	55.61
5550	55.95	53.95
5551	n/a	54.93
5552	56.41	54.2
5502	56.09	54.44
551A	56.03	53.81
651C	52.14	49.14
651B	52.16	49.15
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Manhole Reference	Manhole Cover Level	Manhole Invert Level
541C	n/a	57.1
541H	n/a	n/a
541I	n/a	n/a
541D	n/a	n/a
541B	n/a	55.7
541E	n/a	56.1
541G	n/a	n/a
542M	n/a	56.4
542N	n/a	56.2
5405	57.47	55.02
5450	57.52	55.85
542L	n/a	55.5
542C	n/a	55.4
5402	57	54.34
5451	56.99	55.18
541S	n/a	54.7
541K	n/a	n/a
542K	n/a	55.1
5404	59.14	56.88
541F	n/a	57.1
541V	n/a	n/a
541J	n/a	54.7
541Z	n/a	n/a
542A	n/a	n/a
541R	n/a	54.4
541Q	n/a	54.1
542G	n/a	54.7
541W	n/a	n/a
542O	n/a	n/a
542J	n/a	54.6
5403	55.9	53.77
5452	55.81	54.01
542F	n/a	n/a
542I	n/a	54.7
541X	n/a	n/a
542E	n/a	n/a
542H	n/a	54.6
541M	n/a	n/a
541Y	n/a	n/a
541N	n/a	n/a
541L	n/a	53.7
541P	n/a	n/a
541O	n/a	53.2
641G	n/a	54.4
641C	n/a	n/a
641E	n/a	n/a
641F	n/a	n/a
641B	n/a	53.2
641D	n/a	n/a
6451	55.09	54.24
6450	55.5	53.83
6404	55.71	52.28
6403	54.42	51.79
6406	n/a	n/a
641A	n/a	n/a
6405	52.46	51.09
541A	58.8	57.59
5455	58.88	57.43
5454	58.91	57.17
5456	58.89	57.29
542D	n/a	56
542B	n/a	54.8
541U	n/a	n/a
541T	n/a	55.3
7303	51.86	50.81
7453	n/a	n/a
7451	55.35	52.99
741A	n/a	n/a
7302	51.68	50.66
7301	57.97	50.26
7304	n/a	n/a
7401	57.21	54.34
7450	57.27	54.92
7454	n/a	n/a
8452	57.18	52.68
8451	58.24	56.82
8402	58.32	55.38
8450	60.21	58.7
8401	60.3	58.63
8301	50.64	48.71
8453	57.43	52.45
841A	n/a	n/a
8302	49.2	47.98
8454	59.88	57.17
8403	59.85	57.72
9301	48.42	47.52
9450	59.05	52.05

Manhole Reference	Manhole Cover Level	Manhole Invert Level
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ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

	Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.
	Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.
	Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.
	Trunk Surface Water
	Trunk Foul
	Storm Relief
	Trunk Combined
	Vent Pipe
	Bio-solids (Sludge)
	Proposed Thames Surface Water Sewer
	Proposed Thames Water Foul Sewer
	Gallery
	Foul Rising Main
	Surface Water Rising Main
	Combined Rising Main
	Sludge Rising Main
	Proposed Thames Water Rising Main
	Vacuum

Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plans are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
- 5) 'na' or '0' on a manhole level indicates that data is unavailable.

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

	Air Valve
	Dam Chase
	Fitting
	Meter
	Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

	Control Valve
	Drop Pipe
	Ancillary
	Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

	Outfall
	Undefined End
	Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

	Public/Private Pumping Station
	Change of characteristic indicator (C.O.C.I.)
	Invert Level
	Summit

Areas

Lines denoting areas of underground surveys, etc.

	Agreement
	Operational Site
	Chamber
	Tunnel
	Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

	Foul Sewer
	Surface Water Sewer
	Combined Sewer
	Gulley
	Culverted Watercourse
	Proposed
	Abandoned Sewer

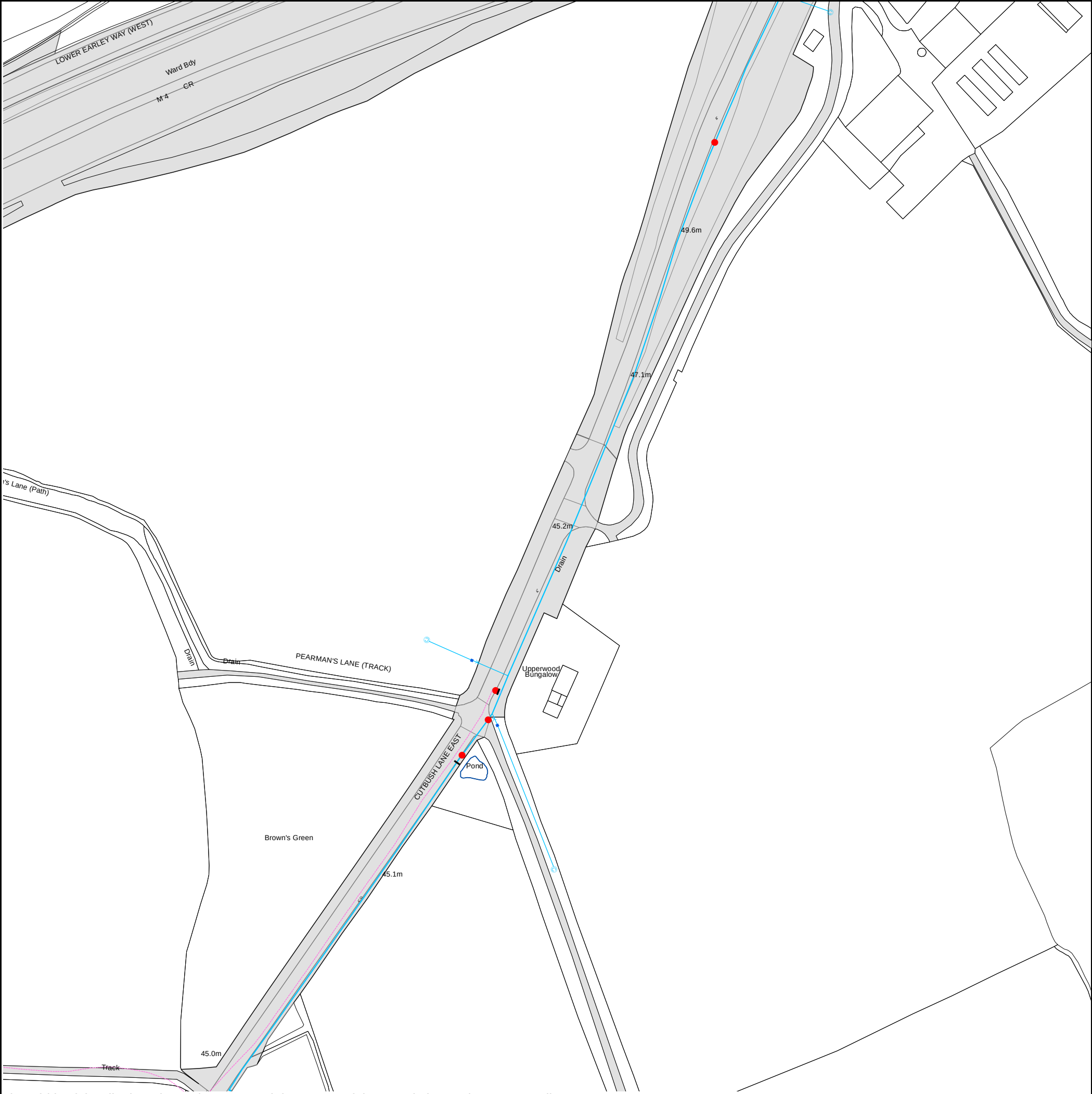
- 6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 474250,168750

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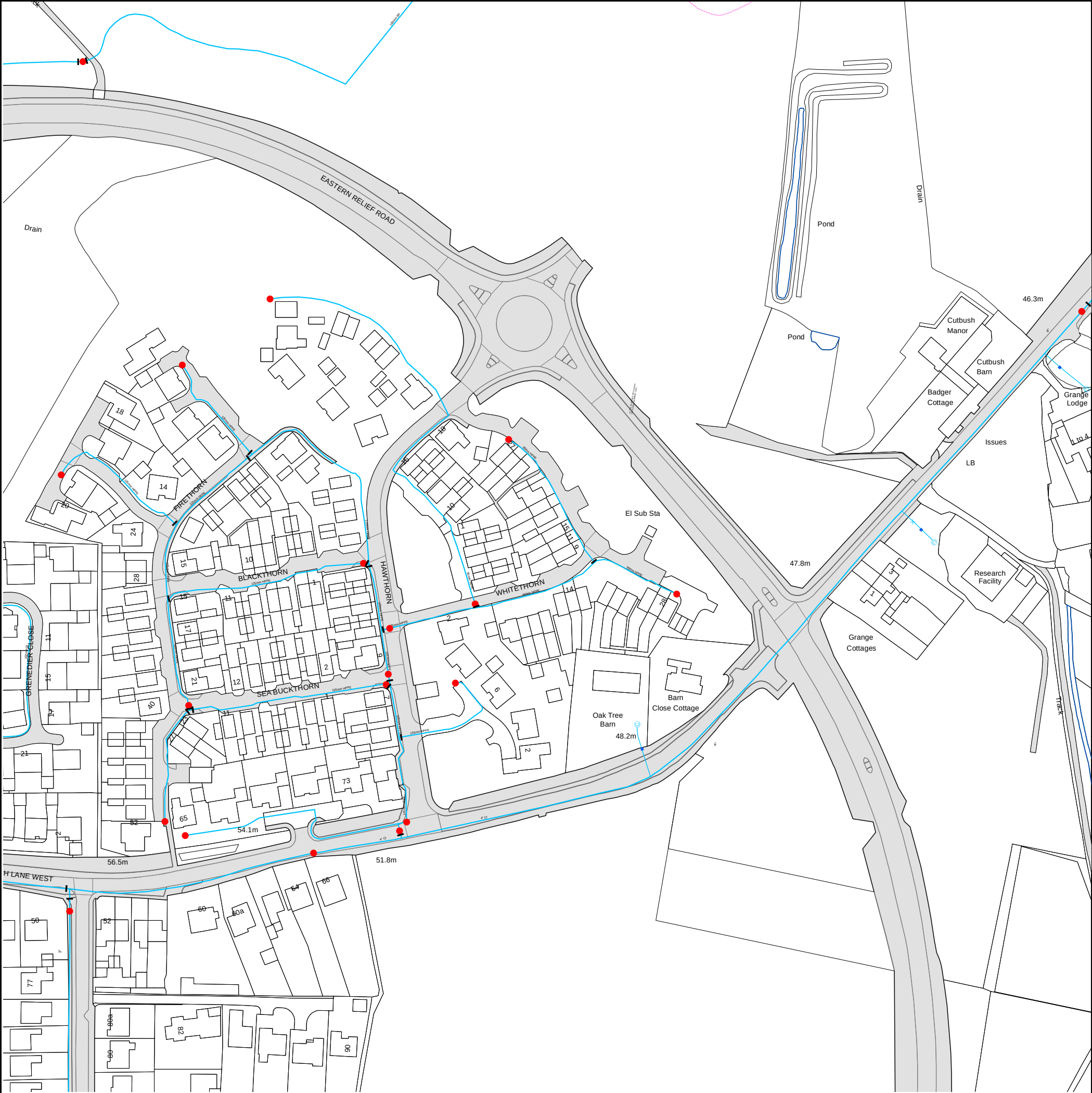
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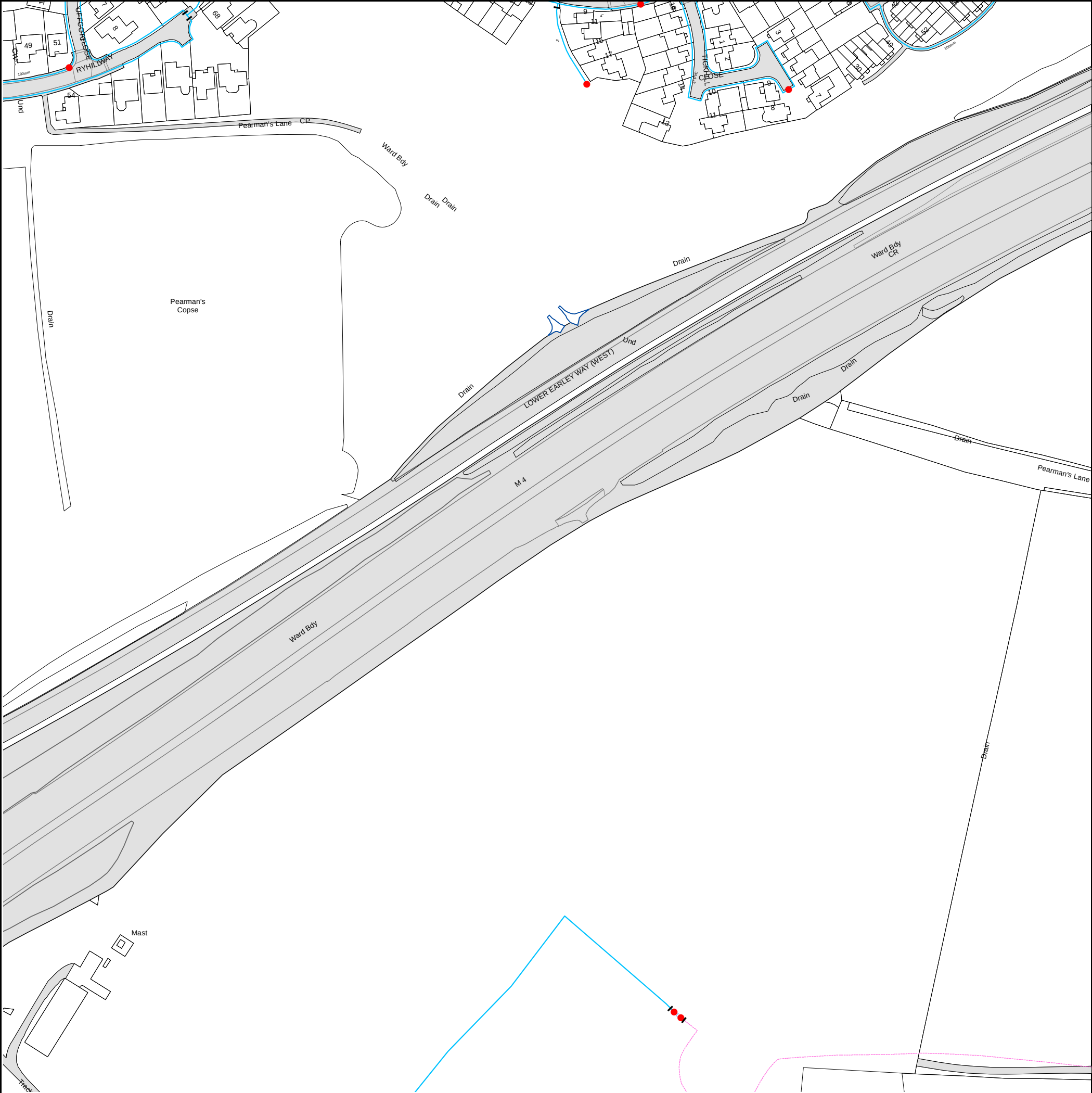
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ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"	Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.
16"	Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.
3" SUPPLY	Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.
3" FIRE	Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.
3" METERED	Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.
	Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.
	Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Valves

	General Purpose Valve
	Air Valve
	Pressure Control Valve
	Customer Valve

Hydrants

	Single Hydrant
--	----------------

Meters

	Meter
--	-------

End Items

Symbol indicating what happens at the end of a water main.

	Blank Flange
	Capped End
	Emptying Pit
	Undefined End
	Manifold
	Customer Supply
	Fire Supply

Operational Sites

	Booster Station
	Other
	Other (Proposed)
	Pumping Station
	Service Reservoir
	Shaft Inspection
	Treatment Works
	Unknown
	Water Tower

Other Symbols

	Data Logger
--	-------------

Other Water Pipes (Not Operated or Maintained by Thames Water)

	Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.
	Private Main: Indicates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL's terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	BACS Payment	Telephone Banking	Cheque
Call 0845 070 9148 quoting your invoice number starting CBA or ADS / OSS	Account number 90478703 Sort code 60-00-01 A remittance advice must be sent to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW. or email ps.billing@thameswater.co.uk	By calling your bank and quoting: Account number 90478703 Sort code 60-00-01 and your invoice number	Made payable to ' Thames Water Utilities Ltd ' Write your Thames Water account number on the back. Send to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW or by DX to 151280 Slough 13

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.



Appendix B – LLFA Drainage Checklist

WBC Planning Application Drainage Checklist

Major Development Full Application (and/or discharge of conditions or reserved matters)

Full planning applications for Major Development and/or discharge of conditions or reserved matters must include the following information and details on the proposed drainage strategy and system(s).

Ref.	Documentation required	Requirement met/included
	In addition to documentation required for outline applications, the applicant shall also submit: ■ Confirmation of the destination of discharge(s) (in accordance with Building Regulation Part H hierarchy) with appropriate justification for the(ir) selection; ■ Details of any offsite works required, together with any necessary consents; ■ Where necessary, a full planting schedule with accompanying plan; ■ Where proposing to discharge to ground the results of site specific ground investigation (accounting for the variability in ground conditions), including geo-environmental characterisation and infiltration test results shall be provided. These investigations shall account for: • Evidence of infiltration tests, providing representative results, at the location and depth of any intended infiltration device; • Records of recorded groundwater levels over a number of visits to establish confidence in seasonal variability on groundwater levels. ■ Exceedence routes – confirmation that exceedence routes will remain clear of development in perpetuity; ■ Confirmation of the arrangements for the adoption, management / operation and maintenance of the drainage system, including but not necessarily limited to: • Details of which body will be responsible for operating and maintenance for the drainage proposals including their written confirmation; • A management statement to outline the management goals for the site and required maintenance; • Description of maintenance schedule and materials and tools needed; • A maintenance schedule; • Legal agreements to ensure the continued operation and maintenance of the drainage system for the lifetime of the development; • Health and safety plan, if appropriate, considering all potential health and safety risks posed by the proposed drainage system including but not limited to areas of open water, confined spaces, and steep slopes; • Access arrangements for maintenance of all aspects of the proposed drainage systems; and • Operational characteristics of any mechanical features including maintenance and energy requirements.	Appendix D N/A N/A N/A Appendix D Within Section 7 of FRA / DS
	Plans & Drawings Required	

	In addition to plan and drawing required for outline applications, the applicant shall also submit: ■ Detail drawings of connections (including flow control devices) to water bodies, sewers, public surface water sewers, highway drains and SuDS; ■ Phasing plans for implementation of the drainage system(s); ■ Details of source control measures including location, type levels and detail drawing; ■ Details of site control measures including location, type levels and detail drawing; ■ Where appropriate, details of regional control measures including location, type levels and detail drawing; ■ Details of all other drainage features including levels, detail location and detail drawings; ■ Details of those components of the drainage system(s) comprising the 'management train' for the site; ■ Conveyance and exceedance routes; ■ The destination of runoff with clearly defined outfall locations; and ■ Any surface water/groundwater flow routes entering the development from adjacent land.	All within drawings in Appendix D
	Calculations Required	
	In addition to calculations required for outline applications, the applicant shall also submit: ■ Full design calculations and design parameters to demonstrate conformity with best practice standards. This shall include a calculation pack for the following storm events: • 1:1 year; • 1:30 year; • 1:100 year; and, • 1:100 year with climate change. The calculations shall be able to be referenced to appropriate drawings of the drainage system with pipe and manhole references and clearly labelled storage and conveyance features (basins, swales, tanks etc.); and, ■ Confirmation of attenuation volumes provided in each storage feature along with details of freeboard allowance for each feature.	Appendix D Within Drawings in Appendix D

Additional requirements for a large site or multi-plot development.

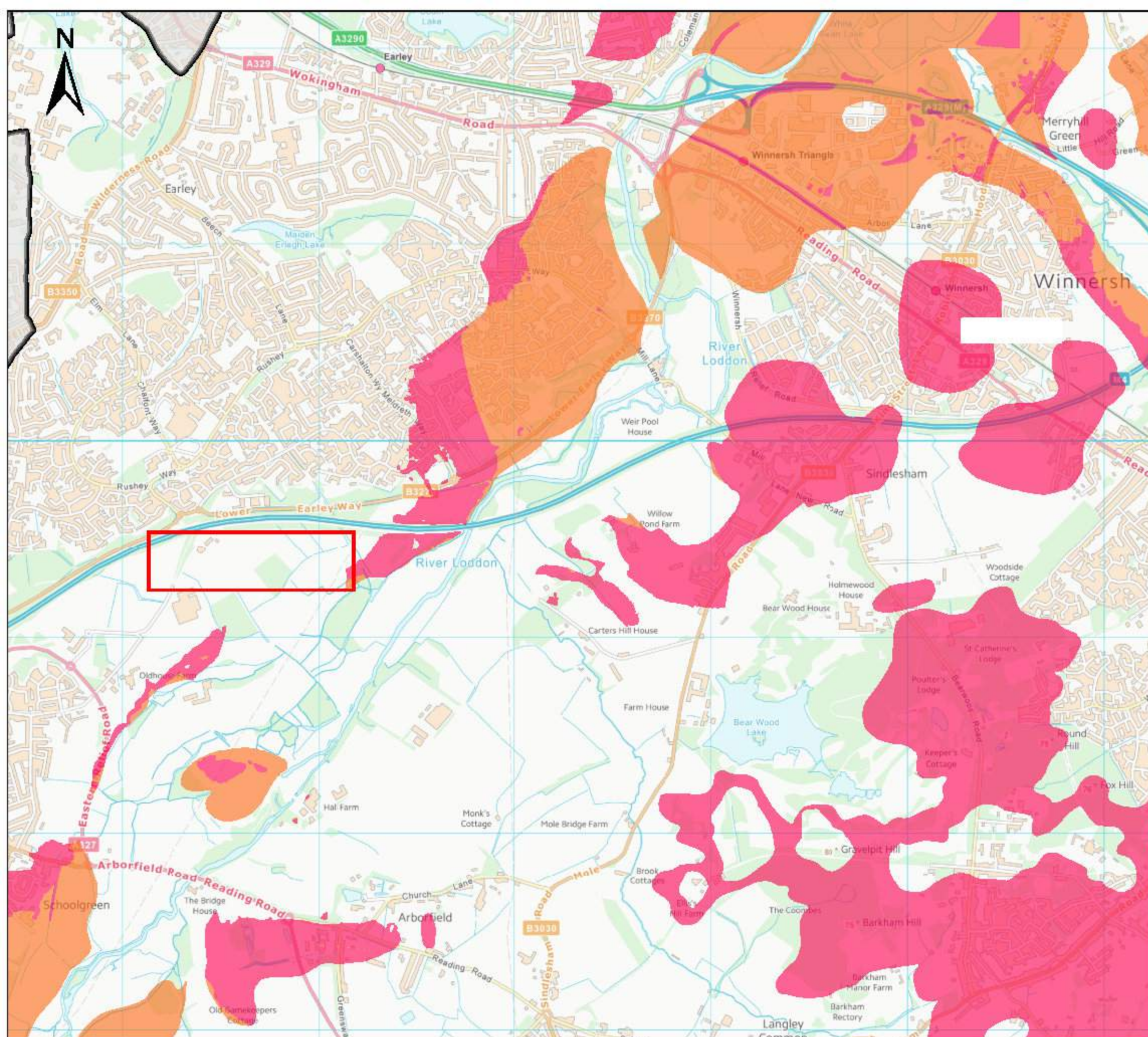
Ref.	Detail required	Requirement met/included
	Plans demonstrating the phasing of drainage infrastructure (in keeping with wider development phasing proposals, demonstrating how flood risks and drainage will be managed throughout and on completion of the development.	Phasing order to be confirmed



Appendix C – WBC Level 1 SFRA Groundwater Mapping

EA Areas Susceptible to Groundwater Flooding Mapping

JBA Groundwater Emergence Mapping



Legend
 Wokingham Borough Council boundary
Watercourses
 Main Rivers
 All Watercourses
Fluvial Flood Zones
 Indicative Flood Zone 3b
 Flood Zone 3b
 Flood Zone 3a
 Flood Zone 2
Fluvial Flood Extent with Climate Change
 1% AEP with Central Climate Change allowance
 1% AEP with Higher Central Climate Change allowance
Arborfield Fluvial Flood Extent with Climate Change
 1% plus 25% Climate Change
 1% plus 40% Climate Change
Risk of Flooding from Surface Water
Surface Water Extent
 3.3% AEP
 1% AEP
 0.1% AEP
Surface Water Extent plus climate change
 3.3% AEP plus 35% Climate Change
 1% AEP plus 40% Climate Change

Site Location
Risk of Groundwater Flooding
EA Areas Susceptible to Groundwater Flooding
 < 25%
 >= 25% < 50%
 >= 50% < 75%
 >= 75%
JBA Groundwater Emergence Map (5m Resolution)
Depth below ground surface
 Less than 0.025m below surface
 Between 0.025m - 0.5m below surface
 Between 0.5m - 5m below surface
 At least 5m below surface
 No risk
Risk of Flooding from Reservoirs
 Wet Day
 Dry Day
Flood Defences
 Demountable Defence
 Embankment
 Wall
 Natural High Ground
Flood Mitigation
 Flood Alert Areas
 Flood Warning Areas
Flood History
 EA Historic Flood map



Appendix D – Drainage Documentation

Greenfield Volume

Drainage Strategy Drawings

Construction Details Drawing

Foul Pumping Station Arrangement

Surface Water Catchment Plan Drawing

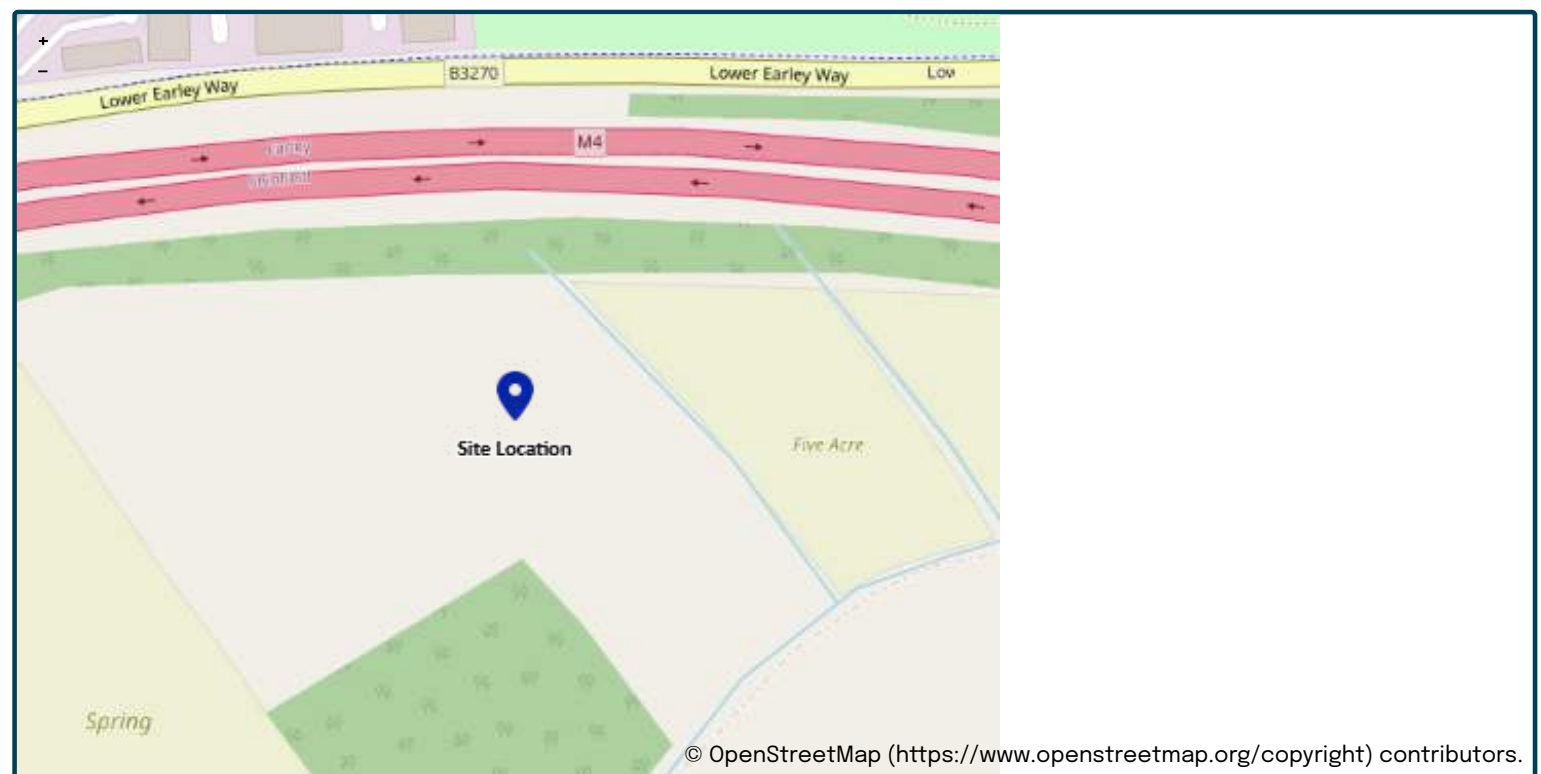
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	26/02/2026
Calculated by	Jonathan
Reference	Hd169
Model version	2.2.3

Location

Site name	TVSP Access Road
Site location	Shinfield



Site easting (British National Grid)	474784
Site northing (British National Grid)	169477

Site details

Total site area (ha)	1	ha
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Greenfield runoff

Method

Method	FEH statistical (2025)
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FEH statistical (2025)

	<u>My value</u>	<u>Map value</u>
SAAR9120 (mm)	640 mm	
BFIHOST19scaled	0.641	
QMed-QBar conversion	1.136	1.136
QMed (l/s)	1.2 l/s	
QBar (FEH statistical 2025) (l/s)	1.4 l/s	

Growth curve factors

	<u>My value</u>	<u>Map value</u>
Hydrological region	6	6
1 year growth factor	0.85	
2 year growth factor	0.88	
10 year growth factor	1.62	
30 year growth factor	2.3	
100 year growth factor	3.19	
200 year growth factor	3.74	

Results

Method	FEH statistical (2025)
Flow rate 1 year (l/s)	1.2 l/s
Flow rate 2 year (l/s)	1.2 l/s
Flow rate 10 years (l/s)	2.3 l/s
Flow rate 30 years (l/s)	3.2 l/s
Flow rate 100 years (l/s)	4.5 l/s
Flow rate 200 years (l/s)	5.3 l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent ‘zero’ figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Design Settings

Rainfall Methodology	FEH-22	Maximum Time of Concentration (mins)	30.00	Preferred Cover Depth (m)	1.250
Return Period (years)	2	Maximum Rainfall (mm/hr)	550.0	Include Intermediate Ground	✓
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00	Enforce best practice design rules	x
CV	1.000	Connection Type	Level Soffits		
Time of Entry (mins)	5.00	Minimum Backdrop Height (m)	9.999		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
SW56			43.347	1200	474719.822	169426.486	2.737
SW43			42.971	1200	474748.220	169445.807	2.642
SW44			42.609	1350	474779.640	169455.409	2.490
SW45			42.239	1350	474810.733	169455.740	2.218
SW46			41.909	1350	474849.118	169448.635	2.085
SW47	0.032	5.00	41.612	1350	474885.988	169419.242	1.906
SW48			42.181	1500	474902.591	169398.554	2.617
SW49			42.498	1500	474920.081	169373.155	2.996
SW50	0.167	5.00	41.823	1500	474945.226	169351.008	2.389
SW52	0.058	5.00	40.988	1500	474994.261	169333.083	1.734
SW54	0.100	5.00	41.582	1350	475155.553	169390.530	1.593
SW55			41.125	1350	475104.371	169365.460	1.628
SW53			41.518	1500	475050.173	169338.924	2.435
HW1			41.050		475055.638	169324.869	2.000
RG2	0.127	5.00	43.634		474713.283	169429.402	1.547
RG4	0.189	5.00	42.443		474802.509	169452.682	1.000
RG6	0.151	5.00	42.018		474838.600	169445.717	1.000
RG10	0.134	5.00	42.110		474899.385	169396.610	1.526
RG18	0.245	5.00	41.198		475102.126	169371.376	1.000
S5-6			40.605	1350	475254.742	169362.816	2.175
1	0.170	5.00	41.050		475083.442	169338.463	2.000
2			41.350	2400	475093.026	169344.491	2.336
3			40.655	1350	475112.467	169358.451	1.725
RG16	0.075	5.00	41.498		475047.000	169347.087	1.522

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S52	0.360	5.00	44.100	1200	474542.274	169401.518	0.850
S56			44.400	1200	474546.119	169396.569	1.310
S53			44.000	1200	474548.841	169394.615	1.250
S54			42.932	1200	474607.404	169393.186	0.782
S55			42.803	1200	474639.707	169399.212	1.003
S39A			42.964	1200	474651.354	169402.344	1.360
S39			43.199	1200	474653.704	169395.008	1.736
S40			43.368	1200	474656.688	169385.722	1.968
HW16			42.297	1200	474660.906	169377.055	1.497
HW11		5.00	42.297	1200	474674.704	169379.379	1.497
S41			42.597	1200	474684.271	169383.503	1.877
HW12			42.290		474688.189	169385.341	1.600
S40A		5.00	43.011	1200	474642.327	169376.818	1.521
HW10			42.297	1200	474659.215	169374.783	1.497
HW2			42.083		474760.558	169439.614	1.875
SWALE 1		5.00	44.500		474553.421	169463.621	1.150
SWALE 2			44.100		474541.863	169424.545	0.850
HW13			41.050		475034.239	169319.120	2.000
HW14	0.160	5.00	41.250		474947.082	169328.475	2.000
HW15			41.250		474910.857	169344.923	2.000
S21		5.00	41.109	1200	474884.320	169357.880	1.779
P3		5.00	41.581		474814.614	169476.921	1.231
P4		5.00	40.773		474954.733	169369.483	0.873
P2		5.00	42.489		474707.993	169441.241	1.464
P5		5.00	40.811		475097.007	169380.422	1.011

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
3.001	SW56	SW43	34.347	0.600	40.610	40.404	0.206	166.7	225	5.73	48.0
3.002	SW43	SW44	32.854	0.600	40.329	40.194	0.135	243.4	300	6.28	46.1
1.004	SW44	SW45	31.095	0.600	40.119	40.021	0.098	317.3	375	7.59	42.1
1.005	SW45	SW46	39.037	0.600	40.021	39.899	0.122	320.0	375	8.23	40.3
1.006	SW46	SW47	47.152	0.600	39.824	39.706	0.118	399.6	450	9.01	38.5
1.007	SW47	SW48	26.526	0.600	39.706	39.639	0.067	395.9	450	9.45	37.5
1.008	SW48	SW49	30.838	0.600	39.564	39.502	0.062	497.4	525	9.96	36.4
1.009	SW49	SW50	33.508	0.600	39.502	39.434	0.068	492.8	525	10.52	35.4
5.000	P3	SW45	21.534	0.600	40.350	40.129	0.221	97.4	225	5.27	49.7
13.000	RG16	SW53	8.758	0.600	39.976	39.458	0.518	16.9	225	5.05	50.6
1.010	SW50	SW52	52.209	0.600	39.434	39.329	0.105	497.2	525	11.39	33.8
1.011	SW52	SW53	56.216	0.600	39.254	39.083	0.171	328.8	600	12.09	32.7
10.000	SW54	SW55	56.992	0.600	39.989	39.647	0.342	166.6	225	5.94	47.2
10.001	SW55	SW53	60.346	0.600	39.497	39.308	0.189	319.3	375	6.94	43.9

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
3.001	1.010	40.1	22.1	2.512	2.342	0.127	0.0	119	1.033
3.002	1.003	70.9	21.2	2.342	2.115	0.127	0.0	112	0.879
1.004	1.012	111.7	19.4	2.115	1.843	0.127	0.0	105	0.764
1.005	1.007	111.2	46.1	1.843	1.635	0.316	0.0	168	0.962
1.006	1.011	160.7	64.8	1.635	1.456	0.467	0.0	198	0.958
1.007	1.015	161.5	67.6	1.456	2.092	0.499	0.0	203	0.971
1.008	0.997	215.9	83.3	2.092	2.471	0.633	0.0	226	0.935
1.009	1.002	216.9	80.9	2.471	1.864	0.633	0.0	222	0.932
5.000	1.324	52.7	0.0	1.006	1.885	0.000	0.0	0	0.000
13.000	3.197	127.1	13.7	1.297	1.835	0.075	0.0	50	2.109
1.010	0.997	215.9	97.8	1.864	1.134	0.800	0.0	248	0.974
1.011	1.337	378.1	101.4	1.134	1.835	0.858	0.0	211	1.141
10.000	1.010	40.2	17.1	1.368	1.253	0.100	0.0	102	0.970
10.001	1.008	111.4	54.8	1.253	1.835	0.345	0.0	186	1.004

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)
1.012	SW53	HW1	15.080	0.600	39.083	39.050	0.033	457.0	600	12.31	32.4
4.000	RG2	SW56	7.160	0.600	42.087	40.610	1.477	4.8	225	5.02	50.7
6.000	RG4	SW45	8.774	0.600	41.443	40.171	1.272	6.9	225	5.03	50.7
7.000	RG6	SW46	10.915	0.600	41.018	40.049	0.969	11.3	225	5.05	50.6
9.000	P4	SW50	20.778	0.600	39.900	39.734	0.166	125.2	225	5.30	49.6
8.000	RG10	SW48	3.749	0.600	40.584	39.864	0.720	5.2	225	5.01	50.7
12.000	RG18	SW55	6.328	0.600	40.198	39.623	0.575	11.0	225	5.03	50.7
14.000	1	2	11.322	0.600	39.050	39.014	0.036	314.5	375	5.19	50.1
14.001	2	3	23.934	0.600	39.014	38.930	0.084	284.9	375	5.56	48.6
14.002	3	S5-6	142.342	0.600	38.930	38.430	0.500	284.7	375	7.78	41.5
15.000	S52	S56	6.267	0.600	43.250	43.090	0.160	39.2	225	5.05	50.6
15.001	S56	S53	3.351	0.600	43.090	42.750	0.340	9.9	150	5.07	50.5
15.002	S53	S54	58.580	0.600	42.750	42.150	0.600	97.6	150	6.03	46.9
15.003	S54	S55	32.860	0.600	42.150	41.800	0.350	93.9	150	6.56	45.1

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.012	1.132	320.2	149.5	1.835	1.400	1.278	0.0	288	1.114
4.000	5.983	237.9	23.4	1.322	2.512	0.127	0.0	47	3.828
6.000	5.013	199.3	34.5	0.775	1.843	0.189	0.0	63	3.776
7.000	3.920	155.9	27.5	0.775	1.635	0.151	0.0	64	2.975
9.000	1.167	46.4	0.0	0.648	1.864	0.000	0.0	0	0.000
8.000	5.772	229.5	24.6	1.301	2.092	0.134	0.0	50	3.811
12.000	3.966	157.7	44.9	0.775	1.277	0.245	0.0	82	3.436
14.000	1.016	112.2	30.8	1.625	1.961	0.170	0.0	134	0.870
14.001	1.068	118.0	29.9	1.961	1.350	0.170	0.0	129	0.897
14.002	1.069	118.0	25.5	1.350	1.800	0.170	0.0	118	0.857
15.000	2.096	83.3	65.8	0.625	1.085	0.360	0.0	152	2.317
15.001	3.228	57.0	65.7	1.160	1.100	0.360	0.0	150	3.288
15.002	1.017	18.0	61.0	1.100	0.632	0.360	0.0	150	1.036
15.003	1.037	18.3	58.7	0.632	0.853	0.360	0.0	150	1.057

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)
15.004	S55	S39A	12.061	0.600	41.800	41.679	0.121	99.7	150	6.76	44.5
15.005	S39A	S39	7.703	0.600	41.604	41.538	0.066	116.7	225	6.86	44.1
15.006	S39	S40	9.754	0.600	41.463	41.400	0.063	154.8	300	6.99	43.7
15.007	S40	HW16	9.639	0.600	41.400	40.800	0.600	16.1	300	7.03	43.6
1.000	HW11	S41	10.418	0.600	40.800	40.720	0.080	130.2	225	5.15	50.2
1.001	S41	HW12	4.328	0.600	40.720	40.690	0.030	144.3	225	5.22	49.9
19.000	S40A	HW10	17.010	0.600	41.490	40.800	0.690	24.7	150	5.14	50.2
1.003	HW2	SW44	24.771	0.600	40.208	40.119	0.089	278.3	375	7.07	43.5
1.002	HW12	HW2	91.000	0.600	40.690	40.283	0.407	223.6	300	6.21	46.3
2.000	HW12	HW2	91.000	0.035	41.690	41.283	0.407	223.6	600	6.69	44.7
17.000	SWALE 1	SWALE 2	41.534	0.035	43.350	43.250	0.100	415.3	350	6.44	45.5
3.000	P2	SW56	18.911	0.600	41.025	40.610	0.415	45.6	225	5.16	50.2
18.000	S21	HW15	29.531	0.600	39.330	39.250	0.080	369.1	225	5.73	48.0
16.000	HW14	HW13	87.658	0.600	39.250	39.050	0.200	438.3	525	6.37	45.7

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
15.004	1.006	17.8	57.9	0.853	1.135	0.360	0.0	150	1.025
15.005	1.209	48.1	57.4	1.135	1.436	0.360	0.0	225	1.231
15.006	1.261	89.1	56.9	1.436	1.668	0.360	0.0	174	1.334
15.007	3.941	278.6	56.7	1.668	1.197	0.360	0.0	91	3.112
1.000	1.144	45.5	0.0	1.272	1.652	0.000	0.0	0	0.000
1.001	1.086	43.2	0.0	1.652	1.375	0.000	0.0	0	0.000
19.000	2.036	36.0	0.0	1.371	1.347	0.000	0.0	0	0.000
1.003	1.081	119.4	0.0	1.500	2.115	0.000	0.0	0	0.000
1.002	1.530	229.5	0.0	1.300	1.500	0.000	0.0	0	0.000
2.000	0.896	1237.0	0.0	0.000	0.200	0.000	0.0	0	0.000
17.000	0.479	260.0	0.0	0.800	0.500	0.000	0.0	0	0.000
3.000	1.943	77.2	0.0	1.239	2.512	0.000	0.0	0	0.000
18.000	0.675	26.8	0.0	1.554	1.775	0.000	0.0	0	0.000
16.000	1.063	230.2	26.4	1.475	1.475	0.160	0.0	119	0.717

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)
11.000	P5	SW55	16.676	0.600	39.800	39.623	0.177	94.2	225	5.21	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
11.000	1.347	53.6	0.0	0.786	1.277	0.000	0.0	0	0.000

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
3.001	34.347	166.7	225	PH1	43.347	40.610	2.512	42.971	40.404	2.342
3.002	32.854	243.4	300	PH1	42.971	40.329	2.342	42.609	40.194	2.115
1.004	31.095	317.3	375	PH1	42.609	40.119	2.115	42.239	40.021	1.843
1.005	39.037	320.0	375	PH1	42.239	40.021	1.843	41.909	39.899	1.635
1.006	47.152	399.6	450	PH1	41.909	39.824	1.635	41.612	39.706	1.456
1.007	26.526	395.9	450	PH1	41.612	39.706	1.456	42.181	39.639	2.092
1.008	30.838	497.4	525	PH1	42.181	39.564	2.092	42.498	39.502	2.471
1.009	33.508	492.8	525	PH1	42.498	39.502	2.471	41.823	39.434	1.864
5.000	21.534	97.4	225	PH1	41.581	40.350	1.006	42.239	40.129	1.885

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
3.001	SW56	1200	Manhole	Adoptable	SW43	1200	Manhole	Adoptable
3.002	SW43	1200	Manhole	Adoptable	SW44	1350	Manhole	Adoptable
1.004	SW44	1350	Manhole	Adoptable	SW45	1350	Manhole	Adoptable
1.005	SW45	1350	Manhole	Adoptable	SW46	1350	Manhole	Adoptable
1.006	SW46	1350	Manhole	Adoptable	SW47	1350	Manhole	Adoptable
1.007	SW47	1350	Manhole	Adoptable	SW48	1500	Manhole	Adoptable
1.008	SW48	1500	Manhole	Adoptable	SW49	1500	Manhole	Adoptable
1.009	SW49	1500	Manhole	Adoptable	SW50	1500	Manhole	Adoptable
5.000	P3		Junction		SW45	1350	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
13.000	8.758	16.9	225	PH1	41.498	39.976	1.297	41.518	39.458	1.835
1.010	52.209	497.2	525	PH1	41.823	39.434	1.864	40.988	39.329	1.134
1.011	56.216	328.8	600	PH1	40.988	39.254	1.134	41.518	39.083	1.835
10.000	56.992	166.6	225	PH1	41.582	39.989	1.368	41.125	39.647	1.253
10.001	60.346	319.3	375	PH1	41.125	39.497	1.253	41.518	39.308	1.835
1.012	15.080	457.0	600	PH1	41.518	39.083	1.835	41.050	39.050	1.400
4.000	7.160	4.8	225	PH1	43.634	42.087	1.322	43.347	40.610	2.512
6.000	8.774	6.9	225	PH1	42.443	41.443	0.775	42.239	40.171	1.843
7.000	10.915	11.3	225	PH1	42.018	41.018	0.775	41.909	40.049	1.635
9.000	20.778	125.2	225	PH1	40.773	39.900	0.648	41.823	39.734	1.864
8.000	3.749	5.2	225	PH1	42.110	40.584	1.301	42.181	39.864	2.092
12.000	6.328	11.0	225	PH1	41.198	40.198	0.775	41.125	39.623	1.277
14.000	11.322	314.5	375	PH1	41.050	39.050	1.625	41.350	39.014	1.961
14.001	23.934	284.9	375	PH1	41.350	39.014	1.961	40.655	38.930	1.350
14.002	142.342	284.7	375	PH1	40.655	38.930	1.350	40.605	38.430	1.800

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
13.000	RG16		Junction		SW53	1500	Manhole	Adoptable
1.010	SW50	1500	Manhole	Adoptable	SW52	1500	Manhole	Adoptable
1.011	SW52	1500	Manhole	Adoptable	SW53	1500	Manhole	Adoptable
10.000	SW54	1350	Manhole	Adoptable	SW55	1350	Manhole	Adoptable
10.001	SW55	1350	Manhole	Adoptable	SW53	1500	Manhole	Adoptable
1.012	SW53	1500	Manhole	Adoptable	HW1		Junction	
4.000	RG2		Junction		SW56	1200	Manhole	Adoptable
6.000	RG4		Junction		SW45	1350	Manhole	Adoptable
7.000	RG6		Junction		SW46	1350	Manhole	Adoptable
9.000	P4		Junction		SW50	1500	Manhole	Adoptable
8.000	RG10		Junction		SW48	1500	Manhole	Adoptable
12.000	RG18		Junction		SW55	1350	Manhole	Adoptable
14.000	1		Junction		2	2400	Manhole	Adoptable
14.001	2	2400	Manhole	Adoptable	3	1350	Manhole	Adoptable
14.002	3	1350	Manhole	Adoptable	S5-6	1350	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
15.000	6.267	39.2	225	PH1	44.100	43.250	0.625	44.400	43.090	1.085
15.001	3.351	9.9	150	PH1	44.400	43.090	1.160	44.000	42.750	1.100
15.002	58.580	97.6	150	PH1	44.000	42.750	1.100	42.932	42.150	0.632
15.003	32.860	93.9	150	PH1	42.932	42.150	0.632	42.803	41.800	0.853
15.004	12.061	99.7	150	PH1	42.803	41.800	0.853	42.964	41.679	1.135
15.005	7.703	116.7	225	PH1	42.964	41.604	1.135	43.199	41.538	1.436
15.006	9.754	154.8	300	PH1	43.199	41.463	1.436	43.368	41.400	1.668
15.007	9.639	16.1	300	PH1	43.368	41.400	1.668	42.297	40.800	1.197
1.000	10.418	130.2	225	PH1	42.297	40.800	1.272	42.597	40.720	1.652
1.001	4.328	144.3	225	PH1	42.597	40.720	1.652	42.290	40.690	1.375
19.000	17.010	24.7	150	PH1	43.011	41.490	1.371	42.297	40.800	1.347
1.003	24.771	278.3	375	PH1	42.083	40.208	1.500	42.609	40.119	2.115
1.002	91.000	223.6	300	GRAVEL500mm	42.290	40.690	1.300	42.083	40.283	1.500
2.000	91.000	223.6	600	0.5mX0.6mSWALE	42.290	41.690	0.000	42.083	41.283	0.200
17.000	41.534	415.3	350	0.5mSWALE	44.500	43.350	0.800	44.100	43.250	0.500

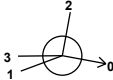
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
15.000	S52	1200	Manhole	Adoptable	S56	1200	Manhole	Adoptable
15.001	S56	1200	Manhole	Adoptable	S53	1200	Manhole	Adoptable
15.002	S53	1200	Manhole	Adoptable	S54	1200	Manhole	Adoptable
15.003	S54	1200	Manhole	Adoptable	S55	1200	Manhole	Adoptable
15.004	S55	1200	Manhole	Adoptable	S39A	1200	Manhole	Adoptable
15.005	S39A	1200	Manhole	Adoptable	S39	1200	Manhole	Adoptable
15.006	S39	1200	Manhole	Adoptable	S40	1200	Manhole	Adoptable
15.007	S40	1200	Manhole	Adoptable	HW16	1200	Manhole	Adoptable
1.000	HW11	1200	Manhole	Adoptable	S41	1200	Manhole	Adoptable
1.001	S41	1200	Manhole	Adoptable	HW12		Junction	
19.000	S40A	1200	Manhole	Adoptable	HW10	1200	Manhole	Adoptable
1.003	HW2		Junction		SW44	1350	Manhole	Adoptable
1.002	HW12		Junction		HW2		Junction	
2.000	HW12		Junction		HW2		Junction	
17.000	SWALE 1		Junction		SWALE 2		Junction	

Pipeline Schedule

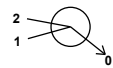
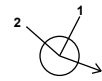
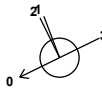
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
3.000	18.911	45.6	225	PH1	42.489	41.025	1.239	43.347	40.610	2.512
18.000	29.531	369.1	225	PH1	41.109	39.330	1.554	41.250	39.250	1.775
16.000	87.658	438.3	525	PH1	41.250	39.250	1.475	41.050	39.050	1.475
11.000	16.676	94.2	225	PH1	40.811	39.800	0.786	41.125	39.623	1.277

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
3.000	P2		Junction		SW56	1200	Manhole	Adoptable
18.000	S21	1200	Manhole	Adoptable	HW15		Junction	
16.000	HW14		Junction		HW13		Junction	
11.000	P5		Junction		SW55	1350	Manhole	Adoptable

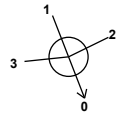
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
SW56	474719.822	169426.486	43.347	2.737	1200		1	4.000	40.610	225
							2	3.000	40.610	225
							0	3.001	40.610	225
SW43	474748.220	169445.807	42.971	2.642	1200		1	3.001	40.404	225
							0	3.002	40.329	300
SW44	474779.640	169455.409	42.609	2.490	1350		1	3.002	40.194	300
							2	1.003	40.119	375
							0	1.004	40.119	375
SW45	474810.733	169455.740	42.239	2.218	1350		1	6.000	40.171	225
							2	5.000	40.129	225
							3	1.004	40.021	375
							0	1.005	40.021	375

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
SW46	474849.118	169448.635	41.909	2.085	1350		1	7.000	40.049	225
							2	1.005	39.899	375
							0	1.006	39.824	450
SW47	474885.988	169419.242	41.612	1.906	1350		1	1.006	39.706	450
							0	1.007	39.706	450
SW48	474902.591	169398.554	42.181	2.617	1500		1	8.000	39.864	225
							2	1.007	39.639	450
							0	1.008	39.564	525
SW49	474920.081	169373.155	42.498	2.996	1500		1	1.008	39.502	525
							0	1.009	39.502	525
SW50	474945.226	169351.008	41.823	2.389	1500		1	9.000	39.734	225
							2	1.009	39.434	525
							0	1.010	39.434	525
SW52	474994.261	169333.083	40.988	1.734	1500		1	1.010	39.329	525
							0	1.011	39.254	600
SW54	475155.553	169390.530	41.582	1.593	1350		0	10.000	39.989	225
SW55	475104.371	169365.460	41.125	1.628	1350		1	12.000	39.623	225
							2	11.000	39.623	225
							3	10.000	39.647	225
							0	10.001	39.497	375

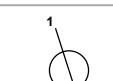
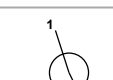
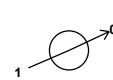
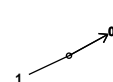
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW53	475050.173	169338.924	41.518	2.435	1500		1 13.000 2 10.001 3 1.011 0 1.012	39.458 39.308 39.083 39.083	225 375 600 600
HW1	475055.638	169324.869	41.050	2.000			1 1.012	39.050	600
RG2	474713.283	169429.402	43.634	1.547			0 4.000	42.087	225
RG4	474802.509	169452.682	42.443	1.000			0 6.000	41.443	225
RG6	474838.600	169445.717	42.018	1.000			0 7.000	41.018	225
RG10	474899.385	169396.610	42.110	1.526			0 8.000	40.584	225
RG18	475102.126	169371.376	41.198	1.000			0 12.000	40.198	225
S5-6	475254.742	169362.816	40.605	2.175	1350		1 14.002	38.430	375

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
1	475083.442	169338.463	41.050	2.000			0	14.000	39.050	375
2	475093.026	169344.491	41.350	2.336	2400		1	14.000	39.014	375
						0	14.001	39.014	375	
3	475112.467	169358.451	40.655	1.725	1350		1	14.001	38.930	375
						0	14.002	38.930	375	
RG16	475047.000	169347.087	41.498	1.522			0	13.000	39.976	225
S52	474542.274	169401.518	44.100	0.850	1200		0	15.000	43.250	225
S56	474546.119	169396.569	44.400	1.310	1200		1	15.000	43.090	225
						0	15.001	43.090	150	
S53	474548.841	169394.615	44.000	1.250	1200		1	15.001	42.750	150
						0	15.002	42.750	150	
S54	474607.404	169393.186	42.932	0.782	1200		1	15.002	42.150	150
						0	15.003	42.150	150	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S55	474639.707	169399.212	42.803	1.003	1200		1 15.003	41.800	150
						0	15.004	41.800	150
S39A	474651.354	169402.344	42.964	1.360	1200		1 15.004	41.679	150
						0	15.005	41.604	225
S39	474653.704	169395.008	43.199	1.736	1200		1 15.005	41.538	225
						0	15.006	41.463	300
S40	474656.688	169385.722	43.368	1.968	1200		1 15.006	41.400	300
						0	15.007	41.400	300
HW16	474660.906	169377.055	42.297	1.497	1200		1 15.007	40.800	300
HW11	474674.704	169379.379	42.297	1.497	1200		0 1.000	40.800	225
S41	474684.271	169383.503	42.597	1.877	1200		1 1.000	40.720	225
						0 1.001	40.720	225	
HW12	474688.189	169385.341	42.290	1.600			1 1.001	40.690	225
						0-1 2.000	40.690	300	
						0-2	2.000	41.690	600

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S40A	474642.327	169376.818	43.011	1.521	1200				
						0	19.000	41.490	150
HW10	474659.215	169374.783	42.297	1.497	1200		1	19.000	40.800
									150
HW2	474760.558	169439.614	42.083	1.875			1 2	2.000 1.002	41.283 40.283
							0	1.003	40.208
									375
SWALE 1	474553.421	169463.621	44.500	1.150			0	17.000	43.350
									350
SWALE 2	474541.863	169424.545	44.100	0.850			1	17.000	43.250
									350
HW13	475034.239	169319.120	41.050	2.000			1	16.000	39.050
									525
HW14	474947.082	169328.475	41.250	2.000					
							0	16.000	39.250
									525
HW15	474910.857	169344.923	41.250	2.000			1	18.000	39.250
									225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S21	474884.320	169357.880	41.109	1.779	1200		0	18.000	39.330	225
P3	474814.614	169476.921	41.581	1.231			0	5.000	40.350	225
P4	474954.733	169369.483	40.773	0.873			0	9.000	39.900	225
P2	474707.993	169441.241	42.489	1.464			0	3.000	41.025	225
P5	475097.007	169380.422	40.811	1.011			0	11.000	39.800	225

Simulation Settings

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

Storm Durations

60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 | 2160 | 2880 | 4320 | 5760 | 7200 | 8640 | 10080

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0	100	40	0	0
30	0	0	0				

Node 2 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	39.014	Product Number	CTL-SHE-0238-3620-2336-3620
Design Depth (m)	2.336	Min Outlet Diameter (m)	0.300
Design Flow (l/s)	36.2	Min Node Diameter (mm)	2400

Node S56 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	43.090	Product Number	CTL-SHE-0067-2000-1010-2000
Design Depth (m)	1.010	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node S41 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	40.720	Product Number	CTL-SHE-0042-1000-1579-1000
Design Depth (m)	1.579	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.0	Min Node Diameter (mm)	1200

Node 2 Online Weir Control

Flap Valve	x	Invert Level (m)	40.750	Discharge Coefficient	0.590
Replaces Downstream Link	x	Width (m)	2.100		

Node S56 Online Weir Control

Flap Valve	x	Invert Level (m)	43.800	Discharge Coefficient	0.590
Replaces Downstream Link	x	Width (m)	1.200		

Node S41 Online Weir Control

Flap Valve	x	Invert Level (m)	41.997	Discharge Coefficient	0.590
Replaces Downstream Link	x	Width (m)	1.200		

Node HW1 Online Orifice Control

Flap Valve	x	Invert Level (m)	39.050	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.600		

Node HW13 Online Orifice Control

Flap Valve	x	Invert Level (m)	39.050	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.525		

Node 1 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	74.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	39.050	Main Channel Slope (1:X)	999999.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.035

Inlets

HW13	HW1
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Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	218.6	0.0	2.000	1657.5	1887.2

Node HW11 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	16.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	40.800	Main Channel Slope (1:X)	999999.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.035

Inlets

HW10 | HW16

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	7.1	7.1	1.500	343.6	405.1

Node S52 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	23.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	43.250	Main Channel Slope (1:X)	999999.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.035

Inlets

SWALE 2

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	267.5	267.5	0.850	459.2	467.5

Node HW14 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	50.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	39.250	Main Channel Slope (1:X)	999999.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.035

Inlets

HW15

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	266.2	0.0	2.000	1618.8	1753.6

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW56	33	40.679	0.069	8.1	0.0782	0.0000	OK
60 minute summer	SW43	34	40.397	0.068	8.0	0.0770	0.0000	OK
60 minute summer	SW44	35	40.185	0.066	7.9	0.0949	0.0000	OK
60 minute summer	SW45	34	40.129	0.108	19.2	0.1545	0.0000	OK
60 minute summer	SW46	34	39.951	0.127	27.9	0.1811	0.0000	OK
60 minute summer	SW47	35	39.840	0.134	29.8	0.1922	0.0000	OK
60 minute summer	SW48	35	39.717	0.153	36.9	0.2698	0.0000	OK
60 minute summer	SW49	35	39.656	0.154	36.9	0.2716	0.0000	OK
60 minute summer	SW50	36	39.601	0.167	45.6	0.2945	0.0000	OK
60 minute summer	SW52	36	39.394	0.140	47.6	0.2480	0.0000	OK
60 minute summer	SW54	33	40.049	0.060	6.3	0.0859	0.0000	OK
60 minute summer	SW55	34	39.612	0.115	21.6	0.1651	0.0000	OK
240 minute summer	SW53	144	39.330	0.247	49.3	0.4367	0.0000	OK
240 minute summer	HW1	156	39.328	0.278	48.0	0.0000	0.0000	OK
60 minute summer	RG2	33	42.115	0.028	8.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW56	3.001	SW43	8.0	0.785	0.199	0.3491	
60 minute summer	SW43	3.002	SW44	7.9	0.672	0.112	0.3889	
60 minute summer	SW44	1.004	SW45	7.8	0.407	0.070	0.6099	
60 minute summer	SW45	1.005	SW46	18.9	0.772	0.170	0.9569	
60 minute summer	SW46	1.006	SW47	27.9	0.738	0.174	1.7862	
60 minute summer	SW47	1.007	SW48	29.5	0.817	0.183	0.9589	
60 minute summer	SW48	1.008	SW49	36.9	0.710	0.171	1.6135	
60 minute summer	SW49	1.009	SW50	36.6	0.659	0.169	1.8608	
60 minute summer	SW50	1.010	SW52	44.9	0.861	0.208	2.7259	
60 minute summer	SW52	1.011	SW53	47.5	0.674	0.126	4.0029	
60 minute summer	SW54	10.000	SW55	6.2	0.734	0.153	0.4780	
60 minute summer	SW55	10.001	SW53	21.2	0.793	0.190	1.6144	
240 minute summer	SW53	1.012	HW1	48.0	0.531	0.150	1.7878	
240 minute summer	HW1	Flow through Pond	1	30.8	0.034	0.063	88.4817	
60 minute summer	RG2	4.000	SW56	8.1	1.343	0.034	0.0473	

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	RG4	33	41.482	0.039	11.9	0.0000	0.0000	OK
60 minute summer	RG6	33	41.056	0.038	9.5	0.0000	0.0000	OK
60 minute summer	RG10	33	40.616	0.032	8.5	0.0000	0.0000	OK
60 minute summer	RG18	33	40.251	0.053	15.5	0.0000	0.0000	OK
240 minute summer	S5-6	160	38.539	0.109	23.5	0.0000	0.0000	OK
240 minute summer	1	160	39.327	0.277	37.1	0.0000	0.0000	OK
240 minute summer	2	160	39.326	0.312	23.5	1.4109	0.0000	OK
240 minute summer	3	160	39.043	0.113	23.5	0.1615	0.0000	OK
60 minute summer	RG16	33	40.006	0.030	4.7	0.0000	0.0000	OK
360 minute summer	S52	256	43.369	0.119	19.6	0.1342	0.0000	OK
120 minute summer	S56	72	43.387	0.297	15.1	0.3364	0.0000	SURCHARGED
360 minute summer	S53	264	42.783	0.033	1.9	0.0378	0.0000	OK
360 minute summer	S54	256	42.183	0.033	1.9	0.0372	0.0000	OK
360 minute summer	S55	256	41.834	0.034	1.9	0.0388	0.0000	OK
360 minute summer	S39A	264	41.636	0.032	1.9	0.0360	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	RG4	6.000	SW45	11.9	2.694	0.060	0.0388	243.1
60 minute summer	RG6	7.000	SW46	9.5	2.154	0.061	0.0481	
60 minute summer	RG10	8.000	SW48	8.5	2.632	0.037	0.0121	
60 minute summer	RG18	12.000	SW55	15.5	2.362	0.098	0.0416	
240 minute summer	1	14.000	2	23.5	0.253	0.209	1.0486	
240 minute summer	2	14.001	3	23.5	0.829	0.199	0.6783	
240 minute summer	3	14.002	S5-6	23.5	0.861	0.199	3.8820	
60 minute summer	RG16	13.000	SW53	4.7	1.502	0.037	0.0274	
360 minute summer	S52	15.000	S56	14.8	0.514	0.177	0.1911	
120 minute summer	S56	15.001	S53	1.9	0.951	0.034	0.0070	
360 minute summer	S53	15.002	S54	1.9	0.673	0.108	0.1691	
360 minute summer	S54	15.003	S55	1.9	0.659	0.106	0.0967	
360 minute summer	S55	15.004	S39A	1.9	0.652	0.109	0.0359	
360 minute summer	S39A	15.005	S39	1.9	0.583	0.040	0.0256	

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute summer	S39	264	41.495	0.032	1.9	0.0362	0.0000	OK
360 minute summer	S40	264	41.418	0.018	1.9	0.0203	0.0000	OK
960 minute winter	HW16	960	41.398	0.598	1.9	0.6763	0.0000	OK
960 minute winter	HW11	975	41.393	0.593	1.3	0.6709	0.0000	SURCHARGED
960 minute winter	S41	975	41.393	0.673	0.8	0.7614	0.0000	SURCHARGED
960 minute winter	HW12	975	40.697	0.007	0.7	0.0000	0.0000	OK
60 minute summer	S40A	1	41.490	0.000	0.0	0.0000	0.0000	OK
960 minute winter	HW10	975	41.393	0.593	0.1	0.6709	0.0000	OK
960 minute winter	HW2	975	40.228	0.020	0.7	0.0000	0.0000	OK
360 minute summer	SWALE 1	256	43.368	0.018	0.1	0.0000	0.0000	OK
360 minute summer	SWALE 2	256	43.368	0.118	5.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute summer	S39	15.006	S40	1.9	0.699	0.022	0.0278	
360 minute summer	S40	15.007	HW16	1.9	0.594	0.007	0.3476	
960 minute winter	HW16	Flow through Pond	HW11	1.3	0.044	0.005	43.8009	
960 minute winter	HW11	1.000	S41	0.8	0.099	0.018	0.4143	
960 minute winter	S41	1.001	HW12	0.7	0.687	0.016	0.0047	
960 minute winter	HW12	1.002	HW2	0.7	0.217	0.003	0.2843	
960 minute winter	HW12	2.000	HW2	0.0	0.000	0.000	0.0014	
60 minute summer	S40A	19.000	HW10	0.0	0.000	0.000	0.1497	
960 minute winter	HW10	Flow through Pond	HW11	1.3	0.044	0.005	43.8009	
960 minute winter	HW2	1.003	SW44	0.7	0.290	0.006	0.0854	
360 minute summer	SWALE 1	17.000	SWALE 2	-0.1	-0.004	-0.001	2.3166	
360 minute summer	SWALE 2	Flow through Pond	S52	-5.0	-0.012	-0.027	33.3380	

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute summer	HW13	156	39.327	0.277	9.8	0.0000	0.0000	OK
240 minute summer	HW14	152	39.329	0.079	13.5	0.0000	0.0000	OK
240 minute summer	HW15	152	39.329	0.079	6.9	0.0000	0.0000	OK
60 minute summer	S21	1	39.330	0.000	0.0	0.0000	0.0000	OK
60 minute summer	P3	1	40.350	0.000	0.0	0.0000	0.0000	OK
60 minute summer	P4	1	39.900	0.000	0.0	0.0000	0.0000	OK
60 minute summer	P2	1	41.025	0.000	0.0	0.0000	0.0000	OK
60 minute summer	P5	1	39.800	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute summer	HW13	Flow through Pond	1	30.8	0.034	0.063	88.4817	
240 minute summer	HW14	16.000	HW13	-9.1	-0.166	-0.040	5.9515	
240 minute summer	HW15	Flow through Pond	HW14	-6.9	-0.024	-0.009	23.0831	
60 minute summer	S21	18.000	HW15	0.0	0.000	0.000	0.0426	
60 minute summer	P3	5.000	SW45	0.0	0.000	0.000	0.0000	
60 minute summer	P4	9.000	SW50	0.0	0.000	0.000	0.0000	
60 minute summer	P2	3.000	SW56	0.0	0.000	0.000	0.0977	
60 minute summer	P5	11.000	SW55	0.0	0.000	0.000	0.0000	

Results for 30 year 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	SW56	33	40.816	0.206	42.1	0.2325	0.0000	OK
60 minute summer	SW43	34	40.497	0.168	41.3	0.1902	0.0000	OK
60 minute summer	SW44	36	40.338	0.219	41.4	0.3140	0.0000	OK
60 minute summer	SW45	36	40.331	0.310	94.4	0.4431	0.0000	OK
60 minute summer	SW46	36	40.251	0.427	141.2	0.6114	0.0000	OK
60 minute summer	SW47	36	40.181	0.475	147.7	0.6793	0.0000	SURCHARGED
60 minute summer	SW48	35	40.131	0.567	186.3	1.0017	0.0000	SURCHARGED
60 minute summer	SW49	35	40.076	0.574	179.1	1.0141	0.0000	SURCHARGED
60 minute summer	SW50	35	40.024	0.590	224.2	1.0425	0.0000	SURCHARGED
60 minute summer	SW52	36	39.884	0.630	226.0	1.1135	0.0000	SURCHARGED
60 minute summer	SW54	35	40.162	0.173	33.1	0.2482	0.0000	OK
60 minute summer	SW55	35	40.002	0.505	114.5	0.7227	0.0000	SURCHARGED
60 minute summer	SW53	36	39.813	0.730	349.5	1.2907	0.0000	SURCHARGED
60 minute summer	HW1	36	39.749	0.699	348.5	0.0000	0.0000	OK
60 minute summer	RG2	33	42.151	0.064	42.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW56	3.001	SW43	41.3	1.169	1.030	1.2080	
60 minute summer	SW43	3.002	SW44	41.4	1.063	0.584	1.2814	
60 minute summer	SW44	1.004	SW45	41.0	0.632	0.367	2.5545	
60 minute summer	SW45	1.005	SW46	93.1	1.068	0.837	3.9984	
60 minute summer	SW46	1.006	SW47	137.1	1.023	0.853	7.4015	
60 minute summer	SW47	1.007	SW48	141.9	1.049	0.879	4.2029	
60 minute summer	SW48	1.008	SW49	179.1	0.939	0.830	6.6620	
60 minute summer	SW49	1.009	SW50	169.0	0.860	0.779	7.2388	
60 minute summer	SW50	1.010	SW52	209.7	1.181	0.971	11.2789	
60 minute summer	SW52	1.011	SW53	224.7	0.798	0.594	15.8348	
60 minute summer	SW54	10.000	SW55	33.4	1.046	0.832	2.0694	
60 minute summer	SW55	10.001	SW53	105.7	1.038	0.949	6.6560	
60 minute summer	SW53	1.012	HW1	348.5	1.237	1.088	4.2477	
60 minute summer	HW1	Flow through Pond	1	133.5	0.098	0.271	261.9770	
60 minute summer	RG2	4.000	SW56	42.1	1.845	0.177	0.1692	

Results for 30 year 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	RG4	31	41.530	0.087	62.4	0.0000	0.0000	OK
60 minute summer	RG6	31	41.107	0.089	49.8	0.0000	0.0000	OK
60 minute summer	RG10	31	40.661	0.077	44.4	0.0000	0.0000	OK
60 minute summer	RG18	33	40.343	0.145	81.2	0.0000	0.0000	OK
180 minute summer	S5-6	144	38.566	0.135	35.5	0.0000	0.0000	OK
180 minute summer	1	144	39.679	0.629	90.9	0.0000	0.0000	SURCHARGED
180 minute summer	2	144	39.675	0.661	35.6	2.9885	0.0000	SURCHARGED
180 minute summer	3	144	39.070	0.140	35.5	0.2010	0.0000	OK
60 minute summer	RG16	33	40.043	0.067	24.8	0.0000	0.0000	OK
360 minute winter	S52	352	43.673	0.423	22.9	0.4781	0.0000	SURCHARGED
360 minute winter	S56	352	43.673	0.583	13.1	0.6589	0.0000	SURCHARGED
4320 minute summer	S53	2940	42.783	0.033	1.9	0.0379	0.0000	OK
2160 minute winter	S54	2220	42.183	0.033	1.9	0.0373	0.0000	OK
2880 minute winter	S55	2880	41.879	0.079	1.9	0.0889	0.0000	OK
2880 minute winter	S39A	2880	41.878	0.274	1.9	0.3096	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	RG4	6.000	SW45	62.4	3.882	0.313	0.1809	684.6
60 minute summer	RG6	7.000	SW46	49.8	3.339	0.320	0.2671	
60 minute summer	RG10	8.000	SW48	44.5	3.760	0.194	0.0909	
60 minute summer	RG18	12.000	SW55	81.1	3.050	0.514	0.2116	
180 minute summer	1	14.000	2	35.6	0.323	0.317	1.2488	
180 minute summer	2	14.001	3	35.5	0.925	0.301	0.9198	
180 minute summer	3	14.002	S5-6	35.5	0.967	0.301	5.2311	
60 minute summer	RG16	13.000	SW53	24.8	2.164	0.195	0.2176	
360 minute winter	S52	15.000	S56	13.1	0.410	0.157	0.2492	
360 minute winter	S56	15.001	S53	1.9	0.947	0.034	0.0071	
4320 minute summer	S53	15.002	S54	1.9	0.673	0.108	0.1695	
2160 minute winter	S54	15.003	S55	1.9	0.673	0.106	0.0970	
2880 minute winter	S55	15.004	S39A	1.9	0.653	0.110	0.1625	
2880 minute winter	S39A	15.005	S39	1.9	0.584	0.041	0.3064	

Results for 30 year 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
2880 minute winter	S39	2880	41.878	0.415	1.9	0.4688	0.0000	SURCHARGED
2880 minute winter	S40	2880	41.878	0.478	1.9	0.5401	0.0000	SURCHARGED
2880 minute winter	HW16	2880	41.877	1.077	1.9	1.2186	0.0000	OK
2880 minute winter	HW11	2940	41.873	1.073	1.4	1.2134	0.0000	SURCHARGED
2880 minute winter	S41	2940	41.873	1.153	1.6	1.3039	0.0000	SURCHARGED
2880 minute winter	HW12	2940	40.698	0.008	0.9	0.0000	0.0000	OK
2880 minute winter	S40A	2940	41.873	0.383	0.0	0.4331	0.0000	SURCHARGED
2880 minute winter	HW10	2940	41.873	1.073	0.1	1.2135	0.0000	OK
60 minute summer	HW2	35	40.339	0.131	8.1	0.0000	0.0000	OK
360 minute winter	SWALE 1	352	43.673	0.323	1.7	0.0000	0.0000	OK
360 minute winter	SWALE 2	352	43.673	0.423	12.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
2880 minute winter	S39	15.006	S40	1.9	0.699	0.022	0.6869	
2880 minute winter	S40	15.007	HW16	1.9	0.284	0.007	0.6788	
2880 minute winter	HW16	Flow through Pond	HW11	1.4	0.041	0.006	136.9224	
2880 minute winter	HW11	1.000	S41	1.6	0.136	0.036	0.4143	
2880 minute winter	S41	1.001	HW12	0.9	0.740	0.020	0.0055	
2880 minute winter	HW12	1.002	HW2	0.9	0.238	0.004	0.3305	
2880 minute winter	HW12	2.000	HW2	0.0	0.000	0.000	0.0014	
2880 minute winter	S40A	19.000	HW10	0.0	-0.001	0.000	0.2995	
2880 minute winter	HW10	Flow through Pond	HW11	1.4	0.041	0.006	136.9224	
60 minute summer	HW2	1.003	SW44	12.3	0.333	0.103	1.2424	
360 minute winter	SWALE 1	17.000	SWALE 2	-1.7	-0.016	-0.007	25.3605	
360 minute winter	SWALE 2	Flow through Pond	S52	-12.3	-0.020	-0.066	133.3792	

Results for 30 year 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
180 minute summer	HW13	144	39.680	0.630	77.8	0.0000	0.0000	OK
120 minute winter	HW14	118	39.679	0.429	95.5	0.0000	0.0000	OK
120 minute winter	HW15	118	39.679	0.429	46.1	0.0000	0.0000	OK
120 minute winter	S21	118	39.679	0.349	0.9	0.3947	0.0000	SURCHARGED
60 minute summer	P3	1	40.350	0.000	0.0	0.0000	0.0000	OK
60 minute summer	P4	35	40.008	0.108	3.9	0.0000	0.0000	OK
60 minute summer	P2	1	41.025	0.000	0.0	0.0000	0.0000	OK
60 minute summer	P5	34	39.997	0.197	2.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute summer	HW13	Flow through Pond	1	64.0	0.065	0.130	280.0687	
120 minute winter	HW14	16.000	HW13	-74.6	-0.464	-0.324	17.7453	
120 minute winter	HW15	Flow through Pond	HW14	-46.1	-0.049	-0.062	176.4499	
120 minute winter	S21	18.000	HW15	-0.9	-0.076	-0.035	1.1745	
60 minute summer	P3	5.000	SW45	0.0	0.000	0.000	0.4042	
60 minute summer	P4	9.000	SW50	-3.9	-0.137	-0.085	0.6088	
60 minute summer	P2	3.000	SW56	0.0	0.000	0.000	0.3600	
60 minute summer	P5	11.000	SW55	-2.4	-0.060	-0.044	0.6395	

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

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW56	35	42.138	1.528	76.6	1.7284	0.0000	SURCHARGED
60 minute summer	SW43	36	41.502	1.173	69.0	1.3262	0.0000	SURCHARGED
60 minute summer	SW44	38	41.393	1.274	143.4	1.8236	0.0000	SURCHARGED
60 minute summer	SW45	37	41.369	1.348	139.0	1.9287	0.0000	SURCHARGED
60 minute summer	SW46	35	41.317	1.493	169.9	2.1365	0.0000	SURCHARGED
60 minute summer	SW47	35	41.217	1.511	181.6	2.1621	0.0000	SURCHARGED
60 minute summer	SW48	35	41.131	1.567	222.6	2.7681	0.0000	SURCHARGED
60 minute summer	SW49	35	41.037	1.535	224.7	2.7123	0.0000	SURCHARGED
60 minute summer	SW50	35	40.929	1.495	307.7	2.6418	0.0000	SURCHARGED
60 minute summer	SW52	35	40.649	1.395	340.3	2.4642	0.0000	SURCHARGED
60 minute summer	SW54	32	41.582	1.593	60.7	2.2796	2.9399	FLOOD
60 minute summer	SW55	34	41.125	1.628	193.7	2.3297	0.2667	FLOOD
60 minute summer	SW53	35	40.476	1.393	567.0	2.4609	0.0000	SURCHARGED
60 minute summer	HW1	35	40.291	1.241	565.1	0.0000	0.0000	OK
60 minute summer	RG2	35	42.321	0.234	77.4	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)
60 minute summer	SW56	3.001	SW43	69.0	1.734	1.718	1.3660	
60 minute summer	SW43	3.002	SW44	66.0	1.077	0.931	2.3136	
60 minute summer	SW44	1.004	SW45	107.9	0.979	0.966	3.4297	
60 minute summer	SW45	1.005	SW46	141.6	1.284	1.273	4.3057	
60 minute summer	SW46	1.006	SW47	173.4	1.094	1.079	7.4709	
60 minute summer	SW47	1.007	SW48	183.4	1.158	1.136	4.2029	
60 minute summer	SW48	1.008	SW49	224.7	1.040	1.041	6.6620	
60 minute summer	SW49	1.009	SW50	226.7	1.049	1.045	7.2388	
60 minute summer	SW50	1.010	SW52	307.6	1.424	1.425	11.2789	
60 minute summer	SW52	1.011	SW53	339.8	1.206	0.899	15.8348	
60 minute summer	SW54	10.000	SW55	49.9	1.255	1.243	2.2666	
60 minute summer	SW55	10.001	SW53	188.1	1.706	1.689	6.6560	
60 minute summer	SW53	1.012	HW1	565.1	2.007	1.765	4.2477	
60 minute summer	HW1	Flow through Pond	1	217.8	0.121	0.442	492.8831	
60 minute summer	RG2	4.000	SW56	76.6	2.326	0.322	0.2848	

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

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	RG4	34	41.848	0.405	114.5	0.0000	0.0000	SURCHARGED
60 minute summer	RG6	34	41.627	0.609	91.5	0.0000	0.0000	SURCHARGED
60 minute summer	RG10	34	41.275	0.691	81.5	0.0000	0.0000	SURCHARGED
60 minute summer	RG18	31	41.198	1.000	149.0	0.0000	0.0000	FLOOD RISK
60 minute winter	S5-6	149	38.566	0.136	36.0	0.0000	0.0000	OK
180 minute winter	1	176	40.021	0.971	110.1	0.0000	0.0000	SURCHARGED
180 minute winter	2	176	40.017	1.003	36.8	4.5388	0.0000	SURCHARGED
120 minute winter	3	254	39.071	0.141	36.0	0.2025	0.0000	OK
60 minute summer	RG16	34	40.553	0.577	45.5	0.0000	0.0000	SURCHARGED
240 minute winter	S52	180	43.843	0.593	55.8	0.6706	0.0000	FLOOD RISK
240 minute winter	S56	180	43.835	0.745	16.3	0.8428	0.0000	SURCHARGED
240 minute winter	S53	180	42.864	0.114	16.3	0.1288	0.0000	OK
240 minute winter	S54	180	42.260	0.110	16.3	0.1245	0.0000	OK
8640 minute summer	S55	6480	42.017	0.217	1.9	0.2456	0.0000	SURCHARGED
8640 minute summer	S39A	6480	42.015	0.411	1.9	0.4652	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	RG4	6.000	SW45	113.8	3.924	0.571	0.3490	701.8
60 minute summer	RG6	7.000	SW46	89.4	3.350	0.573	0.4341	
60 minute summer	RG10	8.000	SW48	79.8	3.861	0.348	0.1491	
60 minute summer	RG18	12.000	SW55	147.4	3.707	0.935	0.2517	
180 minute winter	1	14.000	2	36.8	0.358	0.328	1.2488	
180 minute winter	2	14.001	3	36.0	0.928	0.305	0.9290	
120 minute winter	3	14.002	S5-6	36.0	0.971	0.305	5.2812	
60 minute summer	RG16	13.000	SW53	44.0	2.039	0.346	0.3483	
240 minute winter	S52	15.000	S56	16.3	0.465	0.196	0.2492	
240 minute winter	S56	15.001	S53	16.3	1.601	0.286	0.0338	
240 minute winter	S53	15.002	S54	16.3	1.158	0.908	0.8260	
240 minute winter	S54	15.003	S55	16.3	1.101	0.890	0.4861	
8640 minute summer	S55	15.004	S39A	1.9	0.653	0.110	0.2123	
8640 minute summer	S39A	15.005	S39	1.9	0.583	0.041	0.3064	

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

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
8640 minute summer	S39	6480	42.015	0.552	1.9	0.6244	0.0000	SURCHARGED
8640 minute summer	S40	6480	42.015	0.615	1.9	0.6956	0.0000	SURCHARGED
8640 minute summer	HW16	6480	42.015	1.215	1.9	1.3742	0.0000	OK
8640 minute winter	HW11	6000	42.003	1.203	1.9	1.3608	0.0000	FLOOD RISK
8640 minute winter	S41	6000	42.003	1.283	1.9	1.4511	0.0000	SURCHARGED
60 minute summer	HW12	37	41.407	0.717	111.3	0.0000	0.0000	SURCHARGED
5760 minute summer	S40A	5520	42.003	0.513	0.0	0.5805	0.0000	SURCHARGED
8640 minute winter	HW10	6240	42.003	1.203	0.0	1.3609	0.0000	OK
60 minute summer	HW2	38	41.409	1.201	142.3	0.0000	0.0000	SURCHARGED
240 minute winter	SWALE 1	180	43.843	0.493	6.0	0.0000	0.0000	SURCHARGED
240 minute winter	SWALE 2	180	43.843	0.593	33.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
8640 minute summer	S39	15.006	S40	1.9	0.691	0.022	0.6869	
8640 minute summer	S40	15.007	HW16	1.9	0.286	0.007	0.6788	
8640 minute summer	HW16	Flow through Pond	HW11	1.9	0.043	0.008	171.0806	
8640 minute winter	HW11	1.000	S41	1.9	0.135	0.043	0.4143	
8640 minute winter	S41	1.001	HW12	1.9	0.939	0.045	0.0096	
60 minute summer	HW12	1.002	HW2	-111.3	-0.471	-0.485	41.7700	
60 minute summer	HW12	2.000	HW2	0.0	0.000	0.000	5.0344	
5760 minute summer	S40A	19.000	HW10	0.0	-0.001	0.000	0.2995	
8640 minute winter	HW10	Flow through Pond	HW11	1.9	0.043	0.008	171.0807	
60 minute summer	HW2	1.003	SW44	-142.2	-1.290	-1.192	2.7322	
240 minute winter	SWALE 1	17.000	SWALE 2	-6.0	-0.017	-0.023	48.3212	
240 minute winter	SWALE 2	Flow through Pond	S52	-33.1	-0.031	-0.179	198.4720	

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

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	HW13	168	40.021	0.971	82.0	0.0000	0.0000	OK
180 minute winter	HW14	184	40.023	0.773	112.1	0.0000	0.0000	SURCHARGED
180 minute winter	HW15	184	40.023	0.773	55.4	0.0000	0.0000	OK
180 minute winter	S21	184	40.022	0.692	0.7	0.7832	0.0000	SURCHARGED
60 minute summer	P3	37	41.382	1.032	23.0	0.0000	0.0000	FLOOD RISK
60 minute summer	P4	33	40.773	0.873	7.5	0.0000	0.0000	FLOOD RISK
60 minute summer	P2	35	42.146	1.121	11.9	0.0000	0.0000	SURCHARGED
60 minute summer	P5	32	40.811	1.011	6.2	0.0000	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute winter	HW13	Flow through Pond	1	77.3	0.082	0.157	552.2817	
180 minute winter	HW14	16.000	HW13	-81.7	-0.380	-0.355	18.9370	
180 minute winter	HW15	Flow through Pond	HW14	-55.4	-0.033	-0.074	407.4685	
180 minute winter	S21	18.000	HW15	-0.7	-0.039	-0.027	1.1745	
60 minute summer	P3	5.000	SW45	-23.0	-0.633	-0.438	0.8564	
60 minute summer	P4	9.000	SW50	-7.5	-0.238	-0.163	0.8264	
60 minute summer	P2	3.000	SW56	-11.9	-0.306	-0.154	0.7521	
60 minute summer	P5	11.000	SW55	-6.2	-0.157	-0.117	0.6632	

Design Settings

Rainfall Methodology	FEH-22	Maximum Time of Concentration (mins)	30.00	Preferred Cover Depth (m)	1.250
Return Period (years)	2	Maximum Rainfall (mm/hr)	550.0	Include Intermediate Ground	✓
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00	Enforce best practice design rules	x
CV	1.000	Connection Type	Level Soffits		
Time of Entry (mins)	5.00	Minimum Backdrop Height (m)	9.999		

Simulation Settings

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

Storm Durations

60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 | 2160 | 2880 | 4320 | 5760 | 7200 | 8640 | 10080

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

Node S5-6 Surcharged Outfall

Overrides Design Area	x	Depression Storage Area (m²)	0	Evapo-transpiration (mm/day)	0
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0		
Applies to All storms					

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
0	2.070	105	2.070	210	2.070	315	2.070	420	2.070	525	2.070	630	2.070	735	2.070
15	2.070	120	2.070	225	2.070	330	2.070	435	2.070	540	2.070	645	2.070	750	2.070
30	2.070	135	2.070	240	2.070	345	2.070	450	2.070	555	2.070	660	2.070	765	2.070
45	2.070	150	2.070	255	2.070	360	2.070	465	2.070	570	2.070	675	2.070	780	2.070
60	2.070	165	2.070	270	2.070	375	2.070	480	2.070	585	2.070	690	2.070	795	2.070
75	2.070	180	2.070	285	2.070	390	2.070	495	2.070	600	2.070	705	2.070	810	2.070
90	2.070	195	2.070	300	2.070	405	2.070	510	2.070	615	2.070	720	2.070	825	2.070

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
945	2.070	1455	2.070	1965	2.070	2475	2.070	2985	2.070	3495	2.070	4005	2.070	4515	2.070
960	2.070	1470	2.070	1980	2.070	2490	2.070	3000	2.070	3510	2.070	4020	2.070	4530	2.070
975	2.070	1485	2.070	1995	2.070	2505	2.070	3015	2.070	3525	2.070	4035	2.070	4545	2.070
990	2.070	1500	2.070	2010	2.070	2520	2.070	3030	2.070	3540	2.070	4050	2.070	4560	2.070
1005	2.070	1515	2.070	2025	2.070	2535	2.070	3045	2.070	3555	2.070	4065	2.070	4575	2.070
1020	2.070	1530	2.070	2040	2.070	2550	2.070	3060	2.070	3570	2.070	4080	2.070	4590	2.070
1035	2.070	1545	2.070	2055	2.070	2565	2.070	3075	2.070	3585	2.070	4095	2.070	4605	2.070
1050	2.070	1560	2.070	2070	2.070	2580	2.070	3090	2.070	3600	2.070	4110	2.070	4620	2.070
1065	2.070	1575	2.070	2085	2.070	2595	2.070	3105	2.070	3615	2.070	4125	2.070	4635	2.070
1080	2.070	1590	2.070	2100	2.070	2610	2.070	3120	2.070	3630	2.070	4140	2.070	4650	2.070
1095	2.070	1605	2.070	2115	2.070	2625	2.070	3135	2.070	3645	2.070	4155	2.070	4665	2.070
1110	2.070	1620	2.070	2130	2.070	2640	2.070	3150	2.070	3660	2.070	4170	2.070	4680	2.070
1125	2.070	1635	2.070	2145	2.070	2655	2.070	3165	2.070	3675	2.070	4185	2.070	4695	2.070
1140	2.070	1650	2.070	2160	2.070	2670	2.070	3180	2.070	3690	2.070	4200	2.070	4710	2.070
1155	2.070	1665	2.070	2175	2.070	2685	2.070	3195	2.070	3705	2.070	4215	2.070	4725	2.070
1170	2.070	1680	2.070	2190	2.070	2700	2.070	3210	2.070	3720	2.070	4230	2.070	4740	2.070
1185	2.070	1695	2.070	2205	2.070	2715	2.070	3225	2.070	3735	2.070	4245	2.070	4755	2.070
1200	2.070	1710	2.070	2220	2.070	2730	2.070	3240	2.070	3750	2.070	4260	2.070	4770	2.070
1215	2.070	1725	2.070	2235	2.070	2745	2.070	3255	2.070	3765	2.070	4275	2.070	4785	2.070
1230	2.070	1740	2.070	2250	2.070	2760	2.070	3270	2.070	3780	2.070	4290	2.070	4800	2.070
1245	2.070	1755	2.070	2265	2.070	2775	2.070	3285	2.070	3795	2.070	4305	2.070	4815	2.070
1260	2.070	1770	2.070	2280	2.070	2790	2.070	3300	2.070	3810	2.070	4320	2.070	4830	2.070
1275	2.070	1785	2.070	2295	2.070	2805	2.070	3315	2.070	3825	2.070	4335	2.070	4845	2.070
1290	2.070	1800	2.070	2310	2.070	2820	2.070	3330	2.070	3840	2.070	4350	2.070	4860	2.070
1305	2.070	1815	2.070	2325	2.070	2835	2.070	3345	2.070	3855	2.070	4365	2.070	4875	2.070
1320	2.070	1830	2.070	2340	2.070	2850	2.070	3360	2.070	3870	2.070	4380	2.070	4890	2.070
1335	2.070	1845	2.070	2355	2.070	2865	2.070	3375	2.070	3885	2.070	4395	2.070	4905	2.070
1350	2.070	1860	2.070	2370	2.070	2880	2.070	3390	2.070	3900	2.070	4410	2.070	4920	2.070
1365	2.070	1875	2.070	2385	2.070	2895	2.070	3405	2.070	3915	2.070	4425	2.070	4935	2.070
1380	2.070	1890	2.070	2400	2.070	2910	2.070	3420	2.070	3930	2.070	4440	2.070	4950	2.070
1395	2.070	1905	2.070	2415	2.070	2925	2.070	3435	2.070	3945	2.070	4455	2.070	4965	2.070
1410	2.070	1920	2.070	2430	2.070	2940	2.070	3450	2.070	3960	2.070	4470	2.070	4980	2.070
1425	2.070	1935	2.070	2445	2.070	2955	2.070	3465	2.070	3975	2.070	4485	2.070	4995	2.070
1440	2.070	1950	2.070	2460	2.070	2970	2.070	3480	2.070	3990	2.070	4500	2.070	5010	2.070
														5025	2.070
														5040	2.070
														5055	2.070
														5070	2.070
														5085	2.070
														5100	2.070
														5115	2.070
														5130	2.070
														5145	2.070
														5160	2.070
														5175	2.070
														5190	2.070
														5205	2.070
														5220	2.070
														5235	2.070
														5250	2.070
														5265	2.070
														5280	2.070
														5295	2.070
														5310	2.070
														5325	2.070
														5340	2.070
														5355	2.070
														5370	2.070
														5385	2.070
														5400	2.070
														5415	2.070
														5430	2.070
														5445	2.070
														5460	2.070
														5475	2.070
														5490	2.070
														5505	2.070
														5520	2.070

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
5535	2.070	6045	2.070	6555	2.070	7065	2.070	7575	2.070	8085	2.070	8595	2.070	9105	2.070
5550	2.070	6060	2.070	6570	2.070	7080	2.070	7590	2.070	8100	2.070	8610	2.070	9120	2.070
5565	2.070	6075	2.070	6585	2.070	7095	2.070	7605	2.070	8115	2.070	8625	2.070	9135	2.070
5580	2.070	6090	2.070	6600	2.070	7110	2.070	7620	2.070	8130	2.070	8640	2.070	9150	2.070
5595	2.070	6105	2.070	6615	2.070	7125	2.070	7635	2.070	8145	2.070	8655	2.070	9165	2.070
5610	2.070	6120	2.070	6630	2.070	7140	2.070	7650	2.070	8160	2.070	8670	2.070	9180	2.070
5625	2.070	6135	2.070	6645	2.070	7155	2.070	7665	2.070	8175	2.070	8685	2.070	9195	2.070
5640	2.070	6150	2.070	6660	2.070	7170	2.070	7680	2.070	8190	2.070	8700	2.070	9210	2.070
5655	2.070	6165	2.070	6675	2.070	7185	2.070	7695	2.070	8205	2.070	8715	2.070	9225	2.070
5670	2.070	6180	2.070	6690	2.070	7200	2.070	7710	2.070	8220	2.070	8730	2.070	9240	2.070
5685	2.070	6195	2.070	6705	2.070	7215	2.070	7725	2.070	8235	2.070	8745	2.070	9255	2.070
5700	2.070	6210	2.070	6720	2.070	7230	2.070	7740	2.070	8250	2.070	8760	2.070	9270	2.070
5715	2.070	6225	2.070	6735	2.070	7245	2.070	7755	2.070	8265	2.070	8775	2.070	9285	2.070
5730	2.070	6240	2.070	6750	2.070	7260	2.070	7770	2.070	8280	2.070	8790	2.070	9300	2.070
5745	2.070	6255	2.070	6765	2.070	7275	2.070	7785	2.070	8295	2.070	8805	2.070	9315	2.070
5760	2.070	6270	2.070	6780	2.070	7290	2.070	7800	2.070	8310	2.070	8820	2.070	9330	2.070
5775	2.070	6285	2.070	6795	2.070	7305	2.070	7815	2.070	8325	2.070	8835	2.070	9345	2.070
5790	2.070	6300	2.070	6810	2.070	7320	2.070	7830	2.070	8340	2.070	8850	2.070	9360	2.070
5805	2.070	6315	2.070	6825	2.070	7335	2.070	7845	2.070	8355	2.070	8865	2.070	9375	2.070
5820	2.070	6330	2.070	6840	2.070	7350	2.070	7860	2.070	8370	2.070	8880	2.070	9390	2.070
5835	2.070	6345	2.070	6855	2.070	7365	2.070	7875	2.070	8385	2.070	8895	2.070	9405	2.070
5850	2.070	6360	2.070	6870	2.070	7380	2.070	7890	2.070	8400	2.070	8910	2.070	9420	2.070
5865	2.070	6375	2.070	6885	2.070	7395	2.070	7905	2.070	8415	2.070	8925	2.070	9435	2.070
5880	2.070	6390	2.070	6900	2.070	7410	2.070	7920	2.070	8430	2.070	8940	2.070	9450	2.070
5895	2.070	6405	2.070	6915	2.070	7425	2.070	7935	2.070	8445	2.070	8955	2.070	9465	2.070
5910	2.070	6420	2.070	6930	2.070	7440	2.070	7950	2.070	8460	2.070	8970	2.070	9480	2.070
5925	2.070	6435	2.070	6945	2.070	7455	2.070	7965	2.070	8475	2.070	8985	2.070	9495	2.070
5940	2.070	6450	2.070	6960	2.070	7470	2.070	7980	2.070	8490	2.070	9000	2.070	9510	2.070
5955	2.070	6465	2.070	6975	2.070	7485	2.070	7995	2.070	8505	2.070	9015	2.070	9525	2.070
5970	2.070	6480	2.070	6990	2.070	7500	2.070	8010	2.070	8520	2.070	9030	2.070	9540	2.070
5985	2.070	6495	2.070	7005	2.070	7515	2.070	8025	2.070	8535	2.070	9045	2.070	9555	2.070
6000	2.070	6510	2.070	7020	2.070	7530	2.070	8040	2.070	8550	2.070	9060	2.070	9570	2.070
6015	2.070	6525	2.070	7035	2.070	7545	2.070	8055	2.070	8565	2.070	9075	2.070	9585	2.070
6030	2.070	6540	2.070	7050	2.070	7560	2.070	8070	2.070	8580	2.070	9090	2.070	9600	2.070

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW56	35	42.148	1.538	76.7	1.7398	0.0000	SURCHARGED
60 minute summer	SW43	36	41.509	1.180	68.9	1.3349	0.0000	SURCHARGED
60 minute summer	SW44	38	41.400	1.281	144.3	1.8330	0.0000	SURCHARGED
60 minute summer	SW45	37	41.378	1.357	138.9	1.9417	0.0000	SURCHARGED
60 minute summer	SW46	35	41.326	1.502	169.1	2.1495	0.0000	SURCHARGED
60 minute summer	SW47	35	41.228	1.522	179.8	2.1773	0.0000	SURCHARGED
60 minute summer	SW48	35	41.142	1.578	221.1	2.7888	0.0000	SURCHARGED
60 minute summer	SW49	35	41.050	1.548	223.2	2.7345	0.0000	SURCHARGED
60 minute summer	SW50	35	40.943	1.509	306.8	2.6659	0.0000	SURCHARGED
60 minute summer	SW52	35	40.664	1.410	339.5	2.4913	0.0000	SURCHARGED
60 minute summer	SW54	32	41.582	1.593	60.7	2.2796	3.0222	FLOOD
60 minute summer	SW55	33	41.125	1.628	193.3	2.3297	0.5769	FLOOD
10080 minute winter	SW53	7080	40.600	1.517	17.4	2.6808	0.0000	SURCHARGED
5760 minute winter	HW1	5460	40.614	1.564	66.1	0.0000	0.0000	OK
60 minute summer	RG2	35	42.329	0.242	77.4	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)
60 minute summer	SW56	3.001	SW43	68.9	1.732	1.716	1.3660	
60 minute summer	SW43	3.002	SW44	65.9	1.077	0.929	2.3136	
60 minute summer	SW44	1.004	SW45	107.0	0.970	0.958	3.4297	
60 minute summer	SW45	1.005	SW46	141.2	1.280	1.269	4.3057	
60 minute summer	SW46	1.006	SW47	171.9	1.085	1.070	7.4709	
60 minute summer	SW47	1.007	SW48	181.6	1.146	1.124	4.2029	
60 minute summer	SW48	1.008	SW49	223.2	1.033	1.034	6.6620	
60 minute summer	SW49	1.009	SW50	225.3	1.043	1.039	7.2388	
60 minute summer	SW50	1.010	SW52	306.8	1.420	1.421	11.2789	
60 minute summer	SW52	1.011	SW53	339.0	1.204	0.897	15.8348	
60 minute summer	SW54	10.000	SW55	49.4	1.243	1.231	2.2666	
60 minute summer	SW55	10.001	SW53	187.3	1.698	1.682	6.6560	
10080 minute winter	SW53	1.012	HW1	16.8	0.290	0.053	4.2477	
5760 minute winter	HW1	Flow through Pond	1	24.7	0.014	0.050	1171.6259	
60 minute summer	RG2	4.000	SW56	76.7	2.326	0.322	0.2848	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	RG4	34	41.857	0.414	114.5	0.0000	0.0000	SURCHARGED
60 minute summer	RG6	34	41.636	0.618	91.5	0.0000	0.0000	SURCHARGED
60 minute summer	RG10	34	41.285	0.701	81.5	0.0000	0.0000	SURCHARGED
60 minute summer	RG18	31	41.198	1.000	149.0	0.0000	0.0000	FLOOD RISK
60 minute summer	S5-6	1	40.500	2.070	0.0	0.0000	0.0000	OK
10080 minute winter	1	6840	40.595	1.545	35.4	0.0000	0.0000	SURCHARGED
10080 minute winter	2	6840	40.594	1.580	6.8	7.1499	0.0000	SURCHARGED
10080 minute winter	3	6780	40.502	1.572	6.8	2.2493	0.0000	FLOOD RISK
10080 minute winter	RG16	7200	40.602	0.626	1.9	0.0000	0.0000	SURCHARGED
240 minute winter	S52	180	43.843	0.593	55.8	0.6706	0.0000	FLOOD RISK
240 minute winter	S56	180	43.835	0.745	16.3	0.8428	0.0000	SURCHARGED
240 minute winter	S53	180	42.864	0.114	16.3	0.1288	0.0000	OK
240 minute winter	S54	180	42.260	0.110	16.3	0.1245	0.0000	OK
8640 minute winter	S55	6000	42.017	0.217	1.9	0.2456	0.0000	SURCHARGED
8640 minute winter	S39A	6000	42.015	0.411	1.9	0.4652	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	RG4	6.000	SW45	113.7	3.924	0.570	0.3490	973.6
60 minute summer	RG6	7.000	SW46	89.3	3.350	0.573	0.4341	
60 minute summer	RG10	8.000	SW48	79.7	3.861	0.347	0.1491	
60 minute summer	RG18	12.000	SW55	147.8	3.717	0.937	0.2517	
10080 minute winter	1	14.000	2	6.8	0.134	0.061	1.2488	
10080 minute winter	2	14.001	3	6.8	0.196	0.057	2.6399	
10080 minute winter	3	14.002	S5-6	6.8	0.061	0.057	15.6999	
10080 minute winter	RG16	13.000	SW53	4.0	0.477	0.031	0.3483	
240 minute winter	S52	15.000	S56	16.3	0.465	0.196	0.2492	
240 minute winter	S56	15.001	S53	16.3	1.601	0.286	0.0338	
240 minute winter	S53	15.002	S54	16.3	1.158	0.908	0.8260	
240 minute winter	S54	15.003	S55	16.3	1.101	0.890	0.4861	
8640 minute winter	S55	15.004	S39A	1.9	0.652	0.110	0.2123	
8640 minute winter	S39A	15.005	S39	1.9	0.579	0.041	0.3064	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
8640 minute winter	S39	6000	42.015	0.552	1.9	0.6244	0.0000	SURCHARGED
8640 minute winter	S40	6000	42.015	0.615	1.9	0.6956	0.0000	SURCHARGED
8640 minute winter	HW16	6000	42.015	1.215	1.9	1.3742	0.0000	OK
8640 minute winter	HW11	6000	42.003	1.203	1.9	1.3608	0.0000	FLOOD RISK
8640 minute winter	S41	6000	42.003	1.283	1.9	1.4511	0.0000	SURCHARGED
60 minute summer	HW12	37	41.416	0.726	110.8	0.0000	0.0000	SURCHARGED
8640 minute winter	S40A	6360	42.003	0.513	0.0	0.5806	0.0000	SURCHARGED
8640 minute summer	HW10	6420	42.003	1.203	0.0	1.3609	0.0000	OK
60 minute summer	HW2	38	41.416	1.208	143.6	0.0000	0.0000	SURCHARGED
240 minute winter	SWALE 1	180	43.843	0.493	6.0	0.0000	0.0000	SURCHARGED
240 minute winter	SWALE 2	180	43.843	0.593	33.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
8640 minute winter	S39	15.006	S40	1.9	0.688	0.022	0.6869	
8640 minute winter	S40	15.007	HW16	1.9	0.286	0.007	0.6788	
8640 minute winter	HW16	Flow through Pond	HW11	1.9	0.043	0.008	171.0808	
8640 minute winter	HW11	1.000	S41	1.9	0.136	0.043	0.4143	
8640 minute winter	S41	1.001	HW12	1.9	0.944	0.045	0.0095	
60 minute summer	HW12	1.002	HW2	-110.8	-0.463	-0.483	41.9853	
60 minute summer	HW12	2.000	HW2	0.0	0.000	0.000	5.4477	
8640 minute winter	S40A	19.000	HW10	0.0	-0.001	0.000	0.2995	
8640 minute summer	HW10	Flow through Pond	HW11	2.0	0.043	0.008	171.0804	
60 minute summer	HW2	1.003	SW44	-143.6	-1.302	-1.203	2.7322	
240 minute winter	SWALE 1	17.000	SWALE 2	-6.0	-0.017	-0.023	48.3212	
240 minute winter	SWALE 2	Flow through Pond	S52	-33.1	-0.031	-0.179	198.4722	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute winter	HW13	6720	40.602	1.552	49.0	0.0000	0.0000	OK
10080 minute winter	HW14	6960	40.594	1.344	10.2	0.0000	0.0000	SURCHARGED
10080 minute winter	HW15	6960	40.594	1.344	6.6	0.0000	0.0000	OK
10080 minute winter	S21	6960	40.594	1.264	0.2	1.4296	0.0000	SURCHARGED
60 minute summer	P3	37	41.389	1.039	23.2	0.0000	0.0000	FLOOD RISK
60 minute summer	P4	33	40.773	0.873	8.1	0.0000	0.0000	FLOOD RISK
60 minute summer	P2	35	42.153	1.128	12.0	0.0000	0.0000	SURCHARGED
60 minute summer	P5	32	40.811	1.011	6.3	0.0000	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
10080 minute winter	HW13	Flow through Pond	1	-39.6	0.011	-0.080	1196.2388	
10080 minute winter	HW14	16.000	HW13	10.4	0.048	0.045	18.9370	
10080 minute winter	HW15	Flow through Pond	HW14	8.7	-0.004	0.012	968.7299	
10080 minute winter	S21	18.000	HW15	-0.2	-0.007	-0.007	1.1745	
60 minute summer	P3	5.000	SW45	-23.2	-0.618	-0.440	0.8564	
60 minute summer	P4	9.000	SW50	-8.1	-0.312	-0.175	0.8264	
60 minute summer	P2	3.000	SW56	-12.0	-0.304	-0.155	0.7521	
60 minute summer	P5	11.000	SW55	-6.3	-0.169	-0.117	0.6632	

Design Settings

Rainfall Methodology	FEH-22	Maximum Time of Concentration (mins)	30.00	Preferred Cover Depth (m)	1.250
Return Period (years)	2	Maximum Rainfall (mm/hr)	550.0	Include Intermediate Ground	✓
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00	Enforce best practice design rules	x
CV	1.000	Connection Type	Level Soffits		
Time of Entry (mins)	5.00	Minimum Backdrop Height (m)	9.999		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
SW56			43.347	1200	474719.822	169426.486	2.737
SW43			42.971	1200	474748.220	169445.807	2.642
SW44			42.609	1350	474779.640	169455.409	2.490
SW45			42.239	1350	474810.733	169455.740	2.218
SW46			41.909	1350	474849.118	169448.635	2.085
SW47	0.032	5.00	41.612	1350	474885.988	169419.242	1.906
SW48			42.181	1500	474902.591	169398.554	2.617
SW49			42.498	1500	474920.081	169373.155	2.996
SW50	0.167	5.00	41.823	1500	474945.226	169351.008	2.389
SW52	0.058	5.00	40.988	1500	474994.261	169333.083	1.734
SW54	0.100	5.00	41.582	1350	475155.553	169390.530	1.593
SW55			41.125	1350	475104.371	169365.460	1.628
SW53			41.518	1500	475050.173	169338.924	2.435
HW1			41.050		475055.638	169324.869	2.000
RG2	0.127	5.00	43.634		474713.283	169429.402	1.547
RG4	0.189	5.00	42.443		474802.509	169452.682	1.000
RG6	0.151	5.00	42.018		474838.600	169445.717	1.000
RG10	0.134	5.00	42.110		474899.385	169396.610	1.526
RG18	0.245	5.00	41.198		475102.126	169371.376	1.000
S5-6			40.605	1350	475254.742	169362.816	2.175
1	0.180	5.00	41.050		475083.442	169338.463	2.000
2			41.350	2400	475093.026	169344.491	2.336
3			40.655	1350	475112.467	169358.451	1.725
RG16	0.075	5.00	41.498		475047.000	169347.087	1.522

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S52	0.360	5.00	44.100	1200	474542.274	169401.518	0.850
S56			44.400	1200	474546.119	169396.569	1.310
S53			44.000	1200	474548.841	169394.615	1.250
S54			42.932	1200	474607.404	169393.186	0.782
S55			42.803	1200	474639.707	169399.212	1.003
S39A			42.964	1200	474651.354	169402.344	1.360
S39			43.199	1200	474653.704	169395.008	1.736
S40			43.368	1200	474656.688	169385.722	1.968
HW16			42.297	1200	474660.906	169377.055	1.497
HW11		5.00	42.297	1200	474674.704	169379.379	1.497
S41			42.597	1200	474684.271	169383.503	1.877
HW12			42.290		474688.189	169385.341	1.600
S40A		5.00	43.011	1200	474642.327	169376.818	1.521
HW10			42.297	1200	474659.215	169374.783	1.497
Depth/Area 1	2.510		42.489		474675.167	169517.436	1.000
HW2			42.083		474760.558	169439.614	1.875
Depth/Area 2	2.280		41.581		474814.854	169525.852	1.000
SWALE 1		5.00	44.500		474553.421	169463.621	1.150
SWALE 2			44.100		474541.863	169424.545	0.850
Depth/Area 3	4.560		41.000		474976.322	169448.082	1.000
HW13			41.050		475034.239	169319.120	2.000
HW14	0.170	5.00	41.250		474947.082	169328.475	2.000
HW15	0.610		41.250		474910.857	169344.923	2.000
S21		5.00	41.109	1200	474884.320	169357.880	1.779
P3		5.00	41.581		474814.614	169476.921	1.231
P4		5.00	40.773		474954.733	169369.483	0.873
P2		5.00	42.489		474707.993	169441.241	1.464
P5		5.00	40.811		475097.007	169380.422	1.011
Depth/Area 4	1.130		40.811		475076.775	169438.430	1.000

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
3.001	SW56	SW43	34.347	0.600	40.610	40.404	0.206	166.7	225	5.73	48.0
3.002	SW43	SW44	32.854	0.600	40.329	40.194	0.135	243.4	300	6.28	46.1
1.004	SW44	SW45	31.095	0.600	40.119	40.021	0.098	317.3	375	7.59	42.1
1.005	SW45	SW46	39.037	0.600	40.021	39.899	0.122	320.0	375	8.23	40.3
1.006	SW46	SW47	47.152	0.600	39.824	39.706	0.118	399.6	450	9.01	38.5
1.007	SW47	SW48	26.526	0.600	39.706	39.639	0.067	395.9	450	9.45	37.5
1.008	SW48	SW49	30.838	0.600	39.564	39.502	0.062	497.4	525	9.96	36.4
1.009	SW49	SW50	33.508	0.600	39.502	39.434	0.068	492.8	525	10.52	35.4
5.000	P3	SW45	21.534	0.600	40.350	40.129	0.221	97.4	225	5.27	49.7
13.000	RG16	SW53	8.758	0.600	39.976	39.458	0.518	16.9	225	5.05	50.6
1.010	SW50	SW52	52.209	0.600	39.434	39.329	0.105	497.2	525	11.39	33.8
1.011	SW52	SW53	56.216	0.600	39.254	39.083	0.171	328.8	600	12.09	32.7
10.000	SW54	SW55	56.992	0.600	39.989	39.647	0.342	166.6	225	5.94	47.2
10.001	SW55	SW53	60.346	0.600	39.497	39.308	0.189	319.3	375	6.94	43.9

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
3.001	1.010	40.1	22.1	2.512	2.342	0.127	0.0	119	1.033
3.002	1.003	70.9	21.2	2.342	2.115	0.127	0.0	112	0.879
1.004	1.012	111.7	19.4	2.115	1.843	0.127	0.0	105	0.764
1.005	1.007	111.2	46.1	1.843	1.635	0.316	0.0	168	0.962
1.006	1.011	160.7	64.8	1.635	1.456	0.467	0.0	198	0.958
1.007	1.015	161.5	67.6	1.456	2.092	0.499	0.0	203	0.971
1.008	0.997	215.9	83.3	2.092	2.471	0.633	0.0	226	0.935
1.009	1.002	216.9	80.9	2.471	1.864	0.633	0.0	222	0.932
5.000	1.324	52.7	0.0	1.006	1.885	0.000	0.0	0	0.000
13.000	3.197	127.1	13.7	1.297	1.835	0.075	0.0	50	2.109
1.010	0.997	215.9	97.8	1.864	1.134	0.800	0.0	248	0.974
1.011	1.337	378.1	101.4	1.134	1.835	0.858	0.0	211	1.141
10.000	1.010	40.2	17.1	1.368	1.253	0.100	0.0	102	0.970
10.001	1.008	111.4	54.8	1.253	1.835	0.345	0.0	186	1.004

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)
1.012	SW53	HW1	15.080	0.600	39.083	39.050	0.033	457.0	600	12.31	32.4
4.000	RG2	SW56	7.160	0.600	42.087	40.610	1.477	4.8	225	5.02	50.7
6.000	RG4	SW45	8.774	0.600	41.443	40.171	1.272	6.9	225	5.03	50.7
7.000	RG6	SW46	10.915	0.600	41.018	40.049	0.969	11.3	225	5.05	50.6
9.000	P4	SW50	20.778	0.600	39.900	39.734	0.166	125.2	225	5.30	49.6
8.000	RG10	SW48	3.749	0.600	40.584	39.864	0.720	5.2	225	5.01	50.7
12.000	RG18	SW55	6.328	0.600	40.198	39.623	0.575	11.0	225	5.03	50.7
14.000	1	2	11.322	0.600	39.050	39.014	0.036	314.5	375	5.19	50.1
14.001	2	3	23.934	0.600	39.014	38.930	0.084	284.9	375	5.56	48.6
14.002	3	S5-6	142.342	0.600	38.930	38.430	0.500	284.7	375	7.78	41.5
15.000	S52	S56	6.267	0.600	43.250	43.090	0.160	39.2	225	5.05	50.6
15.001	S56	S53	3.351	0.600	43.090	42.750	0.340	9.9	150	5.07	50.5
15.002	S53	S54	58.580	0.600	42.750	42.150	0.600	97.6	150	6.03	46.9
15.003	S54	S55	32.860	0.600	42.150	41.800	0.350	93.9	150	6.56	45.1

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.012	1.132	320.2	149.5	1.835	1.400	1.278	0.0	288	1.114
4.000	5.983	237.9	23.4	1.322	2.512	0.127	0.0	47	3.828
6.000	5.013	199.3	34.5	0.775	1.843	0.189	0.0	63	3.776
7.000	3.920	155.9	27.5	0.775	1.635	0.151	0.0	64	2.975
9.000	1.167	46.4	0.0	0.648	1.864	0.000	0.0	0	0.000
8.000	5.772	229.5	24.6	1.301	2.092	0.134	0.0	50	3.811
12.000	3.966	157.7	44.9	0.775	1.277	0.245	0.0	82	3.436
14.000	1.016	112.2	32.6	1.625	1.961	0.180	0.0	138	0.884
14.001	1.068	118.0	31.6	1.961	1.350	0.180	0.0	132	0.910
14.002	1.069	118.0	27.0	1.350	1.800	0.180	0.0	121	0.871
15.000	2.096	83.3	65.8	0.625	1.085	0.360	0.0	152	2.317
15.001	3.228	57.0	65.7	1.160	1.100	0.360	0.0	150	3.288
15.002	1.017	18.0	61.0	1.100	0.632	0.360	0.0	150	1.036
15.003	1.037	18.3	58.7	0.632	0.853	0.360	0.0	150	1.057

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)
15.004	S55	S39A	12.061	0.600	41.800	41.679	0.121	99.7	150	6.76	44.5
15.005	S39A	S39	7.703	0.600	41.604	41.538	0.066	116.7	225	6.86	44.1
15.006	S39	S40	9.754	0.600	41.463	41.400	0.063	154.8	300	6.99	43.7
15.007	S40	HW16	9.639	0.600	41.400	40.800	0.600	16.1	300	7.03	43.6
1.000	HW11	S41	10.418	0.600	40.800	40.720	0.080	130.2	225	5.15	50.2
1.001	S41	HW12	4.328	0.600	40.720	40.690	0.030	144.3	225	5.22	49.9
19.000	S40A	HW10	17.010	0.600	41.490	40.800	0.690	24.7	150	5.14	50.2
1.003	HW2	SW44	24.771	0.600	40.208	40.119	0.089	278.3	375	7.07	43.5
1.002	HW12	HW2	91.000	0.600	40.690	40.283	0.407	223.6	300	6.21	46.3
2.000	HW12	HW2	91.000	0.035	41.690	41.283	0.407	223.6	600	6.69	44.7
17.000	SWALE 1	SWALE 2	41.534	0.035	43.350	43.250	0.100	415.3	350	6.44	45.5
3.000	P2	SW56	18.911	0.600	41.025	40.610	0.415	45.6	225	5.16	50.2
18.000	S21	HW15	29.531	0.600	39.330	39.250	0.080	369.1	225	5.73	48.0
16.000	HW14	HW13	87.658	0.600	39.250	39.050	0.200	438.3	525	6.37	45.7

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
15.004	1.006	17.8	57.9	0.853	1.135	0.360	0.0	150	1.025
15.005	1.209	48.1	57.4	1.135	1.436	0.360	0.0	225	1.231
15.006	1.261	89.1	56.9	1.436	1.668	0.360	0.0	174	1.334
15.007	3.941	278.6	56.7	1.668	1.197	0.360	0.0	91	3.112
1.000	1.144	45.5	0.0	1.272	1.652	0.000	0.0	0	0.000
1.001	1.086	43.2	0.0	1.652	1.375	0.000	0.0	0	0.000
19.000	2.036	36.0	0.0	1.371	1.347	0.000	0.0	0	0.000
1.003	1.081	119.4	0.0	1.500	2.115	0.000	0.0	0	0.000
1.002	1.530	229.5	0.0	1.300	1.500	0.000	0.0	0	0.000
2.000	0.896	1237.0	0.0	0.000	0.200	0.000	0.0	0	0.000
17.000	0.479	260.0	0.0	0.800	0.500	0.000	0.0	0	0.000
3.000	1.943	77.2	0.0	1.239	2.512	0.000	0.0	0	0.000
18.000	0.675	26.8	0.0	1.554	1.775	0.000	0.0	0	0.000
16.000	1.063	230.2	28.1	1.475	1.475	0.170	0.0	123	0.729

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)
11.000	P5	SW55	16.676	0.600	39.800	39.623	0.177	94.2	225	5.21	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
11.000	1.347	53.6	0.0	0.786	1.277	0.000	0.0	0	0.000

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
3.001	34.347	166.7	225	PH1	43.347	40.610	2.512	42.971	40.404	2.342
3.002	32.854	243.4	300	PH1	42.971	40.329	2.342	42.609	40.194	2.115
1.004	31.095	317.3	375	PH1	42.609	40.119	2.115	42.239	40.021	1.843
1.005	39.037	320.0	375	PH1	42.239	40.021	1.843	41.909	39.899	1.635
1.006	47.152	399.6	450	PH1	41.909	39.824	1.635	41.612	39.706	1.456
1.007	26.526	395.9	450	PH1	41.612	39.706	1.456	42.181	39.639	2.092
1.008	30.838	497.4	525	PH1	42.181	39.564	2.092	42.498	39.502	2.471
1.009	33.508	492.8	525	PH1	42.498	39.502	2.471	41.823	39.434	1.864
5.000	21.534	97.4	225	PH1	41.581	40.350	1.006	42.239	40.129	1.885

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
3.001	SW56	1200	Manhole	Adoptable	SW43	1200	Manhole	Adoptable
3.002	SW43	1200	Manhole	Adoptable	SW44	1350	Manhole	Adoptable
1.004	SW44	1350	Manhole	Adoptable	SW45	1350	Manhole	Adoptable
1.005	SW45	1350	Manhole	Adoptable	SW46	1350	Manhole	Adoptable
1.006	SW46	1350	Manhole	Adoptable	SW47	1350	Manhole	Adoptable
1.007	SW47	1350	Manhole	Adoptable	SW48	1500	Manhole	Adoptable
1.008	SW48	1500	Manhole	Adoptable	SW49	1500	Manhole	Adoptable
1.009	SW49	1500	Manhole	Adoptable	SW50	1500	Manhole	Adoptable
5.000	P3		Junction		SW45	1350	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
13.000	8.758	16.9	225	PH1	41.498	39.976	1.297	41.518	39.458	1.835
1.010	52.209	497.2	525	PH1	41.823	39.434	1.864	40.988	39.329	1.134
1.011	56.216	328.8	600	PH1	40.988	39.254	1.134	41.518	39.083	1.835
10.000	56.992	166.6	225	PH1	41.582	39.989	1.368	41.125	39.647	1.253
10.001	60.346	319.3	375	PH1	41.125	39.497	1.253	41.518	39.308	1.835
1.012	15.080	457.0	600	PH1	41.518	39.083	1.835	41.050	39.050	1.400
4.000	7.160	4.8	225	PH1	43.634	42.087	1.322	43.347	40.610	2.512
6.000	8.774	6.9	225	PH1	42.443	41.443	0.775	42.239	40.171	1.843
7.000	10.915	11.3	225	PH1	42.018	41.018	0.775	41.909	40.049	1.635
9.000	20.778	125.2	225	PH1	40.773	39.900	0.648	41.823	39.734	1.864
8.000	3.749	5.2	225	PH1	42.110	40.584	1.301	42.181	39.864	2.092
12.000	6.328	11.0	225	PH1	41.198	40.198	0.775	41.125	39.623	1.277
14.000	11.322	314.5	375	PH1	41.050	39.050	1.625	41.350	39.014	1.961
14.001	23.934	284.9	375	PH1	41.350	39.014	1.961	40.655	38.930	1.350
14.002	142.342	284.7	375	PH1	40.655	38.930	1.350	40.605	38.430	1.800

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
13.000	RG16		Junction		SW53	1500	Manhole	Adoptable
1.010	SW50	1500	Manhole	Adoptable	SW52	1500	Manhole	Adoptable
1.011	SW52	1500	Manhole	Adoptable	SW53	1500	Manhole	Adoptable
10.000	SW54	1350	Manhole	Adoptable	SW55	1350	Manhole	Adoptable
10.001	SW55	1350	Manhole	Adoptable	SW53	1500	Manhole	Adoptable
1.012	SW53	1500	Manhole	Adoptable	HW1		Junction	
4.000	RG2		Junction		SW56	1200	Manhole	Adoptable
6.000	RG4		Junction		SW45	1350	Manhole	Adoptable
7.000	RG6		Junction		SW46	1350	Manhole	Adoptable
9.000	P4		Junction		SW50	1500	Manhole	Adoptable
8.000	RG10		Junction		SW48	1500	Manhole	Adoptable
12.000	RG18		Junction		SW55	1350	Manhole	Adoptable
14.000	1		Junction		2	2400	Manhole	Adoptable
14.001	2	2400	Manhole	Adoptable	3	1350	Manhole	Adoptable
14.002	3	1350	Manhole	Adoptable	S5-6	1350	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
15.000	6.267	39.2	225	PH1	44.100	43.250	0.625	44.400	43.090	1.085
15.001	3.351	9.9	150	PH1	44.400	43.090	1.160	44.000	42.750	1.100
15.002	58.580	97.6	150	PH1	44.000	42.750	1.100	42.932	42.150	0.632
15.003	32.860	93.9	150	PH1	42.932	42.150	0.632	42.803	41.800	0.853
15.004	12.061	99.7	150	PH1	42.803	41.800	0.853	42.964	41.679	1.135
15.005	7.703	116.7	225	PH1	42.964	41.604	1.135	43.199	41.538	1.436
15.006	9.754	154.8	300	PH1	43.199	41.463	1.436	43.368	41.400	1.668
15.007	9.639	16.1	300	PH1	43.368	41.400	1.668	42.297	40.800	1.197
1.000	10.418	130.2	225	PH1	42.297	40.800	1.272	42.597	40.720	1.652
1.001	4.328	144.3	225	PH1	42.597	40.720	1.652	42.290	40.690	1.375
19.000	17.010	24.7	150	PH1	43.011	41.490	1.371	42.297	40.800	1.347
1.003	24.771	278.3	375	PH1	42.083	40.208	1.500	42.609	40.119	2.115
1.002	91.000	223.6	300	GRAVEL500mm	42.290	40.690	1.300	42.083	40.283	1.500
2.000	91.000	223.6	600	0.5mX0.6mSWALE	42.290	41.690	0.000	42.083	41.283	0.200
17.000	41.534	415.3	350	0.5mSWALE	44.500	43.350	0.800	44.100	43.250	0.500

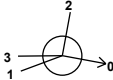
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
15.000	S52	1200	Manhole	Adoptable	S56	1200	Manhole	Adoptable
15.001	S56	1200	Manhole	Adoptable	S53	1200	Manhole	Adoptable
15.002	S53	1200	Manhole	Adoptable	S54	1200	Manhole	Adoptable
15.003	S54	1200	Manhole	Adoptable	S55	1200	Manhole	Adoptable
15.004	S55	1200	Manhole	Adoptable	S39A	1200	Manhole	Adoptable
15.005	S39A	1200	Manhole	Adoptable	S39	1200	Manhole	Adoptable
15.006	S39	1200	Manhole	Adoptable	S40	1200	Manhole	Adoptable
15.007	S40	1200	Manhole	Adoptable	HW16	1200	Manhole	Adoptable
1.000	HW11	1200	Manhole	Adoptable	S41	1200	Manhole	Adoptable
1.001	S41	1200	Manhole	Adoptable	HW12		Junction	
19.000	S40A	1200	Manhole	Adoptable	HW10	1200	Manhole	Adoptable
1.003	HW2		Junction		SW44	1350	Manhole	Adoptable
1.002	HW12		Junction		HW2		Junction	
2.000	HW12		Junction		HW2		Junction	
17.000	SWALE 1		Junction		SWALE 2		Junction	

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
3.000	18.911	45.6	225	PH1	42.489	41.025	1.239	43.347	40.610	2.512
18.000	29.531	369.1	225	PH1	41.109	39.330	1.554	41.250	39.250	1.775
16.000	87.658	438.3	525	PH1	41.250	39.250	1.475	41.050	39.050	1.475
11.000	16.676	94.2	225	PH1	40.811	39.800	0.786	41.125	39.623	1.277

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
3.000	P2		Junction		SW56	1200	Manhole	Adoptable
18.000	S21	1200	Manhole	Adoptable	HW15		Junction	
16.000	HW14		Junction		HW13		Junction	
11.000	P5		Junction		SW55	1350	Manhole	Adoptable

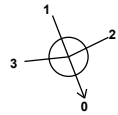
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
SW56	474719.822	169426.486	43.347	2.737	1200		1	4.000	40.610	225
							2	3.000	40.610	225
							0	3.001	40.610	225
SW43	474748.220	169445.807	42.971	2.642	1200		1	3.001	40.404	225
							0	3.002	40.329	300
SW44	474779.640	169455.409	42.609	2.490	1350		1	3.002	40.194	300
							2	1.003	40.119	375
							0	1.004	40.119	375
SW45	474810.733	169455.740	42.239	2.218	1350		1	6.000	40.171	225
							2	5.000	40.129	225
							3	1.004	40.021	375
							0	1.005	40.021	375

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
SW46	474849.118	169448.635	41.909	2.085	1350		1	7.000	40.049	225
							2	1.005	39.899	375
							0	1.006	39.824	450
SW47	474885.988	169419.242	41.612	1.906	1350		1	1.006	39.706	450
							0	1.007	39.706	450
SW48	474902.591	169398.554	42.181	2.617	1500		1	8.000	39.864	225
							2	1.007	39.639	450
							0	1.008	39.564	525
SW49	474920.081	169373.155	42.498	2.996	1500		1	1.008	39.502	525
							0	1.009	39.502	525
SW50	474945.226	169351.008	41.823	2.389	1500		1	9.000	39.734	225
							2	1.009	39.434	525
							0	1.010	39.434	525
SW52	474994.261	169333.083	40.988	1.734	1500		1	1.010	39.329	525
							0	1.011	39.254	600
SW54	475155.553	169390.530	41.582	1.593	1350		0	10.000	39.989	225
SW55	475104.371	169365.460	41.125	1.628	1350		1	12.000	39.623	225
							2	11.000	39.623	225
							3	10.000	39.647	225
							0	10.001	39.497	375

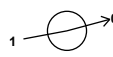
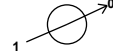
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW53	475050.173	169338.924	41.518	2.435	1500		1 13.000 2 10.001 3 1.011 0 1.012	39.458 39.308 39.083 39.083	225 375 600 600
HW1	475055.638	169324.869	41.050	2.000			1 1.012	39.050	600
RG2	474713.283	169429.402	43.634	1.547			0 4.000	42.087	225
RG4	474802.509	169452.682	42.443	1.000			0 6.000	41.443	225
RG6	474838.600	169445.717	42.018	1.000			0 7.000	41.018	225
RG10	474899.385	169396.610	42.110	1.526			0 8.000	40.584	225
RG18	475102.126	169371.376	41.198	1.000			0 12.000	40.198	225
S5-6	475254.742	169362.816	40.605	2.175	1350		1 14.002	38.430	375

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
1	475083.442	169338.463	41.050	2.000			0	14.000	39.050	375
2	475093.026	169344.491	41.350	2.336	2400		1	14.000	39.014	375
						0	14.001	39.014	375	
3	475112.467	169358.451	40.655	1.725	1350		1	14.001	38.930	375
						0	14.002	38.930	375	
RG16	475047.000	169347.087	41.498	1.522			0	13.000	39.976	225
S52	474542.274	169401.518	44.100	0.850	1200		0	15.000	43.250	225
S56	474546.119	169396.569	44.400	1.310	1200		1	15.000	43.090	225
						0	15.001	43.090	150	
S53	474548.841	169394.615	44.000	1.250	1200		1	15.001	42.750	150
						0	15.002	42.750	150	
S54	474607.404	169393.186	42.932	0.782	1200		1	15.002	42.150	150
						0	15.003	42.150	150	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S55	474639.707	169399.212	42.803	1.003	1200		1 15.003	41.800	150
						0	15.004	41.800	150
S39A	474651.354	169402.344	42.964	1.360	1200		1 15.004	41.679	150
						0	15.005	41.604	225
S39	474653.704	169395.008	43.199	1.736	1200		1 15.005	41.538	225
						0	15.006	41.463	300
S40	474656.688	169385.722	43.368	1.968	1200		1 15.006	41.400	300
						0	15.007	41.400	300
HW16	474660.906	169377.055	42.297	1.497	1200		1 15.007	40.800	300
HW11	474674.704	169379.379	42.297	1.497	1200		0 1.000	40.800	225
S41	474684.271	169383.503	42.597	1.877	1200		1 1.000	40.720	225
						0	1.001	40.720	225
HW12	474688.189	169385.341	42.290	1.600			1 1.001	40.690	225
						0-1	1.002	40.690	300
						0-2	2.000	41.690	600

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S40A	474642.327	169376.818	43.011	1.521	1200		0	19.000	41.490	150
HW10	474659.215	169374.783	42.297	1.497	1200		1	19.000	40.800	150
Depth/Area 1	474675.167	169517.436	42.489	1.000						
HW2	474760.558	169439.614	42.083	1.875			1 2	2.000 1.002	41.283 40.283	600 300
							0	1.003	40.208	375
Depth/Area 2	474814.854	169525.852	41.581	1.000						
SWALE 1	474553.421	169463.621	44.500	1.150			0	17.000	43.350	350
SWALE 2	474541.863	169424.545	44.100	0.850			1	17.000	43.250	350
Depth/Area 3	474976.322	169448.082	41.000	1.000						

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
HW13	475034.239	169319.120	41.050	2.000		1 	16.000	39.050	525
HW14	474947.082	169328.475	41.250	2.000		0 	16.000	39.250	525
HW15	474910.857	169344.923	41.250	2.000		1 	18.000	39.250	225
S21	474884.320	169357.880	41.109	1.779	1200	0 	18.000	39.330	225
P3	474814.614	169476.921	41.581	1.231		0 	5.000	40.350	225
P4	474954.733	169369.483	40.773	0.873		0 	9.000	39.900	225
P2	474707.993	169441.241	42.489	1.464		0 	3.000	41.025	225
P5	475097.007	169380.422	40.811	1.011		0 	11.000	39.800	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Depth/Area 4	475076.775	169438.430	40.811	1.000		°			

Simulation Settings

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

Storm Durations

60	120	180	240	360	480	600	720	960	1440	2160	2880	4320	5760	7200	8640	10080
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0	100	40	0	0
30	0	0	0				

Node 2 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	39.014	Product Number	CTL-SHE-0238-3620-2336-3620
Design Depth (m)	2.336	Min Outlet Diameter (m)	0.300
Design Flow (l/s)	36.2	Min Node Diameter (mm)	2400

Node S56 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	43.090	Product Number	CTL-SHE-0067-2000-1010-2000
Design Depth (m)	1.010	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node S41 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	40.720	Product Number	CTL-SHE-0042-1000-1579-1000
Design Depth (m)	1.579	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.0	Min Node Diameter (mm)	1200

Node Depth/Area 1 Offline Hydro-Brake® Control

Flap Valve	✓	Design Flow (l/s)	7.5	Min Outlet Diameter (m)	0.150
Loop to Node	P2	Objective	(HE) Minimise upstream storage	Min Node Diameter (mm)	1500
Invert Level (m)	41.489	Sump Available	✓		
Design Depth (m)	1.464	Product Number	CTL-SHE-0121-7500-1464-7500		

Node Depth/Area 2 Offline Hydro-Brake® Control

Flap Valve	✓	Design Flow (l/s)	6.8	Min Outlet Diameter (m)	0.150
Loop to Node	P3	Objective	(HE) Minimise upstream storage	Min Node Diameter (mm)	1200
Invert Level (m)	40.581	Sump Available	✓		
Design Depth (m)	1.231	Product Number	CTL-SHE-0119-6800-1231-6800		

Node Depth/Area 3 Offline Hydro-Brake® Control

Flap Valve	✓	Design Flow (l/s)	13.7	Min Outlet Diameter (m)	0.225
Loop to Node	P4	Objective	(HE) Minimise upstream storage	Min Node Diameter (mm)	1500
Invert Level (m)	40.000	Sump Available	✓		
Design Depth (m)	0.873	Product Number	CTL-SHE-0170-1370-0873-1370		

Node Depth/Area 4 Offline Hydro-Brake® Control

Flap Valve	✓	Design Flow (l/s)	3.4	Min Outlet Diameter (m)	0.100
Loop to Node	P5	Objective	(HE) Minimise upstream storage	Min Node Diameter (mm)	1200
Invert Level (m)	39.811	Sump Available	✓		
Design Depth (m)	1.011	Product Number	CTL-SHE-0087-3400-1011-3400		

Node 2 Online Weir Control

Flap Valve	x	Invert Level (m)	40.750	Discharge Coefficient	0.590
Replaces Downstream Link	x	Width (m)	2.100		

Node S56 Online Weir Control

Flap Valve	x	Invert Level (m)	43.800	Discharge Coefficient	0.590
Replaces Downstream Link	x	Width (m)	1.200		

Node S41 Online Weir Control

Flap Valve	x	Invert Level (m)	41.997	Discharge Coefficient	0.590
Replaces Downstream Link	x	Width (m)	1.200		

Node HW1 Online Orifice Control

Flap Valve	x	Invert Level (m)	39.050	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.600		

Node HW13 Online Orifice Control

Flap Valve	x	Invert Level (m)	39.050	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.525		

Node 1 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	74.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	39.050	Main Channel Slope (1:X)	999999.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.035

Inlets

HW13 | HW1

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	218.6	0.0	2.000	1657.5	1887.2

Node HW11 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	16.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	40.800	Main Channel Slope (1:X)	999999.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.035

Inlets

HW10 | HW16

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	7.1	7.1	1.500	343.6	405.1

Node S52 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	23.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	43.250	Main Channel Slope (1:X)	999999.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.035

Inlets

SWALE 2

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	267.5	267.5	0.850	459.2	467.5

Node Depth/Area 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	41.489
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	2445.0	2445.0	1.000	2445.0	2620.3	1.001	0.0	2620.3

Node Depth/Area 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	40.581
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	2250.0	2250.0	1.000	2250.0	2418.1	1.001	0.0	2418.1

Node Depth/Area 3 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	40.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	5800.0	5800.0	1.000	5800.0	6070.0	1.001	0.0	6070.0

Node Depth/Area 4 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	39.811
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	2000.0	2000.0	1.000	2000.0	2158.5	1.001	0.0	2158.5

Node HW14 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	50.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	39.250	Main Channel Slope (1:X)	999999.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.035

Inlets
HW15

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	266.2	0.0	2.000	1618.8	1753.6

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.86%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW56	34	40.682	0.072	8.8	0.0815	0.0000	OK
60 minute summer	SW43	34	40.400	0.071	8.7	0.0804	0.0000	OK
120 minute summer	SW44	66	40.191	0.072	9.2	0.1023	0.0000	OK
120 minute summer	SW45	66	40.134	0.113	20.6	0.1614	0.0000	OK
60 minute summer	SW46	34	39.953	0.129	29.1	0.1850	0.0000	OK
60 minute summer	SW47	35	39.843	0.137	30.9	0.1961	0.0000	OK
60 minute summer	SW48	35	39.719	0.155	37.9	0.2739	0.0000	OK
60 minute summer	SW49	35	39.658	0.156	37.9	0.2755	0.0000	OK
60 minute summer	SW50	36	39.604	0.170	47.2	0.3001	0.0000	OK
600 minute summer	SW52	420	39.459	0.205	31.3	0.3618	0.0000	OK
60 minute summer	SW54	33	40.049	0.060	6.3	0.0859	0.0000	OK
60 minute summer	SW55	34	39.613	0.116	21.8	0.1658	0.0000	OK
600 minute summer	SW53	420	39.457	0.374	40.1	0.6610	0.0000	OK
600 minute summer	HW1	420	39.456	0.406	38.8	0.0000	0.0000	OK
60 minute summer	RG2	33	42.115	0.028	8.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW56	3.001	SW43	8.7	0.804	0.216	0.3702	
60 minute summer	SW43	3.002	SW44	8.6	0.687	0.122	0.4123	
120 minute summer	SW44	1.004	SW45	9.1	0.439	0.082	0.6601	
120 minute summer	SW45	1.005	SW46	20.6	0.790	0.185	1.0170	
60 minute summer	SW46	1.006	SW47	29.0	0.746	0.180	1.8355	
60 minute summer	SW47	1.007	SW48	30.6	0.825	0.190	0.9857	
60 minute summer	SW48	1.008	SW49	37.9	0.714	0.176	1.6469	
60 minute summer	SW49	1.009	SW50	37.6	0.661	0.173	1.9086	
60 minute summer	SW50	1.010	SW52	46.5	0.870	0.215	2.7960	
600 minute summer	SW52	1.011	SW53	30.7	0.364	0.081	7.5773	
60 minute summer	SW54	10.000	SW55	6.2	0.734	0.153	0.4780	
60 minute summer	SW55	10.001	SW53	21.4	0.794	0.192	1.6247	
600 minute summer	SW53	1.012	HW1	38.8	0.445	0.121	2.9250	
600 minute summer	HW1	Flow through Pond	1	35.5	0.026	0.072	147.2924	
60 minute summer	RG2	4.000	SW56	8.1	1.343	0.034	0.0495	

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.86%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	RG4	33	41.482	0.039	11.9	0.0000	0.0000	OK
60 minute summer	RG6	33	41.056	0.038	9.5	0.0000	0.0000	OK
60 minute summer	RG10	33	40.616	0.032	8.5	0.0000	0.0000	OK
60 minute summer	RG18	33	40.251	0.053	15.5	0.0000	0.0000	OK
600 minute summer	S5-6	420	38.559	0.129	32.3	0.0000	0.0000	OK
600 minute summer	1	420	39.454	0.404	38.5	0.0000	0.0000	SURCHARGED
600 minute summer	2	420	39.451	0.437	32.3	1.9753	0.0000	SURCHARGED
600 minute summer	3	420	39.063	0.133	32.3	0.1908	0.0000	OK
60 minute summer	RG16	33	40.006	0.030	4.7	0.0000	0.0000	OK
360 minute summer	S52	256	43.369	0.119	22.8	0.1342	0.0000	OK
120 minute summer	S56	72	43.387	0.297	13.9	0.3364	0.0000	SURCHARGED
360 minute summer	S53	256	42.783	0.033	1.9	0.0378	0.0000	OK
360 minute summer	S54	256	42.183	0.033	1.9	0.0372	0.0000	OK
360 minute summer	S55	256	41.834	0.034	1.9	0.0388	0.0000	OK
360 minute summer	S39A	256	41.636	0.032	1.9	0.0360	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	RG4	6.000	SW45	11.9	2.694	0.060	0.0388	1077.2
60 minute summer	RG6	7.000	SW46	9.5	2.154	0.061	0.0481	
60 minute summer	RG10	8.000	SW48	8.5	2.632	0.037	0.0121	
60 minute summer	RG18	12.000	SW55	15.5	2.362	0.098	0.0416	
600 minute summer	1	14.000	2	32.3	0.293	0.288	1.2488	
600 minute summer	2	14.001	3	32.3	0.902	0.274	0.8566	
600 minute summer	3	14.002	S5-6	32.3	0.941	0.273	4.8819	
60 minute summer	RG16	13.000	SW53	4.7	1.502	0.037	0.0274	
360 minute summer	S52	15.000	S56	-11.5	0.418	-0.138	0.1911	
120 minute summer	S56	15.001	S53	1.9	0.950	0.034	0.0070	
360 minute summer	S53	15.002	S54	1.9	0.673	0.108	0.1691	
360 minute summer	S54	15.003	S55	1.9	0.659	0.106	0.0967	
360 minute summer	S55	15.004	S39A	1.9	0.652	0.109	0.0359	
360 minute summer	S39A	15.005	S39	1.9	0.583	0.040	0.0256	

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.86%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute summer	S39	256	41.495	0.032	1.9	0.0362	0.0000	OK
360 minute summer	S40	256	41.418	0.018	1.9	0.0203	0.0000	OK
960 minute winter	HW16	960	41.398	0.598	1.9	0.6763	0.0000	OK
960 minute winter	HW11	975	41.393	0.593	1.3	0.6709	0.0000	SURCHARGED
960 minute winter	S41	975	41.393	0.673	0.8	0.7614	0.0000	SURCHARGED
960 minute winter	HW12	975	40.697	0.007	0.7	0.0000	0.0000	OK
60 minute summer	S40A	1	41.490	0.000	0.0	0.0000	0.0000	OK
960 minute winter	HW10	975	41.393	0.593	0.1	0.6710	0.0000	OK
1440 minute summer	Depth/Area 1	960	41.655	0.166	27.4	406.2315	0.0000	OK
960 minute winter	HW2	975	40.228	0.020	0.7	0.0000	0.0000	OK
1440 minute summer	Depth/Area 2	960	40.743	0.162	24.9	363.5451	0.0000	OK
360 minute summer	SWALE 1	256	43.368	0.018	0.1	0.0000	0.0000	OK
360 minute summer	SWALE 2	256	43.368	0.118	5.0	0.0000	0.0000	OK
4320 minute summer	Depth/Area 3	2580	40.144	0.144	23.8	834.2830	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute summer	S39	15.006	S40	1.9	0.699	0.022	0.0278	
360 minute summer	S40	15.007	HW16	1.9	0.651	0.007	0.3476	
960 minute winter	HW16	Flow through Pond	HW11	1.3	0.044	0.005	43.8028	
960 minute winter	HW11	1.000	S41	0.8	0.099	0.018	0.4143	
960 minute winter	S41	1.001	HW12	0.7	0.687	0.016	0.0047	
960 minute winter	HW12	1.002	HW2	0.7	0.217	0.003	0.2843	
960 minute winter	HW12	2.000	HW2	0.0	0.000	0.000	0.0014	
60 minute summer	S40A	19.000	HW10	0.0	0.000	0.000	0.1497	
960 minute winter	HW10	Flow through Pond	HW11	1.3	0.044	0.005	43.8028	
1440 minute summer	Depth/Area 1	Hydro-Brake®	P2	6.5				378.3
960 minute winter	HW2	1.003	SW44	0.7	0.210	0.006	0.1855	
1440 minute summer	Depth/Area 2	Hydro-Brake®	P3	6.1				354.7
360 minute summer	SWALE 1	17.000	SWALE 2	-0.1	-0.004	-0.001	2.3157	
360 minute summer	SWALE 2	Flow through Pond	S52	-5.0	-0.012	-0.027	33.3334	
4320 minute summer	Depth/Area 3	Hydro-Brake®	P4	10.4				1189.9

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.86%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute summer	HW13	420	39.454	0.404	9.6	0.0000	0.0000	OK
600 minute summer	HW14	435	39.454	0.204	11.6	0.0000	0.0000	OK
600 minute summer	HW15	435	39.454	0.204	12.6	0.0000	0.0000	OK
600 minute summer	S21	435	39.454	0.124	0.1	0.1400	0.0000	OK
1440 minute summer	P3	960	40.403	0.053	6.1	0.0000	0.0000	OK
4320 minute summer	P4	2580	39.975	0.075	10.4	0.0000	0.0000	OK
1440 minute summer	P2	960	41.069	0.044	6.5	0.0000	0.0000	OK
4320 minute summer	P5	2640	39.832	0.032	2.3	0.0000	0.0000	OK
4320 minute summer	Depth/Area 4	2640	39.918	0.107	5.9	213.8277	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
600 minute summer	HW13	Flow through Pond	1	35.5	0.026	0.072	147.2924	
600 minute summer	HW14	16.000	HW13	9.6	0.176	0.041	11.2060	
600 minute summer	HW15	Flow through Pond	HW14	8.5	0.020	0.011	68.2898	
600 minute summer	S21	18.000	HW15	-0.1	-0.013	-0.004	0.8891	
1440 minute summer	P3	5.000	SW45	6.1	0.880	0.116	0.1494	
4320 minute summer	P4	9.000	SW50	10.4	0.923	0.224	0.2339	
1440 minute summer	P2	3.000	SW56	6.5	0.900	0.084	0.1407	
4320 minute summer	P5	11.000	SW55	2.3	0.668	0.043	0.0574	
4320 minute summer	Depth/Area 4	Hydro-Brake®	P5	2.3				287.0

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

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW56	33	40.896	0.286	48.8	0.3238	0.0000	SURCHARGED
60 minute summer	SW43	34	40.514	0.185	47.8	0.2089	0.0000	OK
60 minute summer	SW44	37	40.454	0.335	48.0	0.4800	0.0000	OK
60 minute summer	SW45	37	40.435	0.414	102.6	0.5922	0.0000	SURCHARGED
60 minute summer	SW46	35	40.361	0.537	148.8	0.7691	0.0000	SURCHARGED
60 minute summer	SW47	34	40.288	0.582	152.8	0.8332	0.0000	SURCHARGED
60 minute summer	SW48	34	40.245	0.681	188.0	1.2027	0.0000	SURCHARGED
60 minute summer	SW49	34	40.167	0.665	175.1	1.1749	0.0000	SURCHARGED
60 minute summer	SW50	35	40.109	0.675	226.8	1.1931	0.0000	SURCHARGED
720 minute winter	SW52	705	40.058	0.804	55.8	1.4198	0.0000	SURCHARGED
60 minute summer	SW54	35	40.313	0.324	33.1	0.4632	0.0000	SURCHARGED
60 minute summer	SW55	35	40.107	0.610	113.4	0.8727	0.0000	SURCHARGED
720 minute winter	SW53	705	40.056	0.973	73.1	1.7200	0.0000	SURCHARGED
720 minute winter	HW1	720	40.058	1.008	70.8	0.0000	0.0000	OK
60 minute summer	RG2	33	42.151	0.064	42.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW56	3.001	SW43	47.8	1.221	1.191	1.2748	
60 minute summer	SW43	3.002	SW44	47.9	1.107	0.676	1.7154	
60 minute summer	SW44	1.004	SW45	58.0	0.660	0.520	3.3323	
60 minute summer	SW45	1.005	SW46	99.0	1.087	0.890	4.3057	
60 minute summer	SW46	1.006	SW47	142.2	1.038	0.885	7.4709	
60 minute summer	SW47	1.007	SW48	143.6	1.055	0.889	4.2029	
60 minute summer	SW48	1.008	SW49	175.1	0.935	0.811	6.6620	
60 minute summer	SW49	1.009	SW50	167.8	0.842	0.773	7.2388	
60 minute summer	SW50	1.010	SW52	211.5	1.175	0.980	11.2789	
720 minute winter	SW52	1.011	SW53	55.6	0.391	0.147	15.8348	
60 minute summer	SW54	10.000	SW55	32.7	1.039	0.815	2.2666	
60 minute summer	SW55	10.001	SW53	103.6	1.008	0.931	6.6560	
720 minute winter	SW53	1.012	HW1	70.8	0.518	0.221	4.2477	
720 minute winter	HW1	Flow through Pond	1	48.5	0.036	0.098	577.7167	
60 minute summer	RG2	4.000	SW56	42.1	1.694	0.177	0.1753	

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

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	RG4	33	41.529	0.086	62.4	0.0000	0.0000	OK
60 minute summer	RG6	33	41.105	0.087	49.8	0.0000	0.0000	OK
60 minute summer	RG10	30	40.658	0.074	44.4	0.0000	0.0000	OK
60 minute summer	RG18	34	40.365	0.167	81.2	0.0000	0.0000	OK
5760 minute winter	S5-6	3540	38.566	0.136	36.0	0.0000	0.0000	OK
720 minute winter	1	705	40.049	0.999	54.8	0.0000	0.0000	SURCHARGED
720 minute winter	2	705	40.045	1.031	36.2	4.6635	0.0000	SURCHARGED
5760 minute winter	3	3540	39.071	0.141	36.0	0.2025	0.0000	OK
720 minute winter	RG16	690	40.056	0.080	2.6	0.0000	0.0000	OK
360 minute winter	S52	352	43.673	0.423	22.9	0.4780	0.0000	SURCHARGED
360 minute winter	S56	352	43.673	0.583	11.4	0.6589	0.0000	SURCHARGED
4320 minute summer	S53	2940	42.783	0.033	1.9	0.0379	0.0000	OK
2160 minute winter	S54	2220	42.183	0.033	1.9	0.0373	0.0000	OK
2880 minute winter	S55	2940	41.879	0.079	1.9	0.0892	0.0000	OK
2880 minute winter	S39A	2940	41.879	0.275	1.9	0.3107	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	RG4	6.000	SW45	62.4	3.803	0.313	0.2332	9126.8
60 minute summer	RG6	7.000	SW46	49.8	3.242	0.319	0.2915	
60 minute summer	RG10	8.000	SW48	44.4	3.759	0.193	0.0923	
60 minute summer	RG18	12.000	SW55	80.8	3.000	0.512	0.2258	
720 minute winter	1	14.000	2	36.2	0.328	0.322	1.2488	
720 minute winter	2	14.001	3	36.0	0.928	0.305	0.9290	
5760 minute winter	3	14.002	S5-6	36.0	0.971	0.305	5.2812	
720 minute winter	RG16	13.000	SW53	2.6	1.172	0.020	0.2291	
360 minute winter	S52	15.000	S56	11.4	0.374	0.137	0.2492	
360 minute winter	S56	15.001	S53	1.9	0.950	0.034	0.0071	
4320 minute summer	S53	15.002	S54	1.9	0.673	0.108	0.1695	
2160 minute winter	S54	15.003	S55	1.9	0.673	0.106	0.0970	
2880 minute winter	S55	15.004	S39A	1.9	0.653	0.110	0.1627	
2880 minute winter	S39A	15.005	S39	1.9	0.584	0.041	0.3064	

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

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute winter	S39	2940	41.879	0.416	1.9	0.4702	0.0000	SURCHARGED
2880 minute winter	S40	2940	41.879	0.479	1.9	0.5414	0.0000	SURCHARGED
2880 minute winter	HW16	2940	41.879	1.079	1.9	1.2200	0.0000	OK
2880 minute winter	HW11	2940	41.875	1.075	1.4	1.2153	0.0000	SURCHARGED
2880 minute winter	S41	2940	41.874	1.154	1.6	1.3057	0.0000	SURCHARGED
2880 minute winter	HW12	2940	40.698	0.008	0.9	0.0000	0.0000	OK
2880 minute winter	S40A	2940	41.875	0.385	0.0	0.4349	0.0000	SURCHARGED
2880 minute winter	HW10	2940	41.875	1.075	0.1	1.2153	0.0000	OK
720 minute winter	Depth/Area 1	705	42.020	0.531	88.2	1298.6620	0.0000	OK
60 minute summer	HW2	37	40.458	0.250	38.0	0.0000	0.0000	OK
720 minute winter	Depth/Area 2	705	41.105	0.524	80.2	1178.5940	0.0000	OK
360 minute winter	SWALE 1	352	43.673	0.323	1.7	0.0000	0.0000	OK
360 minute winter	SWALE 2	352	43.673	0.423	12.3	0.0000	0.0000	OK
720 minute winter	Depth/Area 3	705	40.412	0.412	160.3	2387.7230	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
2880 minute winter	S39	15.006	S40	1.9	0.699	0.022	0.6869	
2880 minute winter	S40	15.007	HW16	1.9	0.284	0.007	0.6788	
2880 minute winter	HW16	Flow through Pond	HW11	1.4	0.041	0.006	137.3239	
2880 minute winter	HW11	1.000	S41	1.6	0.136	0.036	0.4143	
2880 minute winter	S41	1.001	HW12	0.9	0.740	0.020	0.0055	
2880 minute winter	HW12	1.002	HW2	0.9	0.238	0.004	0.3306	
2880 minute winter	HW12	2.000	HW2	0.0	0.000	0.000	0.0014	
2880 minute winter	S40A	19.000	HW10	0.0	-0.001	0.000	0.2995	
2880 minute winter	HW10	Flow through Pond	HW11	1.4	0.041	0.006	137.3239	
720 minute winter	Depth/Area 1	Hydro-Brake®	P2	7.5				328.1
60 minute summer	HW2	1.003	SW44	-37.4	-0.473	-0.313	2.2535	
720 minute winter	Depth/Area 2	Hydro-Brake®	P3	6.8				297.4
360 minute winter	SWALE 1	17.000	SWALE 2	-1.7	-0.017	-0.007	25.3550	
360 minute winter	SWALE 2	Flow through Pond	S52	-12.3	-0.020	-0.066	133.3615	
720 minute winter	Depth/Area 3	Hydro-Brake®	P4	13.7				567.8

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

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	HW13	720	40.046	0.996	31.5	0.0000	0.0000	OK
720 minute winter	HW14	720	40.047	0.797	15.8	0.0000	0.0000	SURCHARGED
720 minute winter	HW15	720	40.047	0.797	21.4	0.0000	0.0000	OK
720 minute winter	S21	705	40.047	0.717	0.2	0.8113	0.0000	SURCHARGED
60 minute summer	P3	37	40.445	0.095	6.8	0.0000	0.0000	OK
60 minute summer	P4	35	40.127	0.227	13.7	0.0000	0.0000	SURCHARGED
180 minute summer	P2	148	41.072	0.047	7.5	0.0000	0.0000	OK
60 minute summer	P5	35	40.100	0.300	7.6	0.0000	0.0000	SURCHARGED
960 minute winter	Depth/Area 4	945	40.120	0.309	31.1	617.1214	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
720 minute winter	HW13	Flow through Pond	1	48.5	0.036	0.098	577.7167	
720 minute winter	HW14	16.000	HW13	8.3	0.188	0.036	18.9370	
720 minute winter	HW15	Flow through Pond	HW14	7.1	0.019	0.009	426.9566	
720 minute winter	S21	18.000	HW15	-0.2	-0.011	-0.007	1.1745	
60 minute summer	P3	5.000	SW45	9.0	0.907	0.170	0.5986	
60 minute summer	P4	9.000	SW50	14.5	0.990	0.311	0.8262	
180 minute summer	P2	3.000	SW56	7.5	0.951	0.097	0.3029	
60 minute summer	P5	11.000	SW55	-7.6	0.392	-0.141	0.6632	
960 minute winter	Depth/Area 4	Hydro-Brake®	P5	3.3				125.7

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW56	35	42.233	1.623	76.5	1.8357	0.0000	SURCHARGED
60 minute summer	SW43	36	41.576	1.247	70.0	1.4103	0.0000	SURCHARGED
60 minute summer	SW44	38	41.455	1.336	150.5	1.9121	0.0000	SURCHARGED
60 minute summer	SW45	36	41.441	1.420	138.4	2.0319	0.0000	SURCHARGED
60 minute summer	SW46	35	41.388	1.564	167.6	2.2380	0.0000	SURCHARGED
60 minute summer	SW47	35	41.295	1.589	177.4	2.2745	0.0000	SURCHARGED
60 minute summer	SW48	35	41.214	1.650	219.7	2.9151	0.0000	SURCHARGED
60 minute summer	SW49	35	41.123	1.621	220.7	2.8636	0.0000	SURCHARGED
60 minute summer	SW50	35	41.016	1.582	309.6	2.7961	0.0000	SURCHARGED
60 minute summer	SW52	35	40.736	1.482	340.8	2.6191	0.0000	FLOOD RISK
60 minute summer	SW54	32	41.582	1.593	60.7	2.2796	3.2569	FLOOD
60 minute summer	SW55	33	41.125	1.628	192.3	2.3297	1.8540	FLOOD
60 minute summer	SW53	35	40.564	1.481	558.7	2.6177	0.0000	SURCHARGED
960 minute winter	HW1	960	40.514	1.464	87.7	0.0000	0.0000	OK
60 minute summer	RG2	35	42.421	0.334	77.4	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)
60 minute summer	SW56	3.001	SW43	70.0	1.760	1.744	1.3660	
60 minute summer	SW43	3.002	SW44	66.9	1.119	0.943	2.3136	
60 minute summer	SW44	1.004	SW45	108.4	0.983	0.970	3.4297	
60 minute summer	SW45	1.005	SW46	140.8	1.277	1.266	4.3057	
60 minute summer	SW46	1.006	SW47	170.0	1.073	1.058	7.4709	
60 minute summer	SW47	1.007	SW48	179.2	1.131	1.110	4.2029	
60 minute summer	SW48	1.008	SW49	220.7	1.022	1.022	6.6620	
60 minute summer	SW49	1.009	SW50	221.6	1.026	1.022	7.2388	
60 minute summer	SW50	1.010	SW52	309.2	1.431	1.432	11.2789	
60 minute summer	SW52	1.011	SW53	339.5	1.206	0.898	15.8348	
60 minute summer	SW54	10.000	SW55	47.6	1.196	1.185	2.2666	
60 minute summer	SW55	10.001	SW53	183.6	1.665	1.648	6.6560	
60 minute summer	SW53	1.012	HW1	557.1	1.978	1.740	4.2477	
960 minute winter	HW1	Flow through Pond	1	55.0	0.037	0.112	1082.3400	
60 minute summer	RG2	4.000	SW56	76.5	2.230	0.322	0.2848	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	RG4	34	41.954	0.511	114.5	0.0000	0.0000	SURCHARGED
60 minute summer	RG6	34	41.727	0.709	91.5	0.0000	0.0000	FLOOD RISK
60 minute summer	RG10	34	41.359	0.775	81.5	0.0000	0.0000	SURCHARGED
60 minute summer	RG18	31	41.198	1.000	149.0	0.0000	0.0000	FLOOD RISK
8640 minute summer	S5-6	4200	38.566	0.136	36.0	0.0000	0.0000	OK
960 minute winter	1	960	40.507	1.457	63.6	0.0000	0.0000	SURCHARGED
960 minute winter	2	960	40.504	1.490	36.3	6.7395	0.0000	SURCHARGED
8640 minute summer	3	4200	39.071	0.141	36.0	0.2025	0.0000	OK
60 minute summer	RG16	35	40.636	0.660	45.5	0.0000	0.0000	SURCHARGED
240 minute winter	S52	180	43.843	0.593	55.8	0.6706	0.0000	FLOOD RISK
240 minute winter	S56	180	43.835	0.745	16.3	0.8428	0.0000	SURCHARGED
240 minute winter	S53	180	42.864	0.114	16.3	0.1287	0.0000	OK
240 minute winter	S54	180	42.260	0.110	16.3	0.1244	0.0000	OK
8640 minute winter	S55	6000	42.017	0.217	1.9	0.2456	0.0000	SURCHARGED
8640 minute winter	S39A	6000	42.015	0.411	1.9	0.4652	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	RG4	6.000	SW45	112.1	3.766	0.563	0.3490	13804.7
60 minute summer	RG6	7.000	SW46	89.6	3.209	0.575	0.4341	
60 minute summer	RG10	8.000	SW48	80.3	3.731	0.350	0.1491	
60 minute summer	RG18	12.000	SW55	148.9	3.745	0.944	0.2517	
960 minute winter	1	14.000	2	36.3	0.329	0.323	1.2488	
960 minute winter	2	14.001	3	36.0	0.928	0.305	0.9288	
8640 minute summer	3	14.002	S5-6	36.0	0.971	0.305	5.2812	
60 minute summer	RG16	13.000	SW53	44.6	1.960	0.351	0.3483	
240 minute winter	S52	15.000	S56	16.3	0.542	0.196	0.2492	
240 minute winter	S56	15.001	S53	16.3	1.601	0.286	0.0338	
240 minute winter	S53	15.002	S54	16.3	1.157	0.908	0.8254	
240 minute winter	S54	15.003	S55	16.3	1.101	0.890	0.4857	
8640 minute winter	S55	15.004	S39A	1.9	0.652	0.110	0.2123	
8640 minute winter	S39A	15.005	S39	1.9	0.579	0.041	0.3064	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
8640 minute winter	S39	6000	42.015	0.552	1.9	0.6244	0.0000	SURCHARGED
8640 minute winter	S40	6000	42.015	0.615	1.9	0.6956	0.0000	SURCHARGED
8640 minute winter	HW16	6000	42.015	1.215	1.9	1.3742	0.0000	OK
8640 minute winter	HW11	6000	42.003	1.203	1.9	1.3608	0.0000	FLOOD RISK
8640 minute winter	S41	6000	42.003	1.283	1.9	1.4511	0.0000	SURCHARGED
60 minute summer	HW12	37	41.479	0.789	105.2	0.0000	0.0000	SURCHARGED
10080 minute winter	S40A	6600	42.003	0.513	0.0	0.5805	0.0000	SURCHARGED
10080 minute summer	HW10	6900	42.003	1.203	0.0	1.3609	0.0000	OK
960 minute winter	Depth/Area 1	945	42.488	0.999	120.0	2441.6000	0.0000	OK
60 minute summer	HW2	38	41.467	1.259	146.8	0.0000	0.0000	SURCHARGED
960 minute winter	Depth/Area 2	945	41.564	0.983	109.0	2211.3460	0.0000	OK
240 minute winter	SWALE 1	180	43.843	0.493	6.0	0.0000	0.0000	SURCHARGED
240 minute winter	SWALE 2	180	43.843	0.593	33.1	0.0000	0.0000	OK
960 minute winter	Depth/Area 3	945	40.763	0.763	218.0	4422.7870	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
8640 minute winter	S39	15.006	S40	1.9	0.688	0.022	0.6869	
8640 minute winter	S40	15.007	HW16	1.9	0.286	0.007	0.6788	
8640 minute winter	HW16	Flow through Pond	HW11	1.9	0.043	0.008	171.0807	
8640 minute winter	HW11	1.000	S41	1.9	0.135	0.043	0.4143	
8640 minute winter	S41	1.001	HW12	1.9	0.944	0.045	0.0095	
60 minute summer	HW12	1.002	HW2	-105.2	-0.537	-0.458	44.4550	
60 minute summer	HW12	2.000	HW2	0.0	0.000	0.000	8.8294	
10080 minute winter	S40A	19.000	HW10	0.0	-0.001	0.000	0.2995	
10080 minute summer	HW10	Flow through Pond	HW11	2.0	0.043	0.008	171.0806	
960 minute winter	Depth/Area 1	Hydro-Brake®	P2	7.5				392.3
60 minute summer	HW2	1.003	SW44	-146.8	-1.331	-1.230	2.7322	
960 minute winter	Depth/Area 2	Hydro-Brake®	P3	6.8				368.6
240 minute winter	SWALE 1	17.000	SWALE 2	-6.0	-0.017	-0.023	48.3162	
240 minute winter	SWALE 2	Flow through Pond	S52	-33.1	-0.031	-0.179	198.4592	
960 minute winter	Depth/Area 3	Hydro-Brake®	P4	13.7				759.8

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute summer	HW13	750	40.514	1.464	37.4	0.0000	0.0000	OK
960 minute winter	HW14	945	40.507	1.257	25.1	0.0000	0.0000	SURCHARGED
960 minute winter	HW15	945	40.507	1.257	29.2	0.0000	0.0000	OK
960 minute winter	S21	945	40.506	1.176	0.2	1.3306	0.0000	SURCHARGED
60 minute summer	P3	36	41.442	1.092	7.0	0.0000	0.0000	FLOOD RISK
60 minute summer	P4	32	40.773	0.873	13.7	0.0000	0.0000	FLOOD RISK
60 minute summer	P2	35	42.234	1.209	9.7	0.0000	0.0000	FLOOD RISK
60 minute summer	P5	31	40.811	1.011	6.2	0.0000	0.0000	FLOOD RISK
2880 minute summer	Depth/Area 4	2940	40.459	0.648	30.9	1296.3070	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
720 minute summer	HW13	Flow through Pond	1	70.9	0.040	0.144	1065.5515	
960 minute winter	HW14	16.000	HW13	-9.7	0.202	-0.042	18.9370	
960 minute winter	HW15	Flow through Pond	HW14	9.2	0.020	0.012	869.0130	
960 minute winter	S21	18.000	HW15	-0.2	-0.006	-0.006	1.1745	
60 minute summer	P3	5.000	SW45	8.1	0.894	0.154	0.8564	
60 minute summer	P4	9.000	SW50	14.0	0.819	0.303	0.8264	
60 minute summer	P2	3.000	SW56	9.8	0.945	0.127	0.7521	
60 minute summer	P5	11.000	SW55	-6.2	0.393	-0.116	0.6632	
2880 minute summer	Depth/Area 4	Hydro-Brake®	P5	3.3				138.9

Design Settings

Rainfall Methodology	FEH-22	Maximum Time of Concentration (mins)	30.00	Preferred Cover Depth (m)	1.250
Return Period (years)	2	Maximum Rainfall (mm/hr)	550.0	Include Intermediate Ground	✓
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00	Enforce best practice design rules	x
CV	1.000	Connection Type	Level Soffits		
Time of Entry (mins)	5.00	Minimum Backdrop Height (m)	9.999		

Simulation Settings

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

Storm Durations

60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 | 2160 | 2880 | 4320 | 5760 | 7200 | 8640 | 10080

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

Node S5-6 Surcharged Outfall

Overrides Design Area	x	Depression Storage Area (m²)	0	Evapo-transpiration (mm/day)	0
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0		
Applies to All storms					

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
0	2.070	105	2.070	210	2.070	315	2.070	420	2.070	525	2.070	630	2.070	735	2.070
15	2.070	120	2.070	225	2.070	330	2.070	435	2.070	540	2.070	645	2.070	750	2.070
30	2.070	135	2.070	240	2.070	345	2.070	450	2.070	555	2.070	660	2.070	765	2.070
45	2.070	150	2.070	255	2.070	360	2.070	465	2.070	570	2.070	675	2.070	780	2.070
60	2.070	165	2.070	270	2.070	375	2.070	480	2.070	585	2.070	690	2.070	795	2.070
75	2.070	180	2.070	285	2.070	390	2.070	495	2.070	600	2.070	705	2.070	810	2.070
90	2.070	195	2.070	300	2.070	405	2.070	510	2.070	615	2.070	720	2.070	825	2.070

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
945	2.070	1455	2.070	1965	2.070	2475	2.070	2985	2.070	3495	2.070	4005	2.070	4515	2.070
960	2.070	1470	2.070	1980	2.070	2490	2.070	3000	2.070	3510	2.070	4020	2.070	4530	2.070
975	2.070	1485	2.070	1995	2.070	2505	2.070	3015	2.070	3525	2.070	4035	2.070	4545	2.070
990	2.070	1500	2.070	2010	2.070	2520	2.070	3030	2.070	3540	2.070	4050	2.070	4560	2.070
1005	2.070	1515	2.070	2025	2.070	2535	2.070	3045	2.070	3555	2.070	4065	2.070	4575	2.070
1020	2.070	1530	2.070	2040	2.070	2550	2.070	3060	2.070	3570	2.070	4080	2.070	4590	2.070
1035	2.070	1545	2.070	2055	2.070	2565	2.070	3075	2.070	3585	2.070	4095	2.070	4605	2.070
1050	2.070	1560	2.070	2070	2.070	2580	2.070	3090	2.070	3600	2.070	4110	2.070	4620	2.070
1065	2.070	1575	2.070	2085	2.070	2595	2.070	3105	2.070	3615	2.070	4125	2.070	4635	2.070
1080	2.070	1590	2.070	2100	2.070	2610	2.070	3120	2.070	3630	2.070	4140	2.070	4650	2.070
1095	2.070	1605	2.070	2115	2.070	2625	2.070	3135	2.070	3645	2.070	4155	2.070	4665	2.070
1110	2.070	1620	2.070	2130	2.070	2640	2.070	3150	2.070	3660	2.070	4170	2.070	4680	2.070
1125	2.070	1635	2.070	2145	2.070	2655	2.070	3165	2.070	3675	2.070	4185	2.070	4695	2.070
1140	2.070	1650	2.070	2160	2.070	2670	2.070	3180	2.070	3690	2.070	4200	2.070	4710	2.070
1155	2.070	1665	2.070	2175	2.070	2685	2.070	3195	2.070	3705	2.070	4215	2.070	4725	2.070
1170	2.070	1680	2.070	2190	2.070	2700	2.070	3210	2.070	3720	2.070	4230	2.070	4740	2.070
1185	2.070	1695	2.070	2205	2.070	2715	2.070	3225	2.070	3735	2.070	4245	2.070	4755	2.070
1200	2.070	1710	2.070	2220	2.070	2730	2.070	3240	2.070	3750	2.070	4260	2.070	4770	2.070
1215	2.070	1725	2.070	2235	2.070	2745	2.070	3255	2.070	3765	2.070	4275	2.070	4785	2.070
1230	2.070	1740	2.070	2250	2.070	2760	2.070	3270	2.070	3780	2.070	4290	2.070	4800	2.070
1245	2.070	1755	2.070	2265	2.070	2775	2.070	3285	2.070	3795	2.070	4305	2.070	4815	2.070
1260	2.070	1770	2.070	2280	2.070	2790	2.070	3300	2.070	3810	2.070	4320	2.070	4830	2.070
1275	2.070	1785	2.070	2295	2.070	2805	2.070	3315	2.070	3825	2.070	4335	2.070	4845	2.070
1290	2.070	1800	2.070	2310	2.070	2820	2.070	3330	2.070	3840	2.070	4350	2.070	4860	2.070
1305	2.070	1815	2.070	2325	2.070	2835	2.070	3345	2.070	3855	2.070	4365	2.070	4875	2.070
1320	2.070	1830	2.070	2340	2.070	2850	2.070	3360	2.070	3870	2.070	4380	2.070	4890	2.070
1335	2.070	1845	2.070	2355	2.070	2865	2.070	3375	2.070	3885	2.070	4395	2.070	4905	2.070
1350	2.070	1860	2.070	2370	2.070	2880	2.070	3390	2.070	3900	2.070	4410	2.070	4920	2.070
1365	2.070	1875	2.070	2385	2.070	2895	2.070	3405	2.070	3915	2.070	4425	2.070	4935	2.070
1380	2.070	1890	2.070	2400	2.070	2910	2.070	3420	2.070	3930	2.070	4440	2.070	4950	2.070
1395	2.070	1905	2.070	2415	2.070	2925	2.070	3435	2.070	3945	2.070	4455	2.070	4965	2.070
1410	2.070	1920	2.070	2430	2.070	2940	2.070	3450	2.070	3960	2.070	4470	2.070	4980	2.070
1425	2.070	1935	2.070	2445	2.070	2955	2.070	3465	2.070	3975	2.070	4485	2.070	4995	2.070
1440	2.070	1950	2.070	2460	2.070	2970	2.070	3480	2.070	3990	2.070	4500	2.070	5010	2.070
														5025	2.070
														5040	2.070
														5055	2.070
														5070	2.070
														5085	2.070
														5100	2.070
														5115	2.070
														5130	2.070
														5145	2.070
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														5280	2.070
														5295	2.070
														5310	2.070
														5325	2.070
														5340	2.070
														5355	2.070
														5370	2.070
														5385	2.070
														5400	2.070
														5415	2.070
														5430	2.070
														5445	2.070
														5460	2.070
														5475	2.070
														5490	2.070
														5505	2.070
														5520	2.070

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
5535	2.070	6045	2.070	6555	2.070	7065	2.070	7575	2.070	8085	2.070	8595	2.070	9105	2.070
5550	2.070	6060	2.070	6570	2.070	7080	2.070	7590	2.070	8100	2.070	8610	2.070	9120	2.070
5565	2.070	6075	2.070	6585	2.070	7095	2.070	7605	2.070	8115	2.070	8625	2.070	9135	2.070
5580	2.070	6090	2.070	6600	2.070	7110	2.070	7620	2.070	8130	2.070	8640	2.070	9150	2.070
5595	2.070	6105	2.070	6615	2.070	7125	2.070	7635	2.070	8145	2.070	8655	2.070	9165	2.070
5610	2.070	6120	2.070	6630	2.070	7140	2.070	7650	2.070	8160	2.070	8670	2.070	9180	2.070
5625	2.070	6135	2.070	6645	2.070	7155	2.070	7665	2.070	8175	2.070	8685	2.070	9195	2.070
5640	2.070	6150	2.070	6660	2.070	7170	2.070	7680	2.070	8190	2.070	8700	2.070	9210	2.070
5655	2.070	6165	2.070	6675	2.070	7185	2.070	7695	2.070	8205	2.070	8715	2.070	9225	2.070
5670	2.070	6180	2.070	6690	2.070	7200	2.070	7710	2.070	8220	2.070	8730	2.070	9240	2.070
5685	2.070	6195	2.070	6705	2.070	7215	2.070	7725	2.070	8235	2.070	8745	2.070	9255	2.070
5700	2.070	6210	2.070	6720	2.070	7230	2.070	7740	2.070	8250	2.070	8760	2.070	9270	2.070
5715	2.070	6225	2.070	6735	2.070	7245	2.070	7755	2.070	8265	2.070	8775	2.070	9285	2.070
5730	2.070	6240	2.070	6750	2.070	7260	2.070	7770	2.070	8280	2.070	8790	2.070	9300	2.070
5745	2.070	6255	2.070	6765	2.070	7275	2.070	7785	2.070	8295	2.070	8805	2.070	9315	2.070
5760	2.070	6270	2.070	6780	2.070	7290	2.070	7800	2.070	8310	2.070	8820	2.070	9330	2.070
5775	2.070	6285	2.070	6795	2.070	7305	2.070	7815	2.070	8325	2.070	8835	2.070	9345	2.070
5790	2.070	6300	2.070	6810	2.070	7320	2.070	7830	2.070	8340	2.070	8850	2.070	9360	2.070
5805	2.070	6315	2.070	6825	2.070	7335	2.070	7845	2.070	8355	2.070	8865	2.070	9375	2.070
5820	2.070	6330	2.070	6840	2.070	7350	2.070	7860	2.070	8370	2.070	8880	2.070	9390	2.070
5835	2.070	6345	2.070	6855	2.070	7365	2.070	7875	2.070	8385	2.070	8895	2.070	9405	2.070
5850	2.070	6360	2.070	6870	2.070	7380	2.070	7890	2.070	8400	2.070	8910	2.070	9420	2.070
5865	2.070	6375	2.070	6885	2.070	7395	2.070	7905	2.070	8415	2.070	8925	2.070	9435	2.070
5880	2.070	6390	2.070	6900	2.070	7410	2.070	7920	2.070	8430	2.070	8940	2.070	9450	2.070
5895	2.070	6405	2.070	6915	2.070	7425	2.070	7935	2.070	8445	2.070	8955	2.070	9465	2.070
5910	2.070	6420	2.070	6930	2.070	7440	2.070	7950	2.070	8460	2.070	8970	2.070	9480	2.070
5925	2.070	6435	2.070	6945	2.070	7455	2.070	7965	2.070	8475	2.070	8985	2.070	9495	2.070
5940	2.070	6450	2.070	6960	2.070	7470	2.070	7980	2.070	8490	2.070	9000	2.070	9510	2.070
5955	2.070	6465	2.070	6975	2.070	7485	2.070	7995	2.070	8505	2.070	9015	2.070	9525	2.070
5970	2.070	6480	2.070	6990	2.070	7500	2.070	8010	2.070	8520	2.070	9030	2.070	9540	2.070
5985	2.070	6495	2.070	7005	2.070	7515	2.070	8025	2.070	8535	2.070	9045	2.070	9555	2.070
6000	2.070	6510	2.070	7020	2.070	7530	2.070	8040	2.070	8550	2.070	9060	2.070	9570	2.070
6015	2.070	6525	2.070	7035	2.070	7545	2.070	8055	2.070	8565	2.070	9075	2.070	9585	2.070
6030	2.070	6540	2.070	7050	2.070	7560	2.070	8070	2.070	8580	2.070	9090	2.070	9600	2.070

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW56	35	42.238	1.628	76.5	1.8416	0.0000	SURCHARGED
60 minute summer	SW43	36	41.581	1.252	69.9	1.4158	0.0000	SURCHARGED
60 minute summer	SW44	38	41.458	1.339	151.1	1.9164	0.0000	SURCHARGED
60 minute summer	SW45	36	41.446	1.425	137.4	2.0392	0.0000	SURCHARGED
60 minute summer	SW46	35	41.394	1.570	166.6	2.2472	0.0000	SURCHARGED
60 minute summer	SW47	35	41.303	1.597	176.6	2.2851	0.0000	SURCHARGED
60 minute summer	SW48	35	41.222	1.658	219.0	2.9296	0.0000	SURCHARGED
60 minute summer	SW49	35	41.131	1.629	220.0	2.8791	0.0000	SURCHARGED
60 minute summer	SW50	35	41.026	1.592	309.2	2.8130	0.0000	SURCHARGED
4320 minute summer	SW52	2340	40.800	1.546	31.2	2.7314	0.0000	FLOOD RISK
60 minute summer	SW54	32	41.582	1.593	60.7	2.2796	3.2920	FLOOD
60 minute summer	SW55	33	41.125	1.628	192.3	2.3297	2.1564	FLOOD
4320 minute summer	SW53	2400	40.799	1.716	38.8	3.0318	0.0000	SURCHARGED
4320 minute summer	HW1	2400	40.800	1.750	59.4	0.0000	0.0000	OK
60 minute summer	RG2	35	42.426	0.339	77.4	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)
60 minute summer	SW56	3.001	SW43	69.9	1.759	1.742	1.3660	
60 minute summer	SW43	3.002	SW44	66.8	1.119	0.943	2.3136	
60 minute summer	SW44	1.004	SW45	108.1	0.980	0.968	3.4297	
60 minute summer	SW45	1.005	SW46	139.8	1.267	1.256	4.3057	
60 minute summer	SW46	1.006	SW47	169.3	1.068	1.053	7.4709	
60 minute summer	SW47	1.007	SW48	178.6	1.127	1.106	4.2029	
60 minute summer	SW48	1.008	SW49	220.0	1.019	1.019	6.6620	
60 minute summer	SW49	1.009	SW50	221.0	1.023	1.019	7.2388	
60 minute summer	SW50	1.010	SW52	308.5	1.428	1.429	11.2789	
4320 minute summer	SW52	1.011	SW53	30.8	0.301	0.081	15.8348	
60 minute summer	SW54	10.000	SW55	47.6	1.196	1.184	2.2666	
60 minute summer	SW55	10.001	SW53	183.3	1.662	1.646	6.6560	
4320 minute summer	SW53	1.012	HW1	39.2	0.347	0.122	4.2477	
4320 minute summer	HW1	Flow through Pond	1	46.6	0.022	0.095	1472.9236	
60 minute summer	RG2	4.000	SW56	76.5	2.228	0.321	0.2848	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	RG4	34	41.961	0.518	114.5	0.0000	0.0000	SURCHARGED
60 minute summer	RG6	34	41.735	0.717	91.5	0.0000	0.0000	FLOOD RISK
60 minute summer	RG10	34	41.368	0.784	81.5	0.0000	0.0000	SURCHARGED
60 minute summer	RG18	31	41.198	1.000	149.0	0.0000	0.0000	FLOOD RISK
60 minute summer	S5-6	1	40.500	2.070	0.0	0.0000	0.0000	OK
4320 minute summer	1	2400	40.792	1.742	49.4	0.0000	0.0000	FLOOD RISK
4320 minute summer	2	2400	40.785	1.771	46.9	8.0110	0.0000	SURCHARGED
4320 minute summer	3	2400	40.583	1.653	46.9	2.3655	0.0000	FLOOD RISK
4320 minute summer	RG16	2340	40.800	0.824	1.5	0.0000	0.0000	SURCHARGED
240 minute winter	S52	180	43.843	0.593	55.8	0.6706	0.0000	FLOOD RISK
240 minute winter	S56	180	43.835	0.745	16.3	0.8428	0.0000	SURCHARGED
240 minute winter	S53	180	42.864	0.114	16.3	0.1287	0.0000	OK
240 minute winter	S54	180	42.260	0.110	16.3	0.1244	0.0000	OK
8640 minute winter	S55	6000	42.017	0.217	1.9	0.2457	0.0000	SURCHARGED
8640 minute winter	S39A	6000	42.015	0.411	1.9	0.4652	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	RG4	6.000	SW45	112.2	3.766	0.563	0.3490	
60 minute summer	RG6	7.000	SW46	89.5	3.209	0.574	0.4341	
60 minute summer	RG10	8.000	SW48	80.3	3.731	0.350	0.1491	
60 minute summer	RG18	12.000	SW55	148.9	3.745	0.944	0.2517	
4320 minute summer	1	14.000	2	46.9	0.425	0.418	1.2488	
4320 minute summer	2	14.001	3	46.9	0.425	0.397	2.6399	
4320 minute summer	3	14.002	S5-6	46.9	0.425	0.397	15.6999	4449.9
4320 minute summer	RG16	13.000	SW53	1.8	0.594	0.014	0.3483	
240 minute winter	S52	15.000	S56	16.3	0.542	0.196	0.2492	
240 minute winter	S56	15.001	S53	16.3	1.601	0.286	0.0338	
240 minute winter	S53	15.002	S54	16.3	1.157	0.908	0.8254	
240 minute winter	S54	15.003	S55	16.3	1.101	0.890	0.4857	
8640 minute winter	S55	15.004	S39A	1.9	0.652	0.110	0.2123	
8640 minute winter	S39A	15.005	S39	1.9	0.579	0.041	0.3064	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.89%

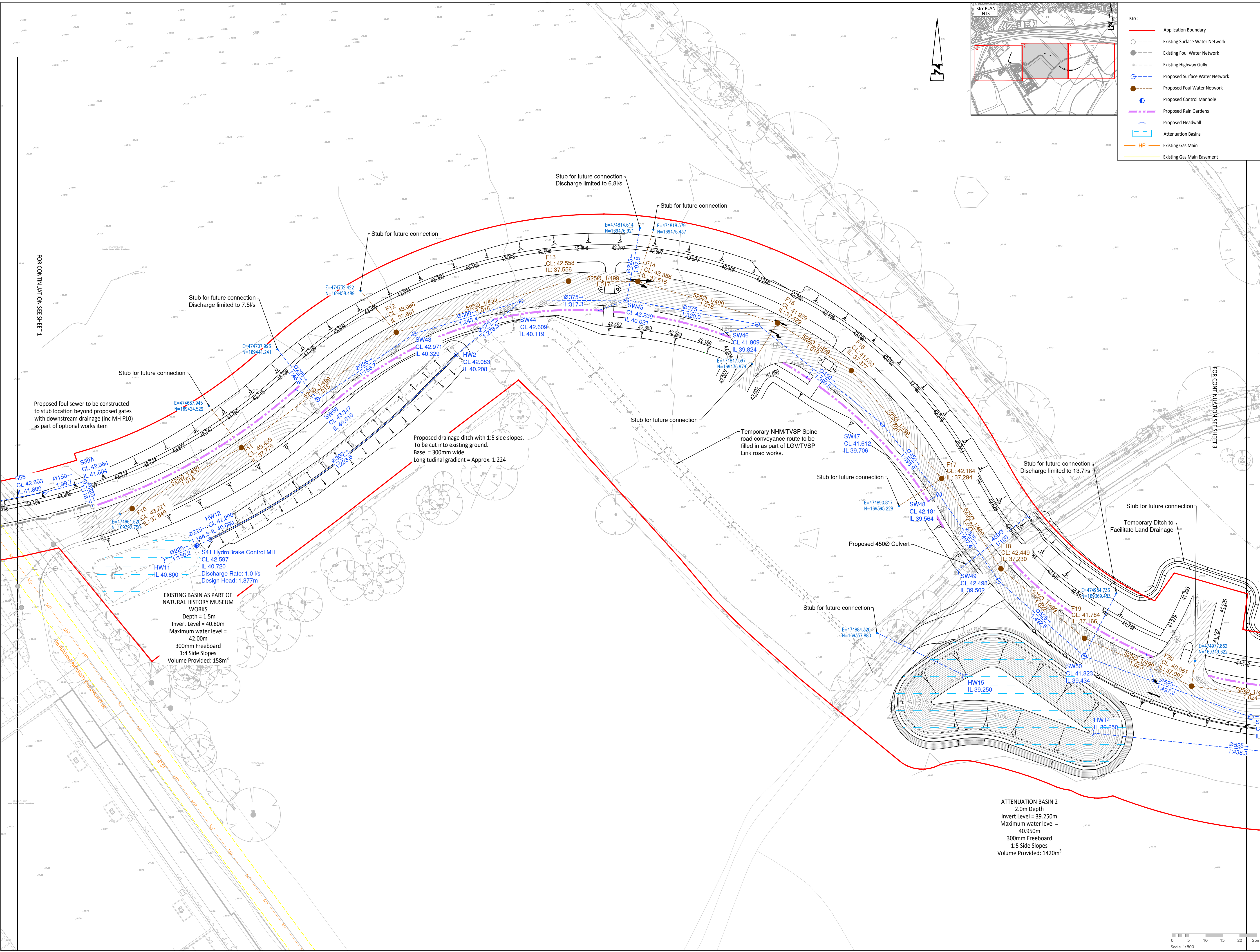
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
8640 minute winter	S39	6000	42.015	0.552	1.9	0.6245	0.0000	SURCHARGED
8640 minute winter	S40	6000	42.015	0.615	1.9	0.6957	0.0000	SURCHARGED
8640 minute winter	HW16	6000	42.015	1.215	1.9	1.3742	0.0000	OK
10080 minute winter	HW11	6420	42.003	1.203	1.9	1.3609	0.0000	FLOOD RISK
10080 minute winter	S41	6360	42.003	1.283	1.9	1.4512	0.0000	SURCHARGED
60 minute summer	HW12	39	41.482	0.792	106.8	0.0000	0.0000	SURCHARGED
5760 minute winter	S40A	5040	42.003	0.513	0.0	0.5805	0.0000	SURCHARGED
8640 minute winter	HW10	6060	42.003	1.203	0.0	1.3609	0.0000	OK
960 minute winter	Depth/Area 1	945	42.488	0.999	120.0	2441.5720	0.0000	OK
60 minute summer	HW2	38	41.471	1.263	147.2	0.0000	0.0000	SURCHARGED
960 minute winter	Depth/Area 2	960	41.566	0.985	109.0	2215.5940	0.0000	OK
240 minute winter	SWALE 1	180	43.843	0.493	6.0	0.0000	0.0000	SURCHARGED
240 minute winter	SWALE 2	180	43.843	0.593	33.1	0.0000	0.0000	OK
10080 minute winter	Depth/Area 3	7020	40.961	0.961	32.0	5573.5190	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
8640 minute winter	S39	15.006	S40	1.9	0.688	0.022	0.6869	
8640 minute winter	S40	15.007	HW16	1.9	0.286	0.007	0.6788	
8640 minute winter	HW16	Flow through Pond	HW11	1.9	0.043	0.008	171.0929	
10080 minute winter	HW11	1.000	S41	1.9	0.149	0.043	0.4143	
10080 minute winter	S41	1.001	HW12	2.0	0.702	0.045	0.0613	
60 minute summer	HW12	1.002	HW2	-106.8	-0.540	-0.465	44.6582	
60 minute summer	HW12	2.000	HW2	0.0	0.000	0.000	9.1180	
5760 minute winter	S40A	19.000	HW10	0.0	-0.001	0.000	0.2995	
8640 minute winter	HW10	Flow through Pond	HW11	1.9	0.043	0.008	171.0929	
960 minute winter	Depth/Area 1	Hydro-Brake®	P2	7.5				392.3
60 minute summer	HW2	1.003	SW44	-147.2	-1.335	-1.233	2.7322	
960 minute winter	Depth/Area 2	Hydro-Brake®	P3	6.8				356.8
240 minute winter	SWALE 1	17.000	SWALE 2	-6.0	-0.017	-0.023	48.3161	
240 minute winter	SWALE 2	Flow through Pond	S52	-33.1	-0.031	-0.179	198.4589	
10080 minute winter	Depth/Area 3	Hydro-Brake®	P4	12.2				2809.6

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
5760 minute summer	HW13	3060	40.794	1.744	37.0	0.0000	0.0000	OK
4320 minute summer	HW14	2400	40.794	1.544	14.7	0.0000	0.0000	SURCHARGED
4320 minute summer	HW15	2400	40.794	1.544	12.2	0.0000	0.0000	OK
4320 minute summer	S21	2400	40.795	1.465	0.1	1.6565	0.0000	SURCHARGED
60 minute summer	P3	36	41.447	1.097	6.9	0.0000	0.0000	FLOOD RISK
60 minute summer	P4	32	40.773	0.873	13.6	0.0000	0.0000	FLOOD RISK
60 minute summer	P2	35	42.240	1.215	9.4	0.0000	0.0000	FLOOD RISK
60 minute summer	P5	31	40.811	1.011	5.8	0.0000	0.0000	FLOOD RISK
10080 minute winter	Depth/Area 4	10080	40.739	0.928	7.9	1855.0810	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
5760 minute summer	HW13	Flow through Pond	1	43.4	0.021	0.088	1469.6139	
4320 minute summer	HW14	16.000	HW13	14.5	0.123	0.063	18.9370	
4320 minute summer	HW15	Flow through Pond	HW14	12.3	0.007	0.016	1217.3524	
4320 minute summer	S21	18.000	HW15	0.1	-0.004	0.004	1.1745	
60 minute summer	P3	5.000	SW45	8.1	0.609	0.154	0.8564	
60 minute summer	P4	9.000	SW50	13.9	0.819	0.300	0.8264	
60 minute summer	P2	3.000	SW56	9.6	0.945	0.124	0.7521	
60 minute summer	P5	11.000	SW55	-5.8	0.393	-0.108	0.6632	
10080 minute winter	Depth/Area 4	Hydro-Brake®	P5	0.8				39.7



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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 (supplier to be approved by WBC, otherwise £600 to be used)
-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 EN255. 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, limits 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.

C	03/26	UPDATED TO REFLECT RSA 2 RESPONSES	JJS	CS
B	02/26	LAYOUT AND DRAINAGE NOTES AMENDED	JJS	JS
A	02/26	FOR REVIEW	JJS	CS
Rev	Date	Description	Drawn	Checked



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Client

UNIVERSITY OF READING

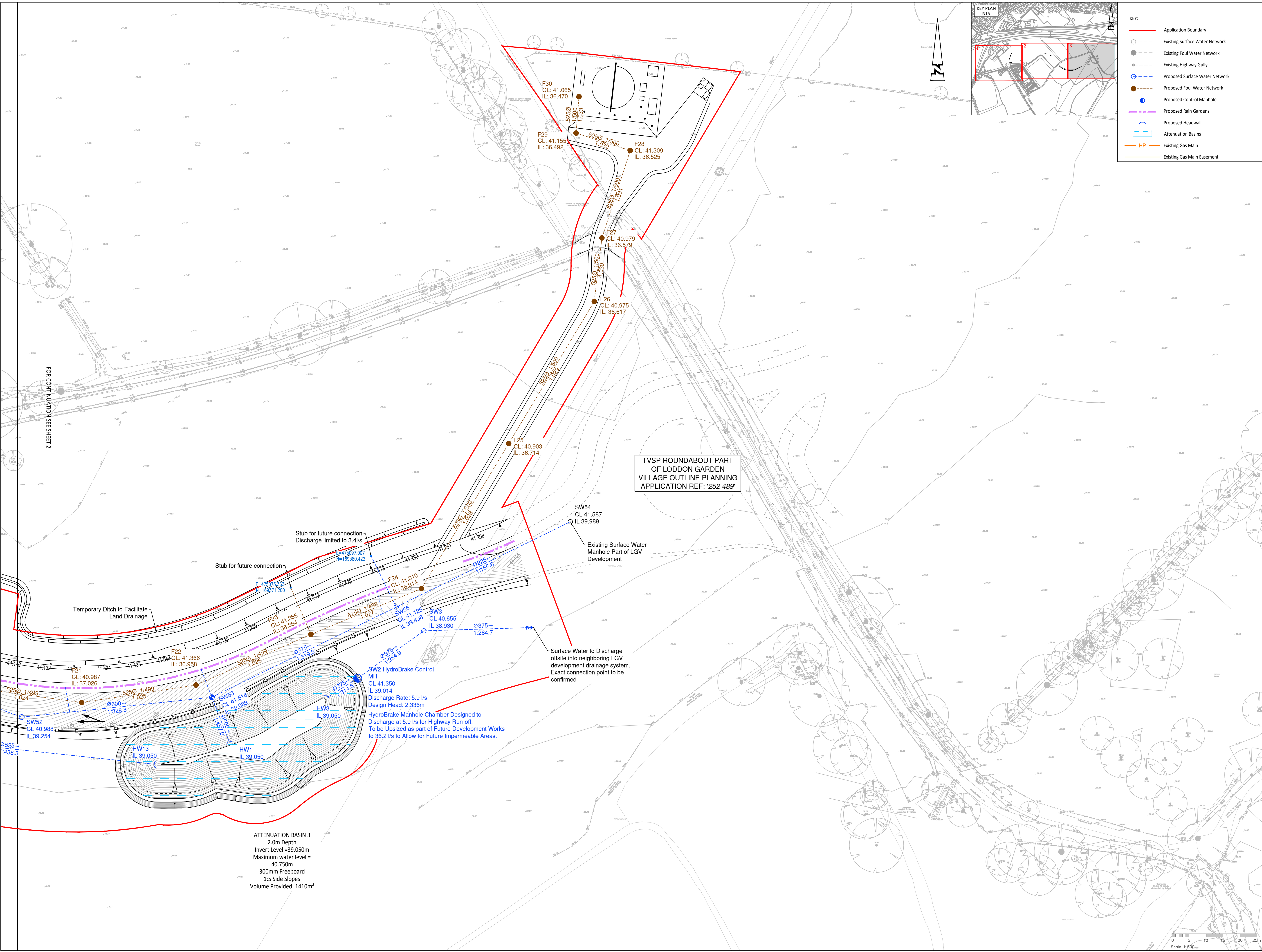
Project
THAMES VALLEY SCIENCE
PARK - LODDON GARDEN
VILLAGE LINK ROAD

Title
DRAINAGE STRATEGY
SHEET 2

Status

Scale	Date	Drawn	Checked
1:500 @ A1	FEB 2026	JJS	CS

Drawing No.	Revision
HD169-TVSP-0502	C



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 - carriageways and roads - D400 (supplier to be approved by WBC, otherwise £600 to be used)
 - 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.
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12. All trenches under existing and proposed public highways are to be backfilled with thoroughly compacted type 1 granular sub-base material.
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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, limits 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.

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Rev	Date	Description	Drawn	Checked
C	03/26	UPDATED TO REFLECT RSA 2 RESPONSES	JJS	CS
B	02/26	LAYOUT AND DRAINAGE NOTES AMENDED	JJS	JS
A	02/26	FOR REVIEW	JJS	CS



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Client
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Project
THAMES VALLEY SCIENCE PARK - LODDON GARDEN VILLAGE LINK ROAD

Title
DRAINAGE STRATEGY SHEET 3

Status

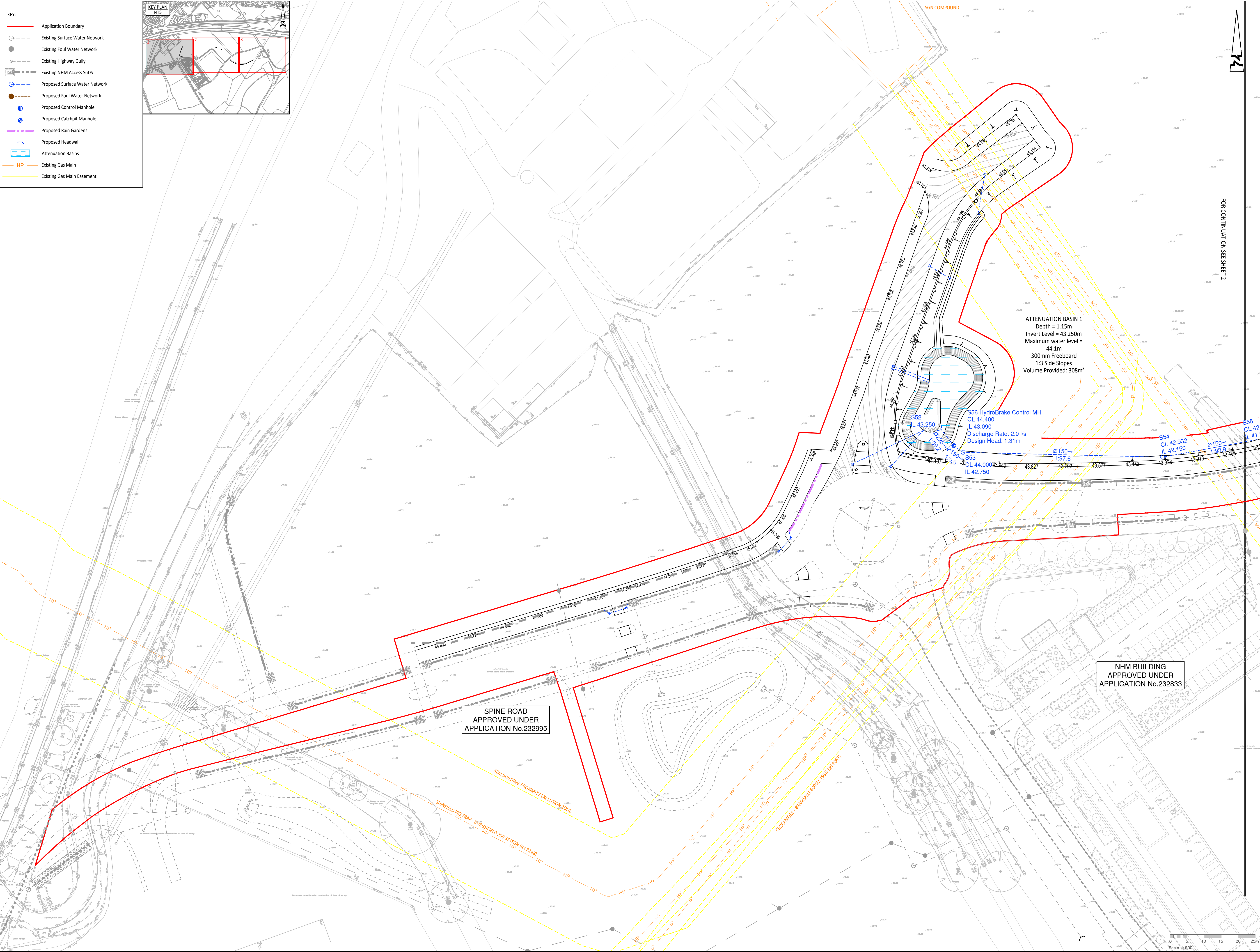
Scale	Date	Drawn	Checked
1:500 @ A1	FEB 2026	JJS	CS

Drawing No.
HD169-TVSP-0503

Revision
C

KEY:

- Application Boundary
- Existing Surface Water Network
- Existing Foul Water Network
- Existing Highway Gully
- Existing NHM Access SuDS
- Proposed Surface Water Network
- Proposed Foul Water Network
- Proposed Control Manhole
- Proposed Catchpit Manhole
- Proposed Rain Gardens
- Proposed Headwall
- Attenuation Basins
- Existing Gas Main
- Existing Gas Main Easement



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- All adoptable drainage works to be constructed as detailed in design and construction guidance or as stipulated in the water authorities addendum.
- All public sewers are to be the subject of a section 104 agreement of the water industry act 1991.
- Invert levels of existing manholes and sewers are to be checked on site before construction commences and results reported to engineers.
- 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.
- All drainage ironworks to comply with BS EN124, and be stamped with bsi kitemark. covers to suit loading as below;
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-driveways and verges - C250
-footways and pedestrian areas - B125
-gardens/landscaping - A15
- All sewer pipes, up to, and including 225mm are to be vitrified clay to BS EN255. 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.
- 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.
- All bedding shall be class s unless noted otherwise.
- All trenches under existing and proposed public highways are to be backfilled with thoroughly compacted type 1 granular sub-base material.
- 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.
- Chambers with outgoing pipes greater than 600mm diameter shall be fitted with guard bars, safety chains or other approved safety devices.
- The use of precast concrete products made with sulphate resisting cement is mandatory, unless a laboratory report proves such precautions are not necessary.
- 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.
- 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.
- Where pipes pass through footings, retaining or screen walls, lintels to be provided over drains.
- 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).
- 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.
- Construction details subject to refinement through detailed design/technical approval process.

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C	03/26	UPDATED TO REFLECT RSA 2 RESPONSES	JJS	CS
B	02/26	LAYOUT AND DRAINAGE NOTES AMENDED	JJS	JJS
A	02/26	FOR REVIEW	JJS	CS

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Client: UNIVERSITY OF READING

Project: THAMES VALLEY SCIENCE PARK - LODDON GARDEN VILLAGE LINK ROAD

Title: DRAINAGE STRATEGY SHEET 1

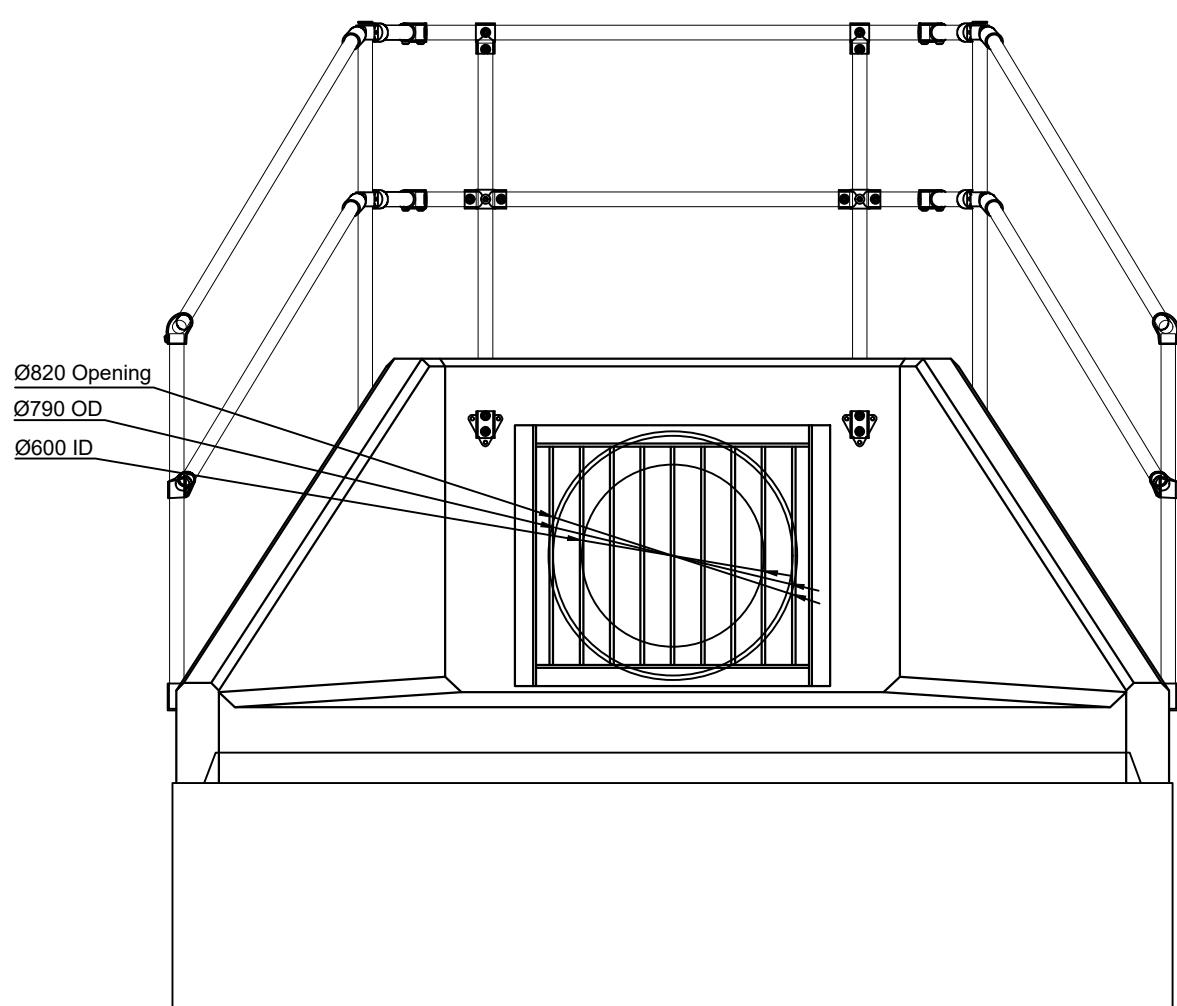
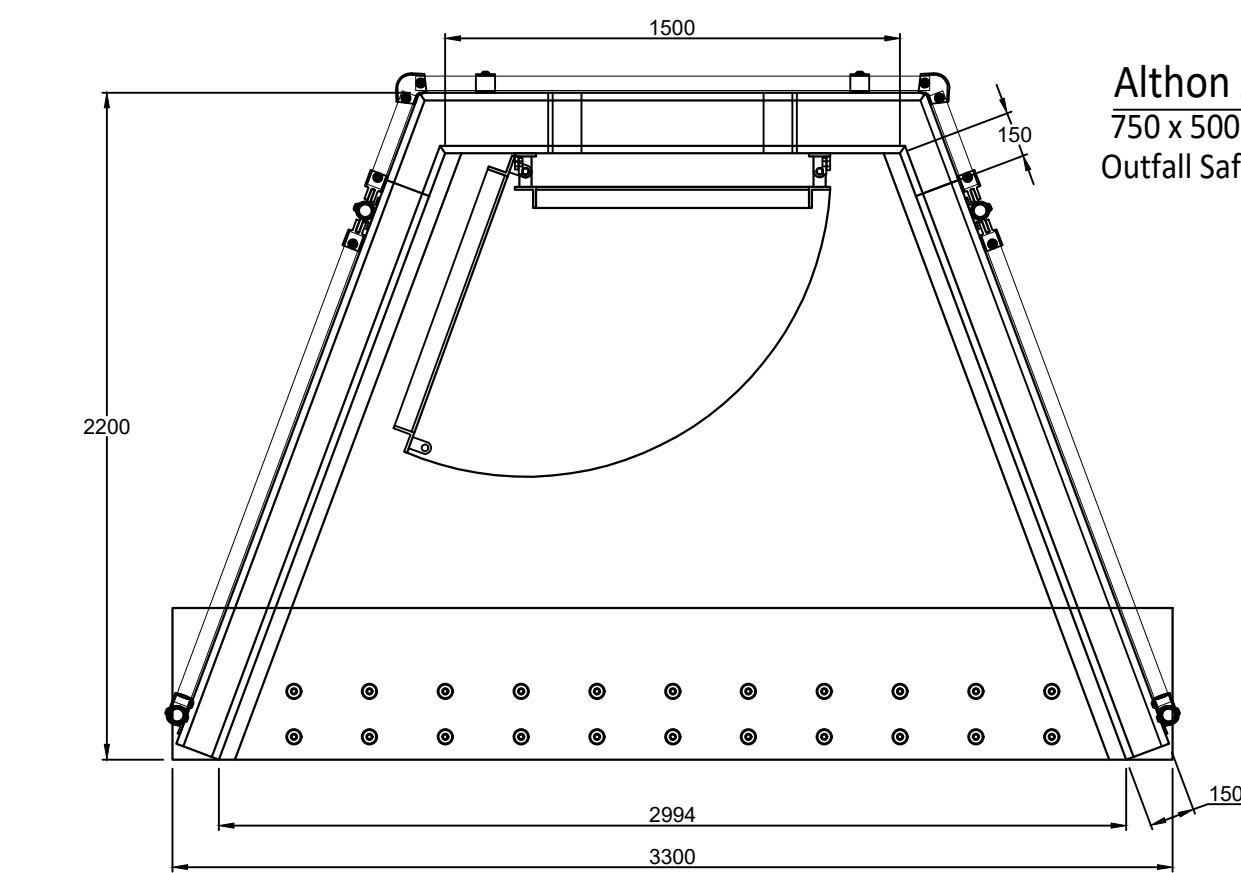
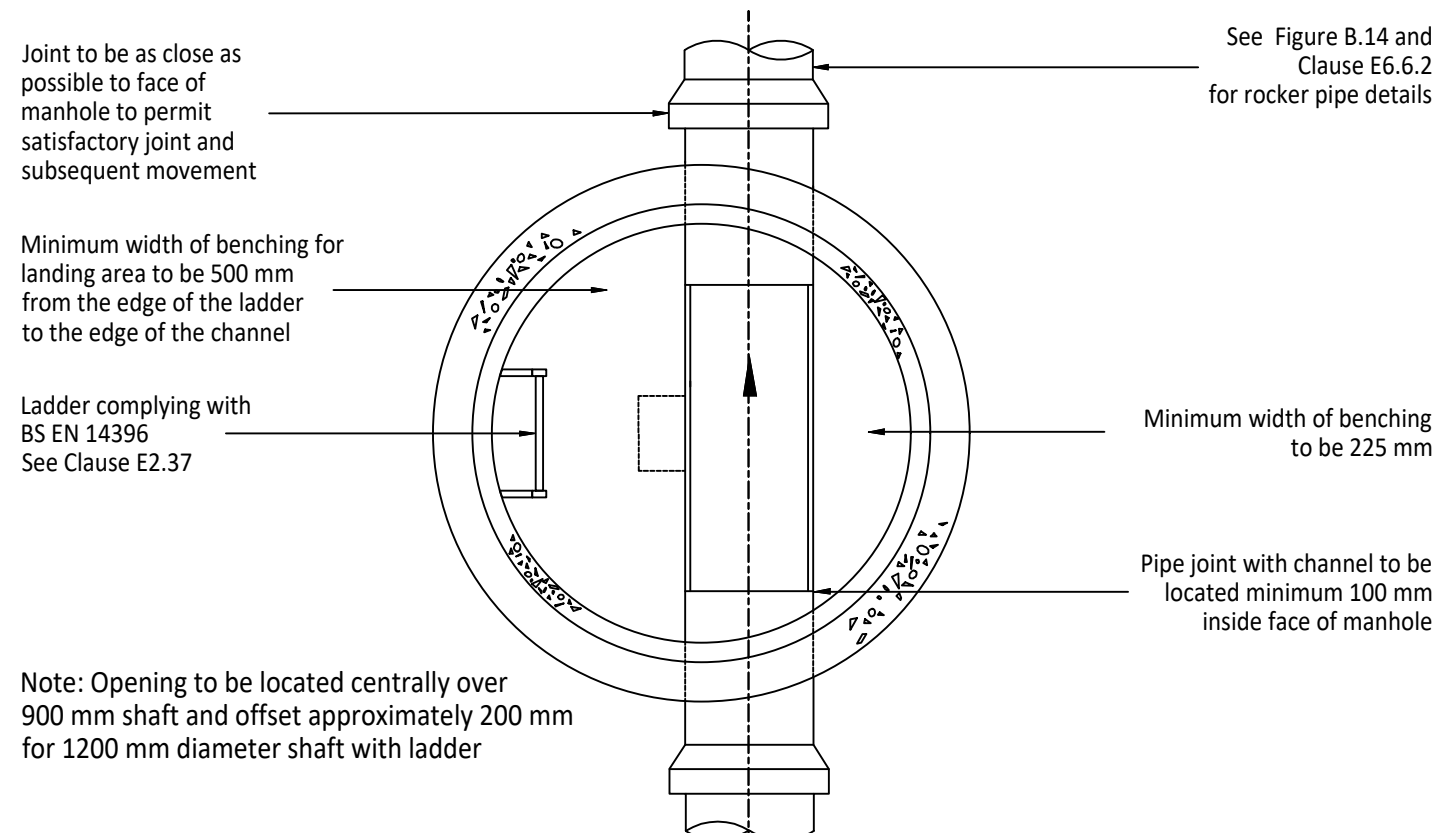
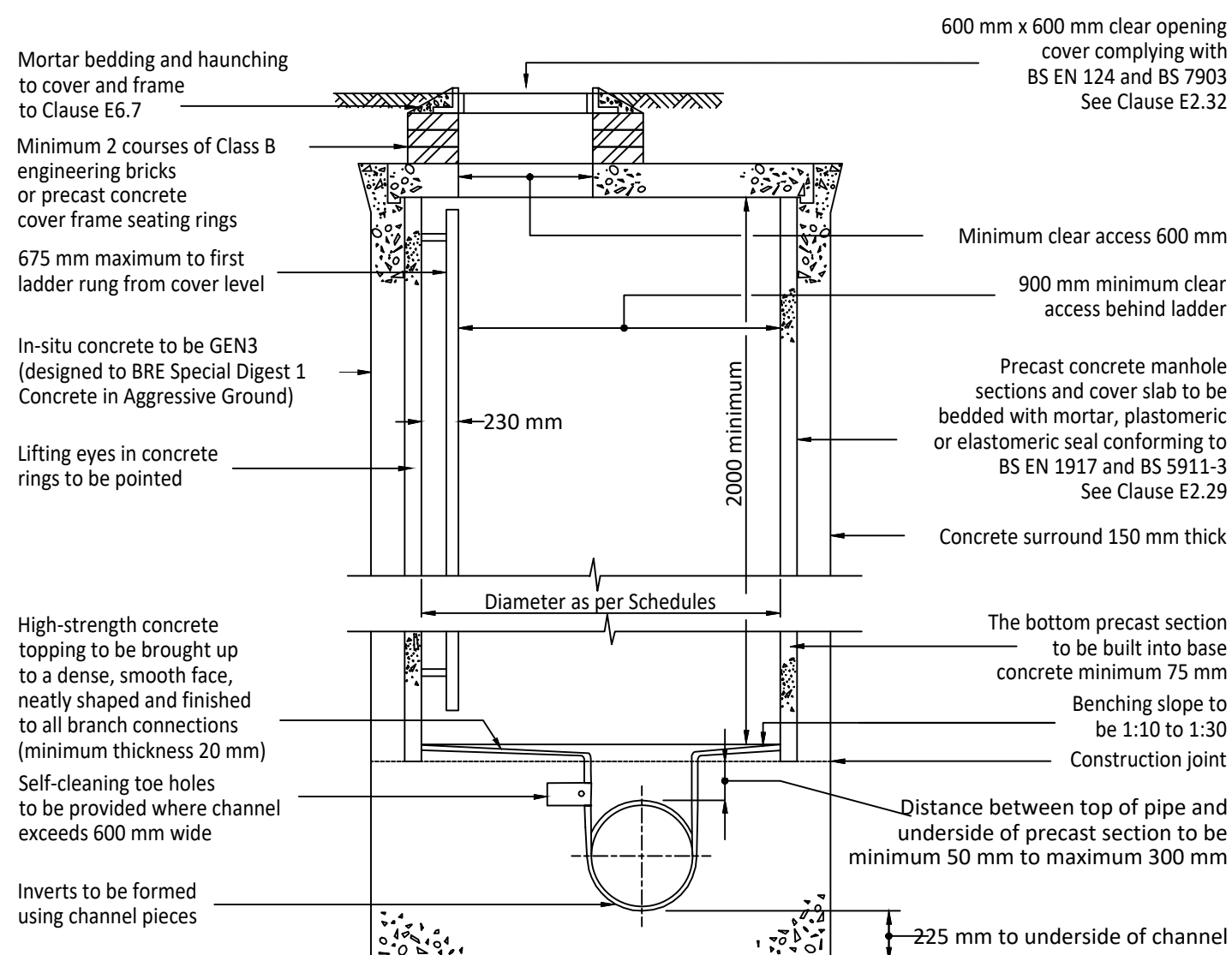
Status:

Scale	Date	Drawn	Checked
1:500 @ A1	FEB 2026	JJS	CS

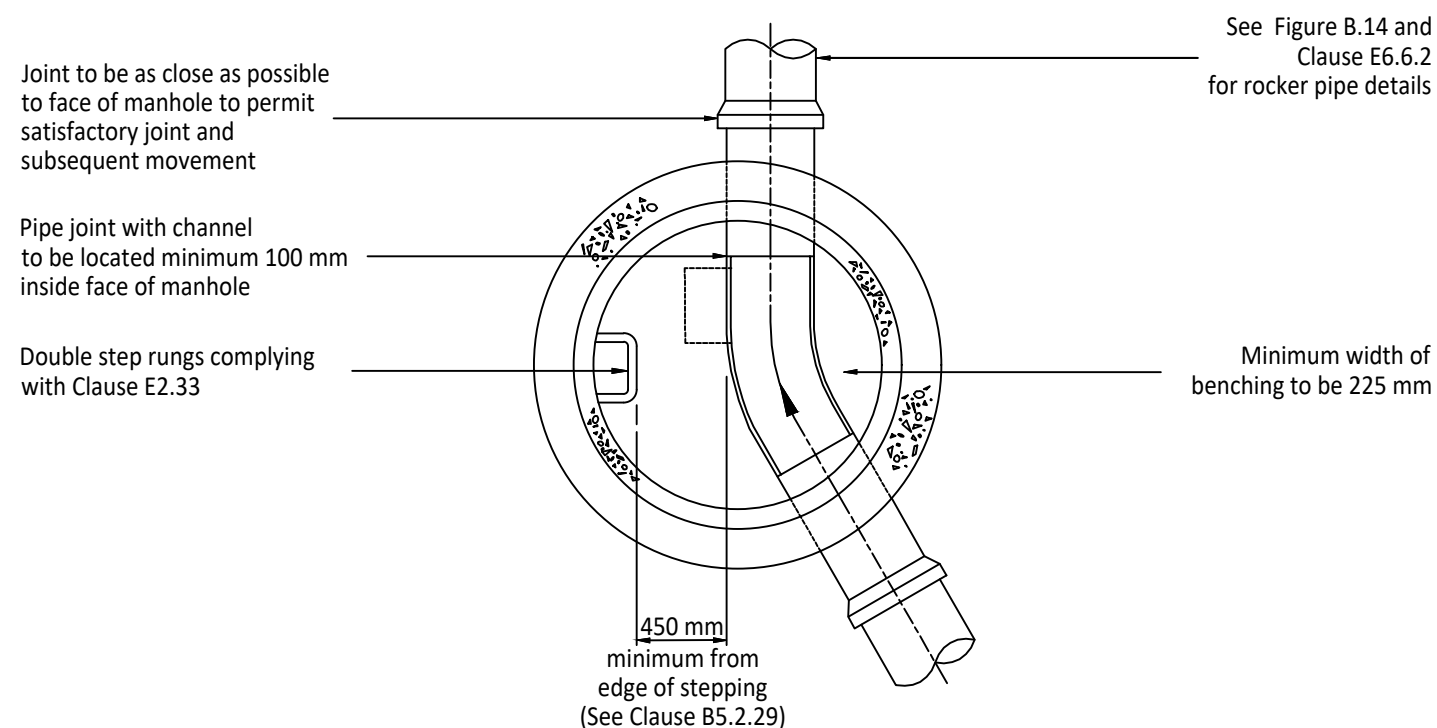
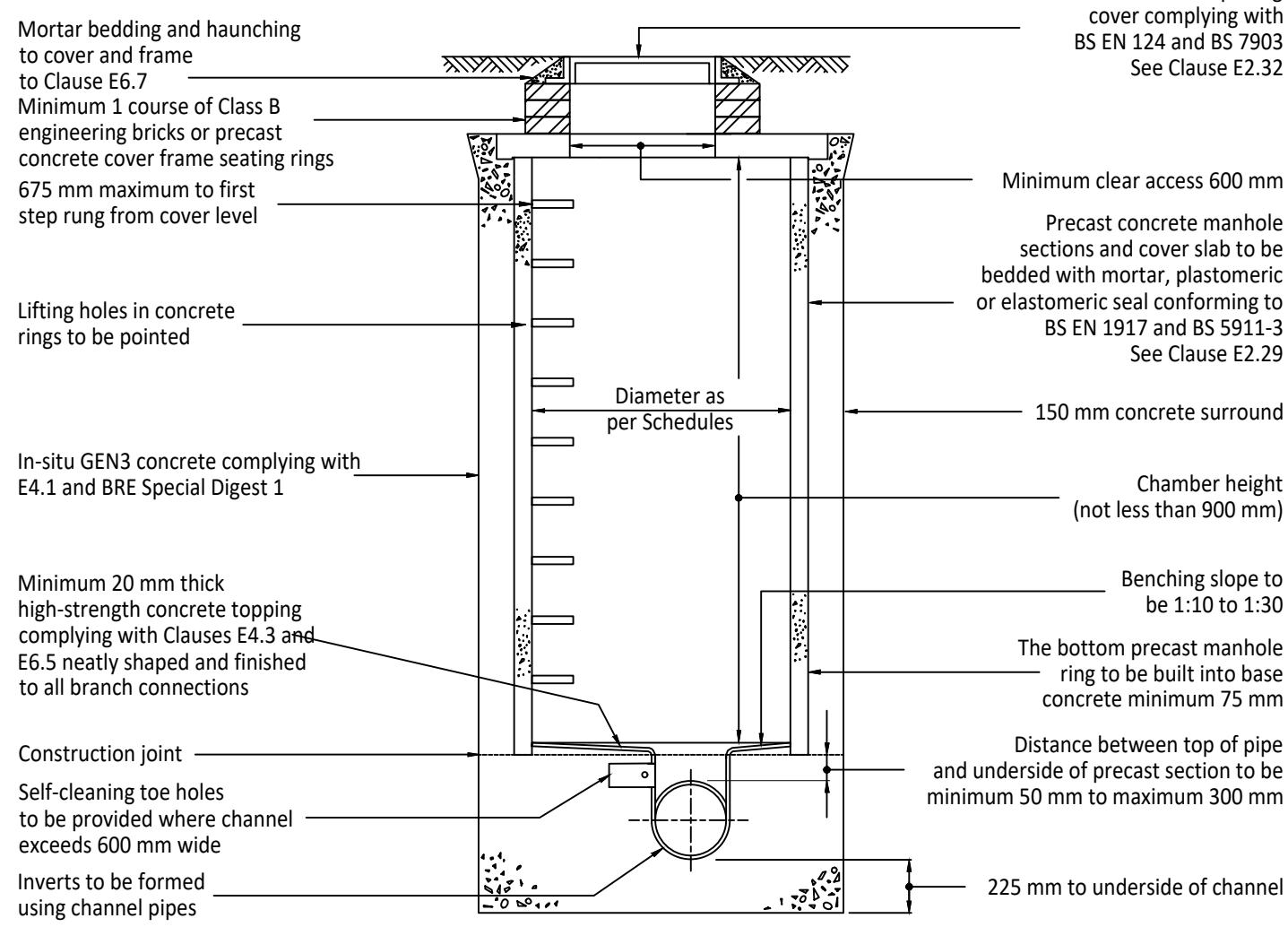
Drawing No: HD169-TVSP-0501

Revision: C

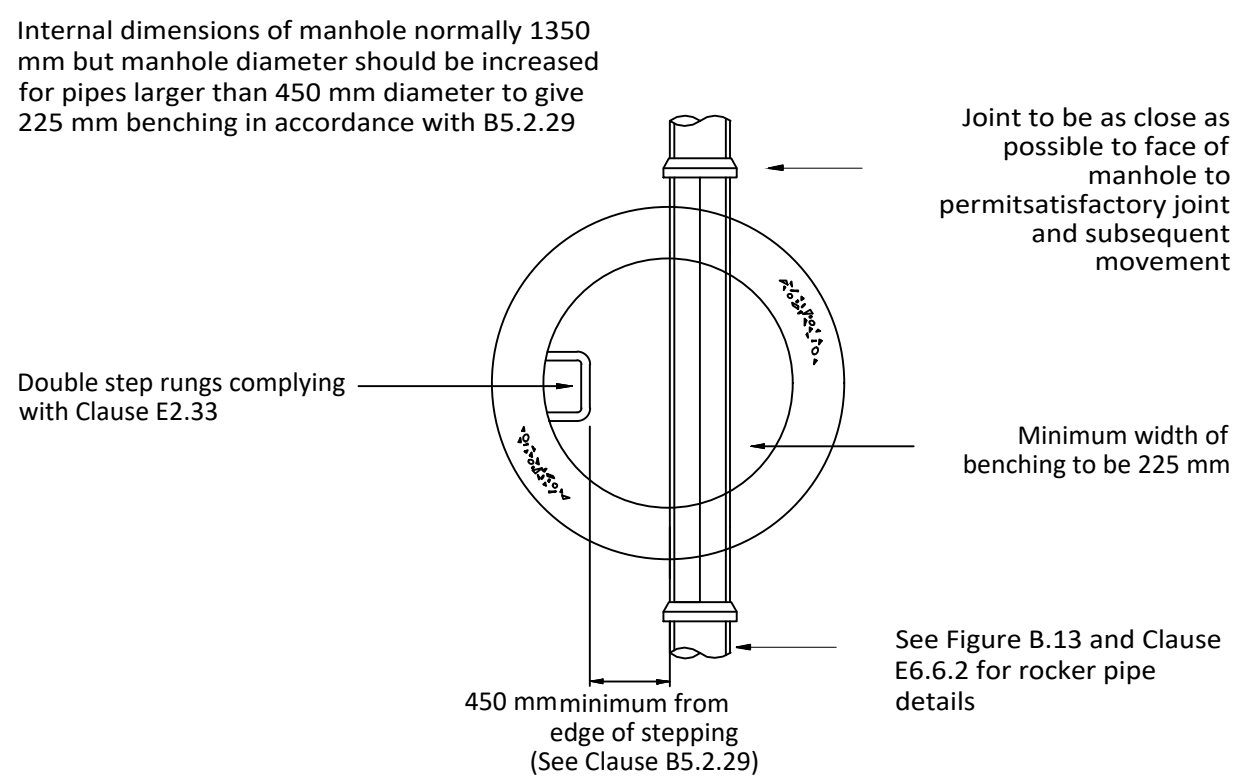
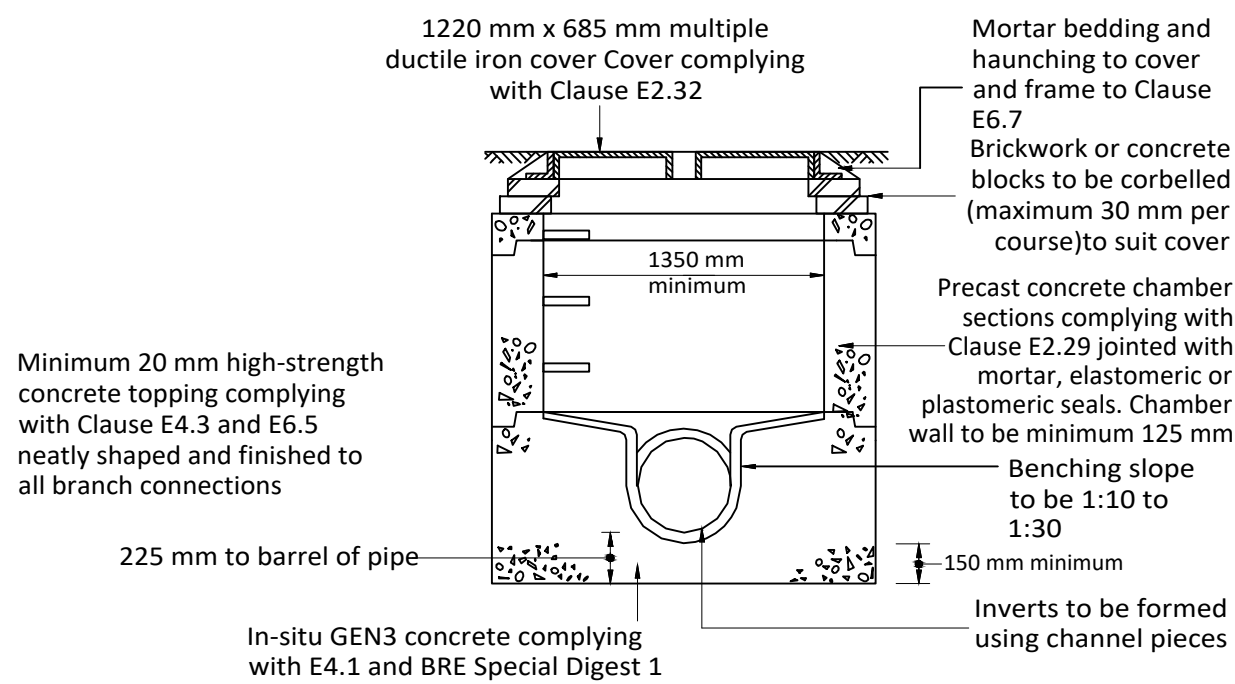
ADOPTABLE MANHOLE DETAIL - TYPE A
Depth from cover level to soffit of pipe 3 m to 6 m



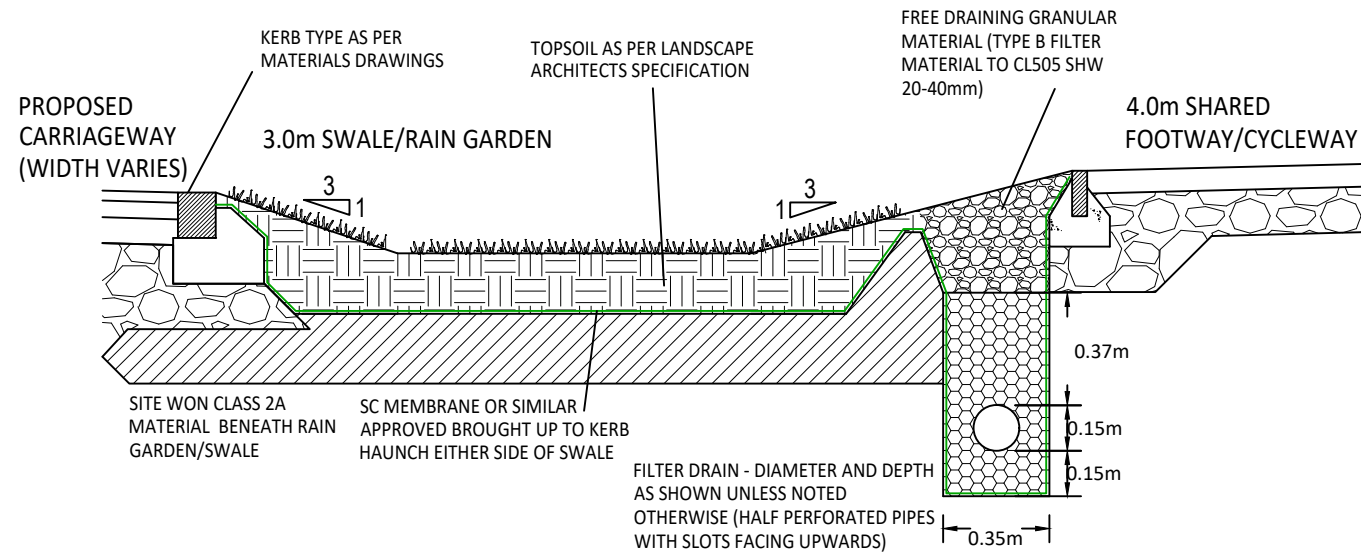
ADOPTABLE MANHOLE DETAIL - TYPE B
Depth from cover level to soffit of pipe 1.5m to 3.0 m



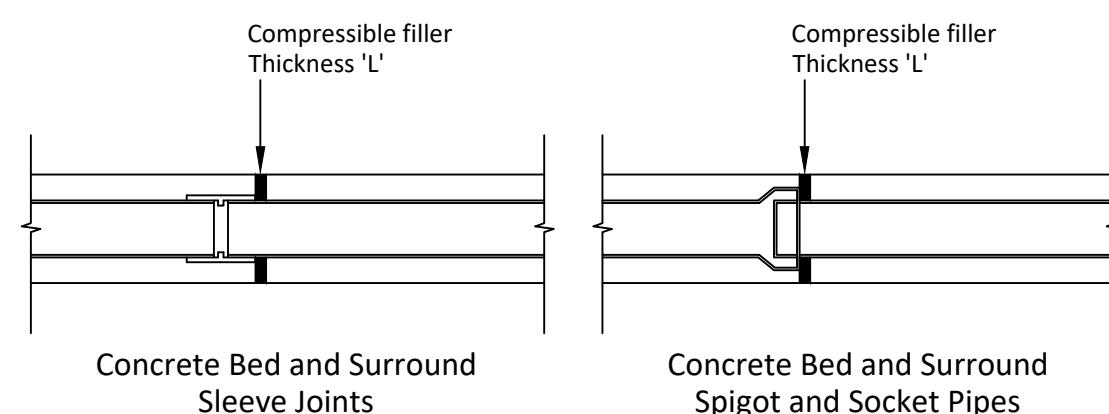
Typical manhole detail - Type C
Depth from cover level to soffit of pipe less than 1.5 m
Rigid material construction



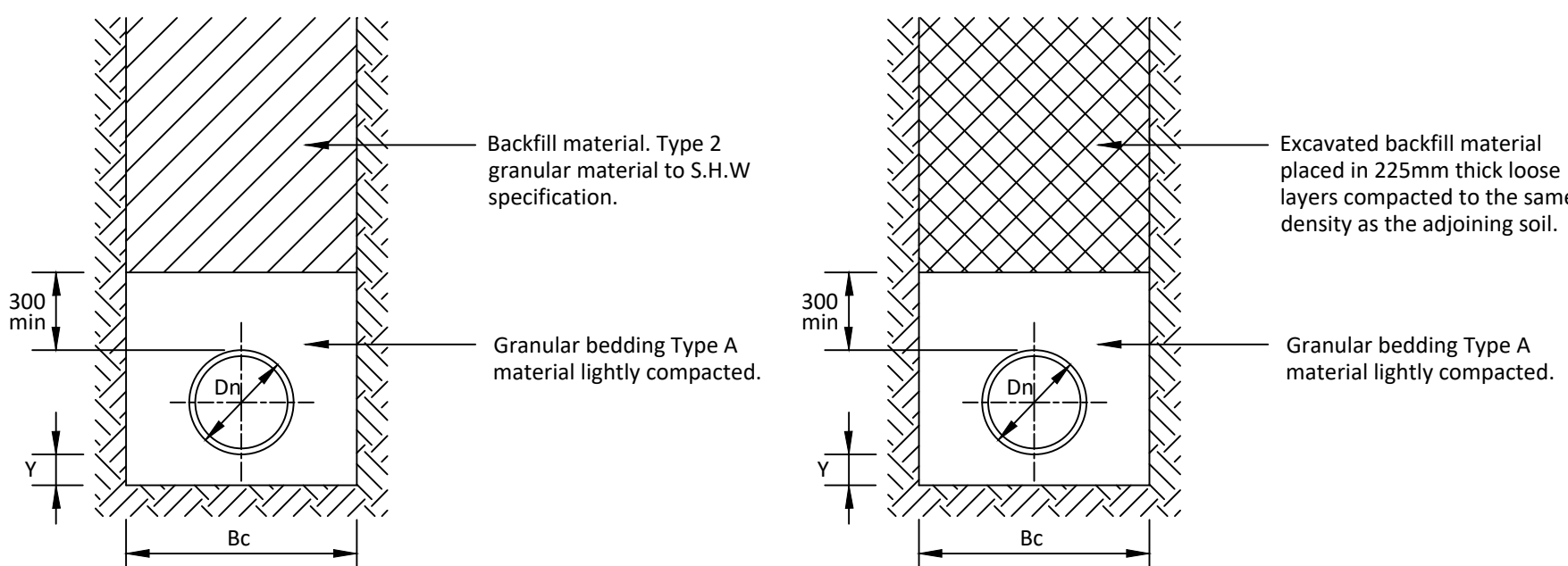
Note: The use of precast concrete chamber units to E2.29 with 150 mm GEN3 in-situ concrete complying with E4.1 and BRE Special Digest 1 in place of brickwork construction is permitted.



STANDARD SWALE/RAIN GARDEN AND ROAD SIDE FILTER DRAIN SECTION

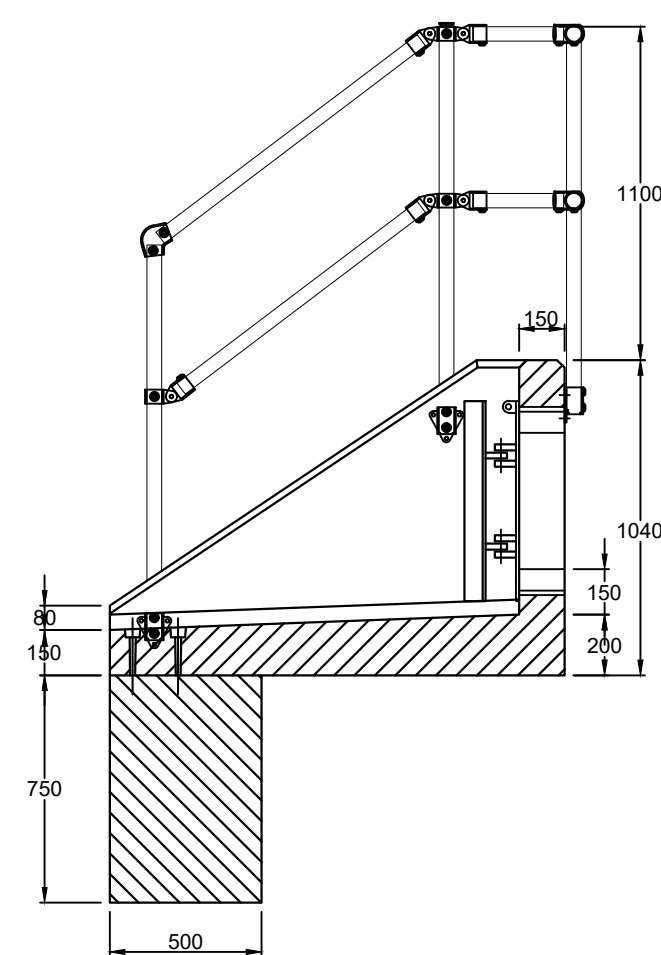
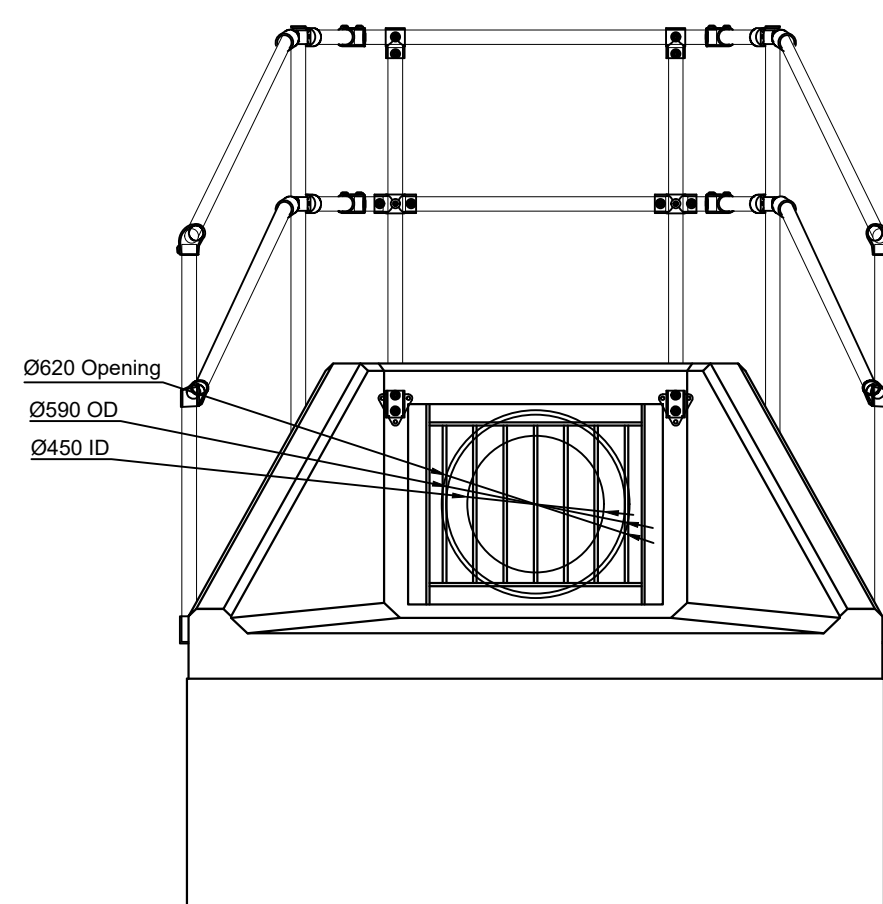
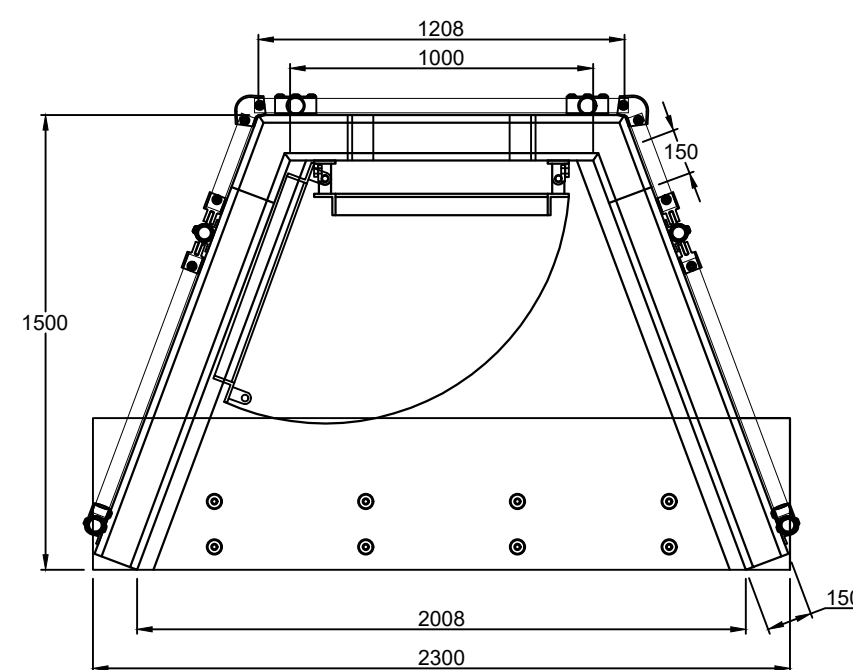


FLEXIBLE JOINT DETAILS

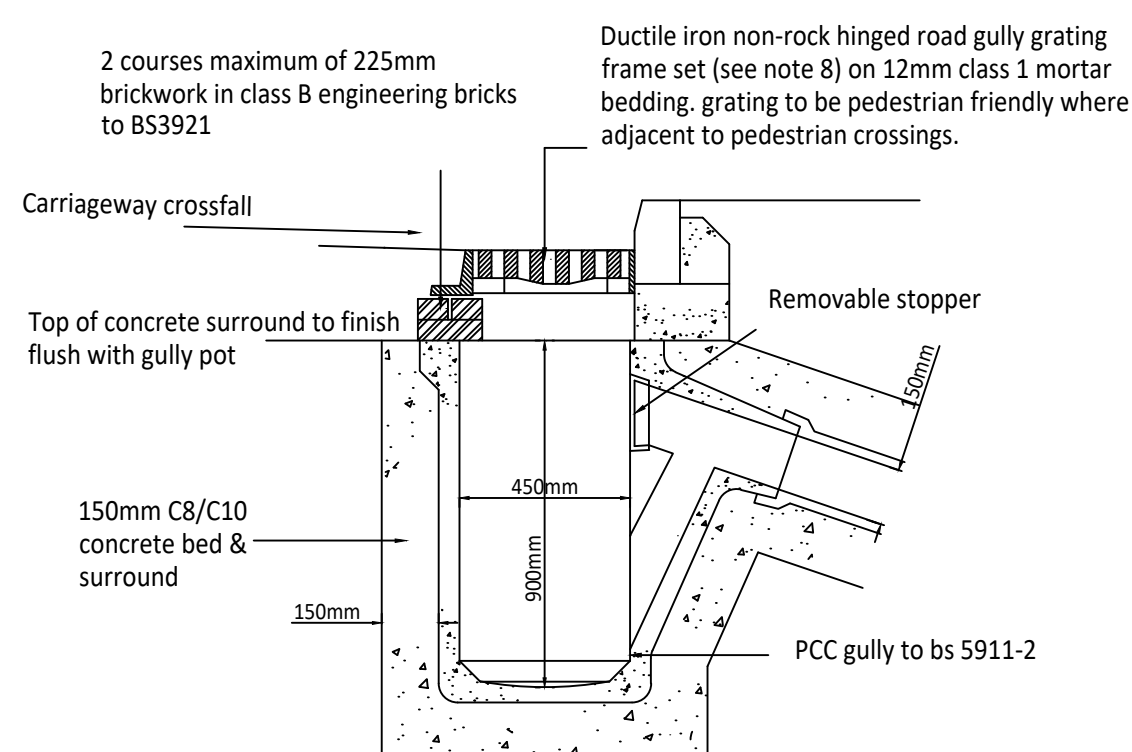


CLASS S BEDDING
(On trafficked areas

CLASS S BEDDING
(Verges & Landscaping)



Althon AWSFA10X Inlet Headwall
750 x 500mm Toe, 3 Sided Kee Klamp, Sfa1 450
Outfall Safety Grille, up to 450mm Concrete Pipe



TYPICAL TRAPPED GULLY DETAIL

SCALE 1:20

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7. The contractor is responsible for maintaining continuity of flow for all existing sewers within the site boundary and limit of the works and the duration of the works.
8. All drainage ironworks to comply with BS EN1421, and be stamped with bsl 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 verified c/cy to BS EN295. All sewer pipes 300mm diameter and above to be verified c/cy to BS EN1316. Where agreed with adopting authority pipes up to and including 600mm diameter can be PVC-U to BS EN1401-1.
10. All drainage shall be installed and tested strictly in accordance with the manufacturers' printed instructions, BS EN 752, BS EN 1610, the 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 constructed with thoroughly compacted type 1 granular sub-base material.
13. Drainage laid beneath roads and areas of vehicular access (car parking etc) and with less than 1200mm of cover shall be encased in concrete and supported with associated movement joints.
14. Drainage laid beneath paths, footways and pedestrian areas with less than 900mm of cover shall be similarly treated.
15. Chambers with outgoing pipes greater than 600mm diameter shall be fitted with guard bars, safety chains or other approved safety devices.
16. The use of precast concrete products made with sulphate resisting cement is mandatory, unless a laboratory report proves such precautions are not necessary.
17. All sewers to be abandoned must be surveyed to identify any lateral connections that are still live with any funds to be reported to the engineer.
18. 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 nbb standards chapter 5.3 and b83001.
19. Where pipes pass through footings, retaining or screen walls, (limits to be provided over drains).
20. All sewers are to be installed in 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 dn400).
21. Where required 1m deep root barrier of an approved type to be installed vertically along the back edging kerb of all areas of footway/dermatation to protect from both proposed and existing vegetation.
22. 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

A	02/26	FOR REVIEW	JJS	CS
Rev	Date	Description	Drawn	Check



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Client

UNIVERSITY OF READING

Project
THAMES VALLEY SCIENCE
PARK - LODDON GARDEN
VILLAGE LINK ROAD

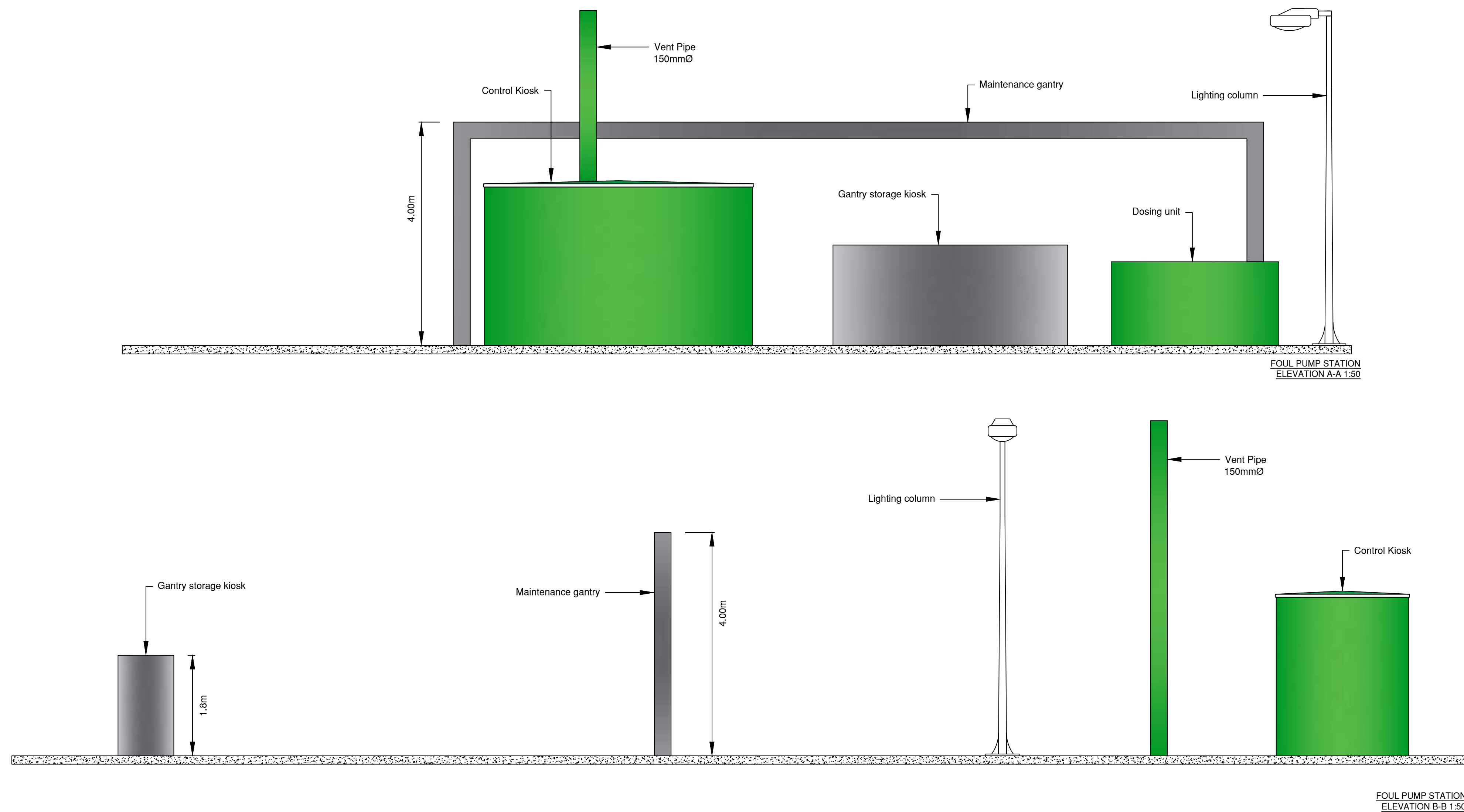
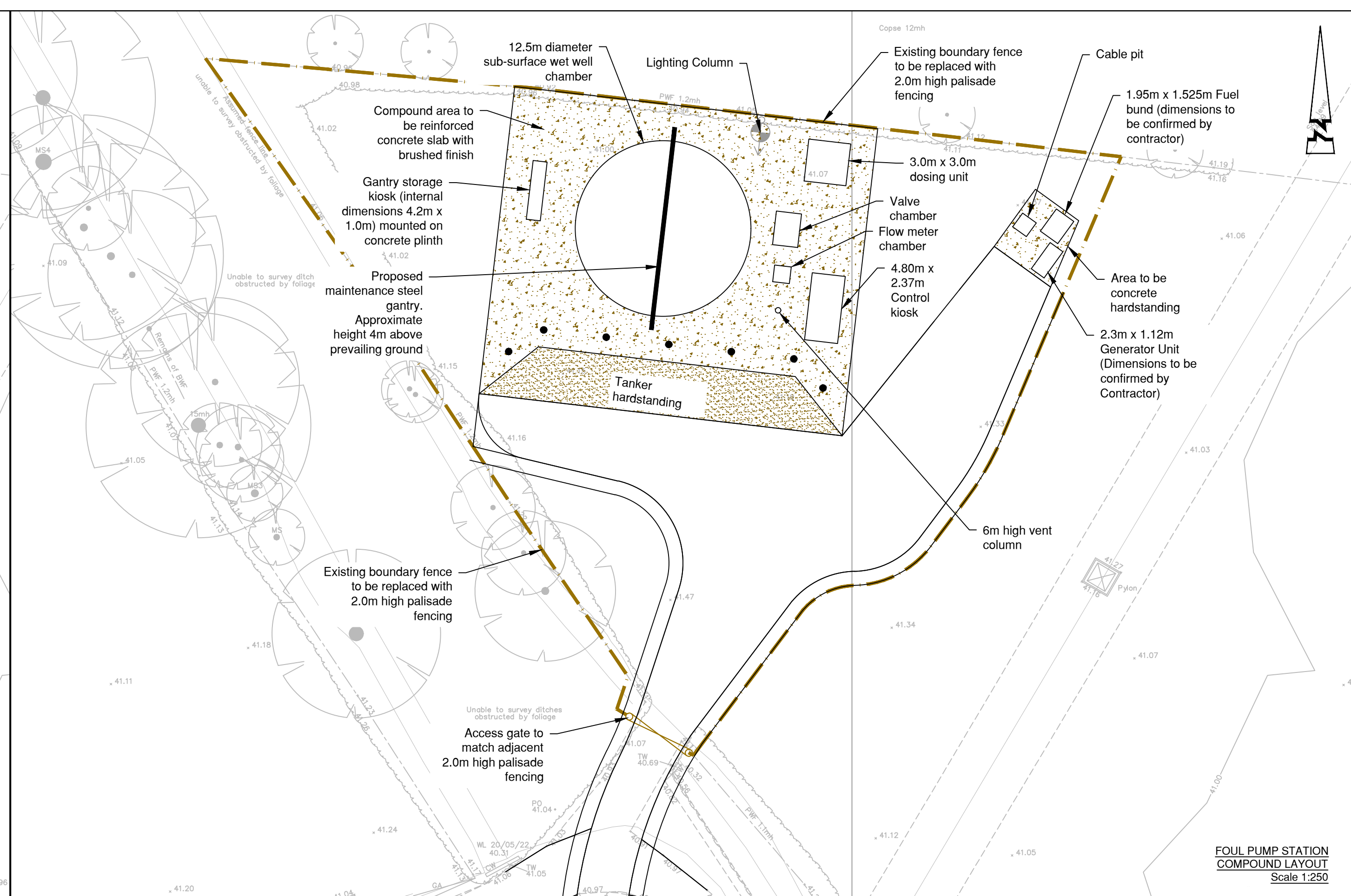
Title
**DRAINAGE CONSTRUCTION
DETAILS**

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Scale	Date	Drawn	Checked
AS SHOWN @ A1	FEB 2026	JJS	CS

HD169-TVSP-0510

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KEY PLAN
NTS

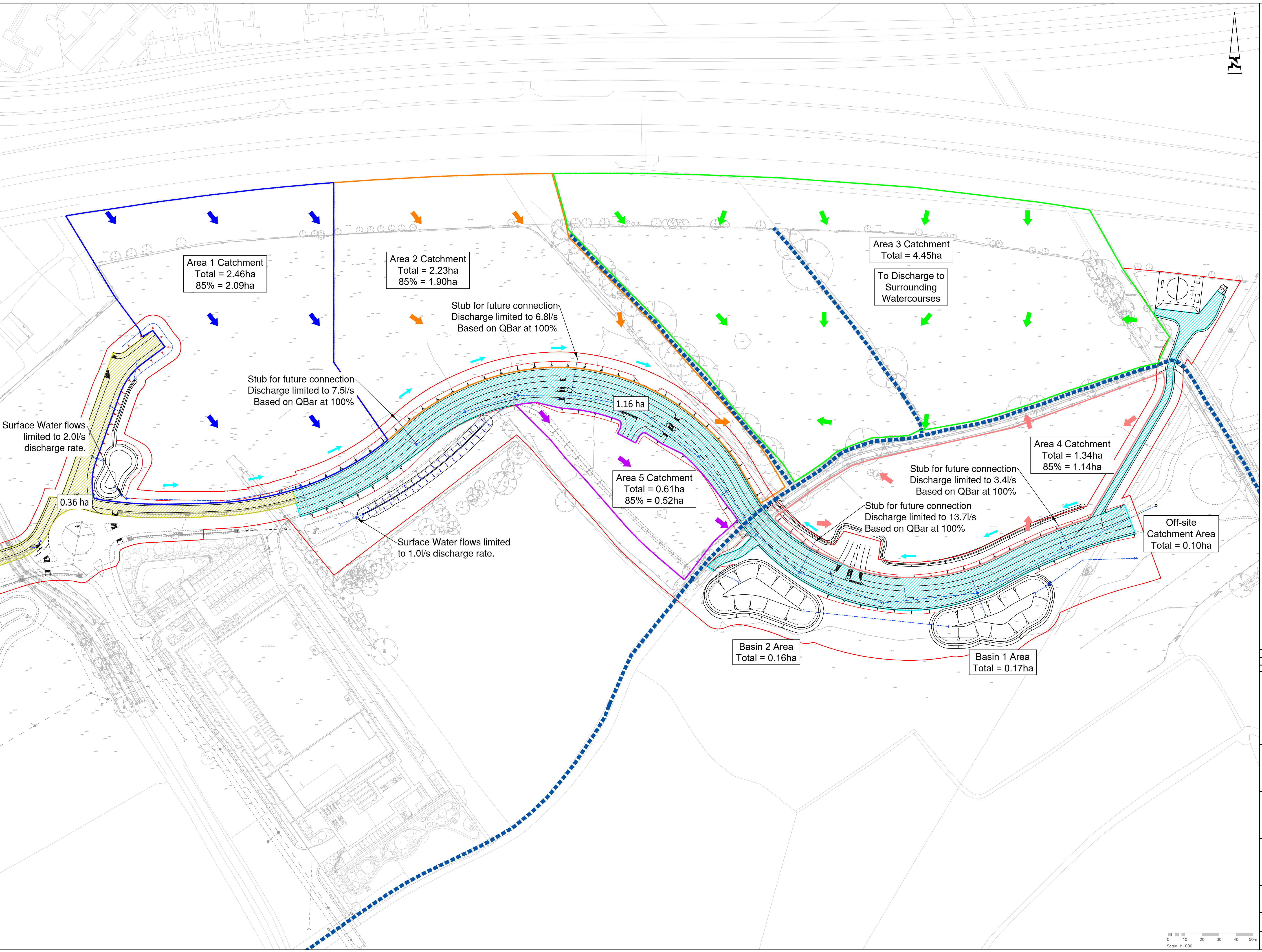
GENERAL NOTES:
1. Do not scale.
2. Refer to all other Project Drawings and supporting notes.

A	02/28	FOR REVIEW		AS	CS
Rev	Date	Description		Drawn	Checked
 Abley Letchford www.ableyletchford.co.uk					
Client UNIVERSITY OF READING					
Project THAMES VALLEY SCIENCE PARK - LODDON GARDEN VILLAGE LINK ROAD					
Title PUMPING STATION DETAILS					
Status					
Scale	Date	Drawn	Checked		
As Shown @ A1	FEB 2026	AS		CS	
Drawing No HD169-TVSP-0115				Revision A	

- GENERAL NOTES:
1. Do not scale.
 2. Refer to all other Project Drawings and supporting notes.
 3. Contractor to allow for transition kerbs as required.

KEY:

- AREA 1 CATCHMENT
- AREA 2 CATCHMENT
- AREA 3 CATCHMENT
- AREA 4 CATCHMENT
- AREA 5 CATCHMENT
- NHM HIGHWAY CATCHMENT
- HIGHWAY CATCHMENT
- SURFACE WATER NETWORK
- AREA 1 SURFACE WATER RUN-OFF
- AREA 2 SURFACE WATER RUN-OFF
- AREA 3 SURFACE WATER RUN-OFF
- AREA 4 SURFACE WATER RUN-OFF
- AREA 5 SURFACE WATER RUN-OFF
- PROPOSED SURFACE WATER RUN-OFF



B	02/26	LAYOUT AND ANNOTATIONS AMENDED	JJS	JS
A	02/26	FOR REVIEW	JJS	CS
Rev	Date	Description	Drawn	Checked



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Client:

UNIVERSITY OF READING

Project:

THAMES VALLEY SCIENCE
PARK - LODDON GARDEN
VILLAGE LINK ROAD

Title:

SURFACE WATER
CATCHMENT PLAN

Status:

Scale	Date	Drawn	Checked
1:1000 @ A1	FEB 2026	JJS	CS

Drawing No.	Revision
HD169-TVSP-0504	B