Flood Risk Assessment
& Drainage Strategy

Land West of Buntingford (North of A507), Hertfordshire

PREPARED BY:
Jubb Consulting Engineers Ltd.

FOR:
Hallam Land Management

DATE:
May 2024

REFERENCE:
23161-FRADS(N)-01 v5

Contents

1 Project Information

1.1 Project Information

Client	Hallam Land Management

1.2 Project Details

Project Name	Land West of Buntingford (North of A507)
Location	Buntingford, Hertfordshire
Jubb Project Number	23161

1.3 Report Details

Version	Five
Status	For Submission
Date	15th May 2024

1.4 Project Authorisation

ISSUE HISTORY: AUTHORISATION:

Version	Date	Detail	Prepared By	Approved By
v1	16.02.24	First Draft	MD	LE
V2	22.02.24	Second Draft – Masterplan included	LE	LE
V3	22.03.24	For Submission	LE	LE
V4	05.04.24	For Submission – Updated Plans	LE	LE
V5	15.05.24	For Submission – Updated Redline	LE	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 (North 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 the 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 north of Baldock Road (A507), directly west of the town of Buntingford, Hertfordshire. The current site is approximately 50.12Ha in area and has a National Grid reference of 535150E, 229584N.

3.1.2 The site boundaries are formed by Baldock Road (A507) to the south, the A10 to the east, Throcking Lane to the north, and arable farmland along its western boundary.

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 (and associated infrastructure) 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 several large open fields which are 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 that there is a steady fall in levels across the northern half of the site, with levels falling from the western boundary in an easterly direction. From the high point of approximately 133mAOD located in the north-west corner of the site, levels fall consistently to the east reaching a low point of approximately 109mAOD on the eastern site boundary.

3.3.3 In the southern region of the site, a crest runs from the north-west corner of the field, in a southerly direction, towards Baldock Road. A high point of approximately 130mAOD is located in the north-west corner, with levels falling to 126mAOD on the southern site boundary. From the high point of the crest, levels fall away steeply towards the brook in the south-west corner of the site reaching a low point of approximately 113.5mAOD, with levels also falling in an easterly direction to a low point of 109mAOD on the eastern site boundary.

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 across the full extents of the site. This strata is described as an extensive sheet of chalky till, together with outwash sands and gravels, silts and clays. Nearby archived BGS boreholes and historic ground investigations indicate these soils are likely to exceed 20m in thickness.

Hydrogeology

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

3.4.4 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.

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

3.4.6 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.

3.4.7 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

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

3.4.9 The nearest EA designated 'main river' is the Thistley Vale Brook and the River Rib, which are located immediately to the south-west and approximately 1.3km to the east of the site respectively.

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

3.4.11 The Thistley Vale Brook runs from its source near the village of Throcking in a south-easterly direction, running along the south-west boundary of the site, before continuing to flow to the south-east where it converges with the River Rib to the east of Aspenden.

3.4.12 Within the site, a network of existing drainage ditches has been identified running along the existing field boundaries. In the north-east corner of the site an existing drainage ditch is located adjacent to the north-east site boundary, running from Throcking Lane in a southerly direction. As the ditch reaches the corner of the site, flows from a culvert coming from a westerly direction enter the ditch, before the ditch is culverted and continues in a south-easterly direction. This culvert then crosses beneath the A10, before continuing to the south-east as an open channel which ultimately converges with the River Rib approximately 700m to the east of the site.

3.4.13 Further investigation of this incoming culvert from the west appears to suggest that it forms part of the existing land drainage which drains the large northern field of the site. Further details on the existing land drainage are provided in Section 3.5.

3.4.14 Another significant drainage ditch has also been identified running between the northern and southern field, cutting across the centre of the site. This ditch collects and conveys flows in an easterly direction, where it is culverted beneath the A10 on the eastern site boundary. Immediately after crossing the A10 the ditch continues as an open channel in a northerly direction, converging with the aforementioned ditch immediately to the north-east of the site.

3.4.15 Existing field/drainage ditches have also been identified running along the eastern/southeastern boundaries of the proposed site. The ditches running along the south-eastern boundaries convey run-off from the existing field to the southeast corner of the site, near the existing business park. Flows appear to be conveyed offsite in a south-easterly direction along a former access track running towards the main access junction to the business park.

3.4.16 However, the access track is bunded/ blocked off near the access junction to the business park. Further investigation could not identify an outfall or continuous route of these ditches.

3.5 Existing Drainage

Public Sewerage

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 east of the site. A copy of Thames Water asset plans is included in Appendix C.

3.5.3 To the east of the site, a large network of public foul and surface 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 south-east 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.

Land Drainage

3.5.5 We have been made aware by the landowner that existing land drainage is present within the site.

3.5.6 Plans provided by the landowner have identified a large network of land drainage which runs throughout the full extents of the northern field, no land drainage appears to be present within the southern parcel according to the plans provided. A copy of the land drainage plans is included in Appendix D.

3.5.7 Within the northern field, a series of land drainage networks are shown to collect runoff from the site and the adjacent land to the west, with flows conveyed to the east and discharged to the two drainage ditches previously discussed in Section 3.4.

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 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 Immediately beyond the site boundaries to the south-west of the site, an area of Flood Zone 2 and 3 is present 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 113.5 – 114mAOD.

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 a north-easterly and south-westerly direction.

4.1.7 The full extents of the site are located within Flood Zone 1, with the proposed development parcels located fully within the eastern region of the site. No built development is proposed within the south-west region of the site.

4.1.8 There is a significant level difference between the flood zone extents and the development parcels. The flood zones extents are shown to correspond to a level of approximately 114mAOD, however, the western edge of the development corresponds to a level of approximately 126 – 129mAOD. Consequently, there is at least a 12m level difference between the development proposals and the flood zone extents.

4.1.9 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

4.1.10 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.

4.1.11 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.

4.1.12 The NPPF Flood Risk and Coastal Change Planning Practice Guidance states that for residential developments it is reasonable to assume a typical lifespan of 100 years.

4.1.13 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.

4.1.14 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%

4.1.15 The proposed development includes a variety of uses which have associated different degrees of vulnerability. In accordance with Planning Practice Guidance, the highest vulnerability category has been used with a vulnerability category of 'more vulnerable' development in relation to the residential element under Table 2 of the NPPF.

4.1.16 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 'more vulnerable' flood risk classification should consider the central peak river flow allowances.

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

4.1.18 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.

4.1.19 A significant level difference of between 12 – 15m was identified between the flood zone extents and the western development edge.

4.1.20 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.

4.1.21 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 vast majority of the proposed site is identified as an area at very low risk of surface water flooding. However, areas of low – high risk are also present within the site.

Figure 2.0 - Environment Agency Flooding from Surface Water Map

4.2.2 The development proposals will be located solely within the eastern and north-east region of the site. In this part of the site, areas of low-high risk are shown along the northern and eastern site boundary.

4.2.3 Due to the existing site topography and the presence of a natural crest running through the south-west region of the site and extending to the north-west, the modelled flows within the site appear to correspond with flow routes of predominantly onsite flows which follow the natural topography and valleys within the site and are prevented from continuing to the east by the presence of the A10, causing flows to back up into the site.

4.2.4 Due to the topography of the site and the surrounding area, the risk of flooding from overland flows is considered to be low. There is the potential for runoff from the neighbouring land to the north and north-west of the site being conveyed towards the site, however, these areas are a relatively small rural catchment and therefore the risk to the site is considered low.

4.2.5 Despite these modelled flows routes shown within the site, further investigation of the site and existing drainage features questions the accuracy of the EA surface water flood risk map. The modelled flows follow the local topography; however, they appear exaggerated compared to the relatively small upstream rural catchment, with the model also not taking into account the mitigation measures which are currently present onsite.

4.2.6 Further mitigation from overland flows is provided by the presence of Throcking Lane which bounds the site to the north and the presence of a large network of land drains which extend into the neighbouring land to the west as described in Section 3.5.

4.2.7 The existing highway drainage along Throcking Lane and the onsite and offsite land drainage will intercept and convey flows away from the site to the east.

4.2.8 It is therefore considered that the risk to the development from overland flows is low and does not pose a significant risk to the development.

4.2.9 As discussed in Section 3.5, the presence of onsite land drainage and drainage features will also mitigate the risk from potential onsite flows. It is considered that these flows would be intercepted by the existing drainage features and conveyed to the east and off-site, reducing the risk of flooding to the site.

4.2.10 The presence of these drainage features will also prevent the backing up of flows within the site due to the level of the A10, with flows conveyed to the east and culverted beneath the A10 which isn't reflected in the EA mapping.

4.2.11 There are no historical records of overland or surface water flooding affecting the site.

4.2.12 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 infrastructure impacting the proposed site due to the location of the existing apparatus and the topography of the site and the 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.

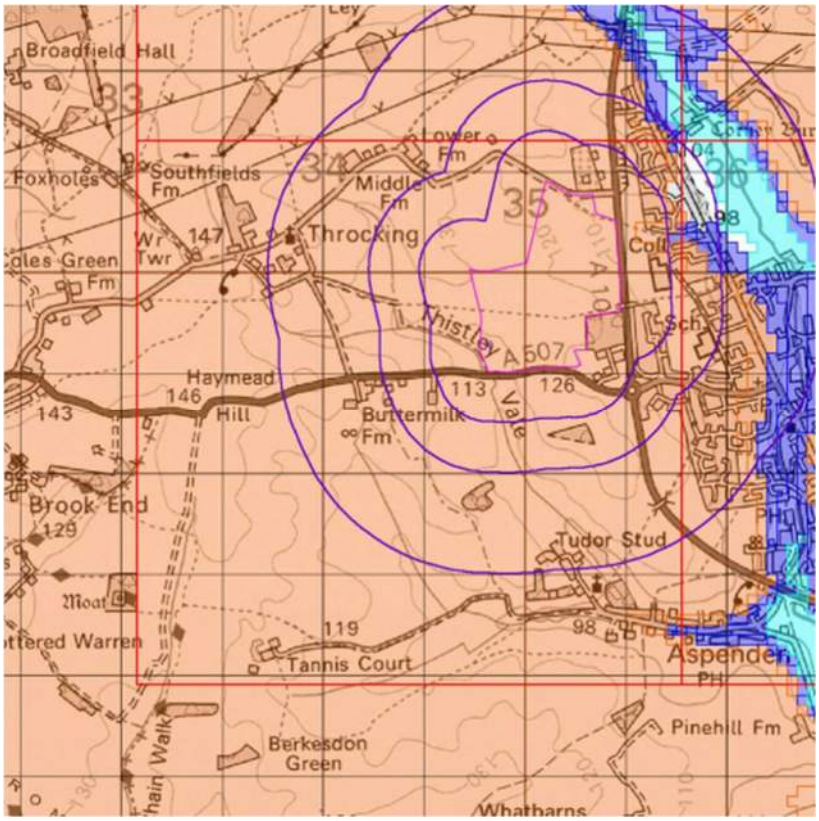


Figure 3.0 – BGS Groundwater Flooding Susceptibility Map

4.4.3 The East Hertfordshire District Council Strategic Flood Risk Assessment (SFRA) completed by JBA in 2016 includes a strategic-scale map (refer to Figure 4.0) 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 majority of the site being at very low risk of groundwater flooding, with a small area of the north-east region of the site identified at low risk (<25%).

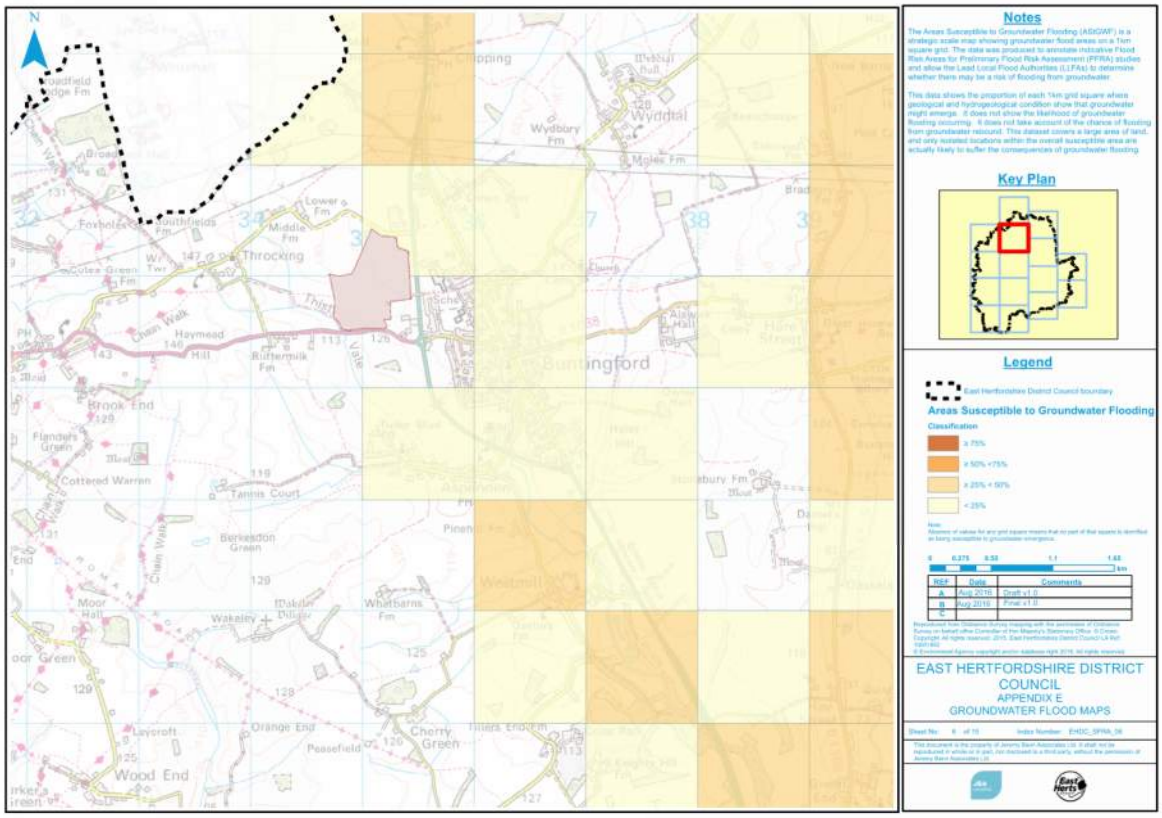


Figure 4.0 - East Hertfordshire District Council SFRA – Extract from Risk of Groundwater Flooding Map

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 the south-east corner of 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 near 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 application for development up to 600 dwellings (C3), elderly accommodation (C3), mixed use local centre (including flexible use E, F and Sui Generis), first school, informal and formal open space, associated works and infrastructure including a new access from the A507 and pedestrian bridge over the A10, with all matters reserved save for access.

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

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 **(<1 in 1000)**	✓	✓	✓	✓	✓
Flood Zone 2 **(Up to 1 in 1000)**	✓	✓	Exception Test	✓	✓
Flood Zone 3a **(1 in 100 fluvial)** **(1 in 200 tidal)**	Exception Test	✓	X	Exception Test	✓
Flood Zone 3b **(Functional floodplain)**	Exception Test	✓	X	X	X

5.2.2 Due to the presence of residential properties the proposed development type is considered to be classified as a “more 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 the foul flows from the development will require pumping from the site to the proposed point of connection. An indicative location for the pump station is shown on the development framework plan.

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 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 utilised 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 a 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 across the proposed site as the site is taken forward to confirm the assumption that infiltration is not a viable option.

6.2.7 It is proposed that generated surface water runoff from the development will be discharged at a restricted pre-development greenfield rate to the existing drainage ditches within the site and existing public sewer network in close proximity to the site, with flows attenuated onsite via SuDS features.

6.2.8 As discussed in Section 3.4, existing drainage features have been identified within the site. An outfall to the open drainage ditch on the eastern site boundary or the culverted section in the north-east of the site could be utilised by the northern and central regions of the development.

6.2.9 For the southern extents of the site, the levels fall steeply to the south-east corner of the site and therefore a discharge to these features in the northern part of the site will not be suitable. Further investigation of the existing drainage features in the south-east corner of the site could not trace the downstream route or identify an existing outfall.

6.2.10 Consequently, it is considered that these existing features will not be a suitable outfall for the discharge of flows from this part of the site. It is therefore proposed to discharge flows from this region to the existing public surface water sewer located at the roundabout between the A10 and Baldock Road.

6.2.11 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.

6.2.12 It is proposed that flows will be discharged from the site at a restricted predevelopment greenfield rate, the FEH statistical method produces a Qbar greenfield rate of 71.9l/s for the total development. This rate will be split across the various catchments and will be used as the maximum offsite discharge rate for storm events up to the 1 in 100-year plus 40% climate change scenario.

6.2.13 Restricting the offsite surface water discharge rate to Qbar, an estimated storage volume of 9750m^3 is required to accommodate the 1 in 100-year plus 40% climate change scenario.

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

6.2.15 It is proposed to provide the required storage primarily through a series of attenuation basins 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.

6.2.16 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.

6.2.17 As discussed in Section 3.5, existing land drainage has been identified within the northern region of the site. Where the existing land drainage is impacted by the development proposals it will be removed as it will no longer be needed. Sections of land drainage that extend beyond the development proposals and into the neighbouring land will be retained, with any sections impacted by the development that need to be retained to be diverted to maintain the existing connections.

6.2.18 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.

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 the proposed SuDS features operate effectively for their lifetimes a detailed management plan for the operation and maintenance of the SuDS will be produced prior to construction, in accordance with Chapter 32 of Ciria C753.

8.1.2 It is anticipated that proposed surface water and foul water drainage networks will be offered to Thames Water for adoption. Where Thames 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, and all other features under private ownership will be managed and maintained privately.

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

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

8.1.6 If SuDS features in public spaces remain under private ownership, a private management company will be responsible for the regular inspection and maintenance of these features, with a contractor on standby for emergency reactive maintenance.

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

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 “more vulnerable” under the NPPF, which is deemed as acceptable for a low-risk site.

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 and sewer network 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 and sewer network. 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 an operated by Thames Water. The closest public sewers to the site are found within Buntingford Business Park and Baldock Road to the south-east of the site.
Proposed Drainage	New surface and foul water sewer networks will be constructed to service the proposed development. 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 watercourses and public sewer network located within and in close proximity to the site.
Surface Water Management	Due to the underlying ground conditions, it is anticipated that discharging flows via infiltration will not be viable. 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 and public sewer. It is proposed to discharge surface water runoff at a restricted pre-development greenfield rate, with onsite attenuation storage provided. 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. 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. 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

Rev	Description	Date

Client:

Hallam Land Management

Land West of Buntingford

Application Boundary Plan (North of Baldock Road)

Scale@ A3 :	Drawn:	Designed:	Approved:
1:5,000	ADW	SJP	SJP

0m — 200m

Drawing Number:	Revision:	Date:
HLM082/021	B	10.05.24

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 Buntingford 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		

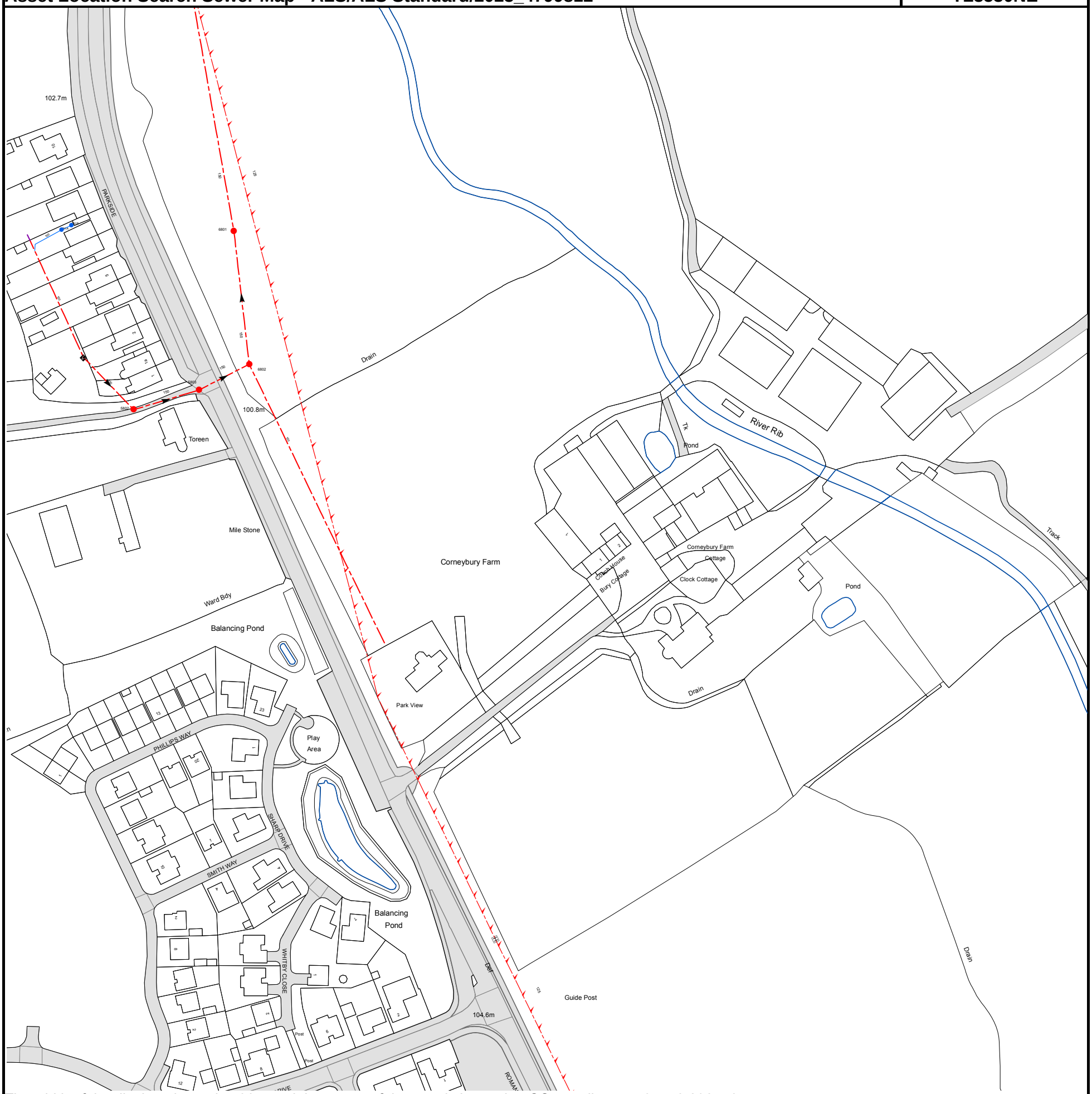
ALS/ALS Standard/2023_4799812

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		

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

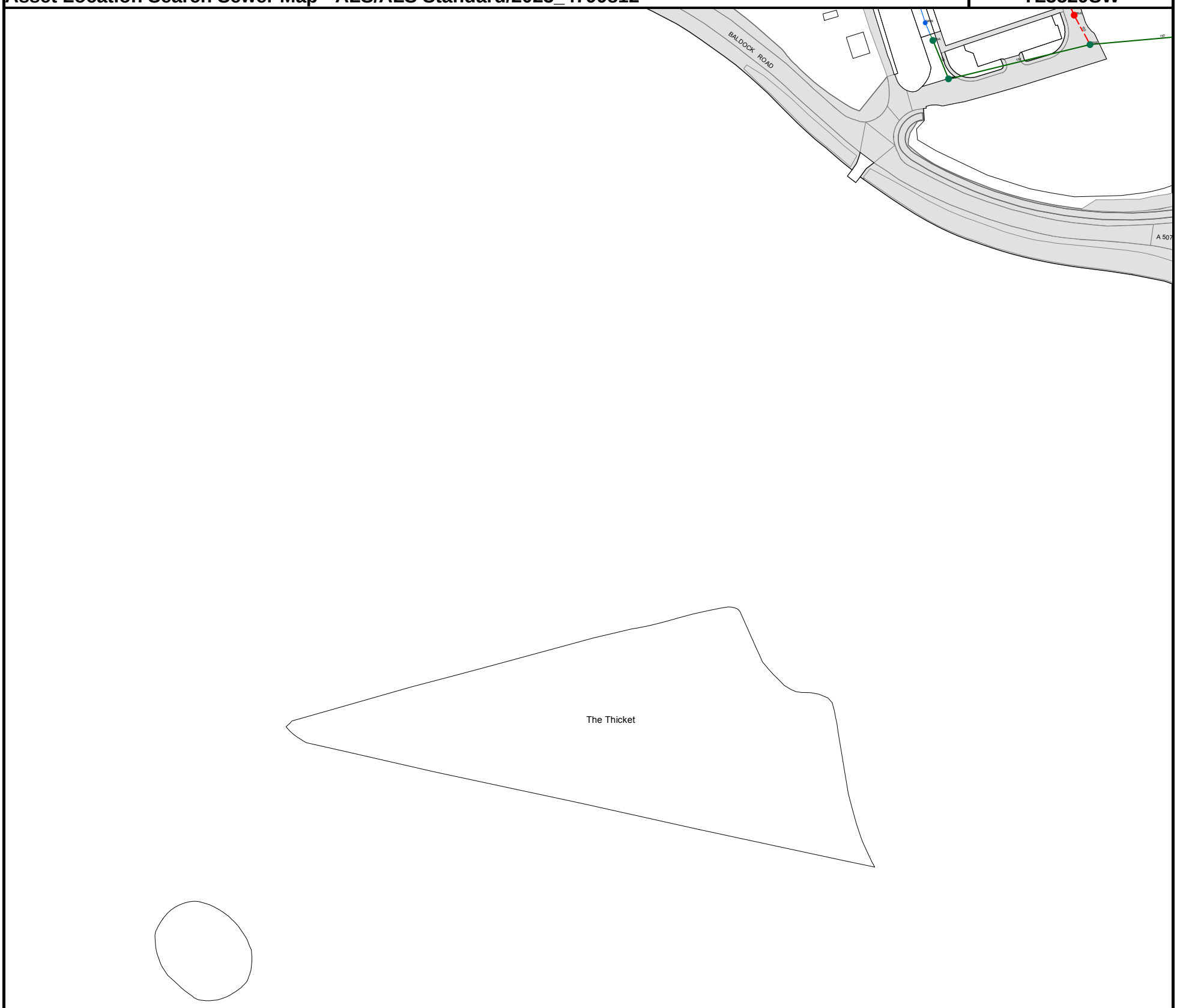
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual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

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.

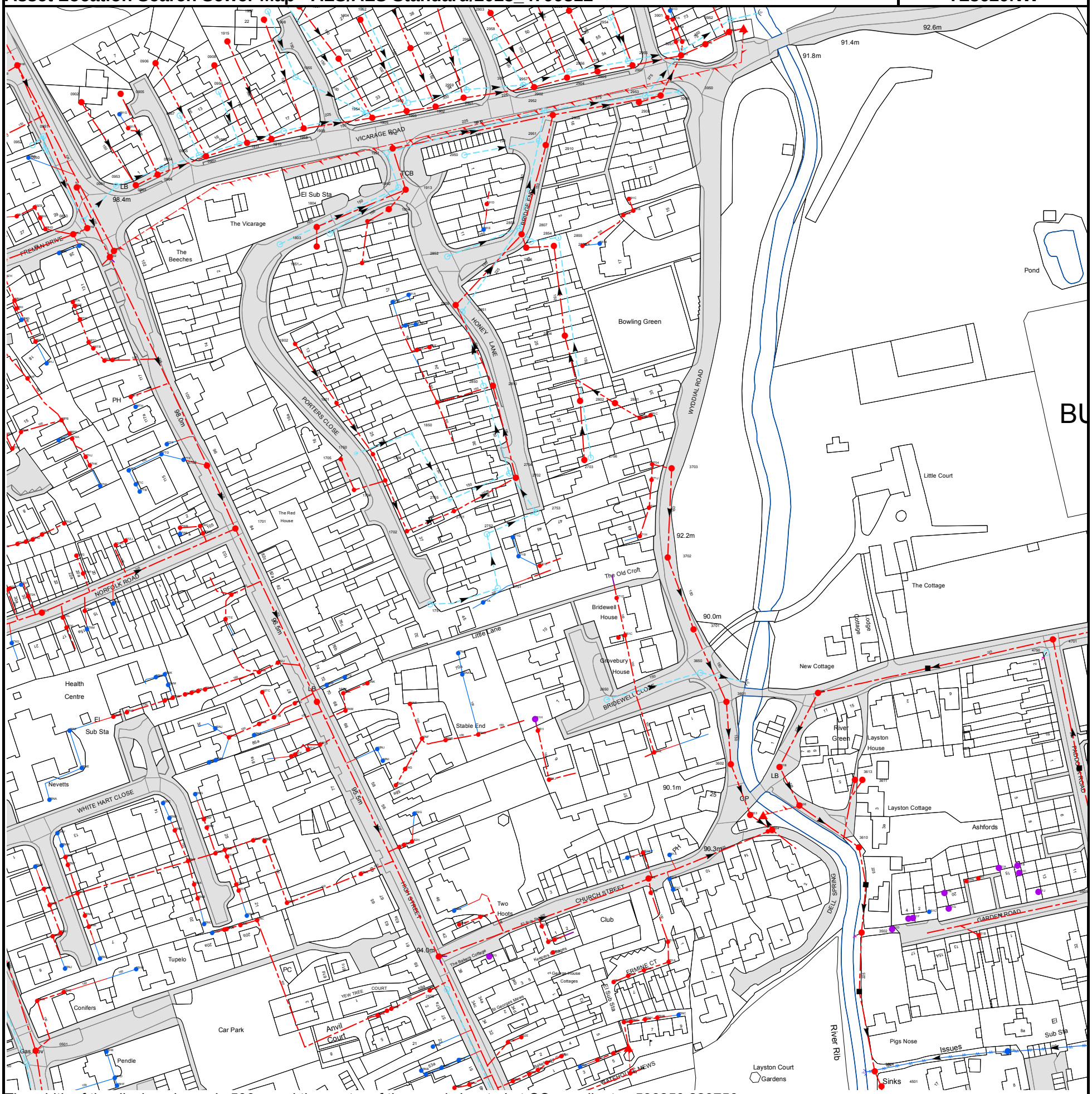
NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

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.

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

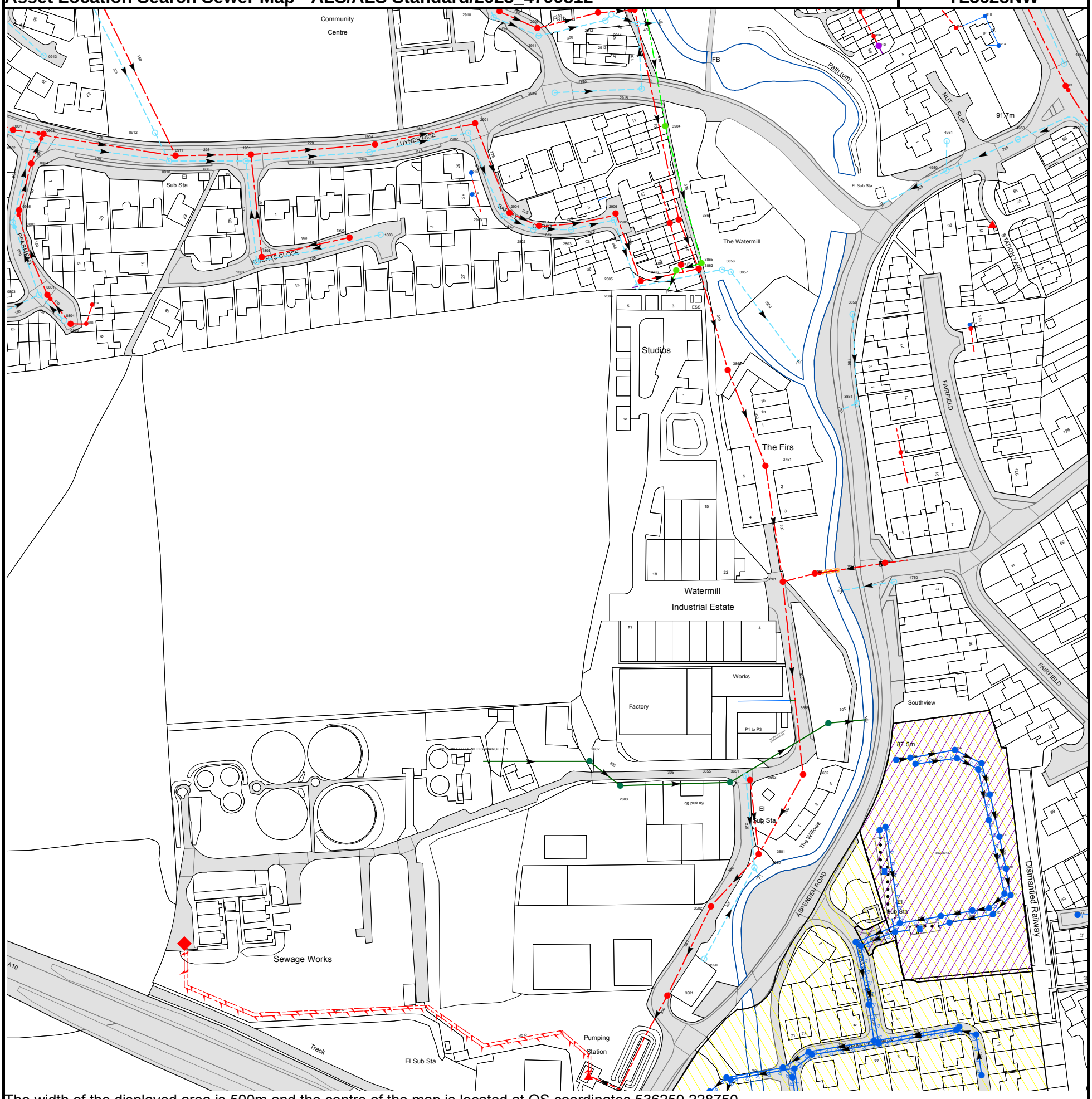
Manhole Reference	Manhole Cover Level	Manhole Invert Level
07HC	n/a	n/a
07ZJ	n/a	n/a
07HD	n/a	n/a
05NG	n/a	n/a
05NH	n/a	n/a
05ND	n/a	n/a
06NP	n/a	n/a
06NZ	n/a	n/a
05NY	n/a	n/a
06NY	n/a	n/a
05NX	n/a	n/a
05NW	n/a	n/a
06NV	n/a	n/a
06NB	n/a	n/a
06ND	n/a	n/a
06NC	n/a	n/a
06NA	n/a	n/a
06NE	n/a	n/a
06NF	n/a	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

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

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.

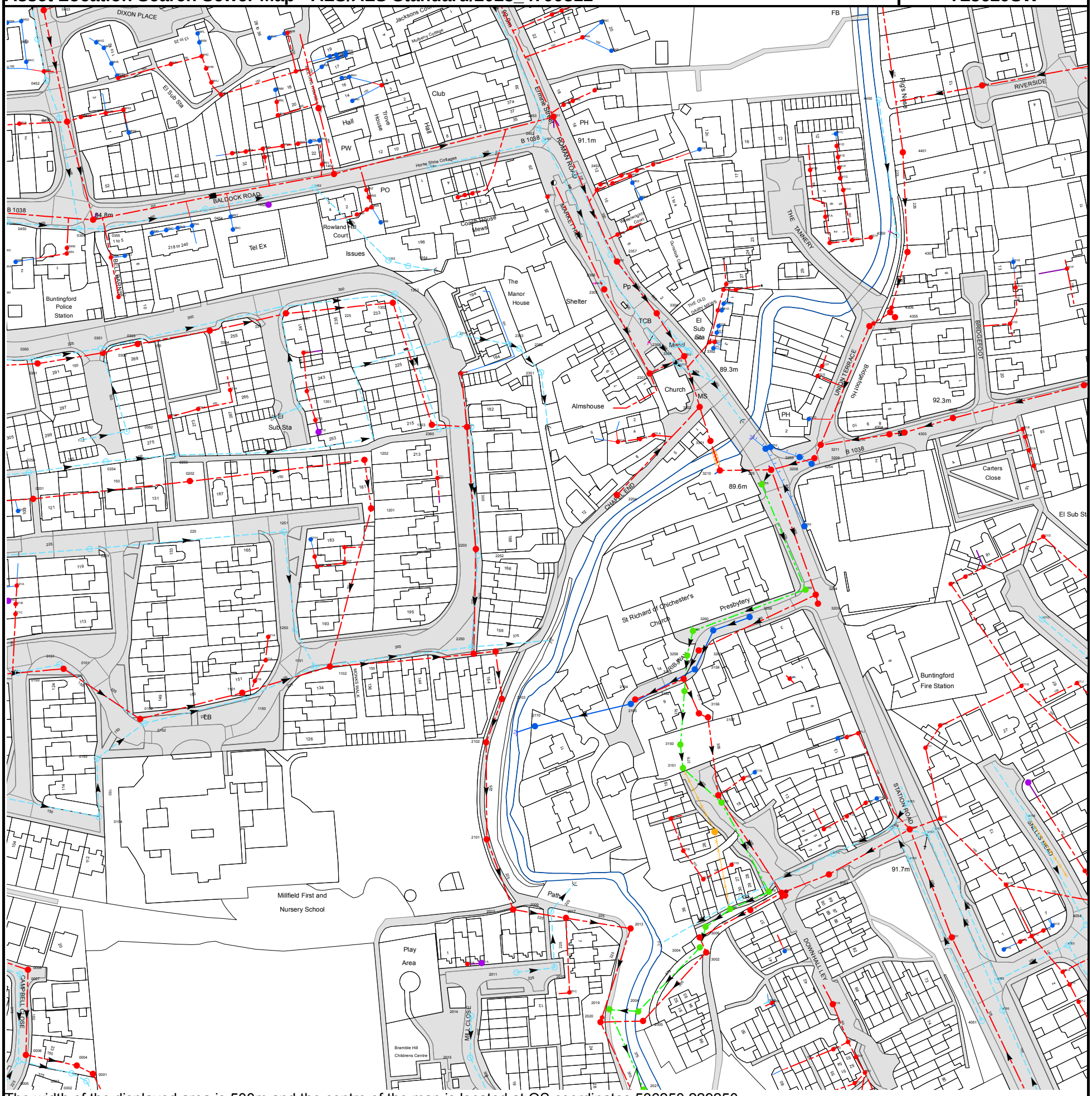
NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

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	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
3501	85.09	83.4
3550	85.47	84.13
n/a	n/a	n/a
n/a	n/a	n/a
3502	85.49	83.59

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.

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

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.

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

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

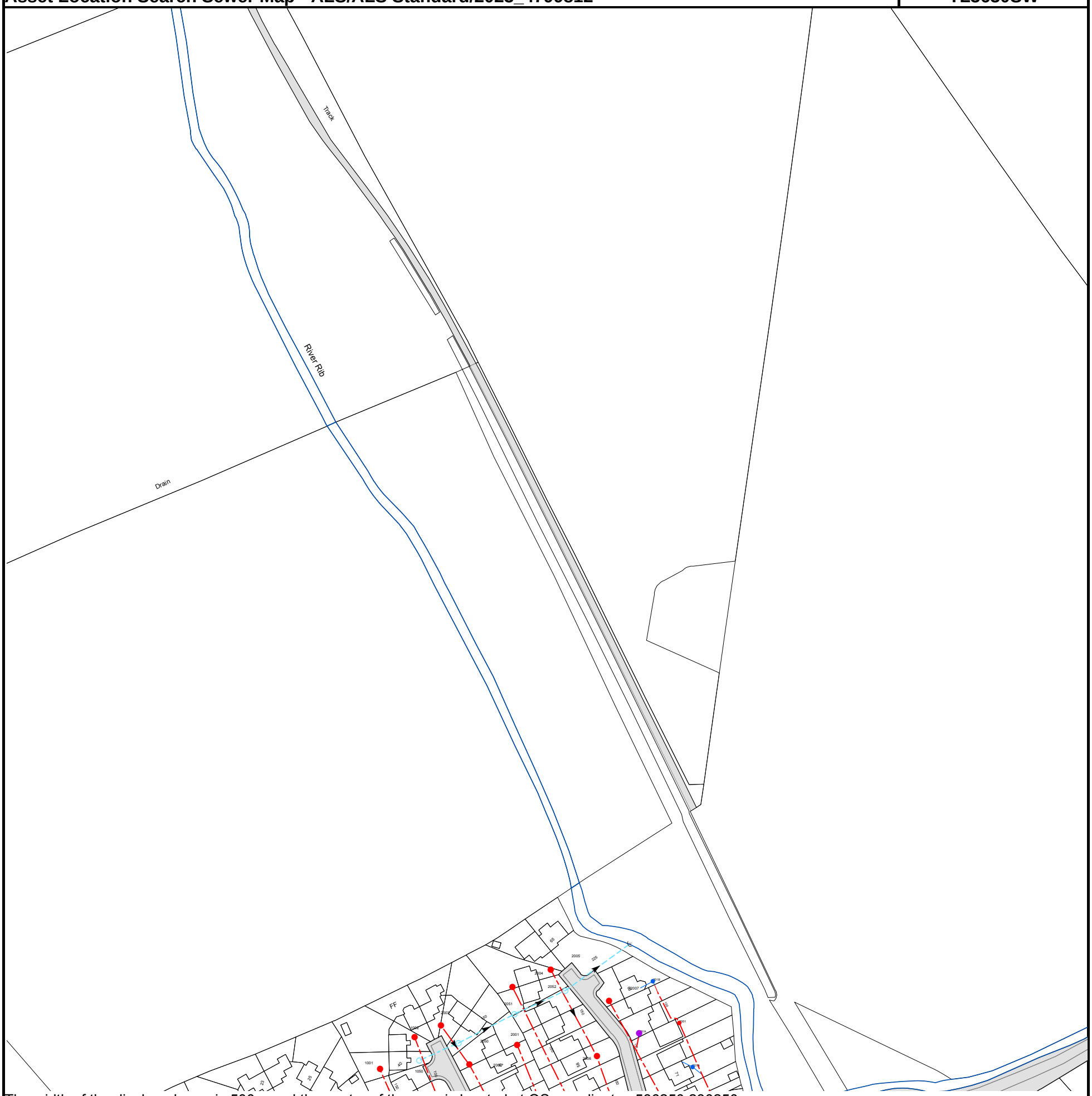
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual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

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.

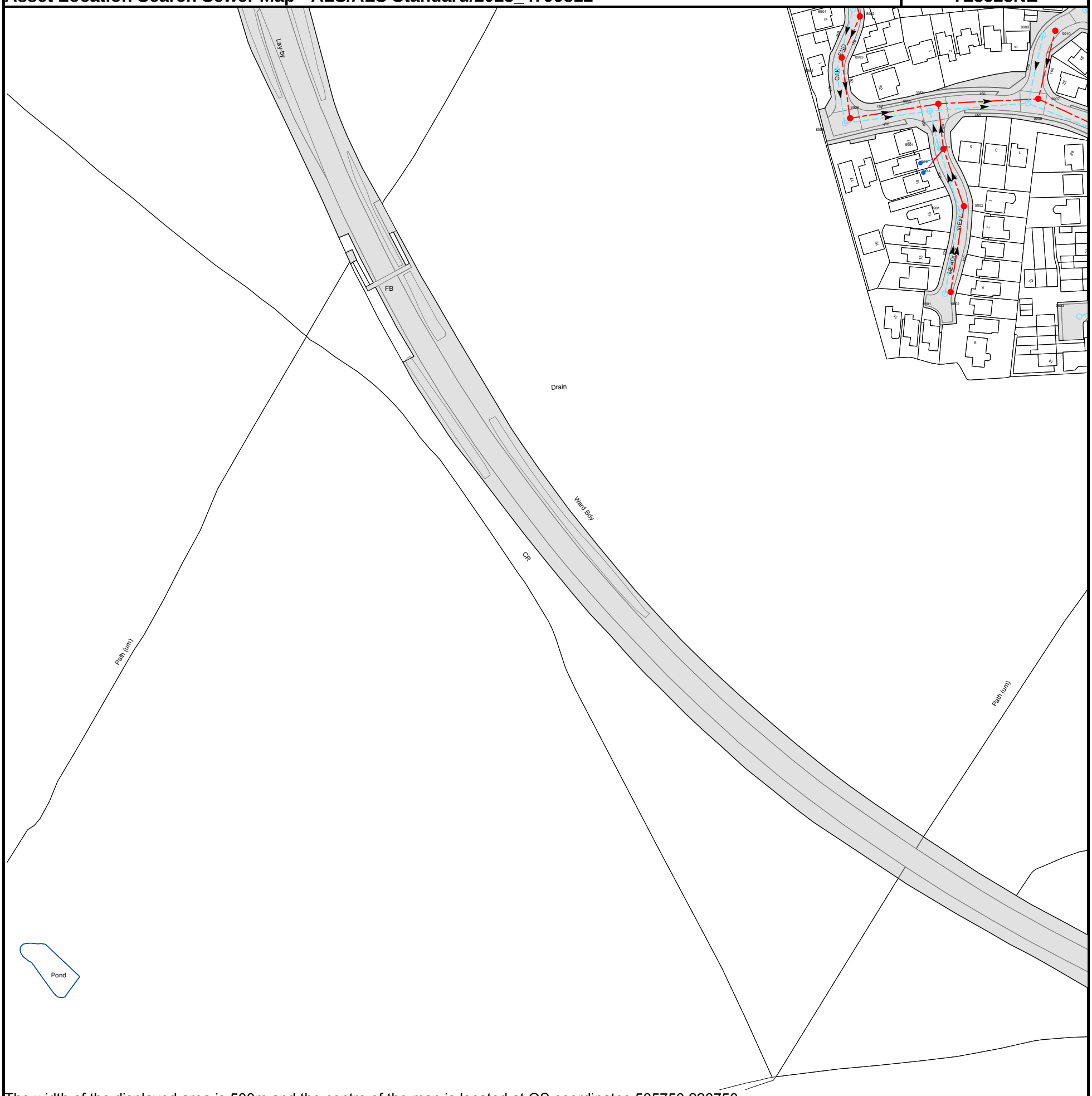
NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

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.

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.

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
- Conduit Bridge
- Subway
- Tunnel

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

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** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number

Appendix D: Land Drainage Asset Plans

N

Orchard

?? - possible 6" leader drain

Cricket Field

Throcking Church

Thistley Vale

Tin House 2

Private Road

Tyre Hill

Buttermilk

Little Chef

Client	Mr J. Sapsed Indegro Ltd
Location	Buttermilk & Lower Farm, Baldock Road, Throcking, Herts, SG9 9RH
Project	Existing Drainage Maps - Tile P3
Scale	1:2500@A1
Date	07.09.2021
Rev	001
Drawing No.	JSIL07092021-001

William Morfoot
www.williammorfoot.co.uk
TEL: 01362820371