



# Dee Park Open Space Drainage Strategy Report

For Reading Borough Council

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Date: 13 May 2026

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# Document Control Sheet

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| <i>Title</i>        | Drainage Strategy Report                                                                                  |                                                                         |
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## 1. Introduction

### 1.1 Scope of The Report

Hydrock have been appointed to provide a Drainage Strategy report for the approval of Reading Borough Council Lead Local Flood Authority.

The proposed drainage strategy will be in accordance with national guidelines and will incorporate a 'best practise' approach in reducing the impact of the flooding caused by the new development.

The report is based upon sewer asset information provided by the sewerage undertakers Thames Water in relation to assets within the vicinity of the development site.

The report highlights the key stakeholders in terms of ownership and maintenance to ensure the drainage system is kept well maintained and reduce the risk of failure. Should the network fail at any point, clearly defined ownership liabilities will ensure that problems can quickly be rectified, thereby reducing the impact of potential damage caused by flooding

### 1.2 Limitations of The Report

This report has been prepared in connection with the scope as described above and considers the instructions and requirements of the client's needs. It is not intended for and should not be relied upon by any third party.

The information received is summarised within this report. In the event that the information is relied upon and is subsequently found to be incorrect, Hydrock Consultants accepts no responsibility for any direct and/or consequential loss that may occur as a result.

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### 1.3 References / Design Codes

- » BS EN 752 - Drain and Sewer Systems Outside Buildings.
- » Building Regulations Approved Document Part H - Drainage and waste disposals.
- » Sewers for Adoption (where applicable).
- » Local Authority Guidance.
- » CIRIA C753 - SuDS Manual.
- » National Planning Policy Framework (NPPF).
- » DEFRA Non-Statutory Technical Standards for Sustainable Drainage.

## 2. Site Information

### 2.1 Site Location

The site is situated on land adjacent to Glenmore Place, Reading, RG30 4EP, occupying a roughly rectangular plot of approximately 1,800m<sup>2</sup>. The central National Grid Reference for the site is 468479, 173632.

Table 2.1: Site Referencing Information

| Site Address            |                 |
|-------------------------|-----------------|
| Postcode                | RG30 4EP        |
| National Grid Reference | 468479, 173632. |

Figure 1: Site Location with Approximate Red Line Boundary



### 2.2 Site Topography

The site is generally level, with ground elevations ranging between approximately 50.7m and 53.0m Above Ordnance Datum (AOD). The existing surface comprises a mix of asphalt hardstanding, woodchip areas for play equipment, and soft landscaping, including grassed areas and mature vegetation along the site boundaries.

Key features of the site include a fenced-off sports court in the centre, a children's play area with woodchip surfacing in the southern section, and a temporary building located in the northern portion.

See **Appendix A** for Topographical Survey

## 2.3 Geology

The following information is a summary from Phase 2 Site Investigation Report:

*"The British Geological Survey Solid and Drift Geology Map for the Reading area (Reading Sheet No. 268) revealed that the northern section of the site was underlain by the Lambeth Group (clay, silt and sand) whilst the southern section was underlain by Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated). Areas of Worked Ground were recorded 1m northeast and 224m south of the site. An inferred bedrock fault was running through the middle of the site, separating the two areas.*

*A BGS borehole (SU67SE718) located ~290m northeast of the site revealed a 0.10m capping of Topsoil over chalk and clayey chalk fill to 1.20m bgl followed by a brown flinty clay to 1.60m bgl. From here up to 2.20m bgl a remoulded chalk with lumps of intact chalk, clay and flints was identified over remoulded chalk with some intact chalk up to 3.10m bgl. A rubbly chalk with some remoulded chalk and flints was then recorded to the base of the borehole at a depth of 6.0m bgl. No groundwater was recorded."*

## 2.4 Hydrology & Hydrogeology

The following information is a summary from Phase 2 Site Investigation Report:

*"A study of the aquifer maps on the DEFRA website revealed the northern section of the site was underlain by a Secondary A Aquifer comprising bedrock deposits of the Lambeth Group whilst the southern section of the site was underlain by a Principal Aquifer comprising bedrock deposits of the Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated).*

*Examination of the Environment Agency records showed that the site did not fall within a Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater.*

*No surface water features were present within a 250m radius of the site. The nearest surface water feature was identified to be the River Thames ~940m north of the site flowing in an easterly direction.*

*From analysis of hydrogeological and topographical maps the actual groundwater table was anticipated to be encountered at depth within the Chalk Formation. Some amounts of groundwater however may be present at shallower depths within the Lambeth Group or within Made ground. It was considered that groundwater was flowing in a northern direction toward the River Thames and in line with local topography.*

*The Groundsure Datasheets revealed the site was at a low risk of flooding from rivers and the sea. The datasheets also revealed the site was at low risk of groundwater flooding. The risk of surface water flooding at the site ranged from low to high."*

See **Appendix I** for Phase 2 Site Investigation Report.

## 2.5 Fluvial Flood Risk

Fluvial flood risk is the risk of flooding from the overbank flow of rivers and watercourses.

Within England, the risk of fluvial flooding is defined by Flood Zones (FZs) which indicate the potential extent of flooding for a given Annual Exceedance Probability (i.e., the potential for of an occurrence within any one year (AEP)) without considering the benefits from flood defences, other manmade structures, or channel improvement works.

The **EA Flood Map for Planning** indicates that the site is located within Flood Zone 1 and is therefore considered to have a low probability of fluvial flooding (see figure 2).

Figure 2: EA Flood Map for Fluvial Flooding

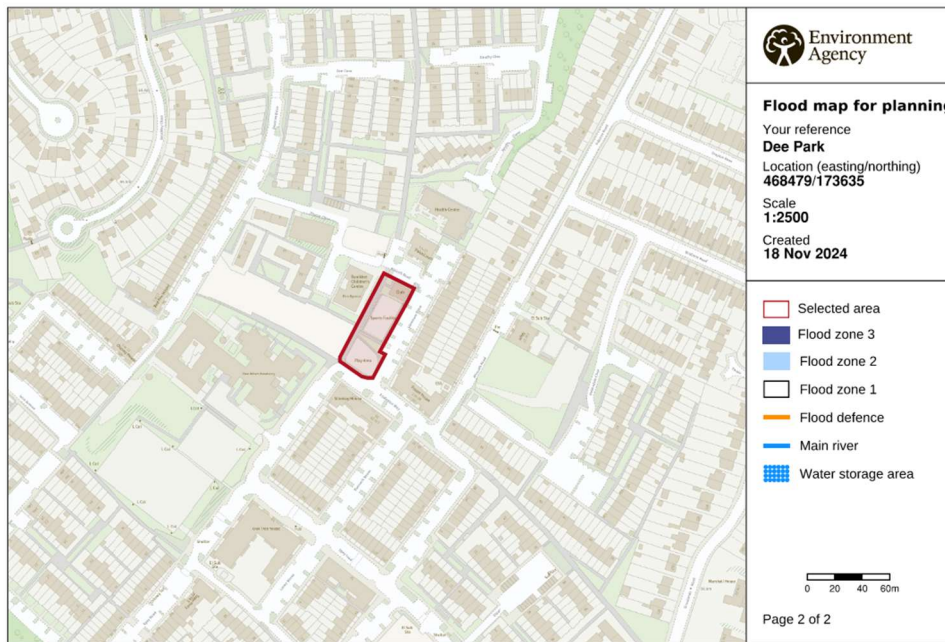


Table 2.2: Flood Zones Probability of Flooding

| NPPF - Flood Zones   |                       |                                                                                   |
|----------------------|-----------------------|-----------------------------------------------------------------------------------|
| <b>Flood Zone 1</b>  | Low Probability       | Less than 1 in 1000 (< 0.1%) chance of flooding occurring each year               |
| <b>Flood Zone 2</b>  | Medium Probability    | Between 1 in 100 and 1 in 1000 (1% - 0.1%) chance of flooding occurring each year |
| <b>Flood Zone 3a</b> | High Probability      | Greater than 1 in 100 (> 1%) chance of flooding occurring each year               |
| <b>Flood Zone 3b</b> | Functional Floodplain | Land where water <i>has</i> to be stored in times of flood                        |

## 2.6 Proposed Development

The proposed project involves the redevelopment of the site into a modernised playground. The plans include upgraded play equipment, resurfaced areas, and improved landscaping to create a safe and accessible recreational space. The site will retain some existing features, such as pathways and soft landscaping, while incorporating new drainage systems to manage surface water effectively.

See **Appendix B** for Architect's Proposed Site Layout.

### 3. Pre-Development Surface Water Management Strategy

#### 3.1 Existing Surface Water Drainage Network

##### 3.1.1 Existing Public Drainage

Review of Thames Water's sewer asset maps confirm that there are surface water sewers running along the southern and western edge of the site.

See **Appendix C** for the Sewer Asset Map.

##### 3.1.2 Existing Private Drainage

Utilities and CCTV surveys of the site were undertaken in August 2022.

The survey confirmed that the private drainage infrastructure is concentrated near the temporary building and surrounding hardstanding area. The system includes a combined foul and surface water network from the building, discharging off site via a combined sewer. No formal drainage infrastructure was identified within the existing playground or MUGA area, which appear to rely on surface runoff or natural infiltration through the current surfacing.

See **Appendix D** for Existing Drainage Layout.

#### 3.2 Pre-Development Surface Water Catchment Areas

Below is an indication of the pre-development catchment type area.

Table 3.1: Pre-Development Catchment Areas

| Catchment                  | Area (m <sup>2</sup> ) |
|----------------------------|------------------------|
| <u>Impermeable</u>         |                        |
| Building / Roof            | 118                    |
| Roads / Hardstanding       | 571                    |
| <u>Permeable</u>           |                        |
| Permeable surfacing (bark) | 402                    |
| Soft Landscaping           | 267                    |
| <b>Total Area</b>          | 1358                   |

See **Appendix E** for Pre-Development Catchment Plans.

### 3.3 Pre-Development Surface Water Run-Off Rates

In order to determine the post-development surface water flows, an assessment has been carried out on the pre-development to ensure that the run-off from the new development will not adversely affect flood risk either within the site boundary, offsite adjacent properties, or the downstream network.

Soakaway testing in accordance with BRE365 was undertaken within SA1-SA4 (refer to Ground Investigation for locations), with the results tabulated below.

| Soakage Testing Results                                                                                                    |             |               |                     |                      |                   |                           |
|----------------------------------------------------------------------------------------------------------------------------|-------------|---------------|---------------------|----------------------|-------------------|---------------------------|
| Trial Hole                                                                                                                 | Test Number | Depth (m bgl) | Start Depth (m bgl) | Finish Depth (m bgl) | Time Taken (mins) | Infiltration Rate (m/sec) |
| SA1*                                                                                                                       | 1           | 1.50          | 0.60                | 0.65                 | 240               | $6.86 \times 10^{-7}$     |
| SA2*                                                                                                                       | 1           | 1.50          | 0.60                | 0.61                 | 240               | $1.34 \times 10^{-7}$     |
| SA3*                                                                                                                       | 1           | 1.50          | 0.68                | 0.71                 | 240               | $4.40 \times 10^{-7}$     |
| SA4                                                                                                                        | 1           | 1.50          | 0.79                | 1.38                 | 6                 | $5.06 \times 10^{-4}$     |
|                                                                                                                            | 2           | 1.38          | 0.68                | 1.21                 | 6                 | $4.43 \times 10^{-4}$     |
|                                                                                                                            | 3           | 1.21          | 0.74                | 1.19                 | 4                 | $7.24 \times 10^{-4}$     |
| *Given the relatively slow infiltration rate encountered, only one test could be undertaken and it did not reach 75% mark. |             |               |                     |                      |                   |                           |

### 3.4 Summary of Pre-Development Flows

The pre-development surface water flows for the site have been assessed based on in situ testing with a rate of  $4.43 \times 10^{-4}$  m/s, as per the Phase 2 Site Investigation Report.

### 3.5 Pre-Development Flood Exceedance

Topographical survey information indicates that, should the existing drainage network fail or otherwise have its capacity exceeded, overland flows would follow the site topography and be directed towards the site's western boundary.

## 4. Surface Water Management and SuDS Assessment

### 4.1 Run-off Destinations

An appraisal should be undertaken to confirm the most suitable and sustainable method for managing surface water runoff from the development in accordance with the following hierarchy as highlighted in [Part H of Building Regulations and the National Planning Policy Framework \(NPPF\)](#):

1. Infiltration to the ground using a sustainable drainage system.
2. If this is not feasible, discharge to a watercourse or river; generally, at a controlled rate unless it does not affect flood risk e.g., if to the sea or an estuary.
3. Discharge at a controlled rate to a surface water sewer or drain.
4. Discharge at a controlled rate to a combined sewer system, with the approval from the Water Authority.
5. Only if the above have all been investigated and it has been proved that none of these options are suitable will discharge at a controlled rate to a foul sewer system, with the approval from the Water Authority.

The discharge of surface water run-off has been considered in accordance with the hierarchical approach:

Table 4.1: Review of the Drainage Hierarchy

| Method               | Reasoning                                                                                                                                                                                                                   | Suitability |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Interception / Reuse | Considered unsuitable due to safety and maintenance requirements                                                                                                                                                            | X           |
| Infiltration         | Partial infiltration techniques have been incorporated within the permeable pavement sub-base systems. However, the site utilises a controlled discharge to the existing Thames Water sewer network as the primary outfall. | ✓           |
| Surface Water Body   | As discharge to existing sewer is viable this method has not been explored.                                                                                                                                                 | X           |
| Surface Water Sewer  | Existing Thames Water sewer available for controlled discharge via saddle connection                                                                                                                                        | ✓           |
| Combined Sewer       | As discharge to existing sewer is viable this method has not been explored.                                                                                                                                                 | X           |
| Foul Water Sewer     | As discharge to existing sewer is viable this method has not been explored.                                                                                                                                                 | X           |

### 4.2 SuDS Assessment

#### 4.2.1 Overview of SuDS

The design of the surface water drainage system should seek to implement and maximise the use of Sustainable Drainage Systems (SuDS) where possible.

The primary purpose of a SuDS system is to manage surface water run-off within a development via mimicking natural methods, attenuating additional water volume generated by the introduction of impermeable areas whilst providing a degree of water treatment to run-off alongside amenity and biodiversity benefits to the local community.

The suitability and benefits of the various potential SuDS systems for the proposed development should be considered, which will aim to maximise the 4 pillars of SuDS:

- » Water Quantity (Controlling runoff);
- » Water Quality (Managing quality of runoff);
- » Amenity (Create and sustain better places for people);
- » Biodiversity (Create and sustain better places for nature).

The implementation of SuDS can be divided into the management of sources and of the wider site and even region, with preference given to source control.

## 4.2.2 Suitability of SuDS Elements

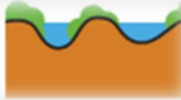
The drainage design should adopt the principles of SuDS where appropriate taking into consideration the site context and location. The principals of SuDS are that they should be designed to maximise the opportunities and benefits that can be secured surface water run-off management in terms of quality, quantity, flood risk, and amenity. The implementation and selection of SuDS techniques is largely dependent on the site layout and context. Some SuDS techniques may be more appropriate than others.

The suitability of SuDS components has been assessed as follows:

Table 4.2: Suitability of SuDS Components

| Hierarchy      | System                                                                                                      | Description                                                                                                                                                                       | Suitability                                                                                    |
|----------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Source Control | Green Roofs<br>          | A planted soil layer on the roof of a building: stores water in the soil layer to be absorbed by vegetation. Reduces runoff and treats pollutants.                                | No.<br>Considered unsuitable due to maintenance requirements                                   |
|                | Rainwater Harvesting<br> | Rainwater is collected from the roof of a building or from other paved surfaces and stored in an over ground or underground tank for treatment and reuse locally.                 | No.<br>Considered unsuitable due to maintenance requirements                                   |
|                | Permeable Surfaces<br>   | Surfaces that allow water to penetrate into underlying layers to be stored, collected or made to infiltrate to groundwater.                                                       | Yes<br>Permeable surfacing will be used across the site                                        |
|                | Bioretention Area<br>    | A vegetated area with gravel and sand layers below designated to channel, filter and cleanse water vertically, to then be stored, collected or made to infiltrate to groundwater. | No.<br>Not deemed suitable for this site due to space constraints and potential conflicts with |

|                           |                                                                                                          |                                                                                                                                                                                                                                                                                   | its primary recreational use.                                                                                                                                                            |
|---------------------------|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hierarchy                 | System                                                                                                   | Description                                                                                                                                                                                                                                                                       | Suitability                                                                                                                                                                              |
| Site and Regional Control | Filter Strip<br>        | Grassed or planted areas that runoff is allowed to run across to promote infiltration and cleansing.                                                                                                                                                                              | No.<br>Not deemed suitable for this site due to space constraints and potential conflicts with its primary recreational use.                                                             |
|                           | Soakaway<br>           | A soakaway is designed to allow water to quickly soak into permeable layers of soil. Constructed like a dry well, an underground pit is dug filled with gravel or rubble. Water can be piped to a soakaway where it will be stored and allowed to gradually seep into the ground. | No.<br>Not deemed suitable for the proposed positive discharge strategy to the existing Thames Water sewer network and the use of partial infiltration sub-base systems across the site. |
|                           | Swale<br>             | Shallow depressions to convey and filter water. May be 'wet' with above ground attenuation or 'dry' with a gravel layer. Can be made to infiltrate to groundwater.                                                                                                                | No.<br>Not deemed suitable for this site due to space constraints in the playground and potential conflicts with its primary recreational use.                                           |
|                           | Hardscape Storage<br> | Hardscape water features can be used to store run-off above ground within a constructed container. Storage features can be integrated into public realm areas with a more urban character.                                                                                        | No.<br>Not deemed suitable                                                                                                                                                               |

|                                                                                                                |                                                                                                                                                                                                                                                                                          |                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Pond / Basin</p>           | <p>Store and treat water. Ponds have a level of standing water whereas basins are generally dry. Can be made to infiltrate to groundwater.</p>                                                                                                                                           | <p>No.<br/>Not deemed suitable for this site due to space constraints</p>                                                                                                |
| <p>Wetland</p>                | <p>Wetlands are shallow vegetated water bodies with a varying water level. Specially selected plant species are used to filter water. Water flows horizontally and is gradually treated before being discharged. Wetlands can be integrated with a natural or hardscape environment.</p> | <p>No.<br/>Not deemed suitable for this site due to space constraints in the playground and potential conflicts with its primary recreational use.</p>                   |
| <p>Underground Storage</p>  | <p>Water can be stored in tanks, gravel or plastic crates beneath the ground to provide attenuation.</p>                                                                                                                                                                                 | <p>Yes.<br/>Attenuation storage is provided within the permeable pavement sub-base systems prior to controlled discharge to the existing Thames Water sewer network.</p> |

### 4.2.3 Interception Storage

Interception can be defined as the capture and retention on site of the first 5mm of the majority of all rainfall events. Interception mechanisms have been assessed to show the site is compliant for zero run-off from the first 5mm for 80% of events during the summer and 50% in winter. (Ciria)

Table 4.3: Interception Storage Systems

| System                      | Reasoning                                                                                                                                                                                                                                                                                             |   |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| Green Roofs                 | All surfaces that have green / blue roofs                                                                                                                                                                                                                                                             | X |
| Rainwater Harvesting        | All surfaces drained to RWH systems designed whether for surface water management or just water supply, provided the RWH system design is based on regular daily demand for non-potable water                                                                                                         | X |
| Soakaways / Infiltration    | Areas of the site drained to systems that are designed to infiltrate run-off for events greater than a 1 month return period.                                                                                                                                                                         | ✓ |
| Permeable Pavements         | All permeable pavements, whether lined or not, can be assumed to comply, provided there is no extra area drained to the permeable pavement.                                                                                                                                                           | ✓ |
| Filter Strips / Swales      | Roads drained by filters strips / swales, where the longitudinal gradient of the vegetated area is less than 1:100, are suitable for interception delivery for impermeable areas up to 5 times the base of the vegetated surface area receiving the runoff.                                           | X |
| Infiltration Trenches       | Roads drained by infiltration trenches can be considered to provide interception                                                                                                                                                                                                                      | X |
| Detention Basins            | Areas of the site drainage to detention basin with a flat base can be assumed to comply. The area of the basin that is assumed to contribute to interception of run-off should be below the outlet of the basin.                                                                                      | X |
| Bioretention / Rain Gardens | Areas of the site drainage to unlined bioretention components can be assume to comply where the impermeable area is less than 5 times the vegetated surface area receiving run-off/ They can be designed to deliver interception for larger areas, where suitable infiltration capacity is available. | X |
| Ponds                       | Areas drained by ponds (with a permanent water pool that is effectively maintained by the outlet structure) are not assumed to deliver interception                                                                                                                                                   | X |

## 5. Post-Development Surface Water Management Strategy

### 5.1 Proposed Surface Water Drainage Strategy

The proposed surface water drainage strategy for the development has been designed in accordance with the principles of sustainable drainage and will manage runoff through a combination of permeable surfacing, attenuating sub-base storage, partial infiltration and controlled discharge to the existing Thames Water surface water sewer network.

#### **Southern Area: Partial Infiltration System (System B)**

In the southern areas of the site, surface water runoff from the proposed permeable play surfacing and hard landscaped areas will be collected within a partial infiltrating permeable pavement construction incorporating attenuating sub-base storage (system B).

The system provides temporary storage of runoff within open graded crushed rock (OGCR) layers whilst allowing limited filtration into the underlying ground and conveying runoff through perforated collector pipes within the sub-base system.

#### **Northern Area: Partial Infiltration System (System B)**

In the northern areas of the site, surface water runoff from the proposed permeable surfacing and associated hard landscaped areas will similarly be collected within partial infiltrating permeable pavement construction and attenuating sub-base layers.

The system provides on-site attenuation storage whilst allowing limited infiltration into the underlying ground before conveying runoff towards the downstream flow control chamber and surface water outfall connection.

#### **Underground Attenuation and Surface Water Discharge**

Surface water runoff from both the northern and southern areas of the site will ultimately discharge via a flow control manhole incorporating a Hydro-Brake flow control device prior to discharge at a maximum rate of 1.0 L/s into the existing Thames Water surface water sewer network via a new saddle connection.

Attenuation storage is provided within the permeable pavement sub-base systems across the site and has been designed to accommodate runoff generated during storm events up to and including the 1 in 100-year rainfall event plus 40% climate change allowance.

Where applicable, the surface water management strategy has incorporated the recommendations of the Non-statutory Technical Standards for Sustainable Drainage and general best practice guidance to provide a sustainable drainage solution for the development.

See **Appendix G** for Drainage Strategy.

See **Appendix E** for Calculations

## 5.2 Post-Development Surface Water Catchment Areas

Below is an indication of the post-development catchment type area.

Table 5.1: Pre vs Post-Development Catchment Areas

| Catchment                                           | Area (m <sup>2</sup> ) |
|-----------------------------------------------------|------------------------|
| <u>Impermeable</u>                                  |                        |
| Building / Roof                                     | 0                      |
| Roads / Hardstanding                                | 0                      |
| <u>Permeable</u>                                    |                        |
| Soft Landscaping                                    | 303                    |
| Permeable surfacing (wet pour/<br>Permeable paving) | 1055                   |
| <b>Total Area</b>                                   | <b>1358</b>            |

## 5.3 Post-Development Surface Water Run-Off Rates

The proposed drainage network has been designed to attenuate runoff generated by the development within permeable pavement sub-base systems prior to controlled discharge into the existing Thames Water surface water sewer network.

Surface water runoff collected within the permeable pavement construction layers will be conveyed through perforated collector pipework towards the downstream flow control manhole.

Flow control measures incorporated within flow control manhole FC-01 will restrict discharge from the site to a maximum rate of 1.0 L/s prior to discharge via a saddle connection into the existing Thames Water surface water sewer network.

Attenuation storage provided within the permeable pavement sub-base systems has been sized to accommodate storm events up to and including the 1 in 100 year rainfall event plus 40% climate change allowance without increasing flood risk on or off site.

In the event that runoff exceeds the design capacity of the drainage system, exceedance flows will follow overland flow routes away from buildings and critical infrastructure in accordance with the proposed site levels.

### 5.3.1 Allowance for Climate Change and Urban Creep

In accordance with EA guidance, an allowance for climate change has been incorporated into the design to ensure that the proposed surface water network has a suitable degree of resilience. These allowances vary with the expected lifetime of the development.

Urban Creep Factor (UCF) is defined as any increase in the impervious area that is drained to an existing drainage system without planning permission being required, such as the construction of patios, small extensions, etc.

As the footprint of the site will remain majority impervious, this factor is not applied.

### 5.3.2 Post-Development Surface Water Storage

In line with the **Non-Statutory Technical Standard for Sustainable Drainage S7 & S8 (Flood Risk)**, all storm events up to and including the 1 in 30 AEP storm event will be retained within the proposed surface water drainage network and exceedance volumes from all other storm events up to and including the 1 in 100 AEP plus 40% allowance for climate change will be retained within the site and managed to minimise the risk to people and property.

Attenuation flood storage will be distributed across the development with the use of attenuating permeable pavement sub-base systems providing temporary storage within open graded crushed rock layers prior to controlled discharge to the existing Thames Water surface water sewer network.

Expected attenuation requirements are shown below:

Table 5.2: Attenuation Requirements

| Type of Storage Structure               | Dimensions                     | Void Ratio | Total Attenuation Volume |
|-----------------------------------------|--------------------------------|------------|--------------------------|
| Attenuating Sub-Base (System B) - AS-01 | 57m <sup>2</sup> x 0.46m deep  | 30%        | <b>26m<sup>3</sup></b>   |
| Attenuating Sub-Base (System B) - AS-02 | 45m <sup>2</sup> x 0.47m deep  | 30%        | <b>21m<sup>3</sup></b>   |
| Attenuating Sub-Base (System B) - AS-03 | 158m <sup>2</sup> x 0.38m deep | 30%        | <b>60m<sup>3</sup></b>   |
| Attenuating Sub-Base (System B) - AS-04 | 33m <sup>2</sup> x 0.3m deep   | 30%        | <b>10m<sup>3</sup></b>   |

### 5.4 Post-Development Flood Exceedance

In line with the **Non-Statutory Technical Standard for Sustainable Drainage S9 (Flood Risk)**, in the event that there is a failure of the surface water drainage network beyond the design storm or through other circumstances, exceedance flows will be directed away from buildings and critical infrastructure.

See **Appendix F** for Overland Flow Routes

### 5.5 Summary of Post-Development Flows

It has been determined that post-development runoff can be effectively managed through partial infiltration permeable pavement systems, on-site attenuation storage, and controlled discharge at a maximum rate of 1.0 L/s into the existing Thames Water surface water sewer network without increasing flood risk on or off site.

See **Appendix G** for the Drainage Strategy Layout.

## 5.6 Water Quality

Consideration must be given both during construction and post-development to ensure that water quality is not negatively impacted.

Playgrounds typically represent a low-pollution hazard environment, as defined in CIRIA C753 – The SuDS Manual, due to the absence of hydrocarbons and limited risks of heavy metals or high sediment loads.

The proposed drainage design incorporates different permeable surfacing types across the site. These SuDS components provide an effective first stage of treatment by allowing water to infiltrate and naturally filter through the surfacing and sub-base, removing suspended solids and pollutants.

The pollution mitigation provided by these SuDS elements exceeds the required levels for low-pollution land uses, ensuring compliance with water quality criteria outlined in CIRIA C753. The system is designed to provide sustainable and effective water treatment appropriate for the low-risk nature of the site.

### 5.6.1 Quality of Surface Water Run-off: Post-Development

In line with the SuDS suitability, the design should seek to provide an appropriate level of water treatment to effectively mitigate the pollution risk associated with the site and not affect the quality of water downstream.

The permeable surfacing utilised across the site, will act as a pre-treatment mechanism, allowing for initial filtration of surface water before it enters the drainage system.

In addition, the attenuating sub-base systems will help further filter and slow water flow, reducing the risk of pollutants being transported into the downstream drainage network or other downstream areas. These measures collectively ensure the water quality is maintained while supporting the functionality and sustainability of the drainage system.

### 5.6.2 Quality of Surface Water Run-off: During Construction

It is anticipated that the during construction adequate provisions will be put in place to ensure the existing drainage is protected to prevent material which could have a negative impact on water quality entering the system.

Some pollution mitigation techniques that are to be considered include:

- » Monitoring and managing disposal of site waste. Make sure all waste is correctly dealt with to stop it from spreading.
- » Keeping materials such as sand and cement secure. Materials should be located where there isn't risk of them being washed into the drainage system.
- » Covering up all drains to prevent waste from ending up in the system.
- » Keep the road and paths to the site clean at all times. This will prevent silt and other pollutants from running off into any bodies of water.
- » Properly collect and treat any wastewater that is produced.
- » Temporary installation of screens within manholes to capture any debris.

## 5.7 Design Standards for Surface Water Drainage

The surface water drainage strategy for the new development should aim to deliver a safe, functional, cost effective and, as far as possible, sustainable drainage system (SuDS) which considers the following design principles to ensure:

- » That natural drainage features are protected;
- » That public health and safety risks are taken into account and managed;
- » The constructability of the surface water system;
- » The maintainability of the surface water system;
- » The long-term economic viability of the system;
- » That sustainability issues are taken into account;
- » That the information requirements of stakeholders are adequately addressed;
- » That the potential value of the surface water system, in enhancing the rural and urban environment is recognized and optimized.

The surface water below ground gravity drainage system is to provide connections from all new rainwater pipes, channels, gullies and road gullies at ground floor level. The locations of the drainage components are to be fully coordinated with all relevant architectural, landscaping and services drawings. All materials and products relating to the below ground drainage system shall be specified in accordance with their intended use and meet all relevant British Standards and BBA accreditations.

In accordance with best practice storm drainage will be designed to the following performance criteria:

|                                   |                                                        |
|-----------------------------------|--------------------------------------------------------|
| 1 in 2-year storm return period:  | Pipes running under full conditions with no surcharge. |
| 1 in 30-year storm return period: | No flooding.                                           |
| 1 in 100-year storm:              | Extreme flooding to be retained on site.               |

## 6. Ownership and Maintenance

The key elements of the surface water drainage system will require periodic maintenance to prevent failure of the system and/or a reduction in capacity of the networks as a whole and the following matrix therefore sets out the various drainage items to be maintained, identifies who is responsible and the frequency of maintenance.

### 6.1 Post Development SuDS Features

The proposed SuDS features will require maintenance including litter and debris removal, sediment removal, vegetation maintenance and remediation to any damaged structures.

The maintenance requirements will be the responsibility of a private maintenance company. All inspection and maintenance works should take into consideration the implications of 'lone working'. An assessment should be carried out and the risks mitigated accordingly.

Table 6.1: Proposed Schedule of Maintenance for Below Ground Drainage

| Permeable Paving - Operation and maintenance requirements in accordance with CIRIA C753 - The SuDS Manual |                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>Maintenance Schedule</u>                                                                               | <u>Required Action</u>                                                                                                                                                                | <u>Frequency</u>                                                                                                                                                                                                                                                                                                               |
| <b>Regular maintenance</b>                                                                                | Brushing and vacuuming (standard cosmetic sweep over whole surface).                                                                                                                  | Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surfaces from adjacent impermeable areas as this area is most likely to collect the most sediment. |
| <b>Occasional maintenance</b>                                                                             | Stabilise and mow contributing and adjacent areas.                                                                                                                                    | As required.                                                                                                                                                                                                                                                                                                                   |
|                                                                                                           | Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying.                                                                | As required – once per year on less frequently used pavements.                                                                                                                                                                                                                                                                 |
| <b>Remedial actions</b>                                                                                   | Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving.                                             | As required.                                                                                                                                                                                                                                                                                                                   |
|                                                                                                           | Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material. | As required.                                                                                                                                                                                                                                                                                                                   |

|                   |                                                                                                |                                                                                                           |
|-------------------|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
|                   | Rehabilitation of surface and upper substructure by remedial sweeping.                         | Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging). |
| <b>Monitoring</b> | Initial inspection.                                                                            | Monthly for three months after installation.                                                              |
|                   | Inspect for evidence of poor operation and/or weed growth – if required, take remedial action. | Three-monthly, 48 h after large storms in first six months.                                               |
|                   | Inspect silt accumulation rates and establish appropriate brushing frequencies.                | Annually.                                                                                                 |
|                   | Monitor inspection chambers.                                                                   | Annually.                                                                                                 |

**Reference should be made to the manufacturer recommendations where applicable**

#### Soakaways - Operation and maintenance requirements in accordance with CIRIA C753 - The SuDS Manual

| <b><u>Maintenance Schedule</u></b> | <b><u>Required Action</u></b>                                                                                                             | <b><u>Frequency</u></b>                      |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| <b>Regular maintenance</b>         | Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings. | Annually.                                    |
|                                    | Trimming any roots that may be causing blockages.                                                                                         | Annually (or as required).                   |
| <b>Occasional maintenance</b>      | Remove sediment and debris                                                                                                                | As required, based on inspections.           |
| <b>Remedial actions</b>            | Reconstruct soakaway and / or replace or clean void fill, if performance deteriorates or failure occurs.                                  | As required.                                 |
|                                    | Replacements of clogged geotextile (will require reconstruction of soakaway).                                                             | As required.                                 |
|                                    | Inspect silt traps and note rate of sediment accumulation.                                                                                | Monthly in the first year and then annually. |
|                                    | Check soakaway to ensure emptying is occurring.                                                                                           | Annually.                                    |

## 6.2 Post Development Drainage System

All drainage systems should be inspected at regular intervals then, if necessary, cleaned and repaired to ensure that system performance is maintained.

This guide includes recommendations on the methods and frequency of the inspection and cleaning but local factors may influence this, therefore this manual should be appended to include any revises or additional requirements determined during the life of the development.

## 6.3 Inspection And Cleaning of Surface Water Drainage

Inspection chambers, gullies and channels should be fully inspected regularly, at least annually, by removing covers and checking for obstructions, silt and damage.

The following should be carried out when cleaning a drainage system:

- » Covers of inspection chambers and manholes should be removed and the sides, benching and channels cleaned.
- » Main and branch drains should be cleaned and should be flushed with clean water afterwards. Any obstructions found should be removed and not flushed into the system.
- » Periodically, accumulated deposits in gullies should be removed. The traps should then be plunged and thoroughly flushed out with clean water.
- » Covers of inspection chambers and gullies should be replaced, bedded in suitable grease or other sealing material and/or bolted down as appropriate to the type. Missing bolts and broken items should be renewed.

## 6.4 Methods Of Cleaning

The drainage system should be cleaned, as appropriate, using one or more of the following methods:

### 6.4.1 Rodding

Appropriate cleaning tools and techniques should be chosen to avoid damage to the pipework during the cleaning process. A set of rods with appropriate ends is basic useful equipment.

It is important that correctly designed propriety ends are used on the rods. Makeshift devices attached to the ends of rods should be avoided, as they are not effective as the correctly designed article and could become detached and create a blockage which would be difficult to remove. Furthermore, is it possible that such devices could cause damage to the pipeline.

If the rods have brass ferrules, they should be checked to ensure that their fastenings are secure and that there are no protruding shoulders or fastenings, as these can cause damage to drain lines, especially when entering through rodding eyes.

### 6.4.2 Jetting

High pressure jetting techniques are suitable for use with all currently available pipe materials and should also be considered.

### 6.4.3 Hydraulic Rams, Compressed Air or Other Gases

Equipment is available for use with all sizes of drain likely to be encountered in building drainage and is suitable for use with all currently available pipe materials. The principle of operation is that a shock wave is induced and is transmitted by water to the point of blockage and the technique is effective where the pipe is surcharged or can be filled with water from the blockage to a point where the equipment can be used.

Table 6.2: Drainage Items - Ownership &amp; Maintenance Responsibility Matrix

| Drainage Items - Ownership & Maintenance Responsibility Matrix |                                   |                                                                                       |
|----------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------|
| Feature                                                        | Maintenance                       | Frequency                                                                             |
| Private Drains                                                 | Inspection                        | CCTV survey every 5-10 years.                                                         |
|                                                                | Regular Maintenance               | Jet clean system fully every 5-10 years. (Recommend prior to CCTV drainage survey is) |
|                                                                | Remedial / Occasional Maintenance | Carry out remedial works as identified in CCTV survey.                                |
| Gully / Drainage Channels                                      | Inspection                        | Quarterly                                                                             |
|                                                                | Regular Maintenance               | Remove silt and debris as necessary to prevent build up.                              |

A formal review of the risks should be undertaken on an annual basis:

Table 6.3: Proposed Operational Schedule for Below Ground Drainage

| Operation                                          | Risks                            | Mitigating Measures                                                                                                     |
|----------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Access to manholes for Inspection and Maintenance. | 1. Confined spaces               | 1. Entry to confined space to be minimised and, where unavoidable, to be carried out by appropriately trained personnel |
| Removal of silt from drainage channel              | 1. Risk to members of the public | 1. Access to hazardous areas by members of the public to be prohibited                                                  |

All inspection and maintenance works should take into consideration the implications of 'lone working'. An assessment should be carried out and the risks mitigated accordingly.

## 7. Consent / Planning

Summary of expected consents required:

- » Ordinary Watercourse Consent – No
- » Sewerage Undertaker Consent – Yes – Consent given via pre development instructions
- » Section 104 / 106 Drainage Adoption - No
- » Build Over / Build Near - No

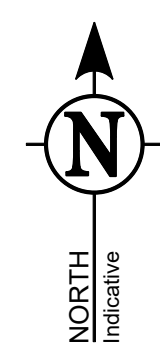
In addition to the above it is anticipated that details of the drainage scheme will need to be approved by Reading Borough Council Lead Local Flood Authority (LLFA) through a formal planning application.

## 8. Conclusions

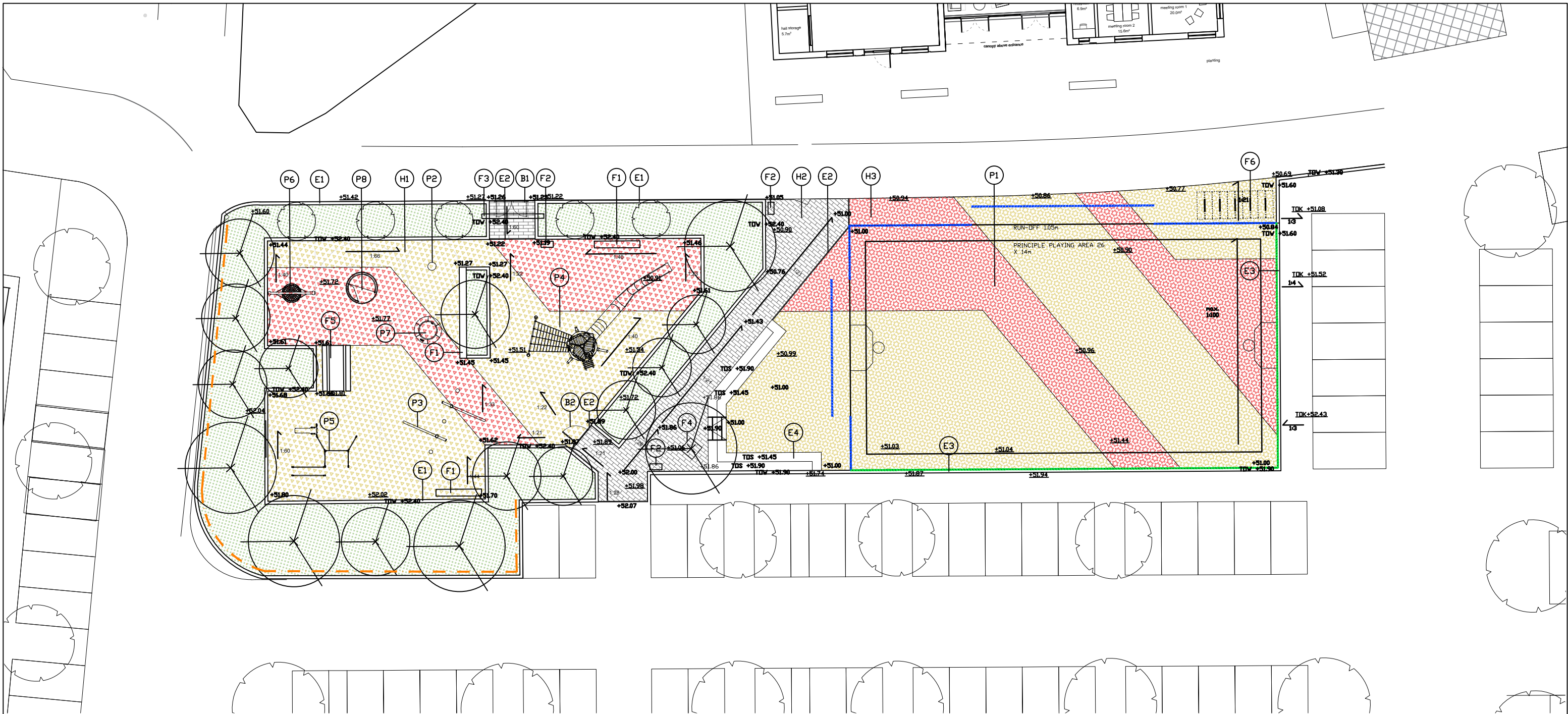
This report concludes that the surface water drainage strategy for the development will be designed in accordance with both national and local standards and best practice guidance. The following key items have been summarised below:

- » The surface water drainage system for the development has been designed to accommodate the required flows for the lifetime of the development, utilising permeable surfacing and partial infiltration sub-base systems to provide source control, attenuation, and water quality treatment benefits.
- » Surface water runoff from the development will be attenuated within permeable pavement sub-base systems prior to controlled discharge at a maximum rate of 1.0 l/s into the existing Thames Water surface water sewer network via a Hydro-Brake flow control chamber and saddle connection.
- » All surface water runoff from storm events up to and including the 1 in 100 year plus 40% climate change event will be retained within the site drainage system without increasing flood risk on or off site.
- » In the event that flows from rainfall exceed the 1 in 100 year rainfall event or system failure occurs through lack of maintenance, surface water runoff will be directed via exceedance routes away from buildings and critical infrastructure.
- » The use of permeable surfacing and partial infiltration sub-base systems ensures that water quality requirements outlined within CIRIA C753 – The SuDS Manual are achieved, minimising pollution risks associated with the development.
- » Ownership and maintenance responsibilities for the surface water drainage system will be clearly defined to ensure the drainage infrastructure continues to operate effectively throughout the lifetime of the development.
- » Ownership and maintenance liabilities for the surface water drainage system will be clearly defined so that in the event of failure the drainage system appropriate action can be taken to ensure that the drainage system continues to work efficiently.

## *Appendix A      Topographical Survey*



## *Appendix B      Proposed Site Layout*



**Legend**

**Levels**

+51.03

Existing level retained

+51.25

Proposed level

1:21

Proposed fall/ gradient

**Surface Finishes & Edges**

H1 A/B wetpour/ tigermulch surfacing (porous)

H2 Porous pre-cast concrete block paving (brick style)

H3 Polymeric surfacing to ball sports area (porous)

E1 Timber sleeper retaining wall - grade A European Oak

E2 Flat Top edging 50mm wide

E3 Brick retaining wall

E4 Natural stone seating steps

**Boundary Treatments**

B1 Double metal gate (gate to open inwards into park)

B2 Single metal gate (gate to open inwards into park)

B3 Metal fence to playground 1.1m high

B4 Rebound fence to ball sports area 3m high

B5 Rebound fence to ball sports area 4m high

**Play**

P1 MUGA - Sport England size for basketball

P2 Spinning bowl

P3 Trapeze swing

P4 Climbing structure

P5 Outdoor gym

P6 Nursery swing

P7 Playground trampoline

P8 Roundabout

Refer to hardworks schedule for details.

**Furniture**

F1 Timber bench

F2 Litter bin

F3 Reclaimed metal arch

F4 Tree grille

F5 Picnic table and bench

F6 Bicycle stands

Refer to hardworks schedule for details.

**Planting**

Shade mix- groundcover structure planting with bulbs

Specimen tree - (ms) multi-stem form, height 3m minimum with raised stems.

Specimen shrub

Refer to softworks schedule for details.

Existing trees to be retained.

**NOTE:** All play equipment and materials are as described 'or similar'. The final design and material specification could be subject to minor changes as a result of stage 4 coordination, subject to client approval.

Rev Date Drawn Description

03.05.23 KRA For information

A 22.05.23 RBL For information

B 25.05.23 RBL For information

C 04.09.24 RBL For information

D 12.09.24 RBL For information

E 08.10.24 RBL For planning

F 14.10.24 RBL Note added to legend. For planning

G 20.11.24 RBL Permeable paving annotated. For planning

H 17.12.24 RBL Permeable paving removed from highways land. For planning

I 07.01.25 RBL Block paving removed from highways land. For planning

J 09.05.25 RBL Redesign following consultation. For coordination.

Notes:

Do not scale from drawings unless by agreement with HTA. Use figured dimensions only. Check all dimensions on site prior to commencing the works. Drawing to be read in conjunction with other relevant consultant information.

This drawing is the copyright of HTA Design LLP and must not be copied or reproduced in part, or in whole, without the express permission of HTA Design LLP. Drawing to be read in conjunction with specification.

Legend

1:250

5m 0 5m

NORTH

Hardworks General Arrangement

drawing title

Reading Borough Council

client name

Dee Park Open Space

status

RBC-DPR\_HTA-L\_DR\_0901

drawing number

1:250

scale @ A3

RBC-DPR

project number

KRA

originated by

HTA Design LLP

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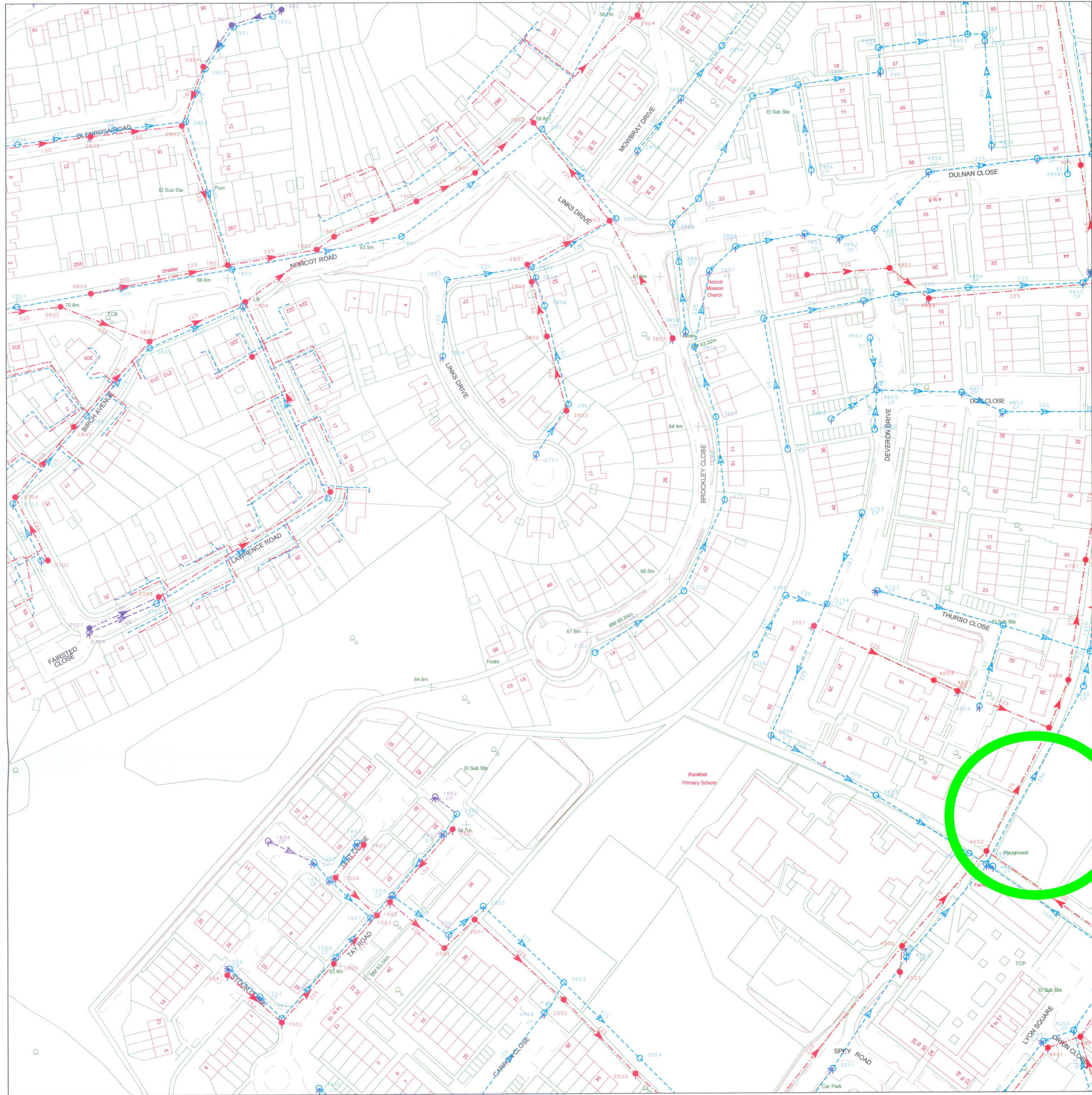
London | Edinburgh | Manchester | Bristol

hta

## *Appendix C     Sewer Asset Map*

SU6874SW

SU6873NW



SU6873SW

**MANHOLES:**

- COMBINED
- FDGL
- SURFACE
- PROPOSED
- W/CHOP
- OTHER / UNKNOWN
- MANHOLE
- PROPOSED
- PRIVATE

**FITTINGS:**

- AV AIR VALVE
- BS BLIND SHIRT
- OP OATON RIT
- DE SAM CHASE
- OP DOUBLE FLUSHING TANK / CHAMBER
- OP SINGLE FLUSHING TANK / CHAMBER

**OPERATIONAL CONTROLS:**

- RR RAILWAY BOARD
- RV RAILWAY VALVE
- CL CLOUGH
- DR DAM BOARD

**SEWERS:**

- PRIVATE COMBINED
- PRIVATE FDOGL
- PUBLIC COMBINED
- PUBLIC FDOGL
- TRUNK COMBINED
- TRUNK FDOGL
- TRUNK SURFACE

**SEWERAGE ASSET ABBREVIATIONS AND SYMBOLS**

- RISING COMBINED
- RISING FDOGL
- RISING SURFACE
- RISING SLODE
- STORM OVERFLOW
- SLIDWAY DRAIN / GULLY
- TRADE EFFLUENT
- BIO-SOLIDS (SLODE)

**AREAS:**

- BUILDING OVER CASE
- DRAWING AREA
- LICENSE AREA
- SEWER SURVEY
- UNKNOWN AREA
- SEWERAGE TREATMENT WORKS OR PUMPING STATION

**END ITEMS:**

- STW EFFLUENT DISCHARGE
- ROADWAY
- OUTFALL
- UNLID / UNDEFINED END
- FLUSHING INLET
- OTHER / UNKNOWN
- OUTFALL

**OTHER:**

- SEWERAGE TREATMENT WORKS
- SEWERAGE PUMPING STATION
- 11100.35 INVERT LEVEL

**NOTE:**

- 1. ALL LEVELS ARE TO ORDNANCE DATUM NBM2K
- 2. ALL MEASUREMENTS ARE METRIC

**Comments:**

ALS/ALS/24/2008\_999224

**inspace**

Regeneration & New Homes

|                  |        |
|------------------|--------|
| REVIEWED         | STATUS |
| PRELIMINARY      | A      |
| FOR COMMENT      | B      |
| FOR CONSTRUCTION | C      |

SIGNED **WJ** DATE **11/3/08**

**Thames Water**

Thames Water Utilities  
Nugent House  
Vestern Road  
Reading Berks RG1 8DB

REGISTERED IN ENGLAND AND WALES NO 2366661

IN CASE OF QUERIES PLEASE CONTACT:

Rose Kila Court  
Rose Kila Lane  
Reading  
Berkshire  
RG2 0HP

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THAMES WATER EAGLE GIS PLOTTING SYSTEM VERSION 4.0.3

ORIGIN

EAST 468250°

NORTH 173750°

SCALE 1:1250

ISSUE DATE 24.1.2008

|          |          |          |
|----------|----------|----------|
| SU6774SE | SU6874SW | SU6874SE |
| SU6773NE | This Map | SU6873NE |
| SU6773SE | SU6873SW | SU6873SE |

REFERENCE COVER LEVEL INVERT LEVEL

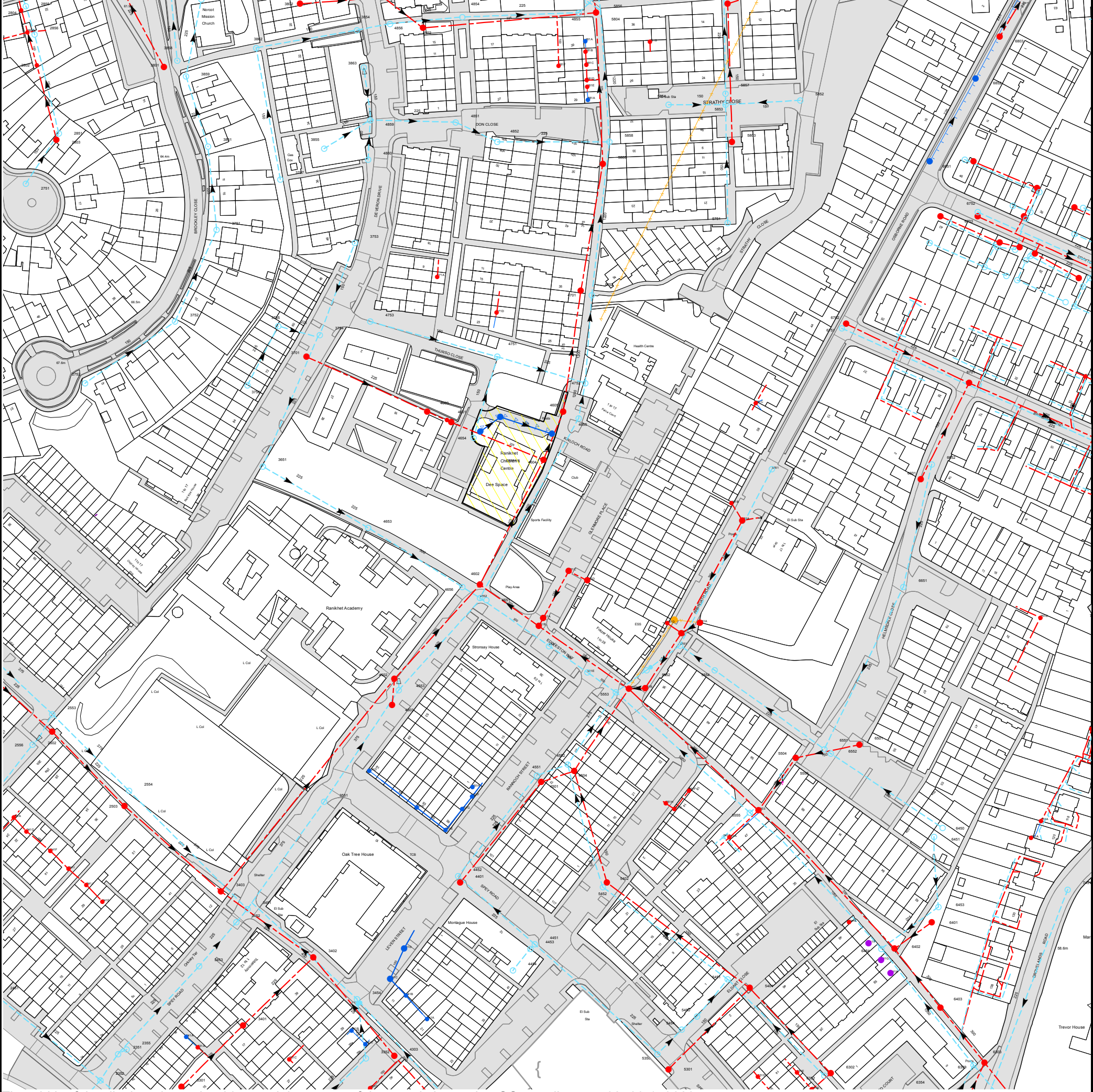
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| SU67739901 | 70.11   | 68.49   |
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| SU68730703 | 73.05   | 71.29   |
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| SU68730751 | 76.45   | 74.87   |
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| SU68730804 | 69.68   | 66.40   |
| SU68730851 | 70.63   | 69.06   |
| SU68730852 | 68.79   | 66.76   |
| SU68730853 | 71.32   | 68.31   |
| SU68730901 | 67.23   | 65.08   |
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| SU68731502 | 61.43   | 59.02   |
| SU68731503 | 61.59   | 59.36   |
| SU68731504 | 64.09   | 62.82   |
| SU68731505 | 62.93   | 61.18   |
| SU68731506 | 62.09   | 60.11   |
| SU68731551 | 62.14   | 59.56   |
| SU68731552 | 63.97   | 61.94   |
| SU68731553 | 64.16   | 62.31   |
| SU68731554 | 64.05   | 62.69   |
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| SU68731558 | 61.37   | 58.35   |
| SU68731601 | 61.63   | 60.41   |
| SU68731651 | 61.89   | 60.02   |
| SU68731652 | 60.02   | 59.08   |
| SU68731653 | 61.64   | 60.07   |
| SU68731654 | 62.48   | 61.68   |
| SU68731701 | 69.74   | 67.10   |
| SU68731751 | 69.75   | 67.56   |
| SU68731801 | 66.67   | 63.46   |
| SU68731802 | 64.70   | 61.94   |
| SU68731803 | 64.06   | 61.56   |
| SU68731804 | 66.57   | 63.25   |
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| SU68731903 | 62.34   | 60.34   |
| SU68731951 | 0.0     | -9999.0 |
| SU68731952 | 0.0     | -9999.0 |
| SU68732452 | 60.62   | 58.95   |
| SU68732501 | 59.03   | 57.45   |
| SU68732502 | 58.46   | 56.08   |
| SU68732503 | 60.03   | 55.46   |
| SU68732504 | 59.42   | 57.76   |
| SU68732551 | 59.46   | 57.38   |
| SU68732552 | 59.03   | 57.09   |
| SU68732553 | 0.0     | -9999.0 |
| SU68732554 | 0.0     | -9999.0 |
| SU68732556 | 58.57   | 57.37   |
| SU68732601 | 59.96   | 59.21   |
| SU68732651 | 59.96   | 58.92   |
| SU68732652 | 59.68   | 58.99   |
| SU68732751 | 69.38   | 67.83   |
| SU68732752 | 67.14   | -9999.0 |
| SU68732801 | 64.54   | 62.92   |
| SU68732802 | 0.0     | -9999.0 |
| SU68732803 | 0.0     | -9999.0 |
| SU68732804 | 64.93   | 63.66   |
| SU68732851 | 0.0     | -9999.0 |
| SU68732852 | 64.46   | 63.15   |
| SU68732853 | 66.73   | 65.13   |
| SU68732854 | 68.81   | 67.62   |
| SU68732855 | 64.82   | 63.98   |
| SU68732856 | 0.0     | -9999.0 |
| SU68732901 | 61.30   | 59.41   |
| SU68732902 | 60.04   | 58.57   |
| SU68732903 | 61.93   | 59.88   |
| SU68732904 | 58.69   | 56.69   |
| SU68732951 | 60.05   | 57.75   |
| SU68732952 | 61.89   | 59.48   |
| SU68732953 | 59.25   | 56.70   |
| SU68733551 | 56.69   | 51.78   |
| SU68733651 | 56.90   | 54.79   |
| SU68733701 | 57.55   | 54.81   |
| SU68733751 | 65.69   | -9999.0 |
| SU68733752 | 66.51   | -9999.0 |
| SU68733753 | 58.87   | 56.72   |
| SU68733754 | 57.28   | 56.04   |
| SU68733755 | 0.0     | -9999.0 |
| SU68733756 | 0.0     | -9999.0 |
| SU68733757 | 61.60   | 59.84   |
| SU68733801 | 62.69   | 60.22   |
| SU68733802 | 0.0     | -9999.0 |
| SU68733851 | 63.58   | -9999.0 |
| SU68733852 | 59.18   | 57.40   |
| SU68733853 | 59.64   | 57.88   |
| SU68733854 | 55.17   | 53.85   |
| SU68733855 | 59.72   | 58.48   |
| SU68733856 | 60.65   | 58.94   |
| SU68733857 | 61.54   | 59.84   |
| SU68733858 | 62.56   | 60.66   |
| SU68733859 | 62.85   | -9999.0 |
| SU68733860 | 57.77   | 56.55   |
| SU68733861 | 58.25   | 56.83   |
| SU68733862 | 60.24   | 58.06   |
| SU68733863 | 59.61   | 56.88   |
| SU68733951 | 57.78   | 55.56   |
| SU68733952 | 57.11   | 55.50   |
| SU68733953 | 56.21   | 55.27   |
| SU68733954 | 56.39   | -9999.0 |
| SU68733955 | 57.67   | 55.52   |
| SU68733956 | 58.53   | 57.05   |
| SU68734501 | 53.23   | 50.22   |
| SU68734502 | 54.88   | 50.83   |
| SU68734503 | 55.37   | 50.99   |
| SU68734504 | 53.46   | 49.79   |
| SU68734551 | 53.39   | 50.96   |
| SU68734552 | 53.35   | 48.98   |
| SU68734553 | 54.97   | 49.75   |
| SU68734601 | 52.67   | 49.56   |
| SU68734602 | 51.53   | 48.28   |
| SU68734603 | 0.0     | -9999.0 |
| SU68734604 | 50.74   | 48.15   |
| SU68734605 | 50.45   | 47.90   |
| SU68734651 | 51.88   | 50.66   |
| SU68734652 | 51.95   | 46.84   |
| SU68734653 | 53.06   | 50.41   |
| SU68734654 | 50.99   | 48.75   |
| SU68734655 | 50.67   | 46.27   |
| SU68734656 | 0.0     | -9999.0 |
| SU68734701 | 50.25   | 47.49   |
| SU68734751 | 52.35   | 48.42   |
| SU68734752 | 50.35   | 46.14   |
| SU68734753 | 56.72   | 53.61   |
| SU68734801 | 58.69   | 55.96   |
| SU68734802 | 55.54   | 53.15   |
| SU68734851 | 55.09   | 53.44   |
| SU68734852 | 52.50   | 50.33   |
| SU68734854 | 54.30   | 52.69   |
| SU68734855 | 50.69   | 48.62   |
| SU68734856 | 55.06   | 53.23   |
| SU68734857 | 58.60   | 56.43   |
| SU68734859 | 58.58   | 56.18   |
| SU68734860 | 58.47   | 56.57   |
| SU68734901 | 51.38   | 46.83   |
| SU68734951 | 52.98   | 51.69   |
| SU68734952 | 52.94   | 51.31   |
| SU68734953 | 50.94   | 48.77   |
| SU68734954 | 50.67   | 49.43   |
| SU68734955 | 52.21   | 51.22   |
| SU68734956 | 55.14   | 54.35   |
| SU68734957 | 52.09   | 50.58   |
| SU68734958 | 52.23   | -9999.0 |
| SU68734959 | 50.75   | -9999.0 |
| SU68735954 | 50.76   | -9999.0 |

NOTES:

1. THE INVERT LEVEL SHOWN MAY EITHER BE THE INVERT LEVEL OF THE MANHOLE OR OF THE PRINCIPAL OUTGOING PIPE.
2. DUE TO THE PRESENCE OF BACKDROPS AND GRADIENT CHANGES A STRAIGHT LINE INTERPOLATION OF GRADIENT BETWEEN THE INVERT LEVELS QUOTED ABOVE MAY NOT BE VALID.

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Asset Location Search Sewer Map - ALS/ALS Standard/2024 5084063



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 468483,173629  
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

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

| Manhole Reference | Manhole Cover Level | Manhole Invert Level |
|-------------------|---------------------|----------------------|
| 67JM              | n/a                 | n/a                  |
| 77LD              | n/a                 | n/a                  |
| 67KJ              | n/a                 | n/a                  |
| 6703              | 55.71               | 53.8                 |
| 67JH              | n/a                 | n/a                  |
| 6752              | 55.72               | 54.13                |
| 77KM              | n/a                 | n/a                  |
| 77HK              | n/a                 | n/a                  |
| 77FN              | n/a                 | n/a                  |
| 67KH              | n/a                 | n/a                  |
| 77LE              | n/a                 | n/a                  |
| 77LC              | n/a                 | n/a                  |
| 3751              | 65.69               | n/a                  |
| 2751              | 69.38               | 67.83                |
| 3757              | 61.6                | 59.84                |
| 3855              | 59.72               | 58.48                |
| 3851              | 63.58               | n/a                  |
| 2803              | n/a                 | n/a                  |
| 2851              | n/a                 | n/a                  |
| 3859              | 62.85               | n/a                  |
| 3801              | 62.69               | 60.22                |
| 77JJ              | n/a                 | n/a                  |
| 77JD              | n/a                 | n/a                  |
| 77HN              | n/a                 | n/a                  |
| 77JH              | n/a                 | n/a                  |
| 67JK              | n/a                 | n/a                  |
| 67JL              | n/a                 | n/a                  |
| 67JE              | n/a                 | n/a                  |
| 67KC              | n/a                 | n/a                  |
| 67JF              | n/a                 | n/a                  |
| 67KE              | n/a                 | n/a                  |
| 77HE              | n/a                 | n/a                  |
| 2752              | 67.14               | n/a                  |
| 3752              | 66.51               | n/a                  |
| 3756              | n/a                 | n/a                  |
| 3651              | 56.9                | 54.79                |
| 3755              | n/a                 | n/a                  |
| 3701              | 57.55               | 54.81                |
| 3754              | 57.28               | 56.04                |
| 3753              | 58.87               | 56.72                |
| 4653              | 53.06               | 50.41                |
| 4753              | 56.72               | 53.61                |
| 4603              | n/a                 | n/a                  |
| 471A              | n/a                 | n/a                  |
| 4601              | 52.67               | 49.56                |
| 4656              | n/a                 | n/a                  |
| 4654              | 50.99               | 48.75                |
| 4652              | 51.95               | 46.84                |
| 4602              | 51.53               | 48.28                |
| n/a               | n/a                 | n/a                  |
| 471D              | n/a                 | n/a                  |
| 4751              | 52.35               | 48.42                |
| n/a               | n/a                 | n/a                  |
| 4604              | 50.74               | 48.15                |
| n/a               | n/a                 | n/a                  |
| 4605              | 50.45               | 47.9                 |
| 461C              | 52.05               | 50.7                 |
| 4655              | 50.67               | 46.27                |
| 4701              | 50.25               | 47.49                |
| 4752              | 50.35               | 46.14                |
| 461D              | 52.5                | 51.366               |
| 5752              | 50.05               | 46.07                |
| 5751              | 48.44               | 46.91                |
| 561B              | n/a                 | n/a                  |
| 561A              | 58.62               | 56.58                |
| 561C              | n/a                 | n/a                  |
| 5651              | 59.07               | 57.45                |
| 6751              | 56.84               | 55.57                |
| 6702              | 56.87               | 54.68                |
| 751C              | n/a                 | n/a                  |
| 751D              | n/a                 | n/a                  |
| 6651              | 59.37               | 57.03                |
| 6601              | 58.96               | 55.43                |
| 6652              | 58.9                | 57.34                |
| 6701              | 57.47               | 54.31                |
| 771D              | n/a                 | n/a                  |
| 77KK              | n/a                 | n/a                  |
| 77JK              | n/a                 | n/a                  |
| 77KJ              | n/a                 | n/a                  |
| 77JM              | n/a                 | n/a                  |
| 67KF              | n/a                 | n/a                  |
| 77KH              | n/a                 | n/a                  |
| 77JC              | n/a                 | n/a                  |
| 77JE              | n/a                 | n/a                  |
| 67JN              | n/a                 | n/a                  |
| 67KD              | n/a                 | n/a                  |
| 2556              | 58.57               | 57.37                |
| 2502              | 58.46               | 56.08                |
| 2553              | n/a                 | n/a                  |
| 4504              | 53.46               | 49.79                |
| 551E              | n/a                 | n/a                  |

| Manhole Reference | Manhole Cover Level | Manhole Invert Level |
|-------------------|---------------------|----------------------|
| 5553              | 53.72               | 47.48                |
| 5502              | 54.12               | 51.36                |
| 551B              | 54.62               | 52.97                |
| 5552              | 55.17               | 51.24                |
| 551H              | n/a                 | n/a                  |
| 551D              | n/a                 | n/a                  |
| 5551              | 57.13               | 55.25                |
| 551C              | 57.14               | 55.41                |
| 551F              | n/a                 | n/a                  |
| 551A              | n/a                 | n/a                  |
| 5554              | 57.27               | 56.13                |
| 5556              | n/a                 | n/a                  |
| 5504              | 57.37               | 55.35                |
| 6551              | 57.95               | 56.37                |
| 6552              | 58.01               | 56.36                |
| 6501              | 58.46               | 56.36                |
| 451D              | n/a                 | n/a                  |
| 4503              | 55.37               | 50.99                |
| 4502              | 54.88               | 50.83                |
| 4553              | 54.97               | 49.75                |
| 451E              | n/a                 | n/a                  |
| 451G              | n/a                 | n/a                  |
| 451F              | n/a                 | n/a                  |
| 451H              | n/a                 | n/a                  |
| 4651              | 51.88               | 50.66                |
| 4551              | 53.39               | 50.96                |
| 451B              | 52.37               | 48.609               |
| 4501              | 53.23               | 50.22                |
| 451A              | 52.3                | 50.533               |
| 451C              | n/a                 | n/a                  |
| 4552              | 53.35               | 48.98                |
| 3453              | 61.41               | 55.7                 |
| 3402              | 59.7                | 57.25                |
| 3452              | n/a                 | n/a                  |
| 3451              | 56.62               | 54.08                |
| 241E              | n/a                 | n/a                  |
| 3403              | 56.75               | 54.93                |
| 241J              | n/a                 | n/a                  |
| 241I              | n/a                 | n/a                  |
| 241F              | n/a                 | n/a                  |
| 241G              | n/a                 | n/a                  |
| 251A              | n/a                 | n/a                  |
| 2503              | 60.03               | 55.46                |
| 3551              | 56.69               | 51.78                |
| 2554              | n/a                 | n/a                  |
| 631A              | n/a                 | n/a                  |
| 531D              | n/a                 | n/a                  |
| 6352              | 55.24               | 52.86                |
| 6302              | 55.19               | 52.79                |
| 531E              | n/a                 | n/a                  |
| 6359              | 55.85               | 52.08                |
| 6303              | 55.82               | 52.36                |
| 6403              | 55.6                | 51.79                |
| 5401              | 55.69               | 51.77                |
| 641H              | n/a                 | n/a                  |
| 641G              | n/a                 | n/a                  |
| 6454              | 55.8                | 50.08                |
| 6402              | 56.37               | 51.56                |
| 641F              | n/a                 | n/a                  |
| 6401              | 57.13               | 55.56                |
| 641E              | n/a                 | n/a                  |
| 6453              | 57.85               | 55.29                |
| 7451              | 59.78               | 57.76                |
| 741A              | n/a                 | n/a                  |
| 541A              | n/a                 | n/a                  |
| 6451              | 58.64               | 56.2                 |
| 6450              | 58.96               | 57.54                |
| 751A              | n/a                 | n/a                  |
| 5555              | 55.46               | 49.21                |
| 5503              | 55.68               | 50.63                |
| 341B              | n/a                 | n/a                  |
| 3454              | 60.41               | 54.73                |
| 341C              | n/a                 | n/a                  |
| 3352              | 62.09               | 59.61                |
| 431C              | n/a                 | n/a                  |
| 441C              | n/a                 | n/a                  |
| 4303              | 61.69               | n/a                  |
| 441D              | n/a                 | n/a                  |
| 441B              | n/a                 | n/a                  |
| 441A              | n/a                 | n/a                  |
| 441E              | n/a                 | n/a                  |
| 4452              | 55.67               | 53.9                 |
| 4401              | 56.38               | 53.54                |
| 4454              | 58.02               | 55.87                |
| 4453              | 57.83               | 54.62                |
| 4451              | 57.32               | 54.41                |
| 5452              | 56.96               | 49.7                 |
| 5402              | 55.81               | 50.47                |
| 5350              | 57.24               | 55.16                |
| 5301              | 57.12               | 52.77                |
| 551G              | n/a                 | n/a                  |
| 5454              | 57.05               | 54.94                |
| 5450              | 56.68               | 54.81                |

| Manhole Reference                                                                                                                                                                                                                                                                                                                                                                                                      | Manhole Cover Level | Manhole Invert Level |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------------|
| 541B                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 5451                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 3301                                                                                                                                                                                                                                                                                                                                                                                                                   | 63.58               | 60.78                |
| 2352                                                                                                                                                                                                                                                                                                                                                                                                                   | 64.92               | 60.31                |
| 331C                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 2351                                                                                                                                                                                                                                                                                                                                                                                                                   | 64.21               | 58.19                |
| 2355                                                                                                                                                                                                                                                                                                                                                                                                                   | 64.02               | 62.31                |
| 331A                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 341A                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 3401                                                                                                                                                                                                                                                                                                                                                                                                                   | 61.7                | 58.43                |
| 3858                                                                                                                                                                                                                                                                                                                                                                                                                   | 62.56               | 60.66                |
| 3862                                                                                                                                                                                                                                                                                                                                                                                                                   | 60.24               | 58.06                |
| 3802                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 3857                                                                                                                                                                                                                                                                                                                                                                                                                   | 61.54               | 59.84                |
| 2852                                                                                                                                                                                                                                                                                                                                                                                                                   | 64.46               | 63.15                |
| 2804                                                                                                                                                                                                                                                                                                                                                                                                                   | 64.93               | 63.66                |
| 2855                                                                                                                                                                                                                                                                                                                                                                                                                   | 64.82               | 63.98                |
| 281A                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 2856                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 2802                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 3854                                                                                                                                                                                                                                                                                                                                                                                                                   | 55.17               | 53.85                |
| 3863                                                                                                                                                                                                                                                                                                                                                                                                                   | 58.61               | 56.88                |
| 4860                                                                                                                                                                                                                                                                                                                                                                                                                   | 58.47               | 56.57                |
| 4859                                                                                                                                                                                                                                                                                                                                                                                                                   | 58.58               | 56.18                |
| 4801                                                                                                                                                                                                                                                                                                                                                                                                                   | 58.69               | 55.96                |
| 4856                                                                                                                                                                                                                                                                                                                                                                                                                   | 55.06               | 53.23                |
| 4802                                                                                                                                                                                                                                                                                                                                                                                                                   | 55.54               | 53.15                |
| 4851                                                                                                                                                                                                                                                                                                                                                                                                                   | 55.09               | 53.44                |
| 4854                                                                                                                                                                                                                                                                                                                                                                                                                   | 54.3                | 52.69                |
| 4852                                                                                                                                                                                                                                                                                                                                                                                                                   | 52.5                | 50.33                |
| 481F                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 4855                                                                                                                                                                                                                                                                                                                                                                                                                   | 50.69               | 48.62                |
| 481A                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 481B                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 481C                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 481D                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 481E                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 5852                                                                                                                                                                                                                                                                                                                                                                                                                   | 48.04               | 46.83                |
| 6851                                                                                                                                                                                                                                                                                                                                                                                                                   | 55.78               | 54.06                |
| 68KM                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 68KK                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 6852                                                                                                                                                                                                                                                                                                                                                                                                                   | 54.71               | 53.36                |
| 6803                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 5856                                                                                                                                                                                                                                                                                                                                                                                                                   | 50.37               | 49.48                |
| 581A                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 5804                                                                                                                                                                                                                                                                                                                                                                                                                   | 50.32               | 46.97                |
| 5855                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 5805                                                                                                                                                                                                                                                                                                                                                                                                                   | 49.51               | 47.41                |
| 5858                                                                                                                                                                                                                                                                                                                                                                                                                   | 49.6                | 45.76                |
| 581B                                                                                                                                                                                                                                                                                                                                                                                                                   | n/a                 | n/a                  |
| 5854                                                                                                                                                                                                                                                                                                                                                                                                                   | 48.03               | 46.35                |
| 5853                                                                                                                                                                                                                                                                                                                                                                                                                   | 47.46               | 46.09                |
| 5857                                                                                                                                                                                                                                                                                                                                                                                                                   | 47.48               | 46.09                |
| 5802                                                                                                                                                                                                                                                                                                                                                                                                                   | 47.34               | 45.48                |
| 5803                                                                                                                                                                                                                                                                                                                                                                                                                   | 47.81               | 46.31                |
| 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)

|  |                                                                                                                                                   |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>Foul Sewer:</b> A sewer designed to convey waste water from domestic and industrial sources to a treatment works.                              |
|  | <b>Surface Water Sewer:</b> A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses. |
|  | <b>Combined Sewer:</b> 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 |

### 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.

## Sewer Fittings

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

|  |           |  |       |
|--|-----------|--|-------|
|  | Air Valve |  | Meter |
|  | Dam Chase |  | Vent  |
|  | Fitting   |  |       |

## Operational Controls

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

|  |               |  |           |
|--|---------------|--|-----------|
|  | Ancillary     |  | Drop Pipe |
|  | Control Valve |  | Weir      |

## End Items

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

|  |               |  |         |
|--|---------------|--|---------|
|  | Inlet         |  | Outfall |
|  | Undefined End |  |         |

## Other Symbols

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

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

## Areas

Lines denoting areas of underground surveys, etc.

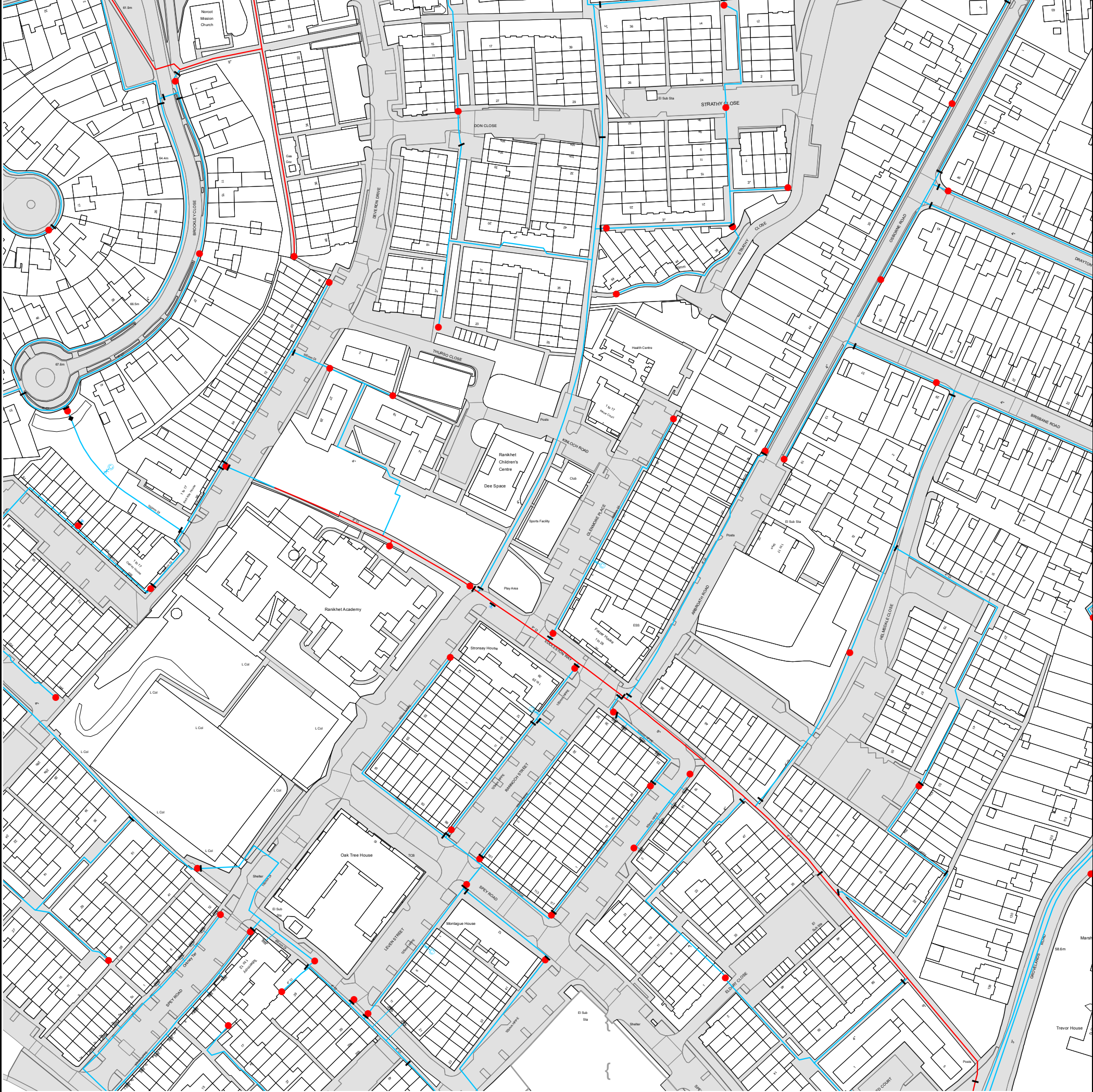
|  |                  |
|--|------------------|
|  | Agreement        |
|  | Chamber          |
|  | Operational Site |

## Ducts or Crossings

|  |                |                                                                        |
|--|----------------|------------------------------------------------------------------------|
|  | Casement       | Ducts may contain high voltage cables. Please check with Thames Water. |
|  | Conduit Bridge |                                                                        |
|  | Subway         |                                                                        |
|  | Tunnel         |                                                                        |

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.



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 468483, 173629.  
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map (2020) with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.



# Asset Location Search - Water Key

## Water Pipes (Operated & Maintained by Thames Water)

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

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

## Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

## Hydrants

- Single Hydrant

## Meters

- Meter

## End Items

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

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

## Operational Sites

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

## Other Symbols

- Data Logger
- Casement:** Ducts may contain high voltage cables. Please check with Thames Water.

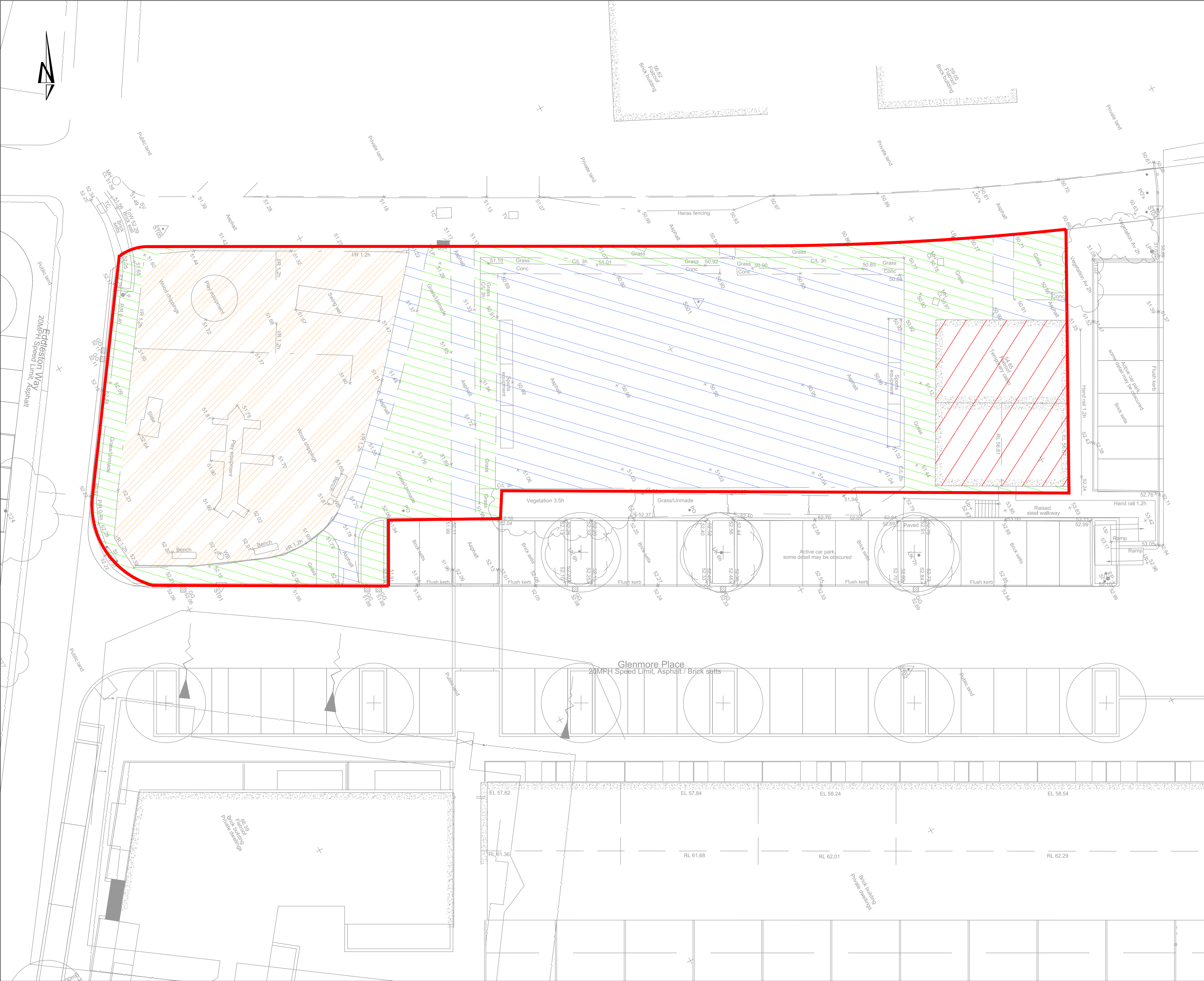
## Other Water Pipes (Not Operated or Maintained by Thames Water)

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

## *Appendix D      Existing Drainage / Utilities*



## *Appendix E      Pre/Post Development Catchments*



KEY PLAN

NOTES

- All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Architect & Engineer for verification. Figured dimensions only are to be taken from this drawing.
- The DWG file is issued for the purposes of coordination only and do not represent formal drawing issue and are not to be reprinted in any form. Formal issue of drawings is via DWF, Adobe PDF files and/or hard copies and their associated information issue sheets.
- Note that all care has been taken with the export of DWG files and their content, but we recommend that you make due dimensional checks before using any DWG file information. Any errors found are to be reported to Hydrock immediately.
- All levels are shown in metres above Ordnance Datum (m AOD).

LEGEND

|       |                     |          |
|-------|---------------------|----------|
|       | BUILDING / ROOF     | = 118m²  |
|       | HARDSTANDING        | = 571m²  |
|       | SOFT LANDSCAPING    | = 267m²  |
|       | PERMEABLE SURFACING | = 402m²  |
| TOTAL |                     | = 1358m² |

|     |                         |          |            |          |             |          |
|-----|-------------------------|----------|------------|----------|-------------|----------|
| PO2 | SITE PLAN UPDATED       |          |            |          |             |          |
|     | B.MURPHY                | 16/05/25 | H.MILER    | 16/05/25 | A.TODD      | 16/05/25 |
| PO1 | PRELIMINARY ISSUE       |          |            |          |             |          |
|     | C.HOPKINSON             | 18/11/24 | A.TODD     | 18/11/24 | A.TODD      | 18/11/24 |
| REV | REVISION NOTES/COMMENTS |          |            |          |             |          |
|     | DRAWN BY                | DATE     | CHECKED BY | DATE     | APPROVED BY | DATE     |

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e: bristolcentral@hydrock.com

CLIENT

READING BOROUGH COUNCIL

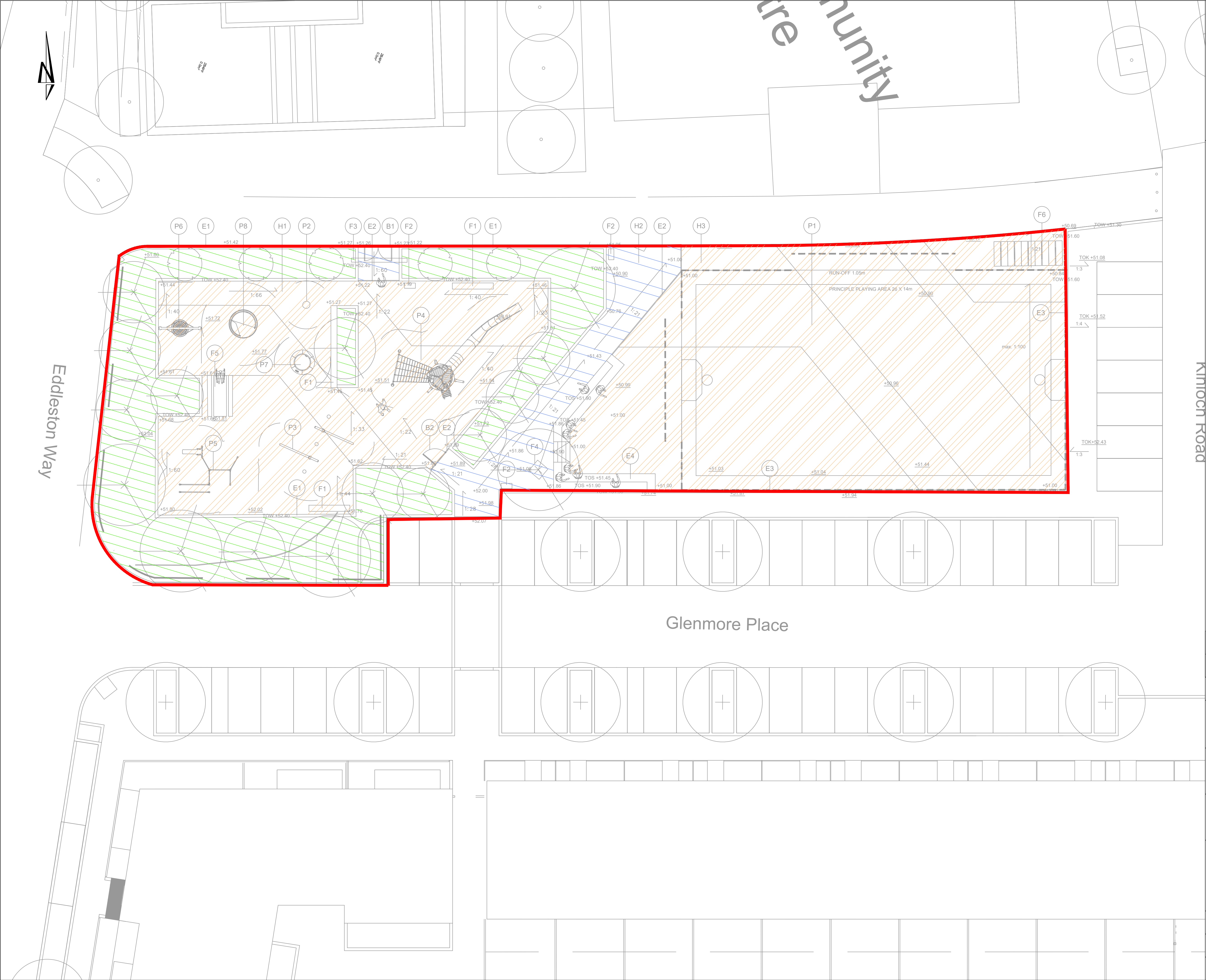
PROJECT

DEE PARK OPEN SPACE

TITLE

PRE-DEVELOPMENT  
CATCHMENT PLAN

|                                                                                                |                     |
|------------------------------------------------------------------------------------------------|---------------------|
| HYDROCK PROJECT NO.<br>C-36064-C                                                               | SCALE @ A1<br>1:125 |
| STATUS DESCRIPTION<br>PLANNING                                                                 | STATUS<br>S2        |
| DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)<br>36064-HYD-00-ZZ-SK-C-7710 | REVISION<br>P02     |



KEY PLAN

NOTES

LEGEND

BUILDING / ROOF

= 0m²

HARDSTANDING

= 0m²

SOFT LANDSCAPING

= 303m²

PERMEABLE SURFACING

= 1055m²

TOTAL

= 1358m²

1. All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Architect & Engineer for verification. Figured dimensions only are to be taken from this drawing.

2. The DWG file is issued for the purposes of coordination only and do not represent formal drawing issue and are not to be reprinted in any form. Formal issue of drawings is via DWF, Adobe PDF files and/or hard copies and their associated information issue sheets.

3. Note that all care has been taken with the export of DWG files and their content, but we recommend that you make due dimensional checks before using any DWG file information. Any errors found are to be reported to Hydrock immediately.

4. All levels are shown in metres above Ordnance Datum (m AOD).

|     |                         |          |            |          |             |          |
|-----|-------------------------|----------|------------|----------|-------------|----------|
| PO2 | SITE PLAN UPDATED       |          |            |          |             |          |
|     | B.MURPHY                | 16/05/25 | H.MILER    | 16/05/25 | A.TODD      | 16/05/25 |
| PO1 | PRELIMINARY ISSUE       |          |            |          |             |          |
|     | H.MILLER                | 18/11/24 | A.TODD     | 18/11/24 | A.TODD      | 18/11/24 |
| REV | REVISION NOTES/COMMENTS |          |            |          |             |          |
|     | DRAWN BY                | DATE     | CHECKED BY | DATE     | APPROVED BY | DATE     |

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CLIENT

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PROJECT

DEE PARK OPEN SPACE

TITLE

POST DEVELOPMENT CATCHMENT PLAN

HYDROCK PROJECT NO.

C-36064-C

SCALE @ A1

1:125

STATUS DESCRIPTION

PLANNING

STATUS

S2

DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)

36064-HYD-00-ZZ-SK-C-7720

REVISION

P02