Flood Risk Assessment
& Drainage Strategy

# Land West of Buntingford (South of A507), Hertfordshire

Jubb


**PREPARED BY:**
Jubb Consulting Engineers Ltd.

**FOR:**
Hallam Land Management

**DATE:**
August 2024

**REFERENCE:**
23161-FRADS(S)-01 v4

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# 1 Project Information

## 1.1 Project Information

| | |
|---|---|
| **Client** | Hallam Land Management |

## 1.2 Project Details

| | |
|---|---|
| **Project Name** | Land West of Buntingford (South of A507) |
| **Location** | Buntingford, Hertfordshire |
| **Jubb Project Number** | 23161 |

## 1.3 Report Details

| | |
|---|---|
| **Version** | Four |
| **Status** | For Submission |
| **Date** | 29th August 2024 |

## 1.4 Project Authorisation

ISSUE HISTORY:

AUTHORISATION:

| Version | Date | Detail | Prepared By | Approved By |
|---|---|---|---|---|
| v1 | 19.02.24 | First Draft | MD | LE |
| V2 | 22.02.24 | Second Draft – Masterplan included | LE | LE |
| V3 | 14.06.24 | For Submission – Masterplan Update | LE | LE |
| V4 | 29.08.24 | Updates to LLFA Comments | RJ | LE |

# 2 Introduction

## 2.1 Instruction

2.1.1 This Flood Risk Assessment has been commissioned on behalf of Hallam Land Management to support an outline planning application for the development of the site known as Land West of Buntingford (South of A507) in Buntingford, Hertfordshire.

2.1.2 This report may not be relied upon or reproduced by any third party for any use without the written agreement of Jubb Consulting Engineers Ltd.

## 2.2 Brief

2.2.1 This flood risk assessment has been prepared in accordance with the requirements of the National Planning Policy Framework (NPPF) published by the Department of Levelling Up, Housing and Communities. Section 14 of the NPPF and the associated Planning Practice Guidance sets out the framework for planning decisions made by the local, regional, and national governments and the Environment Agency (EA). In order for planning authorities to make informed decisions on the development of sites in areas at risk of flooding, NPPF requires the developer to carry out an assessment of flood risk.

2.2.2 This report addresses the requirements set out in Section 14 of the NPPF and other issues, which are deemed relevant to flood risk. These requirements include the following:

- Assessment of the magnitude and severity of flood risk to the site.
- Assess suitability of the site and development through the use of the Sequential Test & Exception Test (if required).
- Consider flood risk due to overtopping of existing flood defences.
- Assess the impact of the proposed development on flood risk to adjacent developments.
- Determine the ability of existing and proposed drainage to accommodate development flows with respect to surface flooding.
- Demonstrate the appropriate mitigation measure have been taken to prevent flooding.
- Demonstrate the appropriate emergency situations have been considered e.g. overland flow paths and evacuation routes.

2.2.3 This report also considers the disposal of foul water from the proposed development. Existing local infrastructure will be reviewed to identify potential options for the disposal of foul and surface water run-off. A strategy will be presented for the preferred option.

# 3 Site Description

## 3.1 Site Location

3.1.1 The proposed site is located to the west of the A10 and south of Baldock Road (A507), directly west of the town of Buntingford, Hertfordshire. The site is approximately 13.28Ha in area with a National Grid reference of 535256E, 229382N.

3.1.2 The site boundaries are formed by the A507 (Baldock Road) to the north, the A10 to the east, adjacent arable farmland to the west, with a small woodland and further agricultural land to the south.

3.1.3 Beyond the site boundaries, the surrounding land is predominantly used for agricultural purposes to the north, west and south, with the existing residential area of Buntingford located immediately to the east.

3.1.4 A Site Location plan is included in Appendix A.

## 3.2 Existing Site Use

3.2.1 The existing site currently comprises of a large open field which is used for agricultural purposes.

## 3.3 Site Topography

3.3.1 A detailed topographical survey has been undertaken on the proposed site.

3.3.2 The survey shows there is a crest running centrally through the western region of the site from the north in a southeasterly direction.

3.3.3 From this crest, levels fall away to the east and west towards the A10 and field boundary respectively. The high point of the parcel is shown to be at an approximate level of 125.5mAOD along the top of the crest, with levels falling to a low point of approximately 113.4mAOD and 122.5mAOD on the eastern and western site boundaries respectively.

3.3.4 A copy of the topographical survey is included in Appendix B.

## 3.4 Site Geology

*Geology*

3.4.1 The British Geological Survey (BGS) maps indicate that the site is underlain with bedrock of the Lewes Nodular Chalk Formation and Seaford Chalk Formation.

3.4.2 Superficial deposits of Lowestoft Formation are also shown to be present within the site area. This strata is described as an extensive sheet of chalky till, together with outwash sands and gravels, silts and clays. Nearby archived BGS borehole records and historic ground investigations indicate that these soils are likely to exceed 20m in thickness.

3.4.3 In addition to this BGS show a small region of sandy Glaciofluvial deposits in the south-east corner of the site.

*Hydrogeology*

3.4.4 The BGS and Environment Agency hydrogeology maps indicate that the chalk bedrock underlying the site is classified as a Principal Aquifer.

3.4.5 Principal aquifers are defined as providing significant quantities of water and support water supply and/or baseflow to rivers, lakes and wetlands on a strategic scale. They typically have a high intergranular and/or fracture permeability meaning they usually provide a high level of water storage.

3.4.6 The superficial Lowestoft Formation Deposits beneath the site are classified as a Secondary (undefined) Aquifer.

3.4.7 Secondary aquifers are defined as providing modest amounts of water, but the nature of the rock or the aquifer structure limits their use. They support water supplies at a local rather than strategic scale and remain important for rivers, wetlands and lakes. They have a wide range of water permeability and storage.

3.4.8 The Environment Agency Source Protection Zone map indicates the entirety of the subject site is within a Zone 3 Total Catchment groundwater source protection zone.

*Hydrology*

3.4.9 The proposed site falls within the catchment of the River Rib (upper stretches, above confluence with the Quin).

3.4.10 The nearest EA designated 'main river' in the vicinity of the site is the Thistley Vale Brook and the River Rib, which are located approximately 165m to the west and 0.9km to the east of the site respectively.

3.4.11 The River Rib runs from the north, in a southerly direction through the centre of Buntingford before continuing on to the south.

3.4.12 The Thistley Vale Brook runs in a southeasterly direction from its source near the village of Throcking, as it reaches Baldock Road it flows in a southerly direction, before continuing to flow towards the south-east where it converges with the River Rib to the east of Aspenden.

3.4.13 An ordinary watercourse has also been identified within the subject site. In the south-east corner of the site an existing drainage ditch runs within an area of dense vegetation, before being culverted beneath the A10, where it is anticipated it continues to flow to the east before converging with the River Rib.

## 3.5 Existing Drainage

3.5.1 The existing public sewer networks serving the local area are owned and maintained by Thames Water.

3.5.2 Thames Water asset plans show there is no public drainage infrastructure located within the site. However, existing networks of public foul and surface water sewers have been identified within the surrounding area of Buntingford to the north-east of the site. A copy of Thames Water asset plans is included in Appendix C.

3.5.3 To the north-east of the site, a large network of public and private foul water sewers run throughout the existing residential area of Buntingford.

3.5.4 The closest public sewers to the site are found within the Buntingford Business Park located immediately to the north of the site. These sewers convey flows to the east where a large network of existing public surface water and foul sewers are present within Baldock Road from the roundabout with the A10, running in an easterly direction.

# 4 Flood Risk to the Existing Site

This section explores the primary sources of flood risk to the site.

## 4.1 Tidal & Fluvial

4.1.1 The proposed site is identified as lying outside of the fluvial and tidal flood risk zone according to the Environment Agency's (EA) published flood map (See Figure 1.0). This estimate of the extent of flooding is based on the absence or failure of all existing flood defences currently protecting the site.




*Figure 1.0 – Extract from Environment Agency Flood Map for Planning*

4.1.2 The EA flood map indicates that the site lies within Flood Zone 1 – Low Probability in Table 1 of the NPPF Planning Practice Guidance. This zone has less than a 1 in 1000-year annual probability of flooding.

4.1.3 The NPPF Planning Practice Guidance states that all types of development are suitable for this flood zone.

4.1.4 An area of Flood Zone 2 and 3 is located to the west of the site which is associated with the Thistley Vale Brook. The NPPF classifies Flood Zone 3 (high probability) as an area with greater than a 1 in 100-year annual probability of flooding. With Flood Zone 2 (medium probability) classified as an area with greater than a 1 in 1000-year annual probability of flooding.

4.1.5 A comparison between the EA Flood Zone 2 and 3 extent and the topographical survey shows that the flood zone extents are constrained to the watercourse channel, with the extents corresponding to a level of approximately 114 – 108mAOD as the watercourse flows to the south.

4.1.6 The flood zone extents are constrained to the watercourse channel due to the steeply rising topography either side of the watercourse in an easterly and westerly direction.

4.1.7 The full extents of the site are located within Flood Zone 1, with a significant level difference between the flood zone extents and the development parcel. The flood zones extents are shown to correspond to a level between approximately 108 - 114mAOD, however, the western edge of the development corresponds to a level of approximately 125mAOD. Consequently, there is at minimum a 11m level difference between the development proposals and the flood zone extents.

4.1.8 A detailed assessment of the risk of fluvial flooding to the subject site and the development proposals has been undertaken, which has concluded that the risk of flooding to the development is low.

*Climate Change*

4.1.9 The EA 'Flood Risk Assessments – Climate Change Allowances' guidance provides support to the NPPF on the impacts of climate change on flooding from the land, rivers and sea as part of a flood risk assessment.

4.1.10 In accordance with the NPPF and supporting planning practice guidance, flood risk assessments should demonstrate how flood risk will be managed now and over the developments lifetime, taking climate change into account.

4.1.11 The NPPF Flood Risk and Coastal Change Planning Practice Guidance states that for commercial development it is reasonable to assume a typical lifespan of 75 years.

4.1.12 Despite the site being within Flood Zone 1, a review of the risk of flooding taking into account the development lifespan and climate change has been undertaken.

4.1.13 The subject site is located within the Upper Lee Management Catchment which has the following EA climate change allowances.

| | Central | Higher | Upper |
|---|---|---|---|
| **2020s** | 3% | 9% | 23% |
| **2050s** | -1% | 7% | 27% |
| **2080s** | 10% | 22% | 59% |

4.1.14 In accordance with Planning Practice Guidance, the vulnerability category of the employment aspect of the development is classified as 'less vulnerable' under Table 2 of the NPPF.

4.1.15 Despite the site not being impacted by the Flood Zone 2 and 3 extents, for this exercise we have followed EA guidance which states that flood risk assessments on sites which are affected by Flood Zone 2 and 3a and with a 'less vulnerable' flood risk classification should consider the central allowance.

4.1.16 The EA have confirmed that detailed flood modelling information is not available for the Thistley Vale Brook.

4.1.17 As previously discussed, the levels of the current flood zone extents with a 1% chance of occurring for fluvial flooding along with the extreme flood outline representing the extent of a flood with a 0.1% chance of occurring in any year has been considered in relation to the existing site levels.

4.1.18 Due to the existing topography, the flood zone extents are constrained to the watercourse channel, with a significant level difference of between the flood zone extents and the proposed development.

4.1.19 It is therefore considered that the relevant climate change allowances will have a negligible impact on the anticipated flood zone extents and hence due to the significant level difference between the anticipated flooding extents and the development, the flood risk to the site over the lifetime of the development is low.

4.1.20 A detailed assessment of the risk of fluvial flooding to the subject site and the development proposals has been undertaken. It is concluded that the risk of flooding to the development is low.

## 4.2 Overland & Surface Water Flooding

4.2.1 As shown on the EA risk of flooding from surface water map (refer to Figure 2.0), the proposed site is almost entirely identified as being in an area of very low risk of overland and surface water flooding.




*Figure 2.0 - Environment Agency Flooding from Surface Water Map*

4.2.2 It is considered that the risk of surface water flooding impacting the proposed development is low, due to the topography of the site.

4.2.3 Within the site, several small, isolated areas of low-high risk are shown in the north-east and south-eastern parts of the site. However, these areas do not impact the development proposals and it is anticipated that flows in these areas will be conveyed away from the site by the local topography.

4.2.4 Due to the topography of the site and the surrounding area, the risk of flooding from overland flows is considered low.

4.2.5 There are no historical records of surface water or overland flooding impacting the site.

4.2.6 Based on further investigation and the factors described above, it is considered that flooding from surface water or overland flows does not pose a significant risk to the proposed development, with additional mitigation measures suggested in Section 9 to further manage the risk to the site.

## 4.3 Flooding from Sewers

4.3.1 There is a very low risk of flooding from the existing public sewerage infrastructure impacting the proposed site due to the location of the existing apparatus and the topography of the site and surrounding area.

4.3.2 In the event of sewer incapacity or blockages occurring to the existing sewer network, flows will be conveyed away from the site due to the topography of the surrounding area and will therefore not impact the site.

4.3.3 There are no historical records of flooding caused by local sewer infrastructure impacting the site. Consequently, it is not considered that flooding from sewers poses a significant risk to the site.

## 4.4 Groundwater Flooding

4.4.1 The underlying bedrock beneath the proposed site has been identified as Lewes Nodular and Seaford Chalk with superficial deposits of Lowestoft Formation.

4.4.2 The BGS groundwater flooding susceptibility map (refer to Figure 3.0) shows that the entirety of the site area is classified as having limited potential for groundwater flooding to occur.

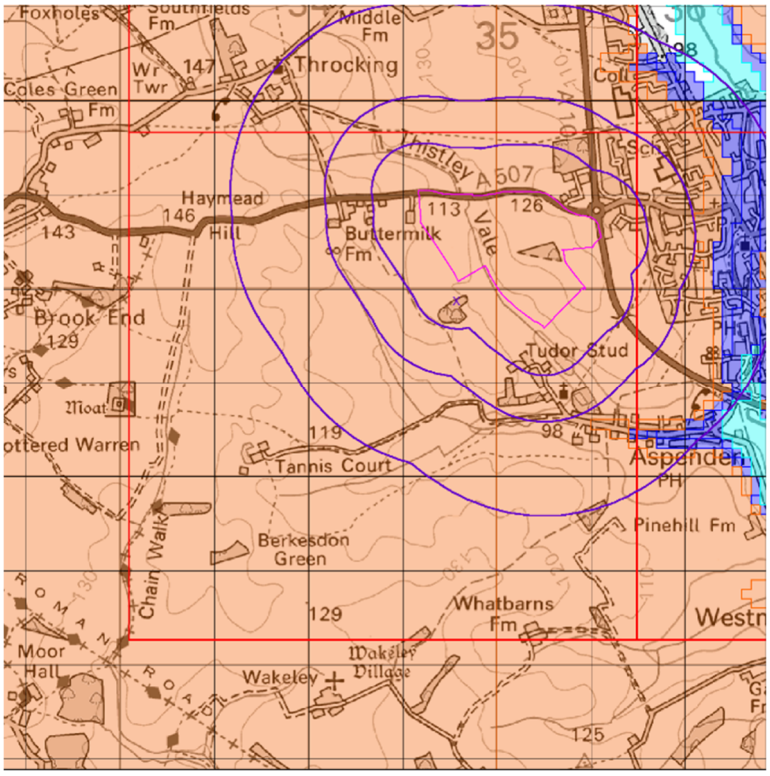



*Figure 3.0 - BGS Groundwater Flooding Susceptibility Map*

4.4.3 The East Hertfordshire District Council Strategic Flood Risk Assessment (SFRA) completed by JBA in 2016 includes a strategic-scale map showing areas susceptible to groundwater flooding based on the proportion of a 1km square grid where geological and hydrogeological flooding may occur. This data identifies the full extents of the site being at very low risk of groundwater flooding.

4.4.4 There are no historical records of groundwater flooding occurring within the site or in the nearby vicinity.

4.4.5 Historical borehole data shows a water strike within a borehole located in close proximity to the site encountering water at 11.8m below ground level, with standing water rising to 3.8m below ground level.

4.4.6 Further onsite testing should be undertaken across the subject site to obtain further details on the underlying ground conditions and the groundwater regime. However, from the available information it appears that groundwater levels may be at a significant depth and consequently groundwater flooding is unlikely to occur.

4.4.7 No detailed on-site geotechnical investigation works have been undertaken on the proposed site. However, based on the currently available information discussed above it is considered that flooding from groundwater does not pose a significant risk to the site.

## 4.5 Flooding from Artificial Sources

4.5.1 There are no artificial bodies of water located within or around the proposed site. Therefore, it is not expected that flooding from artificial sources poses a risk to the proposed site.

# 5 Proposed Development

## 5.1 Development Description

5.1.1 The proposals consist of an outline planning application for development of employment land (flexible use B2, B8, E9c) and E(g)), informal open space, associated works and infrastructure including a new access from A507, with all matters reserved save for access.

5.1.2 A copy of the illustrative concept masterplan is included in Appendix D.

## 5.2 Development Suitability

5.2.1 The NPPF aims to direct developments to suitable areas with low probability of flooding. The table below shows the acceptable classification of development within each flood zone.

| Flood Risk Vulnerability Classification | Essential Infrastructure | Water Compatible | Highly Vulnerable | More Vulnerable | Less Vulnerable |
|---|---|---|---|---|---|
| **Flood Zone 1**<br><br>**(<1 in 1000)** | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Flood Zone 2**<br><br>**(Up to 1 in 1000)** | ✓ | ✓ | Exception Test | ✓ | ✓ |
| **Flood Zone 3a**<br><br>**(1 in 100 fluvial)**<br>**(1 in 200 tidal)** | Exception Test | ✓ | X | Exception Test | ✓ |
| **Flood Zone 3b**<br><br>**(Functional floodplain)** | Exception Test | ✓ | X | X | X |

5.2.2 The development, the proposals are considered to be classified as a 'less vulnerable' development under Table 2 of the NPPF.

5.2.3 As the entirety of the site is within Flood Zone 1, all vulnerability classes are suitable and thus the proposed scheme is deemed acceptable.

5.2.4 The site will not be subject to a Sequential Test by the Local Planning Authority (LPA) in respect of the appropriateness of the proposed development in this location, as the site is located wholly within Flood Zone 1, with no other sources of flooding shown to pose a significant risk to the site.

# 6 Development Drainage

## 6.1 Foul Drainage

6.1.1 A new foul water drainage network will be required to service the proposed development. The new network will collect and convey foul water discharge from the development to a new point of connection on the existing Thames Water foul sewer network.

6.1.2 Thames Water asset plans have identified an existing public sewer network running throughout the town of Buntingford directly to the east of the development. The existing site is not positively drained, consequently the proposed development will increase flows to the public sewerage system.

6.1.3 The new foul sewerage network will be designed to accommodate the anticipated peak development flows without flooding.

6.1.4 Thames Water have been instructed to undertake an initial assessment of the existing public foul sewer network, to confirm if sufficient capacity is available to accommodate the additional flows from the development.

6.1.5 Thames Water have confirmed that the existing sewer network is not currently able to meet the needs of the full development, with further detailed network modelling required to determine any off-site improvement works required to serve the full scale of the development.

6.1.6 However, Thames Water are obligated to accept flows from new developments with the benefit of planning permission. Therefore, it is considered that through further liaison with Thames Water, any off-site improvement works will be co-ordinated and delivered to ensure the existing network is capable of accommodating the development proposals.

6.1.7 The proposed point of connection to the existing public network is to be confirmed through further co-ordination with Thames Water. However, due to the topography of the site and local area, along with the location of the existing infrastructure, it is anticipated that a gravity connection from the development to the proposed point of connection will be feasible. If this is not the case, a pumped solution will need to be considered via an onsite pump station.

6.1.8 If the timeframes for completion of any necessary network upgrade works do not align with the delivery of the development, discharging flows via a private wastewater treatment works could be considered subject to environmental permits.

## 6.2 Surface Water Drainage

6.2.1 Current legislation and guidance require developers to manage surface water run-off from new developments to mitigate flood risk to the site and the surrounding area, and also provide a sustainable means of disposing of run-off from impermeable areas.

6.2.2 Off-site surface water discharge must be managed to ensure that it does not exceed the predevelopment flow rate. Sustainable drainage systems (SuDS) should be used to attenuate flows and ensure that run-off from the new hardstanding areas receives the appropriate water quality treatment before being discharged.

6.2.3 The proposals aim to provide a new sustainable surface water drainage strategy to dispose of surface water run-off in an effective manner. In accordance with the drainage hierarchy, the possible drainage options considered for the proposed site include:

- Infiltration via the use of soakaways or infiltration basins
- Attenuation and discharge to local watercourse
- Attenuation and discharge to a public sewer network

6.2.4 Initial BGS survey information identified that the site area is underlain by Lewes Nodular and Seaford Chalk. However, this bedrock strata is overlaid by significant superficial deposits consisting of chalky til, together with outwash sands and gravels, silts and clays.

6.2.5 No intrusive ground investigation works have been undertaken on the subject site. However, based on currently available information it is anticipated that the discharge of surface water via infiltration techniques will not be feasible and an alternative attenuation option is preferred.

6.2.6 Further ground investigation works should be undertaken on the proposed site as the site is taken forward to confirm the assumption that infiltration is not a viable option.

6.2.7 The proposed development will create areas prevented by impervious surfacing from draining to the ground by natural processes. Surface water run-off will be directed to a new onsite surface water drainage network that will be designed to appropriately control the offsite discharge and prevent flooding within the site and downstream areas.

6.2.8 It is proposed that generated surface water run-off from the development will be discharged at a restricted pre-development greenfield rate to the existing drainage ditch within the south-east corner of the site, with flows attenuated onsite via SuDS features including an attenuation basin.

6.2.9 Using the FEH statistical method, a Qbar greenfield rate of 15.7l/s has been calculated. This rate will be used as the maximum offsite discharge rate for storm events up to the 1 in 100-year plus 40% climate change scenario.

6.2.10 Restricting the offsite surface water discharge rate to Qbar, an estimated storage volume of 3125m$^3$ is required to accommodate the 1 in 100-year plus 40% climate change scenario.

6.2.11 It is proposed to provide the required storage primarily through an attenuation basin which will be sized and located specifically for the individual catchments. A Hydrobrake unit placed downstream of the basins will control the discharge rate ensuring that it does not exceed the agreed rate.

6.2.12 It is proposed that the development drainage strategy will utilise the integration of SuDS features throughout the development proposals. This includes the use of a variety of source control features to enhance the SuDS management train. Further details of the proposed sustainable drainage systems are provided in Chapter 7 and 8.

6.2.13 To accommodate the development proposals and drainage strategy it is anticipated that the localised adjustment of existing onsite levels may be necessary across certain parts of the site.

6.2.14 A plan of the proposed drainage strategy and associated calculations is included in Appendix E.

# 7 Sustainable Drainage Systems & Water Quality

7.1.1 Surface water management systems should incorporate sustainable drainage techniques to restrict surface water discharge from the site and improve the water quality of the run-off. There are a variety of techniques that can be applied including source control, online systems and outlet controls. Ciria have published a SuDS manual, which details a number of systems along with guidance on their application and design.

7.1.2 SuDS systems typically rely on either infiltration or attenuation to reduce peak flows and discharge volume and filtration systems to remove pollutants or solids from the effluent.

7.1.3 The existing ground conditions appear to suggest that infiltration methods will be unsuitable for the discharge of surface water flows from the proposed development. It is therefore proposed that an attenuation option is the preferred strategy.

7.1.4 As a means of analysing whether SuDS measures utilised for the site will provide adequate water treatment to the surface water runoff, the Ciria SuDS manual specifies a simple index approach. This approach gives different land uses certain pollution hazard indices (Table 26.2 Ciria Manual), while SuDS features are given mitigation indices (Table 26.3 Ciria Manual). If the SuDS indices equate or surpass the pollution hazard indices, the water treatment within the system is deemed adequate.

7.1.5 The impermeable hardstanding areas of the site can be split into three distinct areas:

- Carparking/driveways
- Building roof areas
- Carriageways/footways

7.1.6 The building roof areas collect rainfall from the structure and runoff will be predominantly clean. Individual property driveways and low traffic roads also have low hazard indices. The hazard and mitigation indices for each impermeable area type have been summarised in the table below.

| Impermeable Region | Hazard Indices | | | Treatment | Mitigation Indices | | |
|---|---|---|---|---|---|---|---|
| | TSS | Metals | Hydro | | TSS | Metals | Hydro |
| Car Parking /Driveways | 0.5 | 0.4 | 0.4 | Attenuation Basin | 0.5 | 0.5 | 0.6 |
| Building Roof | 0.2 | 0.2 | 0.05 | | | | |
| Roadways /Footways | 0.5 | 0.4 | 0.4 | | | | |

Table 1 – Ciria Simple Index Approach Analysis

7.1.7 As shown in Table 1, the provision of an attenuation basin is deemed adequate to meet water quality requirements for the site.

7.1.8 It is proposed to incorporate a variety of SuDS features as part of the site wide drainage strategy. This will include attenuation basins with additional features such as permeable paving, raingardens/swales and water butts etc to supplement the overall drainage strategy for the site.

7.1.9 These sustainable drainage features will provide ecological benefits as well as amenity and water quality benefits through the dilution, filtration and settlement of solid particles.

7.1.10 Throughout the construction phase of the development the contractor will be required to ensure that appropriate provisions are put into place to ensure that the water quality of the surface water discharge from the site is being maintained. This will involve measures to prevent silts and other construction waste being conveyed offsite through surface water runoff.

7.1.11 The proposed site has been identified within a Zone 3 groundwater source protection zone, atop a principal bedrock aquifer and within a Water Framework Directive Groundwater water body with 'poor' overall classification. However, as the preferred strategy is an attenuation option it is considered that the development proposals or drainage strategy will not impact the sensitive underlying groundwater, with SuDS features providing adequate treatment to ensure the water quality of any downstream features is not affected.

# 8 SuDS Management & Maintenance

8.1.1 To ensure that any proposed SuDS features operate effectively for its lifetime a detailed management plan for the operation and maintenance of the SuDS will be produced, prior to construction, based on Chapter 32 of Ciria C753.

8.1.2 It is anticipated that proposed surface water and foul drainage networks will be offered to Anglian Water for adoption. Where Anglian Water will not accept certain sections of pipework, these will be the responsibility of a site management company.

8.1.3 Drainage for buildings, access roads, car parks, landscaping, etc in private ownership will be managed and maintained privately.

8.1.4 Proposed SuDS features such as permeable paving driveways will remain private and will be maintained by the homeowner or the site management company.

8.1.5 Proposed SuDS features located in public spaces such as the attenuation basin will be offered to the local authority or Anglian Water for adoption.

8.1.6 SuDS features in public spaces that remain under private ownership, will be maintained by a site management company. Details for the management and maintenance of any SuDS within the site will be agreed with the Local Authority prior to construction. The management company will be responsible for the regular inspection and maintenance of SuDS features, with a contractor on standby for emergency reactive maintenance.

8.1.7 As the scheme is progressed management and maintenance practices for maintaining SuDS/drainage infrastructure will be constantly reviewed and updated with a final confirmed plan to be agreed with the Local Authority prior to construction.

8.1.8 SuDS features will be managed in accordance with the guidelines in Ciria C753, Chapter 32. As this is early in the application process, the final details of the SuDS system and exact maintenance requirements are not yet fully known. However, a few fundamental actions can be specified now, these are noted below:

*General requirements*

| Regular Maintenance | Frequency |
|---|---|
| **Litter**<br><br>Collect all litter or other debris and remove from site at each site visit. | Monthly or when deemed necessary |
| **Grass maintenance**<br><br>Amenity Grass – Mow all grass verges, paths and amenity grass at 35-50mm with 75mm max<br><br>All cuttings to remain in situ. | Monthly or when deemed necessary |
| **Flood Routes** | |

| | |
|---|---|
| Make visual inspection of proposed overland flow routes. Check that the route is not obstructed by rubbish, new features etc. Remove obstructions as necessary. | Monthly |

*Gullies, Manholes*

| Regular Maintenance | Frequency |
|---|---|
| **Gully Inlets**<br><br>Inspect physical structure of gully removing surface obstructions and silt as necessary. Check there is no physical damage. | Monthly |
| **Silt Trap, Inspection Chambers**<br><br>Remove cover and inspect ensuring water is flowing freely and that the existing route for water is unobstructed. Remove debris and silt.<br><br>Undertake inspection after leaf fall in autumn in which silt build up is more likely to occur. | Annually |
| **Reactive Maintenance** | **Frequency** |
| Replace gully grating and manhole if physical damage has occurred.<br><br>If a blockage in the drainage system occurs rod the necessary region within the system to ensure the blockage is removed. | As required |

*Hydrobrake*

| Regular Maintenance | Frequency |
|---|---|
| **Inspection Chamber**<br><br>Remove cover to inspect and note any high-water levels, re-inspect 24hrs later to evaluate reduction of water levels.<br><br>Inspect ensuring that water is flowing appropriately through the flow control device and there are no obstructions to the flow of water immediately upstream or within the device. Remove debris and silt where necessary. | Monthly or following severe storms, within first year.<br><br>Monthly for 3 months, then every 6 months. |
| **Reactive Maintenance** | **Frequency** |
| If a blockage in the hydrobrake unit occurs, it will need to be either jetted or replaced depending on the severity of the blockage. | As required |

*Attenuation Basin*

| Regular Maintenance | Frequency |
|---|---|
| Remove debris and litter<br><br>Inspect inlets, outlets and overflows for blockages, and clear if required. Inspect banksides for evidence of physical damage. | Monthly<br><br>Monthly |
| Cut grass | Monthly (during growing season) or as required |
| **Reactive Maintenance** | **Frequency** |
| Repair surface damage, replace topsoil and seed as required<br><br>Repair/rehabilitation of inlets, outlets and overflows<br><br>Relevel uneven surfaces and reinstate design levels | As required |

*Permeable Paving*

| Regular Maintenance | Frequency |
|---|---|
| Surface Protection<br><br>Remove litter and debris.<br><br>Brush or suction sweep surface to remove silt build up and replace grit as required | Monthly<br><br>Annually |
| Bedding Replacement<br><br>Lift blocks and remove bedding material. Clean geotextile and replace bedding material with new silt-free granular material. | Every 10 years or as required |
| **Reactive Maintenance** | **Frequency** |
| Brush or suction sweep to remove any materials left on surface.<br><br>Lift and re-bed blocks where movement has occurred. In case of settlement, full reconstruction and compaction of sub-base may be required. Sub-grade should be checked to washout of fines. | As required |

*Raingardens/ Swales*

| Regular Maintenance | Frequency |
|---|---|
| Remove debris, litter and weeds | Quarterly |
| Inspect surface for infiltration, ponding/siltation | Quarterly |
| Inspect perforated pipe drainage | Annually (after rain) |
| Maintain planting and replace where required | Annually (during growing season) |
| Remove sediment | Annually or as required |
| **Reactive Maintenance** | **Frequency** |
| Replace planting and filter medium as required | |
| Relevel uneven surfaces and reinstate design levels | As required |

# 9 Development Flood Risk & Mitigation

## 9.1 Tidal & Fluvial

9.1.1 As discussed in section 4 – the site lies entirely within Flood Zone 1, with the risk of flooding from tidal & fluvial sources considered to be low. The development proposals do not increase the flood risk to the site or the surrounding area from tidal or fluvial sources.

9.1.2 The proposed use of the site is defined as 'less vulnerable' under the NPPF, which is deemed as suitable for a site in Flood Zone 1.

9.1.3 The proposed development includes a site wide drainage strategy which will collect, attenuate, treat, and discharge flows in a sustainable manner. It is proposed to discharge flows to the local watercourse at the greenfield rate, which will not increase the risk of flooding to the site or surrounding areas.

## 9.2 Overland & Surface Water Flooding

9.2.1 As previously discussed in Section 4.2, it is considered that the risk of flooding from surface water & overland flows is low.

9.2.2 Although the risk to the site is not considered significant, it is suggested that the following flood risk management measures are considered to further manage any potential risk.

- Finished floor levels should be set a minimum of 150mm above existing levels.
- Where possible, the existing ground profile should be designed to convey any potential flows away from buildings or vulnerable areas.

9.2.3 The development proposals will include a site wide drainage strategy which will be designed to accommodate all surface water flows from the new hardstanding areas of the development. This network will be designed to accommodate the 1 in 30-year event without flooding, with flow routes considered to prevent flooding onsite or downstream during extremely severe weather conditions.

9.2.4 Consequently, the proposed development will not have a detrimental impact on flood risk to the site or to the surrounding areas.

## 9.3 Flooding from Sewers

9.3.1 As discussed in Section 4.3 there is a very low risk to the site from the failure of existing drainage infrastructure within the region.

9.3.2 A new surface water drainage network will be constructed to serve the proposed development. This network will be designed to accommodate flows for the 1 in 30-year event, with exceedance flow routes considered to prevent flooding onsite or downstream during more severe weather.

9.3.3 A new foul water drainage network will also be constructed to service the site. This network will be designed to accommodate anticipated peak flows with no flooding.

9.3.4 Based on the information discussed above, it is considered that the proposed development does not increase the risk of flooding from sewers to the site or surrounding area.

## 9.4 Groundwater Flooding

9.4.1 As discussed in Section 4.4, the risk of flooding from groundwater is considered very low.

9.4.2 There are no historic records of groundwater flooding either on or in the nearby vicinity of the site, which suggests that groundwater re-emergence has not caused significant flooding issues in the past.

9.4.3 It is proposed to discharge surface water flows via an attenuation solution to a local watercourse. These proposals are not expected to affect the groundwater table and consequently will not increase the risk of flooding from groundwater related sources.

## 9.5 Flooding from Artificial Sources

9.5.1 As discussed in Section 4.5 there is no flood risk to the site from artificial sources. The development proposals will not cause an increase to this risk, either to the site or to the surrounding areas.

# 10 Conclusions & Recommendations

It is considered that this assessment represents a comprehensive and robust analysis of the flood impact of the development upon other adjacent properties and of the existing flood mechanisms on the development itself. It demonstrates that the proposed development is sustainable in terms of flood risk and can be summarised as follows.

| Subject | Conclusions |
|---|---|
| **Tidal and Fluvial Flood Risk** | The development is located in Flood Zone 1 – low probability for tidal and fluvial flooding on the EA flood maps for planning. |
| **Flood Risk from Other Sources** | No significant flood risk to the site from surface water or overland flows, existing sewers, groundwater or artificial water bodies has been identified. |
| **Development Suitability** | The development use is considered suitable for the site, which lies within Flood Zone 1 – Low Probability, under Table 3 of the NPPF Planning Practice Guidance. |
| **Existing Drainage** | The existing local public foul and surface water networks are owned and operated by Thames Water.<br><br>The closest public sewers to the site are found within Buntingford Business Park and Baldock Road to the north-east of the site. |
| **Proposed Drainage** | New surface and foul water sewer networks will be constructed to service the proposed development.<br><br>Surface water run-off will be discharged via a sustainable drainage solution. It is proposed to discharge flows via an attenuation option to the existing watercourse located within the south-east corner of the site. |
| **Surface Water Management** | Due to the underlying ground conditions, it is anticipated that discharging flows via infiltration will not be viable.<br><br>If infiltration rates are proven to be unfeasible, it is proposed to discharge flows via an alternative attenuation option, with flows discharged to the local watercourse.<br><br>It is proposed to discharge surface water runoff at a restricted pre-development greenfield rate, with onsite attenuation storage provided.<br><br>The attenuation features will be designed to accommodate flows for a range of storm events including the 1 in 100-year plus 40% climate change scenario.<br><br>Additional SuDS features will also be considered as a means of providing additional ecological, amenity and water quality benefits. |
| **Foul Water Disposal** | It is proposed to discharge flows to a suitable point of connection on the existing public sewer network located to the east of the site.<br><br>The existing site is not positively drained, consequently the development will increase foul loadings to the public sewer system. |

| | |
|---|---|
| | A connection to the existing public sewer will be achievable, however, subject to hydraulic modelling network upgrades may be required to accommodate the additional flows from the development. |

Based on the findings of this report, it is considered that there are no grounds for objecting to the proposed development in terms of flood risk.

## **Appendix A:** Site Location Plan

Site Boundary (13.28ha)

Path (um)
FB
45 to 90
El Sub Sta
SKEPPS MEADOW
Pond
Mast
Reservoir (covered)
Buntingford Business Park
El Sub Sta
Tire Hill
125.9m
A 507
BALDOCK ROAD
BALDOCK ROAD
A10
Ivy House
Oak View
Fairview
The Old Farmhouse
B 1038
BALDOCK ROAD
A 507
The Thicket
Thistley Vale
Pond

| Rev | Description | Date |
|---|---|---|

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Ordnance Survey Licence number 100059809.

Client:

Hallam Land Management

# Land West of Buntingford

## Application Boundary Plan (South of Baldock Road)

| Scale@ A3 : | Drawn: | Designed: | Approved: |
|---|---|---|---|
| 1:2,500 | ADW | SJP | SJP |

0m 100m

| Drawing Number: | Revision: | Date: |
|---|---|---|
| HLM082/020 | C | 30.05.24 |

50 North Thirteenth Street, Central Milton Keynes, MK9 3BP
01908 666276 mail@davidlock.com **davidlock.com**

DAVID LOCK ASSOCIATES

## **Appendix B:** Topographical Survey




## Symbol & Abbreviation Key.

- BARBED WIRE FENCE
- POST & RAIL FENCE
- CLOSE BOARD FENCE
- RAILINGS
- CHAIN LINK FENCE
- OTHER FENCE
- KERB
- DROPPED KERB
- GULLY CHANNEL
- TOP / BOTTOM OF BANK
- FOLIAGE
- DITCH
- VERGE
- OVERHEAD CABLES
- GATE
- HEDGE
- TREE - BROAD LEAVED
- TREE - CONIFEROUS
- BUSH
- BUILDING
- BOREHOLE
- SURVEY STATION
- ORDNANCE SURVEY BENCH MARK

| | | | |
|---|---|---|---|
| A/C | AIR CONDITIONING UNIT | KO | KERB OFFLET |
| AV | AIR VALVE | LC | LIGHTING COLUMN |
| BOL | BOLLARD | LP | LAMP POST |
| BH | BOREHOLE | NP | NAME PLATE |
| BL | BED LEVEL | NB | NOTICE BOARD |
| BM | BENCH MARK | PR | PIPE RISER |
| BT | BRITISH TELECOM | RP | RODDING POINT |
| CTV | CABLE TV | RS | ROAD SIGN |
| CL | COVER LEVEL | SP | SIGN POST |
| CR | CABLE RISER | SV | STOP VALVE |
| DP | DOWN PIPE | TL | TRAFFIC LIGHT |
| ER | EARTH ROD | TP | TELEGRAPH POLE |
| EP | ELECTRICITY POLE | TOF | TOP OF FENCE |
| EM | ELECTRICITY MARKER | TOH | TOP OF HEDGE |
| FB | FUSE BOX | TOR | TOP OF RAILINGS |
| FH | FIRE HYDRANT | TOS | SERVICE LEVEL |
| FP | FENCE POST | TOW | TOP OF WALL |
| FL | FLOOR LEVEL | UTL | UNABLE TO LIFT |
| GV | GAS VALVE | VM | VALVE MARKER |
| GM | GAS MARKER | VP | VENT PIPE |
| GU | GULLY | WL | WATER LEVEL |
| HM | HYDRANT MARKER | WM | WATER MARKER |
| IL | INVERT LEVEL | WO | WASH OUT |

## General.

This survey has been prepared with a scaling accuracy for a plot at a scale of 1:200.

All tree heights and spreads are approximate. We have tried to identify tree types, however if tree species are critical specialist advice should be gained.

Drainage pipe sizes have been measured from the surface. Chamber access has not been gained for safety reasons, therefore sizes should be regarded as approximate.

Some detail may have been omitted due to parked vehicles.

## Notes.

Coordinates related to OS National Grid by GPS .
Levels related to GPS.
Scale Factor 0.99982581.

INDICATIVE ONLY

| Rev | Details of Revision | Drawn | Date |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

| Surveyed | Drawn | Date | Checked | Date | Approved | Date |
|---|---|---|---|---|---|---|
| AS | AS | 31.01.23 | GD | 31.01.24 | GD | 31.01.24 |

Interlocks Surveys Limited
St. Andrews House
Radford Semele
Leamington Spa
Warwickshire
CV31 1TF

T: 01926 330123
F: 01926 330120
E: info@interlocksurveys.co.uk

Client.

HALLAM LAND MANAGEMENT
1-3 MORTIMER STREET
LONDON
W1T 3JA

Title.

# TOPOGRAPHICAL SURVEY

LAND TO THE NORTH AND SOUTH OF THE A507
BALDOCK ROAD
BUNTINGFORD
SG9 9ER

Dwg No. **230901 3D** Sheet **1 of 1**

Scale 1:2500 A0 Sheet Rev. -

## **Appendix C:** Thames Water Asset Plans

# Asset location search

Property Searches

| | |
|---|---|
| **Search address supplied** | Land West Of The A10<br>Buntingford<br>SG9 9ER |
| **Your reference** | N/A |
| **Our reference** | ALS/ALS Standard/2023_4799812 |
| **Search date** | 27 March 2023 |

**Notification of Price Changes**

From 1st April 2023 Thames water Property Searches will be increasing the prices of its CON29DW, CommercialDW Drainage & Water Enquiries and Asset Location Searches. Historically costs would rise in line with RPI but as this currently sits at 14.2%, we are capping it at 10%.

Customers will be emailed with the new prices by January 1st 2023.

Any orders received with a higher payment prior to the 1st April 2023 will be non-refundable. For further details on the price increase please visit our website at www.thameswater-propertysearches.co.uk

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

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

0800 009 4540

# Asset location search

Property Searches

**Search address supplied:** Land West Of The A10, Buntingford, SG9 9ER

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 searchprovides 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 0800 009 4540, 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:

TL3529NE
TL3530NE
TL3529SW
TL3629NW
TL3628NW
TL3629SW
TL3529SE
TL3530SE
TL3630SW
TL3528NE
TL3529NW

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.

The following quartiles have not been printed as they contain no assets:

TL3429NE
TL3528NW
TL3430NW
TL3429SW
TL3430NE
TL3428NE
TL3428NW
TL3530SW
TL3530NW
TL3430SW
TL3630NW

TL3429SE
TL3429NW
TL3430SE

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.**

Following examination of our statutory maps, Thames Water has been unable to find any plans of water mains within this area. If you require a connection to the public water supply system, please write to:

New Connections / Diversions
Thames Water
Network Services Business Centre
Brentford
Middlesex
TW8 0EE

Tel: 0845 850 2777
Fax: 0207 713 3858
Email: developer.services@thameswater.co.uk

The following quartiles have not been printed as they are out of Thames' water catchment area. For details of the assets requested please contact the water company indicated below:

| | |
|---|---|
| TL3429NE | Affinity Water |
| TL3528NW | Affinity Water |
| TL3430NW | Affinity Water |
| TL3429SW | Affinity Water |
| TL3529NE | Affinity Water |
| TL3530NE | Affinity Water |
| TL3430NE | Affinity Water |
| TL3428NE | Affinity Water |
| TL3529SW | Affinity Water |
| TL3428NW | Affinity Water |

| | |
|---|---|
| TL3629NW | Affinity Water |
| TL3530SW | Affinity Water |
| TL3530NW | Affinity Water |
| TL3628NW | Affinity Water |
| TL3629SW | Affinity Water |
| TL3430SW | Affinity Water |
| TL3529SE | Affinity Water |
| TL3630NW | Affinity Water |
| TL3530SE | Affinity Water |
| TL3630SW | Affinity Water |
| TL3429SE | Affinity Water |
| TL3429NW | Affinity Water |
| TL3528NE | Affinity Water |
| TL3430SE | Affinity Water |
| TL3529NW | Affinity Water |

Affinity Water Ltd
Tamblin Way
Hatfield
AL10 9EZ

Tel: 0345 3572401

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

Based on the Ordnance Survey Map with the sanction of the Controller of H.M Stationary Office License Number 10019345

# ALS/ALS Standard/2023_4799812




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 before any works are undertaken. Crown copyright Reserved

| | |
|---|---|
| **Scale:** | 1:1791 |
| **Width:** | 500m |
| **Printed By:** | Skrishna1 |
| **Print Date:** | 27/03/2023 |
| **Map Centre:** | 535750,229750 |
| **Grid Reference:** | TL3529NE |

**Comments:**

# ALS/ALS Standard/2023_4799812

NB: Level quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates no Survey information is available.

| REFERENCE | COVER LEVEL | INVERT LEVEL |
|---|---|---|
| 98ZK | | |
| 97PM | | |
| 97WK | | |
| 98HH | | |
| 98HF | | |
| 98XD | | |
| 97WA | | |
| 96XA | | |
| 97WF | | |
| 97WG | | |
| 97HJ | | |
| 97HI | | |
| 97HL | | |
| 97HG | | |
| 98HA | | |
| 87NA | | |
| 98HE | | |
| 97HQ | | |
| 97HZ | | |
| 97HP | | |
| 97HO | | |
| 97HB | | |
| 97HD | | |
| 97HF | | |
| 9601 | 103.62 | 100.62 |
| 9604 | 2.21 | |
| 90NA | | |
| 99WD | | |
| 99WB | | |
| 99WH | | |
| 9651 | 102.82 | 101.61 |
| 9650 | 102.08 | 100.98 |
| 98HX | | |
| 98HW | | |
| 98HU | | |
| 98AA | | |
| 88HC | | |
| 98ZC | | |
| 98ZE | | |
| 98ZA | | |
| 98HL | | |
| 98HK | | |
| 98HO | | |
| 98HR | | |
| 98HQ | | |
| 98HT | | |
| 98ZH | | |
| 6703 | 111.79 | 108.39 |
| 6702 | 112.09 | 108.12 |
| 6701 | 112.35 | 107.85 |
| 6753 | 110.62 | 108.82 |
| 6552 | 109.62 | 106.92 |
| 6553 | 110.24 | 109.09 |
| 67HE | | |
| 68HE | | |
| 68HD | | |
| 68HB | | |
| 66HF | | |
| 6603 | 111.71 | 109.81 |
| 6551 | 109.77 | 106.17 |
| 68HA | | |
| 58HZ | | |
| 58HA | | |
| 57HA | | |
| 57HC | | |
| 67HC | | |
| 67HF | | |
| 6550 | 106.68 | 104.83 |
| 6750 | 112.65 | 108.15 |
| 6504 | 110.49 | 106.69 |
| 65HE | | |
| 65HL | | |
| 66TB | | |
| 66HV | | |
| 66HE | | |
| 66HB | | |
| 67HG | | |
| 67HI | | |
| 79NE | | |
| 78NA | | |
| 79NB | | |

| REFERENCE | COVER LEVEL | INVERT LEVEL |
|---|---|---|
| 98ZG | | |
| 97WI | | |
| 98HI | | |
| 98HZ | | |
| 98HJ | | |
| 98HC | | |
| 97WB | | |
| 97XD | | |
| 97WH | | |
| 97WE | | |
| 97HH | | |
| 97HK | | |
| 99HA | | |
| 97HA | | |
| 88NA | | |
| 97WJ | | |
| 97HS | | |
| 97HT | | |
| 97HN | | |
| 97HM | | |
| 97HV | | |
| 97HC | | |
| 97HE | | |
| 9750 | 104.44 | 103.55 |
| 9652 | 103.68 | 102.38 |
| 99NC | | |
| 99WF | | |
| 99WA | | |
| 99WG | | |
| 98HB | | |
| 9605 | 102.42 | 100 |
| 9501 | 101.89 | 99.89 |
| 98HY | | |
| 98HG | | |
| 98HD | | |
| 88HB | | |
| 98ZD | | |
| 98ZF | | |
| 98ZB | | |
| 98HN | | |
| 88HA | | |
| 98HM | | |
| 98HP | | |
| 98HS | | |
| 98xU | | |
| 98HV | | |
| 6752 | 111.89 | 108.54 |
| 6653 | 112.57 | 107.78 |
| 6704 | 110.65 | 108.55 |
| 6654 | 112.48 | 111.13 |
| 6604 | 112.27 | 107.52 |
| 6502 | 108.22 | 105.75 |
| 66HC | | |
| 58HD | | |
| 68HI | | |
| 68HC | | |
| 661A | | |
| 6651 | 111.76 | 107.36 |
| 6650 | 111.43 | 107.06 |
| 6652 | 111.68 | 108.83 |
| 67HA | | |
| 58HB | | |
| 57HE | | |
| 57HB | | |
| 67HB | | |
| 67HD | | |
| 67HH | | |
| 6501 | 106.19 | 104.56 |
| 6601 | 111.25 | 106.87 |
| 6503 | 109.78 | 106.63 |
| 75HH | | |
| 66TA | | |
| 66TC | | |
| 66HW | | |
| 66HA | | |
| 67HK | | |
| 67HJ | | |
| 79NC | | |
| 79ND | | |
| 79NA | | |
| 67HO | | |

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 before any works are undertaken. Crown copyright Reserved

# ALS/ALS Standard/2023_4799812

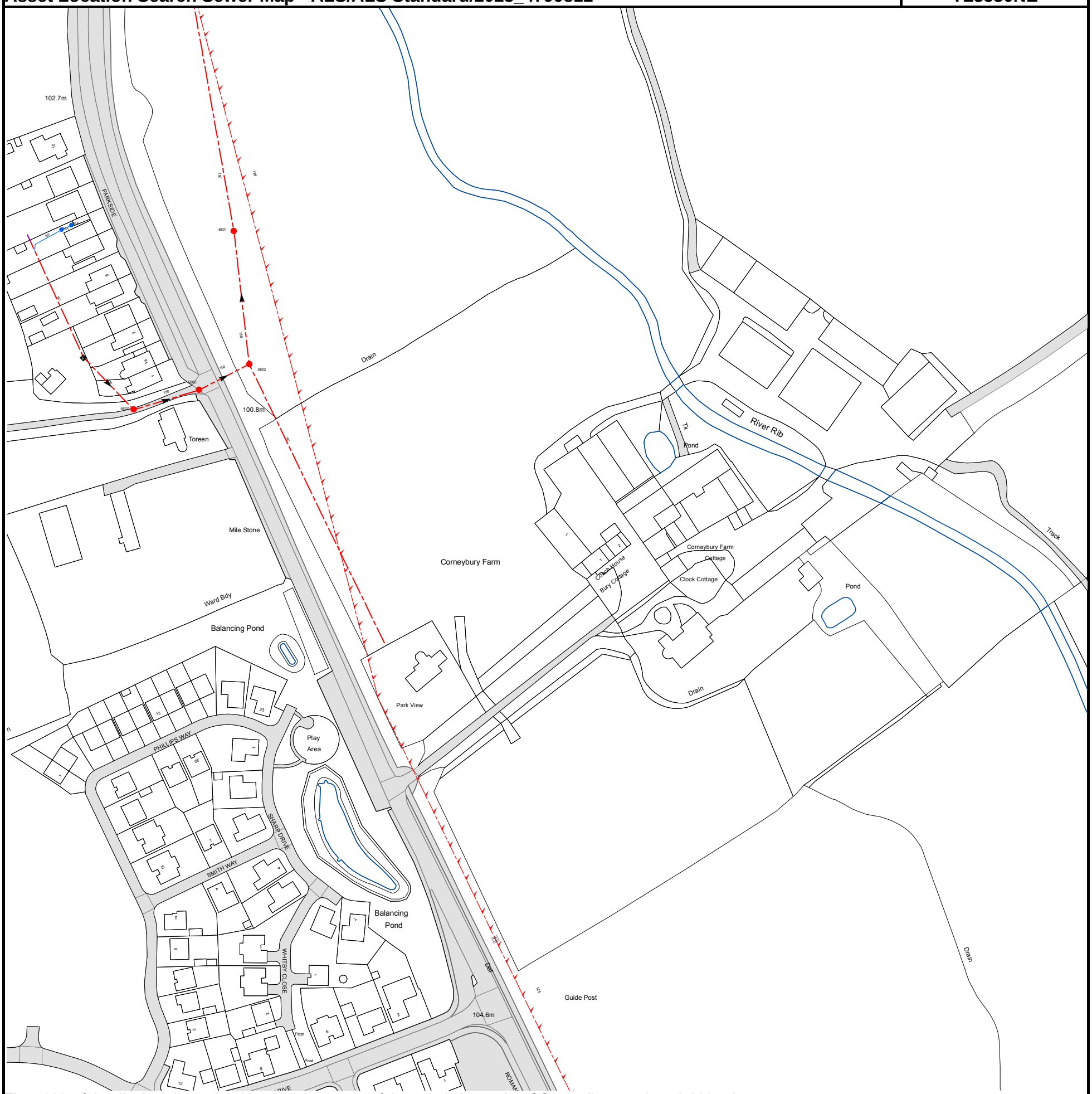
NB: Level quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates no Survey information is available.

| REFERENCE | COVER LEVEL | INVERT LEVEL |
|---|---|---|
| 67HM | | |
| 66HZ | | |
| 66HU | | |
| 75HC | | |
| 75HF | | |
| 65HC | | |
| 66HL | | |
| 65HO | | |
| 65HN | | |
| 65HJ | | |
| 65HA | | |
| 65HI | | |
| 66HK | | |
| 66HH | | |
| 75HA | | |
| 75HB | | |
| 66HT | | |
| 66HQ | | |
| 66HG | | |
| 66HX | | |
| 6605 | | |
| 9603 | 103.72 | 101.42 |
| 9602 | 103.87 | 101.77 |
| 9607 | | |
| 66HD | | |
| 65HB | | |
| 991K | | |

| REFERENCE | COVER LEVEL | INVERT LEVEL |
|---|---|---|
| 66HY | | |
| 66HS | | |
| 75HD | | |
| 75HE | | |
| 65XA | | |
| 65HD | | |
| 66HO | | |
| 6505 | | |
| 65HM | | |
| 65HH | | |
| 65HK | | |
| 66HI | | |
| 66HJ | | |
| 76HA | | |
| 76HB | | |
| 6751 | 111.85 | 108.46 |
| 66HR | | |
| 66HP | | |
| 67HL | | |
| 66HM | | |
| 85NA | | |
| 6602 | 111.7 | 107.05 |
| 9606 | | |
| 66XE | | |
| 661B | | |
| 671O | | |
| 791F | | |

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 before any works are undertaken. Crown copyright Reserved

| Asset Location Search Sewer Map - ALS/ALS Standard/2023_4799812 | TL3530NE |
|---|---|




The width of the displayed area is 500m and the centre of the map is located at OS coordinates 535750,230750

**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.**

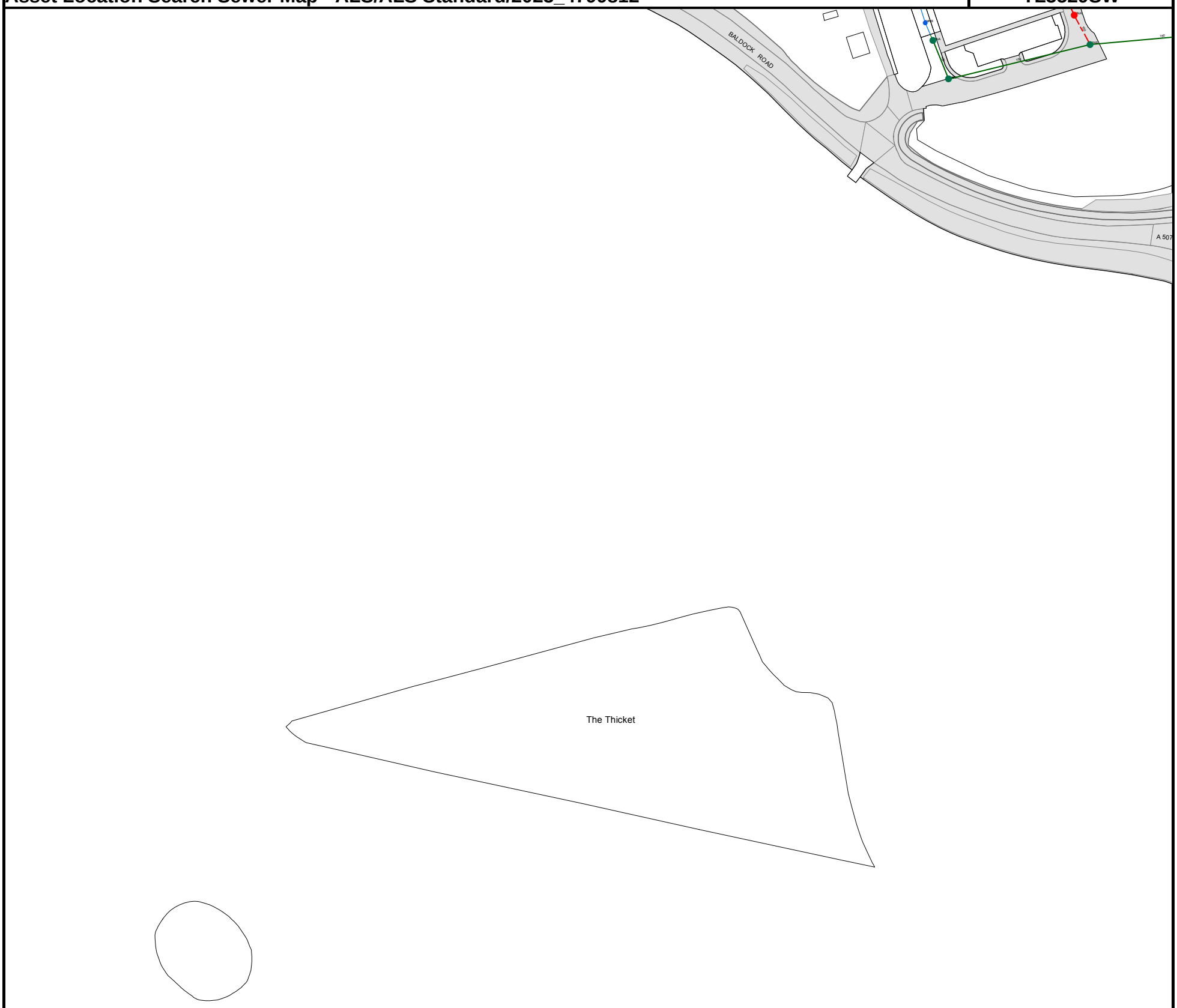
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NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

| Manhole Reference | Manhole Cover Level | Manhole Invert Level |
|---|---|---|
| 5802 | 101.76 | 100.75 |
| 5803 | 100.78 | 99.83 |
| 6802 | 100.05 | 99.25 |
| 6801 | 100.86 | 99.1 |
| 581A | n/a | n/a |
| 581B | 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.**

**Asset Location Search Sewer Map - ALS/ALS Standard/2023_4799812** | **TL3529SW**




The width of the displayed area is 500m and the centre of the map is located at OS coordinates 535250,229250

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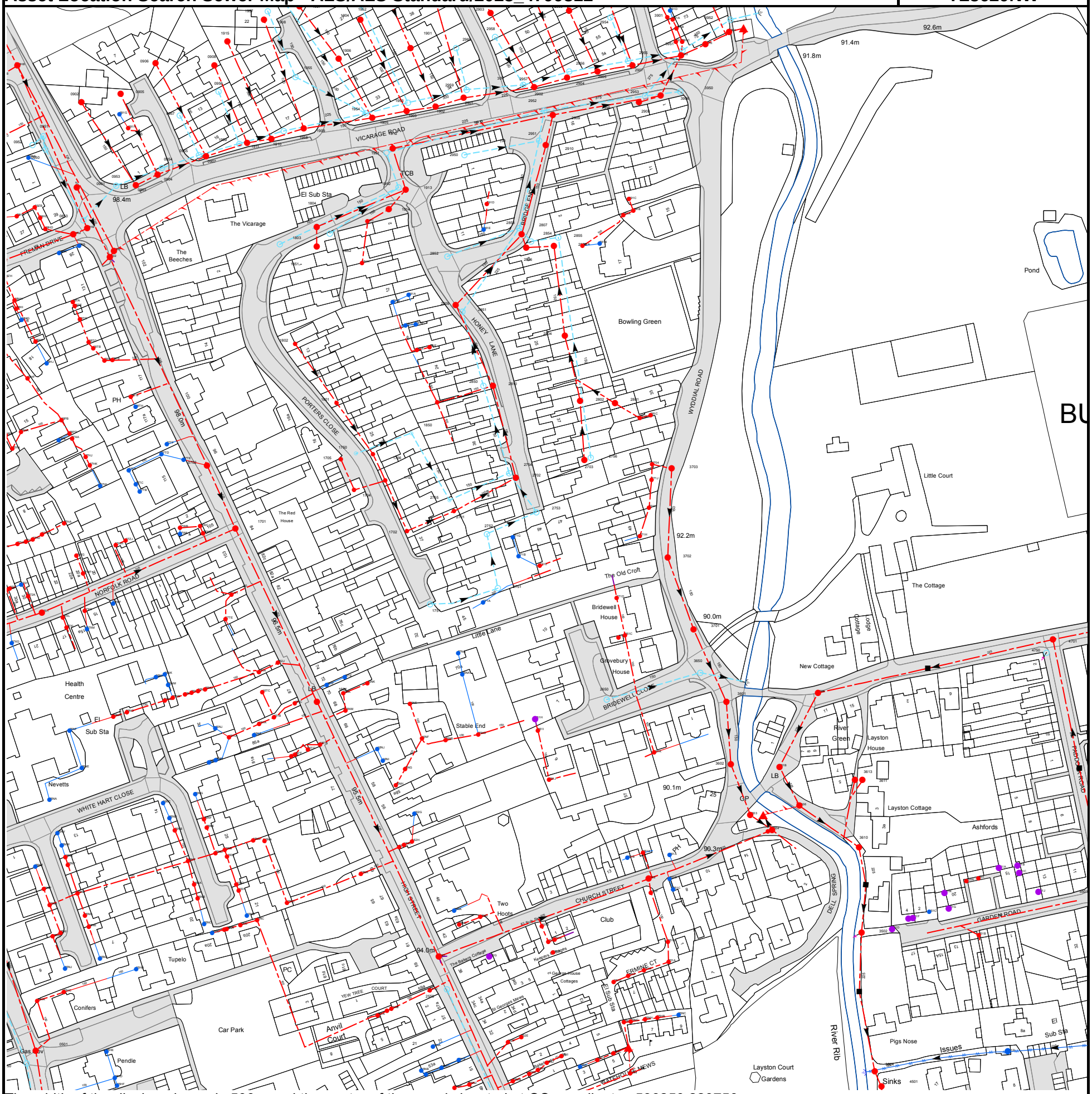
NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

| Manhole Reference | Manhole Cover Level | Manhole Invert Level |
|---|---|---|
| 34NB | n/a | n/a |
| 34NA | n/a | n/a |
| 44NC | n/a | n/a |
| 44NA | n/a | n/a |
| 44NB | 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.**

# Asset Location Search Sewer Map - ALS/ALS Standard/2023_4799812

**TL3629NW**




The width of the displayed area is 500m and the centre of the map is located at OS coordinates 536250,229750

**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 |
|---|---|---|
| 451A | n/a | n/a |
| 451B | n/a | n/a |
| 451F | n/a | n/a |
| 451C | n/a | n/a |
| 451G | n/a | n/a |
| 451K | n/a | n/a |
| 451J | n/a | n/a |
| 451H | n/a | n/a |
| 451I | n/a | n/a |
| 461C | n/a | n/a |
| 461A | n/a | n/a |
| 461B | n/a | n/a |
| 4750 | 95.14 | 94.44 |
| 4701 | 95.07 | 92.72 |
| 351C | n/a | n/a |
| 35NC | n/a | n/a |
| 3701 | 90.38 | 89.6 |
| 3650 | 90.2 | 89.3 |
| 3601 | 89.83 | 89.33 |
| 3602 | 89.89 | 89.29 |
| 3603 | 90.41 | 88.91 |
| 3604 | n/a | n/a |
| 361B | n/a | n/a |
| 3606 | 89.829 | 88.629 |
| 3608 | 90.2 | 89.07 |
| 3613 | n/a | n/a |
| 3610 | 89.61 | 88.54 |
| 3502 | 89.44 | 88.39 |
| 3611 | n/a | n/a |
| 3504 | 89.35 | 88.25 |
| 4501 | 90.63 | 88.19 |
| 451D | n/a | n/a |
| 451E | n/a | n/a |
| 251C | n/a | n/a |
| 251B | n/a | n/a |
| 25NC | n/a | n/a |
| 25ND | n/a | n/a |
| 251F | n/a | n/a |
| 351D | n/a | n/a |
| 2502 | 90.67 | 89.37 |
| 261B | n/a | n/a |
| 361A | n/a | n/a |
| 261A | n/a | n/a |
| 261J | n/a | n/a |
| 261K | n/a | n/a |
| 26ND | n/a | n/a |
| 261I | n/a | n/a |
| 261H | n/a | n/a |
| 2650 | 92.25 | 91.63 |
| 26NA | n/a | n/a |
| 27NA | n/a | n/a |
| 271E | n/a | n/a |
| 261C | n/a | n/a |
| 271A | n/a | n/a |
| 271D | n/a | n/a |
| 2751 | n/a | n/a |
| 271C | n/a | n/a |
| 3702 | 91.86 | 91.06 |
| 271B | n/a | n/a |
| 271G | n/a | n/a |
| 271H | n/a | n/a |
| 25NT | n/a | n/a |
| 25NZ | n/a | n/a |
| 25NM | n/a | n/a |
| 25NL | n/a | n/a |
| 251J | n/a | n/a |
| 25NK | n/a | n/a |
| 25NE | n/a | n/a |
| 25NJ | n/a | n/a |
| 251E | n/a | n/a |
| 25HD | n/a | n/a |
| 25NI | n/a | n/a |
| 25HC | n/a | n/a |
| 252F | n/a | n/a |
| 252E | n/a | n/a |
| 25NF | n/a | n/a |
| 25NG | n/a | n/a |
| 25NH | n/a | n/a |
| 25HB | n/a | n/a |
| 251Q | n/a | n/a |
| 251P | n/a | n/a |
| 251R | n/a | n/a |
| 351A | n/a | n/a |
| 252G | n/a | n/a |
| 251D | n/a | n/a |
| 251A | n/a | n/a |
| 351B | n/a | n/a |
| 16TF | n/a | n/a |
| 16TG | n/a | n/a |
| 16NJ | n/a | n/a |

| Manhole Reference | Manhole Cover Level | Manhole Invert Level |
|---|---|---|
| 16TH | n/a | n/a |
| 26NB | n/a | n/a |
| 16NF | n/a | n/a |
| 161D | n/a | n/a |
| 16XA | n/a | n/a |
| 16NJ | n/a | n/a |
| 161A | n/a | n/a |
| 161B | n/a | n/a |
| 16NM | n/a | n/a |
| 16NE | n/a | n/a |
| 161C | n/a | n/a |
| 1601 | 95.88 | 93.9 |
| 16NL | n/a | n/a |
| 16TC | n/a | n/a |
| 06NT | n/a | n/a |
| 06NU | n/a | n/a |
| 161F | n/a | n/a |
| 16NK | n/a | n/a |
| 161E | n/a | n/a |
| 16TA | n/a | n/a |
| 162J | n/a | n/a |
| 17TE | n/a | n/a |
| 1751 | 94.8 | 93.86 |
| 17TI | n/a | n/a |
| 15NC | n/a | n/a |
| 15NG | n/a | n/a |
| 25NA | n/a | n/a |
| 15NC | n/a | n/a |
| 05NB | n/a | n/a |
| 1501 | n/a | n/a |
| 05NA | n/a | n/a |
| 1502 | n/a | n/a |
| 15NK | n/a | n/a |
| 1602 | n/a | n/a |
| 06ND | n/a | n/a |
| 16NB | n/a | n/a |
| 162I | n/a | n/a |
| 162D | n/a | n/a |
| 162H | n/a | n/a |
| 16NA | n/a | n/a |
| 16ND | n/a | n/a |
| 06NE | n/a | n/a |
| 06NF | n/a | n/a |
| 162G | n/a | n/a |
| 06NG | n/a | n/a |
| 16NH | n/a | n/a |
| 16NG | n/a | n/a |
| 06NI | n/a | n/a |
| 16NI | n/a | n/a |
| 16NH | n/a | n/a |
| 16TE | n/a | n/a |
| 05HF | n/a | n/a |
| 05HD | n/a | n/a |
| 15WC | n/a | n/a |
| 15NB | n/a | n/a |
| 25WD | n/a | n/a |
| 0550 | 98.89 | 97.53 |
| 05HE | n/a | n/a |
| 0501 | 98.78 | 97.41 |
| 15NA | n/a | n/a |
| 151A | n/a | n/a |
| 151B | n/a | n/a |
| 05HA | n/a | n/a |
| 05HC | n/a | n/a |
| 151D | n/a | n/a |
| 2550 | n/a | n/a |
| 05HB | n/a | n/a |
| 05NJ | n/a | n/a |
| 05NF | n/a | n/a |
| 2501 | 94.12 | 91.998 |
| 05NM | n/a | n/a |
| 05ND | n/a | n/a |
| 05NI | n/a | n/a |
| 15HA | n/a | n/a |
| 15HB | n/a | n/a |
| 05NE | n/a | n/a |
| 15ND | n/a | n/a |
| 05NC | n/a | n/a |
| 07XG | n/a | n/a |
| 07XM | n/a | n/a |
| 07XI | n/a | n/a |
| 07XL | n/a | n/a |
| 0701 | 100.73 | 98.58 |
| 07XO | n/a | n/a |
| 07XP | n/a | n/a |
| 072K | n/a | n/a |
| 07WJ | n/a | n/a |
| 072J | n/a | n/a |
| 072I | n/a | n/a |
| 07WF | n/a | n/a |
| 07WG | n/a | n/a |
| 07WH | n/a | n/a |
| 07HB | n/a | n/a |

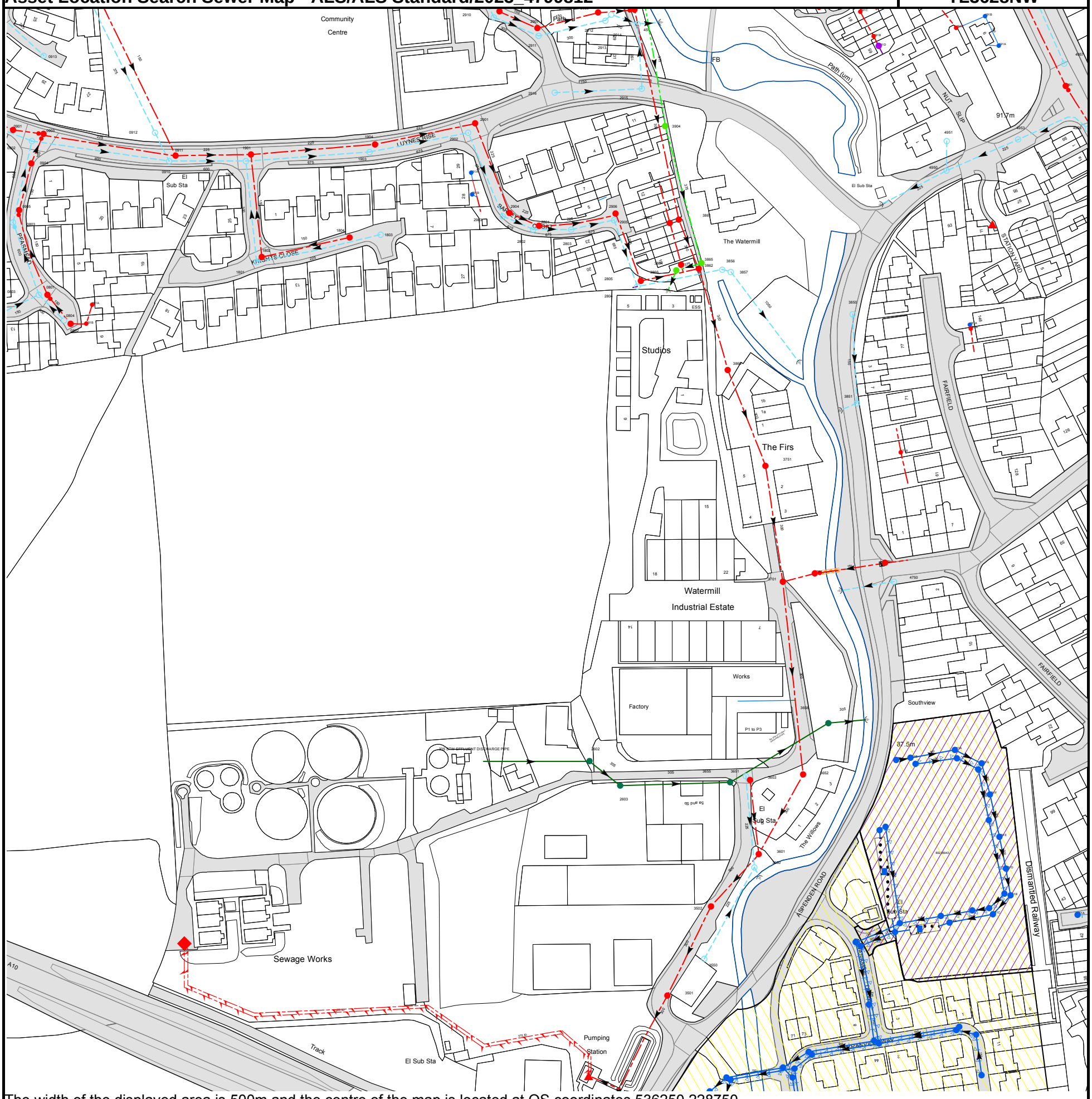
| Manhole Reference | Manhole Cover Level | Manhole Invert Level |
|---|---|---|
| 07HC | n/a | n/a |
| 07ZJ | n/a | n/a |
| 07HD | n/a | n/a |
| 05NG | n/a | n/a |
| 05NH | n/a | n/a |
| 05ND | n/a | n/a |
| 06NP | n/a | n/a |
| 06NZ | n/a | n/a |
| 05NY | n/a | n/a |
| 06NY | n/a | n/a |
| 05NX | n/a | n/a |
| 05NW | n/a | n/a |
| 06NV | n/a | n/a |
| 06NB | n/a | n/a |
| 06ND | n/a | n/a |
| 06NC | n/a | n/a |
| 06NA | n/a | n/a |
| 06NE | n/a | n/a |
| 06NF | n/a | n/a |
| 06NP | n/a | n/a |
| 06NO | n/a | n/a |
| 06NQ | n/a | n/a |
| 06NN | n/a | n/a |
| 06NR | n/a | n/a |
| 06NS | n/a | n/a |
| 06NM | n/a | n/a |
| 06NL | n/a | n/a |
| 06NK | n/a | n/a |
| 2904 | 92.18 | 89.52 |
| 2956 | 92.15 | 90.4 |
| 2906 | n/a | n/a |
| 2905 | 91.92 | 89.32 |
| 2954 | 91.91 | 90.74 |
| 2955 | 91.79 | 89.99 |
| 2907 | 91.73 | 89.23 |
| 2908 | 91.75 | 89.95 |
| 2953 | 91.62 | 89.94 |
| 3906 | 91.65 | 88.95 |
| 3901 | n/a | n/a |
| 391D | n/a | n/a |
| 391A | n/a | n/a |
| 391F | n/a | n/a |
| 391B | n/a | n/a |
| 3950 | 91.62 | 90.52 |
| 3902 | 91.717 | 88.737 |
| 391C | n/a | n/a |
| 3951 | 91.81 | 89.11 |
| 391E | n/a | n/a |
| 3904 | 91.611 | 88.201 |
| 3952 | 91.74 | 89.34 |
| 1904 | 94.24 | 93.26 |
| 1952 | n/a | n/a |
| 1954 | 94.72 | 92.36 |
| 1905 | 94.72 | 91.72 |
| 1903 | n/a | n/a |
| 1953 | n/a | n/a |
| 1901 | n/a | n/a |
| 1902 | 93.41 | 90.61 |
| 2960 | 92.73 | 91.78 |
| 2901 | 92.86 | 90.44 |
| 2959 | 92.82 | 91.22 |
| 2903 | 92.12 | 90.3 |
| 2958 | 92.21 | 91.36 |
| 2957 | 92.34 | 90.64 |
| 2902 | 92.34 | 89.84 |
| 2952 | 92.23 | 90.48 |
| 2909 | 92.64 | 89.94 |
| 1803 | 96.04 | 94.54 |
| 1851 | 95.93 | 94.98 |
| 1852 | 95.56 | 94.11 |
| 1804 | 95.59 | 94.39 |
| 0953 | 98.28 | 97.05 |
| 0903 | 98.04 | 95.64 |
| 0904 | 97.65 | 95.15 |
| 0954 | 97.47 | 96.24 |
| 0907 | n/a | n/a |
| 0955 | n/a | n/a |
| 1959 | 96.59 | 94.24 |
| 1911 | 96.34 | 93.55 |
| 1910 | 95.95 | 93.24 |
| 1958 | 95.78 | 93.56 |
| 1909 | 95.48 | 92.68 |
| 091H | n/a | n/a |
| 0957 | 96.97 | n/a |
| 091G | n/a | n/a |
| 0905 | 97.3 | 96.59 |
| 0956 | 96.78 | 95.22 |
| 1955 | n/a | n/a |
| 0908 | n/a | n/a |
| 0906 | 96.87 | 95.98 |
| 1906 | n/a | n/a |
| 1915 | 95.54 | 94.42 |
| 1908 | 95.26 | 94.21 |

| Manhole Reference | Manhole Cover Level | Manhole Invert Level |
|---|---|---|
| 1957 | 95.14 | 93.51 |
| 1907 | 94.67 | 93.99 |
| 1956 | 94.85 | 94.05 |
| 0802 | 98.63 | 96.834 |
| 08HK | n/a | n/a |
| 0801 | 98.63 | 96.878 |
| 08HL | n/a | n/a |
| 08HM | n/a | n/a |
| 08HD | n/a | n/a |
| 08HB | n/a | n/a |
| 0850 | 98.7 | 96.91 |
| 09HC | n/a | n/a |
| 09HA | n/a | n/a |
| 09ZB | n/a | n/a |
| 0901 | 98.64 | 97.64 |
| 50NA | n/a | n/a |
| 0950 | 98.81 | 97.56 |
| 0952 | 99.01 | 98.31 |
| 0951 | 98.83 | 97.63 |
| 0902 | 97.72 | 96.33 |
| 09HB | n/a | n/a |
| 181H | n/a | n/a |
| 181I | n/a | n/a |
| 1951 | 94.13 | 92.93 |
| 1914 | 94.74 | 93.57 |
| 1912 | 94.08 | 92.43 |
| 181B | n/a | n/a |
| 1950 | 94.45 | 93.4 |
| 181D | n/a | n/a |
| 1913 | 94.42 | 93.07 |
| 181A | n/a | n/a |
| 181C | n/a | n/a |
| 2852 | 94.11 | 92.71 |
| 2809 | 94.04 | 91.24 |
| 2851 | 94.04 | 91.54 |
| 2950 | 94.33 | 92.88 |
| 281E | n/a | n/a |
| 291D | n/a | n/a |
| 2853 | 93.31 | 91.51 |
| 2807 | 93.31 | 90.71 |
| 2806 | 93.52 | 90.92 |
| 2854 | 93.46 | 91.56 |
| 2951 | 92.57 | 90.87 |
| 2910 | 92.59 | 90.24 |
| 2805 | 93.73 | 90.99 |
| 2855 | 93.68 | 91.6 |
| 281A | n/a | n/a |
| 281B | n/a | n/a |
| 291A | n/a | n/a |
| 291C | n/a | n/a |
| 291B | n/a | n/a |
| 2752 | 94.26 | 93.2 |
| 1702 | 95.12 | 92.52 |
| 2753 | 93.85 | 93 |
| 2701 | n/a | n/a |
| 271I | n/a | n/a |
| 2755 | n/a | n/a |
| 1703 | 94.99 | 93.29 |
| 271J | n/a | n/a |
| 2702 | 94.23 | 92.33 |
| 2754 | n/a | n/a |
| 3703 | 92.04 | 91.39 |
| 2704 | 92.53 | 91.56 |
| 2703 | 93.53 | 92.11 |
| 2756 | 93.49 | 92.51 |
| 1706 | 95.14 | 93.48 |
| 1850 | 95.05 | 93.1 |
| 281D | n/a | n/a |
| 281C | n/a | n/a |
| 2801 | 92.7 | 91.92 |
| 181E | n/a | n/a |
| 2802 | 93.42 | 91.85 |
| 2850 | 94.05 | 92.11 |
| 2810 | 93.93 | 91.68 |
| 181E | n/a | n/a |
| 181F | n/a | n/a |
| 2804 | 93.28 | 91.53 |
| 08TD | n/a | n/a |
| 07HJ | n/a | n/a |
| 08TC | n/a | n/a |
| 07HK | n/a | n/a |
| 08TB | n/a | n/a |
| 07HI | n/a | n/a |
| 081A | n/a | n/a |

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# Asset Location Search Sewer Map - ALS/ALS Standard/2023_4799812

**TL3628NW**




The width of the displayed area is 500m and the centre of the map is located at OS coordinates 536250,228750

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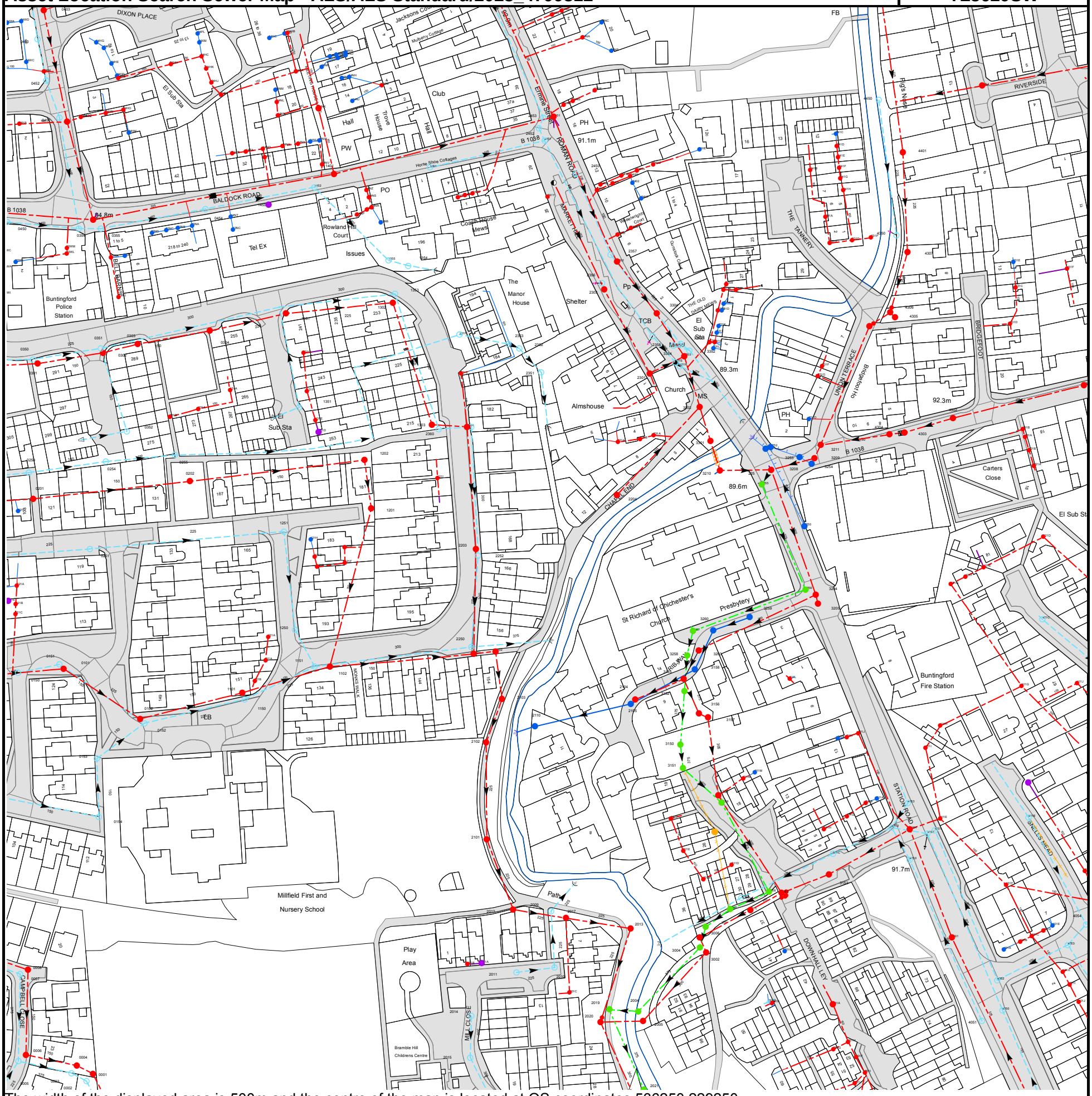
NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

| Manhole Reference | Manhole Cover Level | Manhole Invert Level |
|---|---|---|
| 491A | n/a | n/a |
| 4953 | 91.65 | 90.3 |
| 4957 | 92.91 | 91.93 |
| 4901 | 92.96 | 89.95 |
| 4956 | 93.2 | 92.2 |
| 1901 | 93.96 | 89.63 |
| 1903 | 92.1 | 89.17 |
| 1904 | 92.03 | 88.66 |
| 2902 | 90.82 | 88.3 |
| 2901 | 90.83 | 87.8 |
| 2916 | n/a | n/a |
| 2911 | 90.07 | 88.49 |
| 2907 | 90.14 | 88.14 |
| 2912 | 89.47 | 87.66 |
| 2910 | 90.44 | 88.73 |
| 2913 | 89.41 | 87.58 |
| 2909 | 89.49 | 87.42 |
| 2908 | 90.39 | 88.44 |
| 0901 | 99.41 | 95.35 |
| 0904 | 98.48 | 94.69 |
| 0902 | 98.69 | 95.12 |
| 0903 | 98.65 | 94.64 |
| 0913 | 98.12 | 96.48 |
| 0912 | 96.32 | 93.57 |
| 0910 | 95.92 | 93.05 |
| 0911 | 95.91 | 92.5 |
| 1902 | 94.02 | 90.09 |
| 2917 | 89.52 | 84.97 |
| 2914 | 89.51 | 87.36 |
| 2915 | 88.32 | 86.94 |
| 3904 | 88.301 | 86.851 |
| 391A | n/a | n/a |
| 391C | n/a | n/a |
| 391B | n/a | n/a |
| 491D | n/a | n/a |
| 4950 | 90.61 | 89.31 |
| 4951 | 91.01 | 90.17 |
| 491C | n/a | n/a |
| 491B | n/a | n/a |
| 3701 | 86.04 | 84.15 |
| 4750 | 87.71 | 86.54 |
| 3702 | 86.68 | 84.68 |
| 4701 | 87.53 | 86.26 |
| 3751 | n/a | n/a |
| 471B | n/a | n/a |
| 3851 | 87.52 | 86.83 |
| 3860 | n/a | n/a |
| 481B | n/a | n/a |
| 481A | n/a | n/a |
| 3850 | 88.26 | 87.52 |
| 3857 | 86.5 | 84.16 |
| 3866 | n/a | n/a |
| 3856 | 86.5 | 84.93 |
| 3862 | 88.01 | 85.11 |
| 3864 | n/a | n/a |
| 3865 | 87.5 | 86.64 |
| 3861 | 87.7 | 84.6 |
| 0803 | 98.85 | 95.3 |
| 0905 | 98.89 | 94.89 |
| 0803 | 98.85 | 95.3 |
| 0801 | 97.97 | 95.15 |
| 0804 | 97.48 | 95.52 |
| 0802 | 97.36 | 95.26 |
| 081B | n/a | n/a |
| 081A | n/a | n/a |
| 1801 | 94.32 | 90.69 |
| 1802 | 94.2 | 89.95 |
| 1804 | 92.75 | 90.52 |
| 1803 | 92.15 | 90.98 |
| 291A | n/a | n/a |
| 291B | n/a | n/a |
| 2903 | 89.82 | 87.62 |
| 2904 | 89.73 | 87.02 |
| 2802 | 89.28 | 87.18 |
| 2801 | 89.23 | 86.66 |
| 2803 | 89.02 | 87.02 |
| 2602 | n/a | n/a |
| 2905 | 88.33 | 86.44 |
| 2906 | 88.34 | 86.09 |
| 2603 | n/a | n/a |
| 2804 | 87.961 | 85.751 |
| 2805 | 88.01 | 85.41 |
| 3863 | n/a | n/a |
| 461D | n/a | n/a |
| 3650 | 85.85 | 83.85 |
| 3601 | 85.88 | 83.73 |
| 461E | n/a | n/a |
| 461H | n/a | n/a |
| n/a | n/a | n/a |
| n/a | n/a | n/a |

| Manhole Reference | Manhole Cover Level | Manhole Invert Level |
|---|---|---|
| 461F | n/a | n/a |
| 3655 | n/a | n/a |
| 3603 | 85.99 | 84.56 |
| 3651 | 86.27 | 84.44 |
| 3652 | 85.57 | n/a |
| n/a | n/a | n/a |
| n/a | n/a | n/a |
| 461G | n/a | n/a |
| 461C | n/a | n/a |
| n/a | n/a | n/a |
| 461B | n/a | n/a |
| 461A | n/a | n/a |
| 3656 | n/a | n/a |
| n/a | n/a | n/a |
| n/a | n/a | n/a |
| n/a | n/a | n/a |
| n/a | n/a | n/a |
| n/a | n/a | n/a |
| n/a | n/a | n/a |
| 451E | n/a | n/a |
| n/a | n/a | n/a |
| 451A | 94.12 | 93.12 |
| 451C | n/a | n/a |
| n/a | n/a | n/a |
| n/a | n/a | n/a |
| 451B | n/a | n/a |
| n/a | n/a | n/a |
| n/a | n/a | n/a |
| n/a | n/a | n/a |
| n/a | n/a | n/a |
| n/a | n/a | n/a |
| n/a

# Asset Location Search Sewer Map - ALS/ALS Standard/2023_4799812

**TL3629SW**




The width of the displayed area is 500m and the centre of the map is located at OS coordinates 536250,229250

**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 |
|---|---|---|
| 341D | n/a | n/a |
| 341E | n/a | n/a |
| 341F | n/a | n/a |
| 341G | n/a | n/a |
| 341H | n/a | n/a |
| 331Q | n/a | n/a |
| 3305 | 90.18 | 87.37 |
| 331P | n/a | n/a |
| 4450 | 89.52 | 88.05 |
| 4304 | 90.18 | 88.63 |
| 4306 | 91.32 | 87.51 |
| 4305 | 91.32 | 89.22 |
| 4350 | 89.89 | 87.91 |
| 4401 | 90.13 | 87.88 |
| 4303 | 90.43 | 88.85 |
| 4307 | 91.18 | 87.65 |
| 4302 | 91.34 | 89.59 |
| 441A | n/a | n/a |
| 431D | n/a | n/a |
| 431E | n/a | n/a |
| 431C | n/a | n/a |
| 431B | n/a | n/a |
| 431A | n/a | n/a |
| 431F | n/a | n/a |
| 4301 | 94.01 | 91.18 |
| 3252 | 89.856 | 87.836 |
| 3211 | 89.282 | 87.182 |
| 3301 | 88.6 | 87.57 |
| 331O | n/a | n/a |
| 3302 | 89.32 | 87.72 |
| 331G | n/a | n/a |
| 331R | n/a | n/a |
| 331F | n/a | n/a |
| 331S | n/a | n/a |
| 3303 | 89.27 | 87.83 |
| 3352 | 89.2 | 88.29 |
| 331L | n/a | n/a |
| 3354 | 89.32 | 88.48 |
| 3353 | 89.24 | 88.39 |
| 331E | n/a | n/a |
| 331A | n/a | n/a |
| 331I | n/a | n/a |
| 331K | n/a | n/a |
| 3359 | n/a | n/a |
| 331D | n/a | n/a |
| 331J | n/a | n/a |
| 331M | n/a | n/a |
| 331N | n/a | n/a |
| 3358 | n/a | n/a |
| 331H | n/a | n/a |
| 341A | n/a | n/a |
| 341B | n/a | n/a |
| 34HE | n/a | n/a |
| 341C | n/a | n/a |
| 2204 | 88.98 | 88.1 |
| 221A | n/a | n/a |
| 221B | n/a | n/a |
| 231A | n/a | n/a |
| 2301 | 90.11 | 88.04 |
| 2358 | 89.44 | 88.54 |
| 3304 | 89.38 | 87.96 |
| 2303 | 90.52 | 88.4 |
| 2356 | 90.52 | 89.93 |
| 2302 | 89.99 | 88.25 |
| 2357 | 89.99 | 89.08 |
| 231D | n/a | n/a |
| 231C | n/a | n/a |
| 24HF | n/a | n/a |
| 24HB | n/a | n/a |
| 24HD | n/a | n/a |
| 24HI | n/a | n/a |
| 2402 | n/a | n/a |
| 24HH | n/a | n/a |
| 24HC | n/a | n/a |
| 2450 | 90.91 | 90 |
| 24HA | n/a | n/a |
| 34HZ | n/a | n/a |
| 24NF | n/a | n/a |
| 24NB | n/a | n/a |
| 24NA | n/a | n/a |
| 24NC | n/a | n/a |
| 241X | n/a | n/a |
| 1401 | 93.64 | 91.99 |
| 14NB | n/a | n/a |
| 14NE | n/a | n/a |
| 14NG | n/a | n/a |
| 14NA | n/a | n/a |
| 14ND | n/a | n/a |
| 14NH | n/a | n/a |
| 14NJ | n/a | n/a |

| Manhole Reference | Manhole Cover Level | Manhole Invert Level |
|---|---|---|
| 14NP | n/a | n/a |
| 14NZ | n/a | n/a |
| 14NQ | n/a | n/a |
| 14NS | n/a | n/a |
| 14NR | n/a | n/a |
| 14NI | n/a | n/a |
| 1451 | 92.76 | 91.81 |
| 14TA | n/a | n/a |
| 14TB | n/a | n/a |
| 14TC | n/a | n/a |
| 2452 | 91.36 | 90.33 |
| 2453 | n/a | n/a |
| 2451 | 91.26 | 90.46 |
| 241Y | n/a | n/a |
| 2403 | n/a | n/a |
| 2401 | 91.26 | 89.131 |
| 24ND | n/a | n/a |
| 24NH | n/a | n/a |
| 24NG | n/a | n/a |
| 1102 | 93.06 | 91.24 |
| 2201 | 91.52 | 89.57 |
| 2202 | 91.27 | 89.34 |
| 2250 | 91.49 | 89.07 |
| 121E | n/a | n/a |
| 121F | n/a | n/a |
| 121D | n/a | n/a |
| 2252 | 91.46 | 89.88 |
| 2203 | 91.45 | 90.07 |
| 121G | n/a | n/a |
| 1201 | n/a | n/a |
| 121I | n/a | n/a |
| 1202 | n/a | n/a |
| 131D | n/a | n/a |
| 2360 | 92.64 | 90.64 |
| 2359 | 92.35 | 90.37 |
| 2304 | 92.36 | 90.78 |
| 1303 | 92.49 | 90.97 |
| 131E | n/a | n/a |
| 231E | n/a | n/a |
| 2351 | 91.3 | 89.59 |
| 2352 | 91.96 | 89.82 |
| 2353 | 92.18 | 90.01 |
| 231F | n/a | n/a |
| 1302 | 93.34 | 91.92 |
| 1353 | 93.33 | 91.37 |
| 1354 | 93.43 | 90.96 |
| 1355 | 93.69 | 92.14 |
| 13NB | n/a | n/a |
| 04HC | n/a | n/a |
| 0454 | n/a | n/a |
| 04HK | n/a | n/a |
| 04HJ | n/a | n/a |
| 04HI | n/a | n/a |
| 14NT | n/a | n/a |
| 14ZB | n/a | n/a |
| 14ZA | n/a | n/a |
| 14NO | n/a | n/a |
| 142I | n/a | n/a |
| 1450 | n/a | 94.04 |
| 14HC | n/a | n/a |
| 14NM | n/a | n/a |
| 14NL | n/a | n/a |
| 14NN | n/a | n/a |
| 14NY | n/a | n/a |
| 14HD | n/a | n/a |
| 14HB | n/a | n/a |
| 14HA | n/a | n/a |
| 14NX | n/a | n/a |
| 14NU | n/a | n/a |
| 1452 | n/a | n/a |
| 14NK | n/a | n/a |
| 14NW | n/a | n/a |
| 14NF | n/a | n/a |
| 14NV | n/a | n/a |
| 14NC | n/a | n/a |
| 04WA | n/a | n/a |
| 0450 | 96.42 | 95.37 |
| 04HA | n/a | n/a |
| 04WD | n/a | n/a |
| 04WC | n/a | n/a |
| 0453 | 97.6 | 96.1 |
| 0403 | 98.01 | 96.38 |
| 0404 | 96.92 | 96.2 |
| 0452 | 96.84 | 95.64 |
| 0451 | 95.99 | 95.01 |
| 0402 | 95.94 | 94.46 |
| 04HL | n/a | n/a |
| 0401 | 95.1 | 93.673 |
| 04HG | n/a | n/a |
| 04HF | n/a | n/a |
| 04HN | n/a | n/a |
| 04HE | n/a | n/a |
| 04HD | n/a | n/a |

| Manhole Reference | Manhole Cover Level | Manhole Invert Level |
|---|---|---|
| 04HB | n/a | n/a |
| 04HO | n/a | n/a |
| 04HM | n/a | n/a |
| 04HH | n/a | n/a |
| 04PL | n/a | n/a |
| 04XM | n/a | n/a |
| 03WK | n/a | n/a |
| 0350 | 97.06 | 94.47 |
| 0301 | 97.07 | 95.46 |
| 03WL | n/a | n/a |
| 03WM | n/a | n/a |
| 0354 | 95.27 | 94.53 |
| 0351 | 96.33 | 94.14 |
| 0355 | n/a | n/a |
| 0302 | 96.33 | 94.63 |
| 03WA | n/a | n/a |
| 03WJ | n/a | n/a |
| 03JJ | n/a | n/a |
| 0303 | 96.05 | 94.22 |
| 03ND | n/a | n/a |
| 03NC | n/a | n/a |
| 0255 | n/a | n/a |
| 03NB | n/a | n/a |
| 03NA | n/a | n/a |
| 0304 | 95.41 | 93.27 |
| 131A | n/a | n/a |
| 13NC | n/a | n/a |
| 1301 | 94.64 | 92.82 |
| 131G | n/a | n/a |
| 131F | n/a | n/a |
| 111B | n/a | n/a |
| 0150 | 97.34 | 95.19 |
| 0101 | 96.7 | 94.97 |
| 1151 | 93.35 | 91.03 |
| 0151 | 96.71 | 94.59 |
| 111A | n/a | n/a |
| 121A | n/a | n/a |
| 1250 | 93.64 | 91.54 |
| 021C | n/a | n/a |
| 021B | n/a | n/a |
| 021E | n/a | n/a |
| 021A | n/a | n/a |
| 0251 | 96.21 | 94.61 |
| 121H | n/a | n/a |
| 1251 | 93.73 | 91.94 |
| 021D | n/a | n/a |
| 0201 | 96.82 | 95.07 |
| 0202 | 95.15 | 93.46 |
| 0250 | 96.55 | 95.8 |
| 0254 | n/a | n/a |
| 0352 | 95.66 | 94.94 |
| 031B | n/a | n/a |
| 031A | n/a | n/a |
| 1351 | 94.41 | 92.7 |
| 3155 | 88.84 | 86.54 |
| 3258 | 88.05 | 87.17 |
| 3257 | 88.975 | 87.175 |
| 3158 | 88.92 | 87.63 |
| 3203 | 88.03 | 86.73 |
| 3260 | 89.18 | 87.72 |
| 3210 | 89.01 | 87.5 |
| 3259 | 89.45 | 88.02 |
| 3255 | 89.86 | 87.46 |
| 3251 | 89.778 | 87.728 |
| 3208 | 89.823 | 86.973 |
| 311L | n/a | n/a |
| 3253 | 89.32 | 88.41 |
| 3250 | 89.732 | 88.282 |
| 3256 | 89.85 | 87.54 |
| 3254 | 89.23 | 88.7 |
| 3209 | 89.3 | 87.18 |
| 3204 | 89.95 | 86.86 |
| 3205 | 90 | 88.96 |
| 421G | n/a | n/a |
| 421F | n/a | n/a |
| 421E | n/a | n/a |
| 421B | n/a | n/a |
| 421A | n/a | n/a |
| 421C | 94.571 | 93.561 |
| 421D | n/a | n/a |
| 411J | n/a | n/a |
| 2105 | 88.43 | 87.18 |
| 2104 | 88.48 | 86.85 |
| 311F | n/a | n/a |
| 3150 | 87.81 | 87.05 |
| 3151 | 89.62 | 87.06 |
| 311E | n/a | n/a |
| 3152 | n/a | n/a |
| 3156 | 88.1 | 86.32 |
| 301K | n/a | n/a |
| 3006 | n/a | n/a |
| 3157 | 88.5 | 86.78 |
| 3163 | n/a | n/a |

| Manhole Reference | Manhole Cover Level | Manhole Invert Level |
|---|---|---|
| 3159 | 89.941 | 86.371 |
| 3007 | n/a | n/a |
| 311D | n/a | n/a |
| 3010 | n/a | n/a |
| 311N | n/a | n/a |
| 301L | n/a | n/a |
| 311M | n/a | n/a |
| 3008 | 90.312 | 86.442 |
| 3003 | 90.642 | 85.542 |
| 311H | n/a | n/a |
| 3153 | 90.85 | 86.89 |
| 311C | n/a | n/a |
| 311K | n/a | n/a |
| 311I | n/a | n/a |
| 311G | n/a | n/a |
| 311J | n/a | n/a |
| 311B | n/a | n/a |
| 311A | n/a | n/a |
| 411D | n/a | n/a |
| 4153 | 91.7 | 90.91 |
| 4150 | 92.01 | 91.41 |
| 4101 | 91.85 | 88.27 |
| 411I | n/a | n/a |
| 4152 | 92.16 | 91.06 |
| 4151 | 92.41 | 90.61 |
| 411H | n/a | n/a |
| 411E | n/a | n/a |
| 401F | n/a | n/a |
| 411G | n/a | n/a |
| 411F | n/a | n/a |
| 411B | n/a | n/a |
| 401D | n/a | n/a |
| 401E | 93.493 | 92.653 |
| 411C | n/a | n/a |
| 4054 | 93.61 | 91.58 |
| 401G | n/a | n/a |
| 4052 | 92.17 | 91.5 |
| 4050 | 92.34 | 91.3 |
| 401A | n/a | n/a |
| 401B | n/a | n/a |
| 401C | 93.284 | 92.034 |
| 401H | n/a | n/a |
| 4053 | 93.14 | 91.54 |
| 401I | n/a | n/a |
| 401J | n/a | n/a |
| 2015 | 90.69 | 89.01 |
| 2020 | 89.12 | 85.16 |
| 2014 | 90.81 | 89.18 |
| 2019 | 89.01 | 87.11 |
| 201C | n/a | n/a |
| 2011 | 90.5 | 88.9 |
| 2010 | 90.08 | 88.29 |
| 201B | n/a | n/a |
| 201A | n/a | n/a |
| 2013 | 88.39 | 86.73 |
| 2017 | n/a | n/a |
| 2009 | 90.22 | 87.46 |
| 2012 | 90.89 | 87.89 |
| 2101 | n/a | n/a |
| 2102 | n/a | n/a |
| 2110 | 88.13 | 87.1 |
| 2103 | 91.42 | 89.18 |
| 0005 | 98.66 | 95.83 |
| 0007 | 98.07 | 96.75 |
| 0006 | 98.58 | 95.18 |
| 0008 | 97.93 | 96.02 |
| 0003 | 97.59 | 95.48 |
| 0004 | 97.59 | 94.95 |
| 0002 | 97.05 | 95.45 |
| 0001 | 97.28 | 94.89 |
| 0153 | 96.29 | 94.62 |
| 0154 | 96.62 | 95.25 |
| 0102 | 95.79 | 93.93 |
| 0152 | 95.7 | 93.29 |
| 1101 | n/a | n/a |
| 1150 | 94.28 | 91.98 |
| 2004 | 88.12 | 87.22 |
| 2005 | 87.81 | 85.29 |
| 2021 | n/a | n/a |
| 3005 | 90.25 | 86.65 |
| 3004 | 88.91 | 86 |
| 3002 | n/a | n/a |
| 301O | n/a | n/a |
| 301N | n/a | n/a |

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# Asset Location Search Sewer Map - ALS/ALS Standard/2023_4799812

**TL3529SE**




The width of the displayed area is 500m and the centre of the map is located at OS coordinates 535750,229250

**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 |
|---|---|---|
| 94WB | n/a | n/a |
| 94HA | n/a | n/a |
| 94WG | n/a | n/a |
| 93WB | n/a | n/a |
| 93WA | n/a | n/a |
| 93WC | n/a | n/a |
| 50WI | n/a | n/a |
| 9101 | 98.42 | 96.62 |
| 9256 | 97.96 | 96.88 |
| 9152 | n/a | n/a |
| 94HK | n/a | n/a |
| 94HH | n/a | n/a |
| 94HI | n/a | n/a |
| 94HJ | n/a | n/a |
| 94HG | n/a | n/a |
| 84HD | n/a | n/a |
| 8407 | n/a | n/a |
| 8401 | 100.82 | 99.32 |
| 84HC | n/a | n/a |
| 7452 | 102.15 | 100.6 |
| 7407 | n/a | n/a |
| 7404 | 102.45 | 100.3 |
| 84NB | n/a | n/a |
| 7403 | 103.89 | 102.13 |
| 7451 | 102.94 | 101.81 |
| 84NC | n/a | n/a |
| 74HE | n/a | n/a |
| 84AA | n/a | n/a |
| 84ND | n/a | n/a |
| 74NB | n/a | n/a |
| 74NC | n/a | n/a |
| 74ND | n/a | n/a |
| 84NE | n/a | n/a |
| 74NA | n/a | n/a |
| 74HG | n/a | n/a |
| 74NE | n/a | n/a |
| 84NF | n/a | n/a |
| 74NF | n/a | n/a |
| 84NG | n/a | n/a |
| 84NH | n/a | n/a |
| 84NI | n/a | n/a |
| 64ND | n/a | n/a |
| 64NE | n/a | n/a |
| 6455 | n/a | n/a |
| 6401 | n/a | n/a |
| 64NF | n/a | n/a |
| 6402 | n/a | n/a |
| 6454 | n/a | n/a |
| 64NJ | n/a | n/a |
| 7455 | n/a | n/a |
| 7405 | n/a | n/a |
| 64NI | n/a | n/a |
| 64NH | n/a | n/a |
| 7456 | 104.585 | 102.885 |
| 7450 | n/a | n/a |
| 641A | n/a | n/a |
| 6452 | 105.85 | 104.55 |
| 7402 | 105.12 | 103.42 |
| 74HA | n/a | n/a |
| 74HD | n/a | n/a |
| 74HF | n/a | n/a |
| 74HC | n/a | n/a |
| 6453 | 106.11 | 104.41 |
| 74HB | n/a | n/a |
| 64NA | n/a | n/a |
| 64NB | n/a | n/a |
| 64NC | n/a | n/a |
| 7406 | n/a | n/a |
| 7453 | 102.05 | 100.58 |
| 74NG | n/a | n/a |
| 74NH | n/a | n/a |
| 74NI | n/a | n/a |
| 7401 | 101.51 | 100.61 |
| 7454 | 101.29 | 99.79 |
| 741A | n/a | n/a |
| 731A | n/a | n/a |
| 8450 | n/a | 100.25 |
| 841C | n/a | n/a |
| 841D | n/a | n/a |
| 84NK | n/a | n/a |
| 84NL | n/a | n/a |
| 8406 | 101.06 | 100.06 |
| 84NM | n/a | n/a |
| 84NN | n/a | n/a |
| 84NO | n/a | n/a |
| 8451 | 100.74 | 99.19 |
| 84NP | n/a | n/a |
| 8402 | 100.48 | 98.88 |
| 84HB | n/a | n/a |
| 84NR | n/a | n/a |

| Manhole Reference | Manhole Cover Level | Manhole Invert Level |
|---|---|---|
| 83NB | n/a | n/a |
| 841B | n/a | n/a |
| 842B | n/a | n/a |
| 8452 | 99.9 | 98.75 |
| 8403 | 99.82 | 98.22 |
| 93NJ | n/a | n/a |
| 8351 | n/a | n/a |
| 9350 | n/a | n/a |
| 93NF | n/a | n/a |
| 9351 | 97.3 | 95.95 |
| 83NG | n/a | n/a |
| 93NK | n/a | n/a |
| 93NC | n/a | n/a |
| 94ND | n/a | n/a |
| 84ZF | n/a | n/a |
| 94NE | n/a | n/a |
| 941D | n/a | n/a |
| 94WD | n/a | n/a |
| 94NC | n/a | n/a |
| 94NB | n/a | n/a |
| 94NA | n/a | n/a |
| 84NA | n/a | n/a |
| 94HB | n/a | n/a |
| 94HD | n/a | n/a |
| 94HC | n/a | n/a |
| 941C | n/a | n/a |
| 94HE | n/a | n/a |
| 94HF | n/a | n/a |
| 941A | n/a | n/a |
| 941B | n/a | n/a |
| 84HA | n/a | n/a |
| 94HL | n/a | n/a |
| 73NE | n/a | n/a |
| 73NF | n/a | n/a |
| 73NK | n/a | n/a |
| 73ND | n/a | n/a |
| 73NJ | n/a | n/a |
| 73NI | n/a | n/a |
| 73NC | n/a | n/a |
| 73NB | n/a | n/a |
| 73NH | n/a | n/a |
| 73NA | n/a | n/a |
| 73NG | n/a | n/a |
| 83NP | n/a | n/a |
| 83NQ | n/a | n/a |
| 83NR | n/a | n/a |
| 83NM | n/a | n/a |
| 83NO | n/a | n/a |
| 83NL | n/a | n/a |
| 83NA | n/a | n/a |
| 83NC | n/a | n/a |
| 83ND | n/a | n/a |
| 831A | n/a | n/a |
| 831B | n/a | n/a |
| 8350 | n/a | n/a |
| 83NE | n/a | n/a |
| 93NH | n/a | n/a |
| 93NA | n/a | n/a |
| 93NB | n/a | n/a |
| 73NL | n/a | n/a |
| 73NM | n/a | n/a |
| 731B | n/a | n/a |
| 821A | n/a | n/a |
| 821E | n/a | n/a |
| 821D | n/a | n/a |
| 821C | n/a | n/a |
| 821B | n/a | n/a |
| 83NS | n/a | n/a |
| 8250 | 101.32 | 100.62 |
| 8251 | n/a | n/a |
| 8201 | 100.88 | 99.03 |
| 931A | n/a | n/a |
| 931B | n/a | n/a |
| 921A | n/a | n/a |
| 921C | n/a | n/a |
| 921B | n/a | n/a |
| 9250 | 100.51 | 98.46 |
| 9255 | 100.11 | 99.41 |
| 9353 | 99.69 | 98.29 |
| 9254 | 99.9 | 98.9 |
| 9301 | 99.69 | 98.49 |
| 9253 | 99.83 | 98.73 |
| 9201 | n/a | n/a |
| 9252 | 99.38 | 97.73 |
| 931Q | n/a | n/a |
| 931P | n/a | n/a |
| 9352 | 98.13 | 96.73 |
| 9302 | 98.12 | 96.92 |
| 9002 | 103.73 | 102.65 |
| 9007 | 101.75 | 100.45 |
| 8004 | 105.62 | 101.14 |
| 9006 | 100.45 | 99.3 |
| 8005 | 105.67 | 101.67 |

| Manhole Reference | Manhole Cover Level | Manhole Invert Level |
|---|---|---|
| 9004 | 99.64 | 98.16 |
| 9003 | 99.17 | 98.16 |
| 9005 | 99.49 | 98.44 |
| 9001 | 103.48 | 102.33 |
| 8003 | 104.45 | 101.37 |
| 8001 | 104.57 | 101.98 |
| 8002 | 106.14 | 103.82 |
| 8151 | 106.93 | 105.84 |
| 9151 | 100.81 | 99.81 |
| 8150 | 103.67 | 101.57 |
| 8102 | n/a | n/a |
| 8101 | 104.49 | 102.69 |
| 9150 | 100.25 | 98.5 |
| 921D | n/a | n/a |
| 921F | n/a | n/a |
| 8253 | 104.35 | 103 |
| 821H | n/a | n/a |
| 8252 | 104.16 | 103.26 |
| 821G | n/a | n/a |
| 921E | n/a | n/a |
| 821F | n/a | n/a |
| 9251 | 99.15 | 97.3 |
| 541C | 111.25 | 109.58 |
| 541B | 111 | 109.05 |
| 541A | 110.85 | 108.79 |
| 5353 | n/a | n/a |
| 5358 | 111.273 | 108.153 |
| 5358 | n/a | n/a |
| 54NC | n/a | n/a |
| 5301 | n/a | n/a |
| 54ND | n/a | n/a |
| 54NA | n/a | n/a |
| 53NB | n/a | n/a |
| 54NE | n/a | n/a |
| 54NH | n/a | n/a |
| 54NG | n/a | n/a |
| 5356 | 110.36 | 107.38 |
| 5302 | 110.27 | 107.54 |
| 54NF | n/a | n/a |
| 54NJ | n/a | n/a |
| 54NI | n/a | n/a |
| 53NA | n/a | n/a |
| 54NL | n/a | n/a |
| 63NA | n/a | n/a |
| 6451 | 107.23 | 105.88 |
| 8006 | 105.8 | 101.45 |

**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.**

# Asset Location Search Sewer Map - ALS/ALS Standard/2023_4799812

**TL3530SE**




The width of the displayed area is 500m and the centre of the map is located at OS coordinates 535750,230250

**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.**

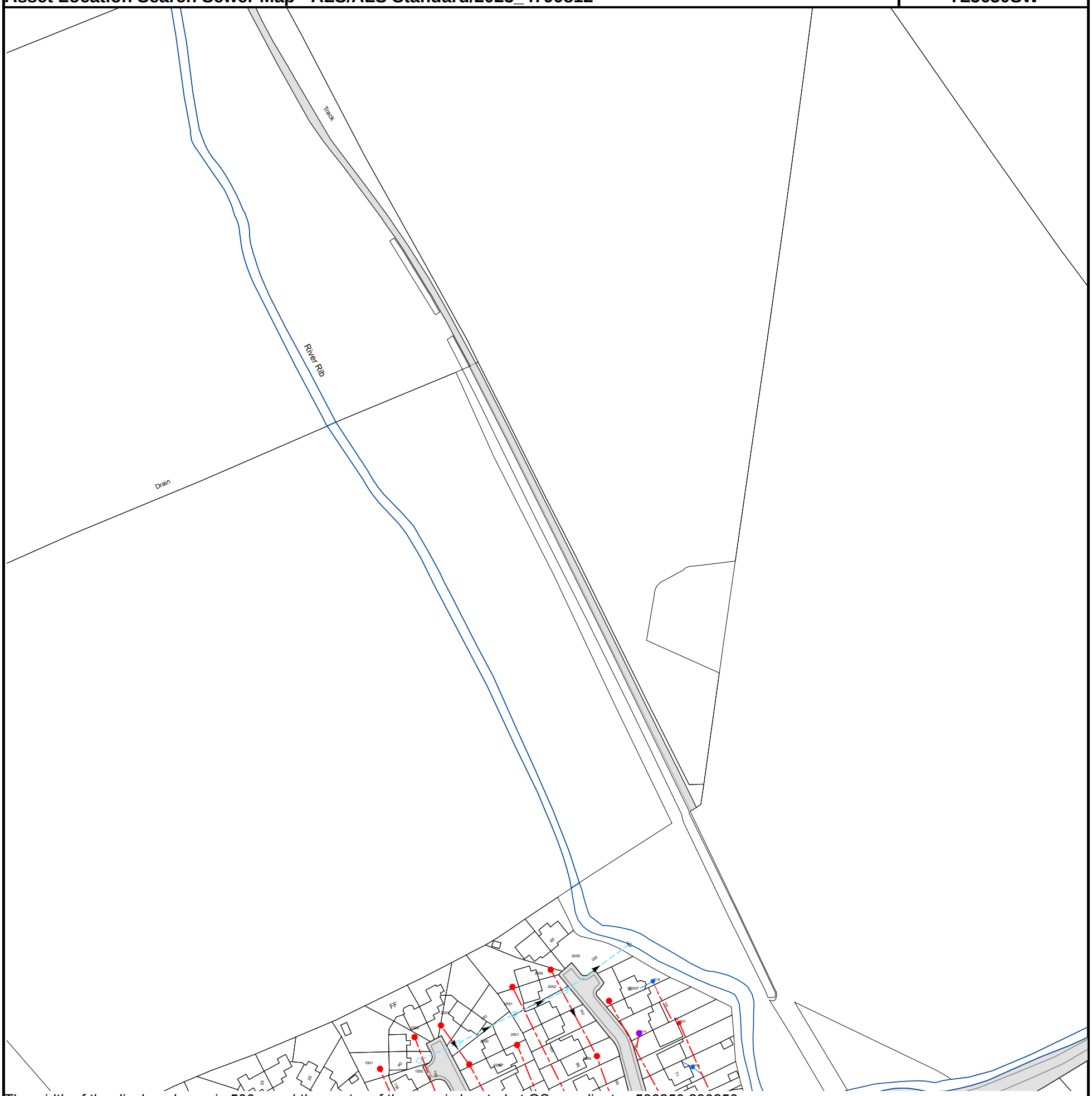
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NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

| Manhole Reference | Manhole Cover Level | Manhole Invert Level |
|---|---|---|
| 90TA | n/a | n/a |
| 9101 | 99.42 | 97.587 |
| 91NA | n/a | n/a |
| 9001 | 99.29 | 97.4 |
| 90NE | n/a | n/a |
| 90NE | n/a | n/a |
| 60NA | n/a | n/a |
| 70NF | 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.**

| Asset Location Search Sewer Map - ALS/ALS Standard/2023_4799812 | TL3630SW |
|---|---|




The width of the displayed area is 500m and the centre of the map is located at OS coordinates 536250,230250

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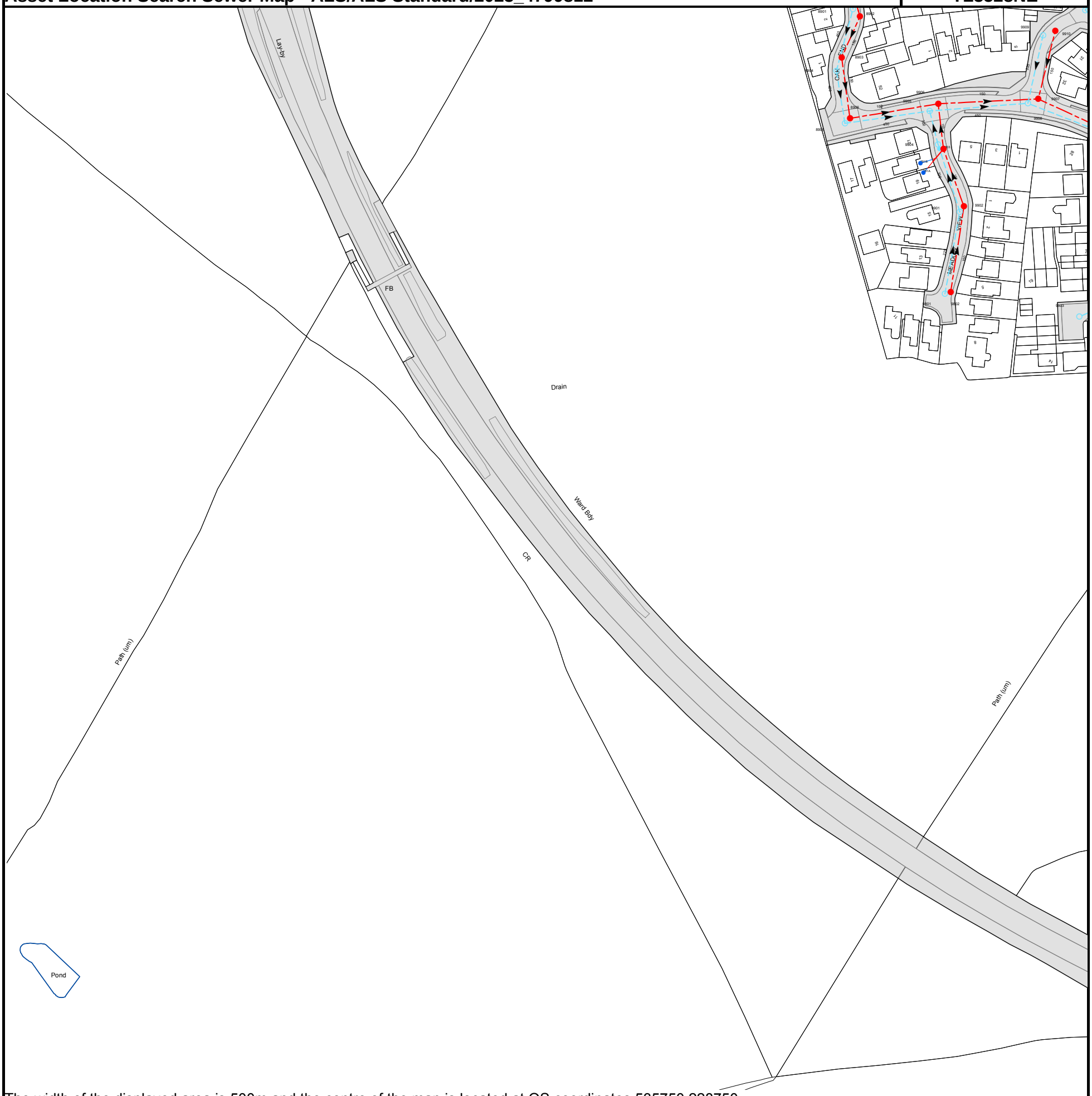
NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

| Manhole Reference | Manhole Cover Level | Manhole Invert Level |
|---|---|---|
| 201B | n/a | n/a |
| 2005 | 91.58 | 90.72 |
| 2006 | n/a | n/a |
| 2007 | 91.48 | 90.38 |
| 201A | n/a | n/a |
| 3001 | n/a | n/a |
| 301A | n/a | n/a |
| 1001 | 92.94 | 91.71 |
| 1002 | 92.42 | 91.8 |
| 1050 | 92.22 | 91.24 |
| 2003 | 91.98 | 90.8 |
| 2050 | 92 | 90.54 |
| 2002 | n/a | n/a |
| 2004 | 91.91 | 90.71 |
| 2051 | n/a | n/a |
| 2001 | n/a | n/a |
| 2052 | 91.36 | 89.86 |

**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.**

# Asset Location Search Sewer Map - ALS/ALS Standard/2023_4799812

**TL3528NE**




The width of the displayed area is 500m and the centre of the map is located at OS coordinates 535750,228750

**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 |
|---|---|---|
| 9909 | 100.16 | 97.88 |
| 9910 | 100.06 | 97.16 |
| 9912 | 99.24 | 96.2 |
| 9803 | 98.43 | 97.07 |
| 9801 | 101.41 | 100.02 |
| 9802 | 101.37 | 99.74 |
| 9901 | 101.97 | 99.68 |
| 9902 | 101.98 | 99.31 |
| 991A | n/a | n/a |
| 991B | n/a | n/a |
| 9903 | 102.9 | 98.9 |
| 9904 | 102.97 | 99.47 |
| 8905 | 104.93 | 100.85 |
| 8906 | 104.81 | 100.47 |
| 9905 | 102.98 | 99.05 |
| 9906 | 102.82 | 98.59 |
| 9908 | 100.92 | 97.24 |
| 9907 | 100.74 | 96.63 |
| 8904 | 105.47 | 101.07 |
| 8903 | 105.51 | 100.67 |
| 8902 | 105.64 | 100.77 |
| 8901 | 105.7 | 101.19 |

**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.**

| Asset Location Search Sewer Map - ALS/ALS Standard/2023_4799812 | TL3529NW |
|---|---|




The width of the displayed area is 500m and the centre of the map is located at OS coordinates 535250,229750

**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 |
|---|---|---|
| 351B | n/a | n/a |
| 351C | n/a | n/a |
| 35NA | n/a | n/a |
| 46NA | n/a | n/a |
| 45NA | n/a | n/a |
| 45NB | n/a | n/a |
| 45NC | n/a | n/a |
| 45NE | n/a | n/a |
| 45ND | n/a | n/a |
| 45NG | n/a | n/a |
| 46NB | n/a | n/a |
| 45NF | 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.**

# Asset Location Search - Sewer Key

## Public Sewer Types (Operated and maintained by Thames Water)

**Foul Sewer:** A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

**Surface Water Sewer:** A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

**Combined Sewer:** A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

- Storm Sewer
- Sludge Sewer
- Foul Trunk Sewer
- Surface Trunk Sewer
- Combined Trunk Sewer
- Foul Rising Main
- Surface Water Rising Main
- Combined Rising Main
- Vacuum
- Thames Water Proposed
- Vent Pipe
- Gallery

## Other Sewer Types (Not operated and maintained by Thames Water)

- Sewer
- Culverted Watercourse
- Proposed
- Decommissioned Sewer
- Content of this drainage network is currently unknown
- Ownership of this drainage network is currently unknown

## 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
- Meter
- Dam Chase
- Vent
- Fitting

## Operational Controls

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

- Ancillary
- Drop Pipe
- Control Valve
- 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.

- Inlet
- Outfall
- Undefined End

## Other Symbols

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

- Change of Characteristic Indicator
- Public / Private Pumping Station
- Invert Level
- Summit

## Areas

Lines denoting areas of underground surveys, etc.

- Agreement
- Chamber
- Operational Site

## Ducts or Crossings

- Casement

Ducts may contain high voltage cables. Please check with Thames Water.

- Conduit Bridge
- Subway
- Tunnel

**Notes:**

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plan are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate the 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 indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimeters. 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, please contact Property Searches on 0800 009 4540.

## Payment 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 within 14 days of the 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. 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'.
5. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
6. 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 still not satisfied with the outcome provided, we will refer the matter to a Senior Manager for resolution who will provide you with a response.

If you are still dissatisfied with our final response, and in certain circumstances such as you are buying a residential property or commercial property within certain parameters, The Property Ombudsman will investigate your case and give an independent view. The Ombudsman can award compensation of up to £25,000 to you if he finds that you have suffered actual financial loss and/or aggravation, distress, or inconvenience because of your search not keeping to the Code. Further information can be obtained by visiting www.tpos.co.uk or by sending an email to admin@tpos.co.uk.

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 0300 034 2222 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** |
|---|---|---|
| Please Call **0800 009 4540** quoting your invoice number starting CBA or ADS | Account number **90478703**<br>Sort code **60-00-01**<br>A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.**<br>or email **ps.billing@thameswater.co.uk** | By calling your bank and quoting:<br>Account number **90478703**<br>Sort code **60-00-01**<br>and your invoice number |

## **Appendix D:** Illustrative Concept Masterplan

- Employment
- Green Space
- SuDS
- Structural Planting
- Vegetation
- Existing Woodland

A10

Baldock Road

A10

| Rev | Description | Date |
|---|---|---|

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Client:

Hallam Land Management

Land West of Buntingford

**Illustrative Masterplan (South of Baldock Road)**

| Scale@A3: | Drawn: | Designed: | Approved: |
|---|---|---|---|
| **1:5,000** | **MG** | **SJP** | **SJP** |

0m — 200m

| Drawing Number: | Revision: | Date: |
|---|---|---|
| **HLM082/030** | **C** | **10.06.24** |

50 North Thirteenth Street, Central Milton Keynes, MK9 3BP
01908 666276 mail@davidlock.com **davidlock.com**

DAVID LOCK ASSOCIATES

## **Appendix E:** Proposed Drainage Strategy Plan & Associated Calculations

N

INDICATIVE NORTH

Drainage requirements for proposed employment areas based on an assumed percentage of impermeable area
Additional on-plot attenuation could be provided if necessary - subject to detail design.

Proposed Basin
- Attenuation Storage: 3125m$^3$ (As shown on plan)
- Depth: 1.2m with 0.3m Freeboard
- Size, shape & position subject to detailed design

Drainage ditch connection to existing Thames Water public sewer

Drainage ditch runs to the rear of Longmead properties

Existing ditch culverted beneath the A10

Proposed outfall to existing ditch

Outfall to River Rib

Legend

- Proposed Attenuation Basin with Associated Grading (1 in 100yr + 40% climate change)
- Proposed Foul Pumping Station
- Existing Ordinary Watercourse Corridor
- Flood Zone 2
- Flood Zone 3
- Existing SW Sewer
- Existing Foul Water Sewer
- Existing Drainage Ditch
- Off site Drainage Ditch
- Environment Agency Main River

Notes:
1. Do not scale from this drawing.
2. The location of existing sewers and other features are shown indicatively based on utility companies asset plans. The location and details of any existing apparatus/features should be further investigated prior to commencement of works onsite.
3. Fluvial flood zones and surface water flood risk zones shown based on EA flood maps. These zones are subject to change following further investigation of EA flood data.
4. No detailed ground investigation information data is available for the site.
5. BGS data shows the site is underlain with Chalk of the Lewes Nodular Chalk Formation and Seaford Chalk Formation, which may be suitable for infiltration. Full infiltration testing in accordance with BRE Digest 365 guidance is required onsite to check infiltration feasibility.
6. If infiltration is found not to be a viable option, the preferred drainage strategy for the development is to discharge to the existing watercourses/ public sewer within the site and surrounding area, subject to approval from the LLFA, with surface water run-off from the development restricted to a pre-development greenfield Qbar rate.
7. The indicative attenuation basin shown has been sized to contain the 1 in 100 year including 40% CC allowance event.
8. The proposed basins are shown indicatively with grading shown tying into existing levels. The size, shape and position is subject to detail design.
9. An indicative overview of the drainage strategy is shown based on currently available information. This is subject to change and further assessment as the site is taken forward and more detailed information becomes available.
10. There is a considerable level difference in parts of the site, proposed basins have been shown to try to reflect the existing topography. However, significant earthworks may be required in the construction of the basins.
11. Due to the existing topography of the site, it is anticipated that foul flows will be discharged to the existing foul sewer network through a gravity connection.
12. For the attenuation option, it is anticipated that surface flows from the development will be conveyed to a suitable point of connection to the existing public sewer network or a local watercourse located within close proximity to the site. This is subject to approval with Thames Water/ LLFA.

| Rev | Date | Description | By | Apvd |
|---|---|---|---|---|
| P4 | 28.08.24 | Updated to LLFA comments | RJ | LE |
| P3 | 12.06.24 | Updated site boundary | LE | LE |
| P2 | 26.04.24 | Updated site boundary | LE | LE |
| P1 | 15.02.24 | Preliminary Issue | MD | LE |

**PROJECT:**
LAND SOUTH OF BALDOCK ROAD, BUNTINGFORD

**TITLE:**
PRELIMINARY DRAINAGE LAYOUT

**CLIENT:**
HALLAM LAND MANAGEMENT

**SCALE@A1:**
1:2000

**PROJECT REF:**
23161

**DRAWING No:** SK-C-008

**REV:** P4

*Revision Referencing*
P = Preliminary A = Approval T = Tender C = Construction

Jubb
Bristol, Cardiff, Plymouth, Winchester
St James Court, St James Parade, Bristol BS1 3LH
jubb.uk.com
+44(0)117 922 6266

# Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

| | |
|---|---|
| **Calculated by:** | |
| **Site name:** | |
| **Site location:** | |

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.

## Site Details

| | |
|---|---|
| **Latitude:** | 51.95294° N |
| **Longitude:** | 0.03669° W |
| **Reference:** | 36901523 |
| **Date:** | Jan 11 2024 15:55 |

## Runoff estimation approach

FEH Statistical

## Site characteristics

**Total site area (ha):** 4.6

## Methodology

| | |
|---|---|
| **$Q_{MED}$ estimation method:** | Calculate from BFI and SAAR |
| **BFI and SPR method:** | Specify BFI manually |
| **HOST class:** | N/A |
| **BFI / BFIHOST:** | 0.385 |
| **$Q_{MED}$ (l/s):** | |
| **$Q_{BAR}$ / $Q_{MED}$ factor:** | 1.14 |

## Hydrological characteristics

| | Default | Edited |
|---|---|---|
| **SAAR (mm):** | 631 | 631 |
| **Hydrological region:** | 6 | 6 |
| **Growth curve factor 1 year:** | 0.85 | 0.85 |
| **Growth curve factor 30 years:** | 2.3 | 2.3 |
| **Growth curve factor 100 years:** | 3.19 | 3.19 |
| **Growth curve factor 200 years:** | 3.74 | 3.74 |

## Notes

### (1) Is $Q_{BAR}$ < 2.0 l/s/ha?

When $Q_{BAR}$ is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

### (2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

### (3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

## Greenfield runoff rates

| | Default | Edited |
|---|---|---|

| | | |
|---|---|---|
| $Q_{BAR}$ (l/s): | | 15.66 |
| 1 in 1 year (l/s): | | 13.31 |
| 1 in 30 years (l/s): | | 36.02 |
| 1 in 100 year (l/s): | | 49.95 |
| 1 in 200 years (l/s): | | 58.57 |

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at 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 www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of 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, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

| Project: | Date: 18/07/2024 | | |
|---|---|---|---|
| | Designed by: LEvans | Checked by: | Approved By: |
| Report Details: Type: Inflows Storm Phase: Phase | Company Address: | | |

**Pond - TAD 1**

Type : Catchment Area

| | |
|---|---|
| Area (ha) | 3.68 |

## Dynamic Sizing

| | |
|---|---|
| Runoff Method | Time Area Diagram |
| Summer Volumetric Runoff Coefficient | 1.000 |
| Winter Volumetric Runoff Coefficient | 1.000 |
| Percentage Impervious (%) | 100 |

| Time (mins) | Area (ha) |
|---|---|
| 4 | 1.00 |
| 8 | 1.00 |
| 12 | 1.68 |

| Project: | Date: 18/07/2024 | | |
|---|---|---|---|
| | Designed by: LEvans | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Storm Phase: Phase | Company Address: | | |

**Pond** Type : Pond

## Dimensions

| | |
|---|---|
| Exceedance Level (m) | 1.500 |
| Depth (m) | 1.500 |
| Base Level (m) | 0.000 |
| Freeboard (mm) | 0 |
| Initial Depth (m) | 0.000 |
| Porosity (%) | 100 |
| Average Slope (1:X) | 0.00 |
| Total Volume (m³) | 4687.500 |

| Depth (m) | Area (m²) | Volume (m³) |
|---|---|---|
| 0.000 | 3125.00 | 0.000 |
| 1.000 | 3125.00 | 3125.000 |

## Inlets

### Inlet

| | |
|---|---|
| Inlet Type | Point Inflow |
| Incoming Item(s) | Pond - TAD 1 |
| Bypass Destination | (None) |
| Capacity Type | No Restriction |

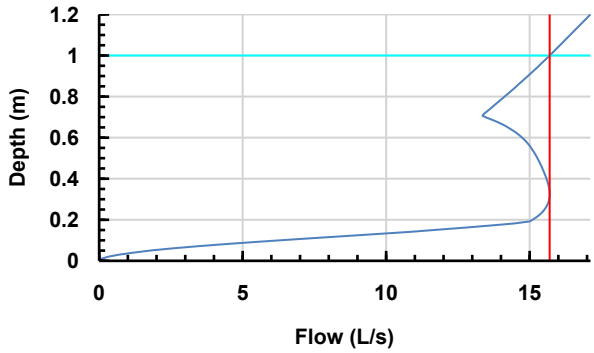
## Outlets

### Outlet

| | |
|---|---|
| Outgoing Connection | (None) |
| Outlet Type | Hydro-Brake® |

| | |
|---|---|
| Invert Level (m) | 0.000 |
| Design Depth (m) | 1.000 |
| Design Flow (L/s) | 15.7 |
| Objective | Minimise Upstream Storage Requirements |
| Application | Surface Water Only |
| Sump Available | ☑ |

| | |
|---|---|
| Unit Reference | SHE-0179-1570-1000-1570 |



| Project: | Date: 18/07/2024 | | |
|---|---|---|---|
| | Designed by: LEvans | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Storm Phase: Phase | Company Address: | | |

## Advanced

| | |
|---|---|
| Perimeter | Circular |
| Length (m) | 50.000 |
| Friction Scheme | Manning's n |
| n | 0.04 |

| Project: | Date: 18/07/2024 | | |
|---|---|---|---|
| | Designed by: LEvans | Checked by: | Approved By: |
| Report Title: Rainfall Analysis Criteria | Company Address: | | |

| | |
|---|---|
| Runoff Type | Dynamic |
| Output Interval (mins) | 5 |
| Time Step | Default |
| Urban Creep | Apply Global Value |
| Urban Creep Global Value (%) | 0 |
| Junction Flood Risk Margin (mm) | 0 |
| Perform No Discharge Analysis | ☐ |

## Rainfall

### Rainfall Details FEH

Type: FEH

| | |
|---|---|
| Site Location | GB 536400 228400 TL 36400 28400 |
| Rainfall Version | 2013 |
| Data Type | Catchment |
| Summer | ☑ |
| Winter | ☑ |

### Return Period

| Return Period (years) | Increase Rainfall (%) |
|---|---|
| 2.0 | 40.000 |
| 30.0 | 40.000 |
| 100.0 | 40.000 |

### Storm Durations

| Duration (mins) | Run Time (mins) |
|---|---|
| 15 | 30 |
| 30 | 60 |
| 60 | 120 |
| 120 | 240 |
| 180 | 360 |
| 240 | 480 |
| 360 | 720 |
| 480 | 960 |
| 600 | 1200 |
| 720 | 1440 |
| 960 | 1920 |
| 1440 | 2880 |
| 2160 | 4320 |
| 2880 | 5760 |
| 4320 | 8640 |
| 5760 | 11520 |

| Project: | Date: 18/07/2024 | | |
|---|---|---|---|
| | Designed by: LEvans | Checked by: | Approved By: |
| Report Details: Type: Stormwater Control Results Storm Phase: Phase | Company Address: | | |

**Pond**
**Critical Storm: Rainfall Details FEH: 100 years: Increase Rainfall (%): +40: 960 mins: Winter**

Type : Pond

## Tables

| Time (mins) | Total Inflow (L/s) | US Depth ( m ) | DS Depth ( m ) | Resident Volume( m³ ) | Flooded Volume (m³) | Total Outflow (L/s) |
|---|---|---|---|---|---|---|
| 0 | 0.0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0 |
| 5 | 0.7 | 0.000 | 0.000 | 0.089 | 0.000 | 0.0 |
| 10 | 1.8 | 0.001 | 0.000 | 0.437 | 0.000 | 0.0 |
| 15 | 4.3 | 0.002 | 0.000 | 1.302 | 0.000 | 0.0 |
| 20 | 7.2 | 0.005 | 0.000 | 2.989 | 0.000 | 0.0 |
| 25 | 10.3 | 0.008 | 0.000 | 5.565 | 0.000 | 0.0 |
| 30 | 12.8 | 0.010 | 0.000 | 8.995 | 0.000 | 0.0 |
| 35 | 15.3 | 0.012 | 0.000 | 13.154 | 0.000 | 0.0 |
| 40 | 17.2 | 0.013 | 0.000 | 18.002 | 0.000 | 0.0 |
| 45 | 19.2 | 0.015 | 0.000 | 23.437 | 0.000 | 0.0 |
| 50 | 20.8 | 0.016 | 0.000 | 29.415 | 0.000 | 0.0 |
| 55 | 22.3 | 0.017 | 0.003 | 35.855 | 0.000 | 0.0 |
| 60 | 23.5 | 0.018 | 0.008 | 42.701 | 0.000 | 0.1 |
| 65 | 24.7 | 0.019 | 0.014 | 49.884 | 0.000 | 0.2 |
| 70 | 25.6 | 0.020 | 0.017 | 57.347 | 0.000 | 0.2 |
| 75 | 26.4 | 0.022 | 0.020 | 65.047 | 0.000 | 0.3 |
| 80 | 27.0 | 0.024 | 0.023 | 72.942 | 0.000 | 0.4 |
| 85 | 27.6 | 0.027 | 0.026 | 80.988 | 0.000 | 0.5 |
| 90 | 28.0 | 0.029 | 0.028 | 89.152 | 0.000 | 0.6 |
| 95 | 28.4 | 0.032 | 0.031 | 97.404 | 0.000 | 0.7 |
| 100 | 28.6 | 0.034 | 0.034 | 105.706 | 0.000 | 0.9 |
| 105 | 28.8 | 0.037 | 0.037 | 114.036 | 0.000 | 1.0 |
| 110 | 28.9 | 0.039 | 0.039 | 122.377 | 0.000 | 1.2 |
| 115 | 29.0 | 0.042 | 0.042 | 130.716 | 0.000 | 1.3 |
| 120 | 29.1 | 0.045 | 0.045 | 139.026 | 0.000 | 1.5 |
| 125 | 29.1 | 0.047 | 0.047 | 147.297 | 0.000 | 1.6 |
| 130 | 29.1 | 0.050 | 0.050 | 155.521 | 0.000 | 1.8 |
| 135 | 29.0 | 0.053 | 0.052 | 163.692 | 0.000 | 1.9 |
| 140 | 29.0 | 0.055 | 0.055 | 171.736 | 0.000 | 2.1 |
| 145 | 29.0 | 0.058 | 0.058 | 179.773 | 0.000 | 2.3 |
| 150 | 29.0 | 0.060 | 0.060 | 187.749 | 0.000 | 2.5 |
| 155 | 29.0 | 0.063 | 0.063 | 195.669 | 0.000 | 2.7 |
| 160 | 29.1 | 0.065 | 0.065 | 203.536 | 0.000 | 2.9 |
| 165 | 29.2 | 0.068 | 0.068 | 211.361 | 0.000 | 3.1 |
| 170 | 29.3 | 0.070 | 0.070 | 219.155 | 0.000 | 3.4 |
| 175 | 29.5 | 0.073 | 0.073 | 226.933 | 0.000 | 3.6 |
| 180 | 29.7 | 0.075 | 0.075 | 235.042 | 0.000 | 3.8 |
| 185 | 30.0 | 0.078 | 0.078 | 242.493 | 0.000 | 4.0 |
| 190 | 30.4 | 0.080 | 0.080 | 250.368 | 0.000 | 4.3 |
| 195 | 30.9 | 0.083 | 0.083 | 258.341 | 0.000 | 4.5 |
| 200 | 31.4 | 0.085 | 0.085 | 266.127 | 0.000 | 4.8 |
| 205 | 32.0 | 0.088 | 0.088 | 274.562 | 0.000 | 5.0 |
| 210 | 32.7 | 0.090 | 0.090 | 282.316 | 0.000 | 5.3 |
| 215 | 33.5 | 0.093 | 0.093 | 291.011 | 0.000 | 5.5 |
| 220 | 34.3 | 0.096 | 0.096 | 299.102 | 0.000 | 5.8 |
| 225 | 35.4 | 0.099 | 0.098 | 307.850 | 0.000 | 6.1 |
| 230 | 36.3 | 0.101 | 0.101 | 316.577 | 0.000 | 6.5 |
| 235 | 37.7 | 0.104 | 0.104 | 326.132 | 0.000 | 6.8 |
| 240 | 38.7 | 0.107 | 0.108 | 335.055 | 0.000 | 7.1 |
| 245 | 40.3 | 0.111 | 0.110 | 345.091 | 0.000 | 7.4 |

| Project: | Date: 18/07/2024 | | |
|---|---|---|---|
| | Designed by: LEvans | Checked by: | Approved By: |
| Report Details: Type: Stormwater Control Results Storm Phase: Phase | Company Address: | | |

| Time (mins) | Total Inflow (L/s) | US Depth ( m ) | DS Depth ( m ) | Resident Volume( m³ ) | Flooded Volume (m³) | Total Outflow (L/s) |
|---|---|---|---|---|---|---|
| 250 | 41.7 | 0.114 | 0.113 | 355.215 | 0.000 | 7.8 |
| 255 | 43.5 | 0.117 | 0.117 | 365.468 | 0.000 | 8.1 |
| 260 | 45.0 | 0.120 | 0.121 | 376.253 | 0.000 | 8.6 |
| 265 | 46.9 | 0.123 | 0.125 | 387.386 | 0.000 | 9.0 |
| 270 | 48.7 | 0.128 | 0.128 | 399.016 | 0.000 | 9.3 |
| 275 | 50.8 | 0.132 | 0.132 | 410.592 | 0.000 | 9.8 |
| 280 | 52.9 | 0.135 | 0.135 | 423.608 | 0.000 | 10.2 |
| 285 | 55.2 | 0.140 | 0.140 | 436.599 | 0.000 | 10.7 |
| 290 | 57.4 | 0.143 | 0.144 | 450.340 | 0.000 | 11.1 |
| 295 | 59.8 | 0.149 | 0.149 | 464.234 | 0.000 | 11.5 |
| 300 | 62.4 | 0.154 | 0.153 | 479.319 | 0.000 | 11.9 |
| 305 | 64.9 | 0.159 | 0.158 | 494.689 | 0.000 | 12.4 |
| 310 | 67.6 | 0.165 | 0.163 | 511.373 | 0.000 | 12.9 |
| 315 | 70.4 | 0.170 | 0.168 | 527.697 | 0.000 | 13.3 |
| 320 | 73.3 | 0.176 | 0.174 | 544.872 | 0.000 | 13.8 |
| 325 | 76.1 | 0.180 | 0.180 | 563.060 | 0.000 | 14.3 |
| 330 | 79.2 | 0.187 | 0.186 | 582.040 | 0.000 | 14.7 |
| 335 | 82.1 | 0.193 | 0.192 | 601.648 | 0.000 | 15.0 |
| 340 | 85.5 | 0.199 | 0.199 | 622.326 | 0.000 | 15.1 |
| 345 | 88.4 | 0.206 | 0.206 | 644.047 | 0.000 | 15.2 |
| 350 | 91.9 | 0.213 | 0.213 | 666.525 | 0.000 | 15.2 |
| 355 | 94.8 | 0.222 | 0.220 | 689.960 | 0.000 | 15.3 |
| 360 | 98.5 | 0.228 | 0.228 | 714.253 | 0.000 | 15.4 |
| 365 | 101.6 | 0.236 | 0.236 | 739.881 | 0.000 | 15.4 |
| 370 | 105.2 | 0.245 | 0.245 | 765.766 | 0.000 | 15.5 |
| 375 | 108.3 | 0.254 | 0.254 | 793.230 | 0.000 | 15.5 |
| 380 | 112.0 | 0.264 | 0.262 | 821.624 | 0.000 | 15.6 |
| 385 | 115.2 | 0.273 | 0.273 | 851.422 | 0.000 | 15.6 |
| 390 | 118.8 | 0.282 | 0.281 | 881.745 | 0.000 | 15.6 |
| 395 | 121.9 | 0.293 | 0.292 | 913.110 | 0.000 | 15.7 |
| 400 | 125.3 | 0.303 | 0.302 | 945.294 | 0.000 | 15.7 |
| 405 | 128.4 | 0.312 | 0.313 | 978.786 | 0.000 | 15.7 |
| 410 | 131.7 | 0.326 | 0.324 | 1012.601 | 0.000 | 15.7 |
| 415 | 134.8 | 0.336 | 0.335 | 1047.885 | 0.000 | 15.7 |
| 420 | 137.9 | 0.348 | 0.347 | 1084.276 | 0.000 | 15.7 |
| 425 | 140.9 | 0.360 | 0.359 | 1121.130 | 0.000 | 15.7 |
| 430 | 143.8 | 0.372 | 0.371 | 1159.251 | 0.000 | 15.7 |
| 435 | 146.6 | 0.384 | 0.383 | 1198.403 | 0.000 | 15.6 |
| 440 | 149.2 | 0.398 | 0.398 | 1238.295 | 0.000 | 15.6 |
| 445 | 151.8 | 0.409 | 0.408 | 1278.655 | 0.000 | 15.6 |
| 450 | 154.0 | 0.424 | 0.421 | 1319.867 | 0.000 | 15.5 |
| 455 | 156.3 | 0.437 | 0.436 | 1361.445 | 0.000 | 15.5 |
| 460 | 158.2 | 0.450 | 0.448 | 1403.702 | 0.000 | 15.4 |
| 465 | 160.2 | 0.464 | 0.463 | 1447.537 | 0.000 | 15.4 |
| 470 | 161.7 | 0.478 | 0.478 | 1491.078 | 0.000 | 15.4 |
| 475 | 163.2 | 0.491 | 0.492 | 1534.845 | 0.000 | 15.3 |
| 480 | 164.3 | 0.505 | 0.505 | 1579.228 | 0.000 | 15.2 |
| 485 | 164.8 | 0.521 | 0.521 | 1624.929 | 0.000 | 15.2 |
| 490 | 164.9 | 0.535 | 0.534 | 1669.398 | 0.000 | 15.1 |
| 495 | 164.1 | 0.549 | 0.548 | 1714.906 | 0.000 | 15.1 |
| 500 | 163.0 | 0.563 | 0.563 | 1758.379 | 0.000 | 15.0 |
| 505 | 161.4 | 0.572 | 0.578 | 1803.458 | 0.000 | 14.9 |
| 510 | 159.9 | 0.591 | 0.591 | 1846.744 | 0.000 | 14.8 |
| 515 | 157.9 | 0.605 | 0.605 | 1889.800 | 0.000 | 14.7 |
| 520 | 155.9 | 0.619 | 0.619 | 1932.603 | 0.000 | 14.6 |
| 525 | 153.6 | 0.631 | 0.631 | 1975.068 | 0.000 | 14.4 |
| 530 | 151.3 | 0.645 | 0.643 | 2016.476 | 0.000 | 14.3 |
| 535 | 148.7 | 0.659 | 0.658 | 2056.712 | 0.000 | 14.1 |

| Project: | Date: 18/07/2024 | | |
|---|---|---|---|
| | Designed by: LEvans | Checked by: | Approved By: |
| Report Details: Type: Stormwater Control Results Storm Phase: Phase | Company Address: | | |

| Time (mins) | Total Inflow (L/s) | US Depth ( m ) | DS Depth ( m ) | Resident Volume( m³ ) | Flooded Volume (m³) | Total Outflow (L/s) |
|---|---|---|---|---|---|---|
| 540 | 146.0 | 0.671 | 0.670 | 2096.340 | 0.000 | 14.0 |
| 545 | 143.2 | 0.683 | 0.681 | 2136.335 | 0.000 | 13.8 |
| 550 | 140.3 | 0.696 | 0.695 | 2174.771 | 0.000 | 13.5 |
| 555 | 137.4 | 0.708 | 0.708 | 2212.648 | 0.000 | 13.4 |
| 560 | 134.2 | 0.720 | 0.720 | 2248.869 | 0.000 | 13.4 |
| 565 | 131.2 | 0.731 | 0.730 | 2284.586 | 0.000 | 13.5 |
| 570 | 127.8 | 0.743 | 0.742 | 2319.354 | 0.000 | 13.6 |
| 575 | 124.7 | 0.759 | 0.754 | 2353.588 | 0.000 | 13.7 |
| 580 | 121.2 | 0.764 | 0.764 | 2385.920 | 0.000 | 13.8 |
| 585 | 118.1 | 0.774 | 0.773 | 2418.258 | 0.000 | 13.9 |
| 590 | 114.4 | 0.784 | 0.783 | 2448.548 | 0.000 | 14.0 |
| 595 | 111.4 | 0.793 | 0.793 | 2478.190 | 0.000 | 14.1 |
| 600 | 107.6 | 0.802 | 0.802 | 2506.699 | 0.000 | 14.1 |
| 605 | 104.6 | 0.805 | 0.809 | 2534.048 | 0.000 | 14.2 |
| 610 | 100.8 | 0.822 | 0.818 | 2561.445 | 0.000 | 14.3 |
| 615 | 97.9 | 0.828 | 0.828 | 2586.063 | 0.000 | 14.4 |
| 620 | 94.2 | 0.837 | 0.836 | 2611.042 | 0.000 | 14.4 |
| 625 | 91.3 | 0.843 | 0.843 | 2633.786 | 0.000 | 14.5 |
| 630 | 87.8 | 0.851 | 0.850 | 2656.583 | 0.000 | 14.5 |
| 635 | 84.8 | 0.857 | 0.857 | 2678.203 | 0.000 | 14.6 |
| 640 | 81.6 | 0.864 | 0.864 | 2699.165 | 0.000 | 14.6 |
| 645 | 78.6 | 0.870 | 0.870 | 2718.521 | 0.000 | 14.7 |
| 650 | 75.5 | 0.876 | 0.876 | 2737.249 | 0.000 | 14.7 |
| 655 | 72.7 | 0.882 | 0.881 | 2755.035 | 0.000 | 14.8 |
| 660 | 69.8 | 0.887 | 0.887 | 2772.102 | 0.000 | 14.8 |
| 665 | 67.1 | 0.892 | 0.892 | 2788.153 | 0.000 | 14.9 |
| 670 | 64.4 | 0.897 | 0.897 | 2803.773 | 0.000 | 14.9 |
| 675 | 61.8 | 0.902 | 0.902 | 2817.878 | 0.000 | 15.0 |
| 680 | 59.4 | 0.906 | 0.906 | 2831.567 | 0.000 | 15.0 |
| 685 | 56.9 | 0.910 | 0.910 | 2844.313 | 0.000 | 15.0 |
| 690 | 54.7 | 0.914 | 0.914 | 2856.532 | 0.000 | 15.1 |
| 695 | 52.4 | 0.918 | 0.918 | 2868.282 | 0.000 | 15.1 |
| 700 | 50.5 | 0.922 | 0.921 | 2879.105 | 0.000 | 15.1 |
| 705 | 48.3 | 0.925 | 0.925 | 2889.429 | 0.000 | 15.1 |
| 710 | 46.6 | 0.927 | 0.928 | 2899.159 | 0.000 | 15.2 |
| 715 | 44.6 | 0.931 | 0.931 | 2908.270 | 0.000 | 15.2 |
| 720 | 43.1 | 0.934 | 0.933 | 2916.929 | 0.000 | 15.2 |
| 725 | 41.4 | 0.936 | 0.936 | 2925.015 | 0.000 | 15.2 |
| 730 | 40.0 | 0.938 | 0.938 | 2932.711 | 0.000 | 15.2 |
| 735 | 38.5 | 0.941 | 0.941 | 2939.841 | 0.000 | 15.3 |
| 740 | 37.4 | 0.943 | 0.943 | 2946.691 | 0.000 | 15.3 |
| 745 | 36.2 | 0.945 | 0.945 | 2953.148 | 0.000 | 15.3 |
| 750 | 35.2 | 0.947 | 0.947 | 2959.282 | 0.000 | 15.3 |
| 755 | 34.2 | 0.949 | 0.949 | 2965.035 | 0.000 | 15.3 |
| 760 | 33.4 | 0.951 | 0.951 | 2970.543 | 0.000 | 15.3 |
| 765 | 32.5 | 0.952 | 0.952 | 2975.918 | 0.000 | 15.3 |
| 770 | 31.9 | 0.954 | 0.954 | 2980.904 | 0.000 | 15.4 |
| 775 | 31.3 | 0.955 | 0.955 | 2985.781 | 0.000 | 15.4 |
| 780 | 30.8 | 0.957 | 0.957 | 2990.491 | 0.000 | 15.4 |
| 785 | 30.3 | 0.959 | 0.958 | 2995.081 | 0.000 | 15.4 |
| 790 | 30.0 | 0.960 | 0.960 | 2999.481 | 0.000 | 15.4 |
| 795 | 29.7 | 0.961 | 0.961 | 3003.822 | 0.000 | 15.4 |
| 800 | 29.5 | 0.963 | 0.963 | 3008.103 | 0.000 | 15.4 |
| 805 | 29.3 | 0.964 | 0.964 | 3012.299 | 0.000 | 15.4 |
| 810 | 29.1 | 0.965 | 0.965 | 3016.363 | 0.000 | 15.4 |
| 815 | 29.1 | 0.967 | 0.966 | 3020.531 | 0.000 | 15.4 |
| 820 | 29.0 | 0.968 | 0.968 | 3024.608 | 0.000 | 15.5 |
| 825 | 29.0 | 0.969 | 0.969 | 3028.620 | 0.000 | 15.5 |

| Project: | Date: 18/07/2024 | | |
|---|---|---|---|
| | Designed by: LEvans | Checked by: | Approved By: |
| Report Details: Type: Stormwater Control Results Storm Phase: Phase | Company Address: | | |

| Time (mins) | Total Inflow (L/s) | US Depth ( m ) | DS Depth ( m ) | Resident Volume( m³ ) | Flooded Volume (m³) | Total Outflow (L/s) |
|---|---|---|---|---|---|---|
| 830 | 29.0 | 0.971 | 0.970 | 3032.676 | 0.000 | 15.5 |
| 835 | 29.0 | 0.972 | 0.972 | 3036.756 | 0.000 | 15.5 |
| 840 | 29.0 | 0.973 | 0.973 | 3040.839 | 0.000 | 15.5 |
| 845 | 29.1 | 0.974 | 0.974 | 3044.841 | 0.000 | 15.5 |
| 850 | 29.1 | 0.976 | 0.976 | 3048.960 | 0.000 | 15.5 |
| 855 | 29.1 | 0.977 | 0.977 | 3053.003 | 0.000 | 15.5 |
| 860 | 29.0 | 0.978 | 0.978 | 3057.009 | 0.000 | 15.5 |
| 865 | 28.9 | 0.980 | 0.980 | 3061.075 | 0.000 | 15.5 |
| 870 | 28.8 | 0.981 | 0.981 | 3065.055 | 0.000 | 15.6 |
| 875 | 28.6 | 0.982 | 0.982 | 3069.020 | 0.000 | 15.6 |
| 880 | 28.3 | 0.983 | 0.983 | 3072.859 | 0.000 | 15.6 |
| 885 | 28.0 | 0.985 | 0.984 | 3076.650 | 0.000 | 15.6 |
| 890 | 27.5 | 0.986 | 0.986 | 3080.276 | 0.000 | 15.6 |
| 895 | 26.9 | 0.987 | 0.987 | 3083.814 | 0.000 | 15.6 |
| 900 | 26.3 | 0.988 | 0.988 | 3087.080 | 0.000 | 15.6 |
| 905 | 25.4 | 0.989 | 0.989 | 3090.194 | 0.000 | 15.6 |
| 910 | 24.5 | 0.990 | 0.990 | 3092.950 | 0.000 | 15.6 |
| 915 | 23.3 | 0.990 | 0.991 | 3095.484 | 0.000 | 15.6 |
| 920 | 22.1 | 0.991 | 0.991 | 3097.590 | 0.000 | 15.6 |
| 925 | 20.5 | 0.992 | 0.992 | 3099.305 | 0.000 | 15.6 |
| 930 | 18.9 | 0.992 | 0.992 | 3100.557 | 0.000 | 15.6 |
| 935 | 16.9 | 0.992 | 0.992 | 3101.240 | 0.000 | 15.6 |
| 940 | 14.9 | 0.992 | 0.992 | 3101.325 | 0.000 | 15.6 |
| 945 | 12.3 | 0.992 | 0.992 | 3100.739 | 0.000 | 15.6 |
| 950 | 10.0 | 0.992 | 0.992 | 3099.433 | 0.000 | 15.6 |
| 955 | 6.6 | 0.991 | 0.991 | 3097.184 | 0.000 | 15.6 |
| 960 | 3.8 | 0.990 | 0.990 | 3094.061 | 0.000 | 15.6 |
| 965 | 1.5 | 0.989 | 0.989 | 3090.192 | 0.000 | 15.6 |
| 970 | 0.5 | 0.987 | 0.987 | 3085.792 | 0.000 | 15.6 |
| 975 | 0.0 | 0.986 | 0.986 | 3081.271 | 0.000 | 15.6 |
| 980 | 0.0 | 0.985 | 0.984 | 3076.510 | 0.000 | 15.6 |
| 985 | 0.0 | 0.983 | 0.983 | 3071.840 | 0.000 | 15.6 |
| 990 | 0.0 | 0.981 | 0.981 | 3067.185 | 0.000 | 15.6 |
| 995 | 0.0 | 0.980 | 0.980 | 3062.499 | 0.000 | 15.6 |
| 1000 | 0.0 | 0.978 | 0.978 | 3057.862 | 0.000 | 15.5 |
| 1005 | 0.0 | 0.977 | 0.977 | 3053.182 | 0.000 | 15.5 |
| 1010 | 0.0 | 0.976 | 0.976 | 3048.562 | 0.000 | 15.5 |
| 1015 | 0.0 | 0.974 | 0.974 | 3043.905 | 0.000 | 15.5 |
| 1020 | 0.0 | 0.973 | 0.973 | 3039.244 | 0.000 | 15.5 |
| 1025 | 0.0 | 0.971 | 0.971 | 3034.573 | 0.000 | 15.5 |
| 1030 | 0.0 | 0.970 | 0.970 | 3030.024 | 0.000 | 15.5 |
| 1035 | 0.0 | 0.968 | 0.968 | 3025.316 | 0.000 | 15.5 |
| 1040 | 0.0 | 0.967 | 0.967 | 3020.669 | 0.000 | 15.4 |
| 1045 | 0.0 | 0.965 | 0.965 | 3016.047 | 0.000 | 15.4 |
| 1050 | 0.0 | 0.964 | 0.964 | 3011.439 | 0.000 | 15.4 |
| 1055 | 0.0 | 0.962 | 0.962 | 3006.784 | 0.000 | 15.4 |
| 1060 | 0.0 | 0.961 | 0.961 | 3002.170 | 0.000 | 15.4 |
| 1065 | 0.0 | 0.959 | 0.959 | 2997.551 | 0.000 | 15.4 |
| 1070 | 0.0 | 0.958 | 0.958 | 2992.968 | 0.000 | 15.4 |
| 1075 | 0.0 | 0.956 | 0.956 | 2988.311 | 0.000 | 15.4 |
| 1080 | 0.0 | 0.955 | 0.955 | 2983.714 | 0.000 | 15.4 |
| 1085 | 0.0 | 0.953 | 0.953 | 2979.093 | 0.000 | 15.4 |
| 1090 | 0.0 | 0.952 | 0.952 | 2974.483 | 0.000 | 15.3 |
| 1095 | 0.0 | 0.950 | 0.950 | 2969.962 | 0.000 | 15.3 |
| 1100 | 0.0 | 0.949 | 0.949 | 2965.286 | 0.000 | 15.3 |
| 1105 | 0.0 | 0.947 | 0.947 | 2960.704 | 0.000 | 15.3 |
| 1110 | 0.0 | 0.946 | 0.946 | 2956.147 | 0.000 | 15.3 |
| 1115 | 0.0 | 0.945 | 0.944 | 2951.572 | 0.000 | 15.3 |

| Project: | Date: 18/07/2024 | | |
|---|---|---|---|
| | Designed by: LEvans | Checked by: | Approved By: |
| Report Details: Type: Stormwater Control Results Storm Phase: Phase | Company Address: | | |

| Time (mins) | Total Inflow (L/s) | US Depth ( m ) | DS Depth ( m ) | Resident Volume( m³ ) | Flooded Volume (m³) | Total Outflow (L/s) |
|---|---|---|---|---|---|---|
| 1120 | 0.0 | 0.943 | 0.943 | 2946.959 | 0.000 | 15.3 |
| 1125 | 0.0 | 0.942 | 0.942 | 2942.381 | 0.000 | 15.3 |
| 1130 | 0.0 | 0.940 | 0.940 | 2937.784 | 0.000 | 15.2 |
| 1135 | 0.0 | 0.939 | 0.939 | 2933.193 | 0.000 | 15.2 |
| 1140 | 0.0 | 0.937 | 0.937 | 2928.644 | 0.000 | 15.2 |
| 1145 | 0.0 | 0.936 | 0.936 | 2924.128 | 0.000 | 15.2 |
| 1150 | 0.0 | 0.934 | 0.934 | 2919.589 | 0.000 | 15.2 |
| 1155 | 0.0 | 0.933 | 0.933 | 2914.977 | 0.000 | 15.2 |
| 1160 | 0.0 | 0.931 | 0.931 | 2910.445 | 0.000 | 15.2 |
| 1165 | 0.0 | 0.930 | 0.930 | 2905.850 | 0.000 | 15.2 |
| 1170 | 0.0 | 0.928 | 0.929 | 2901.282 | 0.000 | 15.2 |
| 1175 | 0.0 | 0.927 | 0.927 | 2896.752 | 0.000 | 15.1 |
| 1180 | 0.0 | 0.926 | 0.925 | 2892.204 | 0.000 | 15.1 |
| 1185 | 0.0 | 0.924 | 0.924 | 2887.682 | 0.000 | 15.1 |
| 1190 | 0.0 | 0.923 | 0.923 | 2883.174 | 0.000 | 15.1 |
| 1195 | 0.0 | 0.921 | 0.921 | 2878.606 | 0.000 | 15.1 |
| 1200 | 0.0 | 0.920 | 0.920 | 2874.127 | 0.000 | 15.1 |
| 1205 | 0.0 | 0.918 | 0.918 | 2869.550 | 0.000 | 15.1 |
| 1210 | 0.0 | 0.917 | 0.917 | 2865.026 | 0.000 | 15.1 |
| 1215 | 0.0 | 0.915 | 0.915 | 2860.529 | 0.000 | 15.1 |
| 1220 | 0.0 | 0.914 | 0.914 | 2855.979 | 0.000 | 15.0 |
| 1225 | 0.0 | 0.912 | 0.913 | 2851.525 | 0.000 | 15.0 |
| 1230 | 0.0 | 0.911 | 0.911 | 2846.978 | 0.000 | 15.0 |
| 1235 | 0.0 | 0.910 | 0.910 | 2842.444 | 0.000 | 15.0 |
| 1240 | 0.0 | 0.908 | 0.908 | 2837.971 | 0.000 | 15.0 |
| 1245 | 0.0 | 0.907 | 0.907 | 2833.449 | 0.000 | 15.0 |
| 1250 | 0.0 | 0.905 | 0.905 | 2829.000 | 0.000 | 15.0 |
| 1255 | 0.0 | 0.904 | 0.904 | 2824.495 | 0.000 | 15.0 |
| 1260 | 0.0 | 0.902 | 0.902 | 2819.988 | 0.000 | 15.0 |
| 1265 | 0.0 | 0.901 | 0.901 | 2815.497 | 0.000 | 14.9 |
| 1270 | 0.0 | 0.899 | 0.900 | 2811.073 | 0.000 | 14.9 |
| 1275 | 0.0 | 0.898 | 0.898 | 2806.547 | 0.000 | 14.9 |
| 1280 | 0.0 | 0.897 | 0.897 | 2802.116 | 0.000 | 14.9 |
| 1285 | 0.0 | 0.895 | 0.895 | 2797.601 | 0.000 | 14.9 |
| 1290 | 0.0 | 0.894 | 0.894 | 2793.115 | 0.000 | 14.9 |
| 1295 | 0.0 | 0.892 | 0.892 | 2788.645 | 0.000 | 14.9 |
| 1300 | 0.0 | 0.891 | 0.891 | 2784.212 | 0.000 | 14.9 |
| 1305 | 0.0 | 0.890 | 0.889 | 2779.741 | 0.000 | 14.9 |
| 1310 | 0.0 | 0.888 | 0.888 | 2775.279 | 0.000 | 14.8 |
| 1315 | 0.0 | 0.887 | 0.887 | 2770.835 | 0.000 | 14.8 |
| 1320 | 0.0 | 0.885 | 0.885 | 2766.375 | 0.000 | 14.8 |
| 1325 | 0.0 | 0.884 | 0.884 | 2761.941 | 0.000 | 14.8 |
| 1330 | 0.0 | 0.882 | 0.882 | 2757.514 | 0.000 | 14.8 |
| 1335 | 0.0 | 0.881 | 0.881 | 2753.049 | 0.000 | 14.8 |
| 1340 | 0.0 | 0.880 | 0.879 | 2748.608 | 0.000 | 14.8 |
| 1345 | 0.0 | 0.878 | 0.878 | 2744.202 | 0.000 | 14.8 |
| 1350 | 0.0 | 0.877 | 0.877 | 2739.776 | 0.000 | 14.8 |
| 1355 | 0.0 | 0.875 | 0.875 | 2735.348 | 0.000 | 14.7 |
| 1360 | 0.0 | 0.874 | 0.874 | 2730.924 | 0.000 | 14.7 |
| 1365 | 0.0 | 0.872 | 0.872 | 2726.505 | 0.000 | 14.7 |
| 1370 | 0.0 | 0.871 | 0.871 | 2722.100 | 0.000 | 14.7 |
| 1375 | 0.0 | 0.870 | 0.870 | 2717.726 | 0.000 | 14.7 |
| 1380 | 0.0 | 0.868 | 0.868 | 2713.347 | 0.000 | 14.7 |
| 1385 | 0.0 | 0.867 | 0.867 | 2708.882 | 0.000 | 14.7 |
| 1390 | 0.0 | 0.865 | 0.865 | 2704.484 | 0.000 | 14.7 |
| 1395 | 0.0 | 0.864 | 0.864 | 2700.093 | 0.000 | 14.6 |
| 1400 | 0.0 | 0.863 | 0.863 | 2695.683 | 0.000 | 14.6 |
| 1405 | 0.0 | 0.861 | 0.861 | 2691.308 | 0.000 | 14.6 |

| Project: | Date: 18/07/2024 | | |
|---|---|---|---|
| | Designed by: LEvans | Checked by: | Approved By: |
| Report Details: Type: Stormwater Control Results Storm Phase: Phase | Company Address: | | |

| Time (mins) | Total Inflow (L/s) | US Depth ( m ) | DS Depth ( m ) | Resident Volume( m³ ) | Flooded Volume (m³) | Total Outflow (L/s) |
|---|---|---|---|---|---|---|
| 1410 | 0.0 | 0.860 | 0.860 | 2686.946 | 0.000 | 14.6 |
| 1415 | 0.0 | 0.858 | 0.858 | 2682.613 | 0.000 | 14.6 |
| 1420 | 0.0 | 0.857 | 0.857 | 2678.140 | 0.000 | 14.6 |
| 1425 | 0.0 | 0.856 | 0.856 | 2673.748 | 0.000 | 14.6 |
| 1430 | 0.0 | 0.854 | 0.854 | 2669.410 | 0.000 | 14.6 |
| 1435 | 0.0 | 0.853 | 0.853 | 2665.013 | 0.000 | 14.6 |
| 1440 | 0.0 | 0.851 | 0.851 | 2660.684 | 0.000 | 14.6 |
| 1445 | 0.0 | 0.850 | 0.850 | 2656.414 | 0.000 | 14.5 |
| 1450 | 0.0 | 0.849 | 0.849 | 2651.910 | 0.000 | 14.5 |
| 1455 | 0.0 | 0.847 | 0.847 | 2647.577 | 0.000 | 14.5 |
| 1460 | 0.0 | 0.846 | 0.846 | 2643.207 | 0.000 | 14.5 |
| 1465 | 0.0 | 0.844 | 0.844 | 2638.900 | 0.000 | 14.5 |
| 1470 | 0.0 | 0.843 | 0.843 | 2634.506 | 0.000 | 14.5 |
| 1475 | 0.0 | 0.842 | 0.842 | 2630.178 | 0.000 | 14.5 |
| 1480 | 0.0 | 0.840 | 0.840 | 2625.841 | 0.000 | 14.5 |
| 1485 | 0.0 | 0.839 | 0.839 | 2621.501 | 0.000 | 14.4 |
| 1490 | 0.0 | 0.837 | 0.837 | 2617.156 | 0.000 | 14.4 |
| 1495 | 0.0 | 0.836 | 0.836 | 2612.846 | 0.000 | 14.4 |
| 1500 | 0.0 | 0.835 | 0.835 | 2608.527 | 0.000 | 14.4 |
| 1505 | 0.0 | 0.833 | 0.833 | 2604.179 | 0.000 | 14.4 |
| 1510 | 0.0 | 0.832 | 0.832 | 2599.881 | 0.000 | 14.4 |
| 1515 | 0.0 | 0.831 | 0.831 | 2595.540 | 0.000 | 14.4 |
| 1520 | 0.0 | 0.829 | 0.829 | 2591.280 | 0.000 | 14.4 |
| 1525 | 0.0 | 0.828 | 0.828 | 2586.911 | 0.000 | 14.4 |
| 1530 | 0.0 | 0.826 | 0.826 | 2582.608 | 0.000 | 14.3 |
| 1535 | 0.0 | 0.825 | 0.825 | 2578.324 | 0.000 | 14.3 |
| 1540 | 0.0 | 0.824 | 0.824 | 2574.058 | 0.000 | 14.3 |
| 1545 | 0.0 | 0.822 | 0.822 | 2569.703 | 0.000 | 14.3 |
| 1550 | 0.0 | 0.821 | 0.821 | 2565.487 | 0.000 | 14.3 |
| 1555 | 0.0 | 0.820 | 0.820 | 2561.149 | 0.000 | 14.3 |
| 1560 | 0.0 | 0.818 | 0.818 | 2556.844 | 0.000 | 14.3 |
| 1565 | 0.0 | 0.817 | 0.817 | 2552.673 | 0.000 | 14.3 |
| 1570 | 0.0 | 0.815 | 0.815 | 2548.284 | 0.000 | 14.3 |
| 1575 | 0.0 | 0.814 | 0.814 | 2544.016 | 0.000 | 14.2 |
| 1580 | 0.0 | 0.813 | 0.813 | 2539.736 | 0.000 | 14.2 |
| 1585 | 0.0 | 0.811 | 0.811 | 2535.480 | 0.000 | 14.2 |
| 1590 | 0.0 | 0.810 | 0.810 | 2531.216 | 0.000 | 14.2 |
| 1595 | 0.0 | 0.809 | 0.809 | 2526.944 | 0.000 | 14.2 |
| 1600 | 0.0 | 0.807 | 0.807 | 2522.756 | 0.000 | 14.2 |
| 1605 | 0.0 | 0.806 | 0.806 | 2518.444 | 0.000 | 14.2 |
| 1610 | 0.0 | 0.805 | 0.805 | 2514.242 | 0.000 | 14.2 |
| 1615 | 0.0 | 0.803 | 0.803 | 2509.996 | 0.000 | 14.2 |
| 1620 | 0.0 | 0.802 | 0.802 | 2505.716 | 0.000 | 14.1 |
| 1625 | 0.0 | 0.801 | 0.800 | 2501.461 | 0.000 | 14.1 |
| 1630 | 0.0 | 0.799 | 0.799 | 2497.214 | 0.000 | 14.1 |
| 1635 | 0.0 | 0.798 | 0.798 | 2493.050 | 0.000 | 14.1 |
| 1640 | 0.0 | 0.796 | 0.796 | 2488.748 | 0.000 | 14.1 |
| 1645 | 0.0 | 0.795 | 0.795 | 2484.537 | 0.000 | 14.1 |
| 1650 | 0.0 | 0.794 | 0.794 | 2480.311 | 0.000 | 14.1 |
| 1655 | 0.0 | 0.792 | 0.792 | 2476.087 | 0.000 | 14.1 |
| 1660 | 0.0 | 0.791 | 0.791 | 2472.015 | 0.000 | 14.1 |
| 1665 | 0.0 | 0.790 | 0.790 | 2467.650 | 0.000 | 14.0 |
| 1670 | 0.0 | 0.788 | 0.788 | 2463.464 | 0.000 | 14.0 |
| 1675 | 0.0 | 0.787 | 0.787 | 2459.246 | 0.000 | 14.0 |
| 1680 | 0.0 | 0.786 | 0.786 | 2455.088 | 0.000 | 14.0 |
| 1685 | 0.0 | 0.784 | 0.784 | 2450.815 | 0.000 | 14.0 |
| 1690 | 0.0 | 0.783 | 0.783 | 2446.667 | 0.000 | 14.0 |
| 1695 | 0.0 | 0.782 | 0.782 | 2442.453 | 0.000 | 14.0 |

| Project: | Date: 18/07/2024 | | |
|---|---|---|---|
| | Designed by: LEvans | Checked by: | Approved By: |
| Report Details: Type: Stormwater Control Results Storm Phase: Phase | Company Address: | | |

| Time (mins) | Total Inflow (L/s) | US Depth ( m ) | DS Depth ( m ) | Resident Volume( m³ ) | Flooded Volume (m³) | Total Outflow (L/s) |
|---|---|---|---|---|---|---|
| 1700 | 0.0 | 0.780 | 0.780 | 2438.238 | 0.000 | 14.0 |
| 1705 | 0.0 | 0.779 | 0.779 | 2434.112 | 0.000 | 13.9 |
| 1710 | 0.0 | 0.778 | 0.778 | 2429.878 | 0.000 | 13.9 |
| 1715 | 0.0 | 0.776 | 0.776 | 2425.695 | 0.000 | 13.9 |
| 1720 | 0.0 | 0.775 | 0.775 | 2421.539 | 0.000 | 13.9 |
| 1725 | 0.0 | 0.774 | 0.774 | 2417.358 | 0.000 | 13.9 |
| 1730 | 0.0 | 0.772 | 0.772 | 2413.203 | 0.000 | 13.9 |
| 1735 | 0.0 | 0.771 | 0.771 | 2409.043 | 0.000 | 13.9 |
| 1740 | 0.0 | 0.770 | 0.769 | 2404.841 | 0.000 | 13.9 |
| 1745 | 0.0 | 0.768 | 0.768 | 2400.701 | 0.000 | 13.9 |
| 1750 | 0.0 | 0.767 | 0.767 | 2396.630 | 0.000 | 13.8 |
| 1755 | 0.0 | 0.765 | 0.766 | 2392.495 | 0.000 | 13.8 |
| 1760 | 0.0 | 0.764 | 0.764 | 2388.272 | 0.000 | 13.8 |
| 1765 | 0.0 | 0.763 | 0.763 | 2384.070 | 0.000 | 13.8 |
| 1770 | 0.0 | 0.762 | 0.762 | 2379.985 | 0.000 | 13.8 |
| 1775 | 0.0 | 0.760 | 0.760 | 2375.812 | 0.000 | 13.8 |
| 1780 | 0.0 | 0.759 | 0.759 | 2371.737 | 0.000 | 13.8 |
| 1785 | 0.0 | 0.758 | 0.758 | 2367.577 | 0.000 | 13.8 |
| 1790 | 0.0 | 0.756 | 0.756 | 2363.398 | 0.000 | 13.8 |
| 1795 | 0.0 | 0.755 | 0.755 | 2359.343 | 0.000 | 13.7 |
| 1800 | 0.0 | 0.754 | 0.754 | 2355.160 | 0.000 | 13.7 |
| 1805 | 0.0 | 0.752 | 0.752 | 2351.049 | 0.000 | 13.7 |
| 1810 | 0.0 | 0.751 | 0.751 | 2346.973 | 0.000 | 13.7 |
| 1815 | 0.0 | 0.750 | 0.750 | 2342.811 | 0.000 | 13.7 |
| 1820 | 0.0 | 0.748 | 0.748 | 2338.702 | 0.000 | 13.7 |
| 1825 | 0.0 | 0.747 | 0.747 | 2334.724 | 0.000 | 13.7 |
| 1830 | 0.0 | 0.746 | 0.746 | 2330.558 | 0.000 | 13.7 |
| 1835 | 0.0 | 0.744 | 0.744 | 2326.401 | 0.000 | 13.7 |
| 1840 | 0.0 | 0.743 | 0.743 | 2322.299 | 0.000 | 13.6 |
| 1845 | 0.0 | 0.742 | 0.742 | 2318.197 | 0.000 | 13.6 |
| 1850 | 0.0 | 0.741 | 0.741 | 2314.182 | 0.000 | 13.6 |
| 1855 | 0.0 | 0.739 | 0.739 | 2310.091 | 0.000 | 13.6 |
| 1860 | 0.0 | 0.738 | 0.738 | 2306.004 | 0.000 | 13.6 |
| 1865 | 0.0 | 0.737 | 0.737 | 2301.893 | 0.000 | 13.6 |
| 1870 | 0.0 | 0.735 | 0.735 | 2297.896 | 0.000 | 13.6 |
| 1875 | 0.0 | 0.734 | 0.734 | 2293.754 | 0.000 | 13.6 |
| 1880 | 0.0 | 0.733 | 0.733 | 2289.678 | 0.000 | 13.6 |
| 1885 | 0.0 | 0.731 | 0.731 | 2285.633 | 0.000 | 13.5 |
| 1890 | 0.0 | 0.730 | 0.730 | 2281.545 | 0.000 | 13.5 |
| 1895 | 0.0 | 0.729 | 0.729 | 2277.498 | 0.000 | 13.5 |
| 1900 | 0.0 | 0.728 | 0.727 | 2273.418 | 0.000 | 13.5 |
| 1905 | 0.0 | 0.726 | 0.726 | 2269.393 | 0.000 | 13.5 |
| 1910 | 0.0 | 0.725 | 0.725 | 2265.337 | 0.000 | 13.5 |
| 1915 | 0.0 | 0.724 | 0.724 | 2261.263 | 0.000 | 13.5 |
| 1920 | 0.0 | 0.722 | 0.722 | 2257.254 | 0.000 | 13.5 |