DRAINAGE STRATEGY ADDENDUM

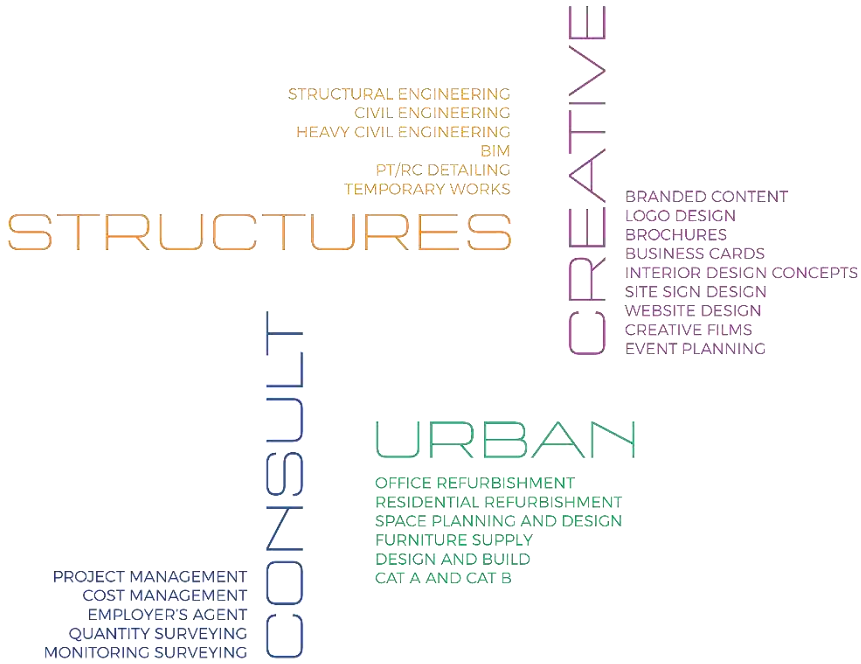
AVONDALE DRIVE ESTATE

HIGGINS PARTNERSHIP

SEPTEMBER 2025

AVD-IES-XX-00-RP-C-3000

IESISSTRUCTURES



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AVD-IES-XX-00-RP-C-3000

REPORT ISSUE

Revision	Date	Notes
P01	19/09/2025	First Issue
P02	29/10/2025	Applicant name updated

PREPARED BY

Isobel Oates September 2025

REVIEWED BY

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CONTENTS

Avondale Drive Estate – Section 73 Addendum

This drainage strategy Addendum, prepared by SLR Consulting Limited on behalf of Higgins Partnerships 1961 ("Higgins") and the applicant, London Borough of Hillingdon, supports a Section 73 application for the redevelopment of Avondale Drive Estate (UB3 3NR). Higgins are working with LB Hillingdon (as their development partner) to deliver the regeneration of the Estate.

The Avondale Drive Estate is situated in Hayes, between Avondale Drive and Hitherbroom Park, within an established residential neighbourhood. Its proximity to schools, parks, and extensive open fields with sports facilities renders it a suitable location for family housing. The approved redevelopment proposals include the demolition of three existing council tower blocks and the delivery of approximately 240 new homes, alongside a new pocket park, associated landscaping, and podium parking.

The extant consent is a hybrid planning permission, with a detailed element (Phase 1a) comprising a 30 home residential block (Block A) and an outline element (Phase 1b and Phase 2) with all matters reserved. Following the discharge of relevant planning conditions and the approval of a number on non-material amendment applications, Block A is now complete on site, with handover anticipated in September 2025.

This Section 73 application seeks to revise specific conditions of the original planning consent (reference 76551/APP/2021/4502), including conditions 3 (approved plans), 4 (approved documents), 5 (land use/quantum), 6 (housing mix), 7 (phasing plan), 9 (density), and 10 (building heights).

The proposed Section 73 amendments encompass the following key changes to the outline area:

- An increase of 56 residential units overall, including an uplift of 33 affordable homes.
- Removal of the existing parking court and an increase in podium size, intended to enhance active frontages along Avondale Drive and improve site security.
- A revised height strategy to establish a lower-level frontage along Avondale Drive and mitigate overshadowing impacts on Hitherbroom Park.
- Deletion of vehicle access around Phase 1B, aimed at improving the quality of the public realm.
- Increased separation distances between Phases 1B and 2 to create a new public square, facilitating the relocation of playspace to a safer, off-road position.

1 DRAINAGE STRATEGY

1.1 INITIAL DRAINAGE STRATEGY

The initial drainage strategy for the Avondale Drive estate was provided on 29th November 2021 by Whitby Wood. The drainage strategy can be found in Appendix A in this addendum.

The strategy concluded that the site is well served by existing infrastructure, with both foul and surface water public sewers located adjacent to the site boundary. This provides convenient connection points for the proposed development. At the time of writing of the initial drainage strategy, a pre-planning enquiry had been submitted to Thames Water to confirm available capacity for discharge. Thames Water raised no objections to the original application subject to suitably worded planning conditions and confirmed that there was sufficient capacity and connections for the proposed development in relation to both foul and surface water via a letter dated February 2022.

Based on data from the Strategic Flood Risk Assessment (SFRA), the risk of groundwater flooding at the site was considered low, but due to the presence of clay soils, infiltration techniques were not recommended, and alternative drainage strategies were considered.

Two existing sewers were identified that may require diversion or build-over agreements. This means that formal approval from Thames Water would be required post-planning via a Section 185 agreement if the diversion or build-over proposal were to progress within the updated strategy. The proposed surface water discharge rate was set at QBar equalling 4.3 litres per second, while foul water discharge would be unrestricted.

The development presented an opportunity to incorporate Sustainable Drainage Systems (SuDS), although not all techniques were deemed suitable given site constraints. Permeable paving, green roofs, rain gardens, soft landscaping, and below-ground attenuation tanks were considered viable options to support effective water management and enhance environmental sustainability.

The initial strategy that can be found within Appendix A proposes two attenuation tanks, a surface water drainage system which provides collection for the whole proposed site and connects to the existing surface water sewers at two points with flow controls restricting the outlet to 2.3l/s and 2l/s, and a foul water network to serve the proposed building and connects to the existing foul water sewers at two points.

1.2 SITE CHANGES

Since the initial drainage strategy was prepared, the site layout and landscaping design have undergone notable changes. These revisions have introduced new spatial arrangements and features, such as updated landscaping of footways and green spaces and altered building footprints which had implications for how surface water and foul drainage are managed.

Initially, two attenuation tanks were proposed and were to be located beneath the carparking areas within the two proposed buildings. As the building footprints have now changed, the tanks had to be reshaped and relocated. The changes in the shape of the proposed buildings also meant that the initial foul water network had to be updated to still serve the development but to avoid clashes with the buildings.

The Surface water strategy had to be amended as the impermeable area of the site had changed with the updated to landscaping and building layouts, so attenuation tanks had to be increased in size, and with a redesign of the levels the drainage within the landscaped area was amended and the surface water pipes moved to provide connection points for channel drains and yard gullies.

1.3 Foul Water Drainage Strategy

The revised proposed foul water drainage strategy is shown in drawing AVD-IES-P2ZZ-00-DR-D-3000 Below ground Drainage General Arrangement. This Drawing can be found in Appendix B. The foul water drainage strategy proposes two private networks of foul sewers which run from collection points within the two buildings, to a foul pipe network adjacent to them and to tow connection points in the existing foul water network. All foul networks proposed are gravity networks, and connections are all to be agreed by Thames Water.

The Phase 2 building is served by one pipe network, which is proposed to connect into the existing foul water sewer at MH6203. There are existing foul water pipes between the proposed new manholes F04 and F11, which are to be removed as they are no longer serving any property. The Phase 1b building follows the same strategy- it is served by one pipe network which is proposed to connect into the existing foul water sewer at MH7204. From this manhole it is proposed that the existing foul water sewer is diverted, as its existing location is very close to the proposed building which may interfere with the foundations. The diversion would require two additional manholes and removal of approximately 20m of the existing pipe immediately before the existing manhole MH7204A, with the diversion running further from the proposed building and connecting back into the same manhole MH7204A. The diversion would be subject to agreement with Thames Water, and due to layout constraints a build-over agreement may also be required as a 3m easement from the proposed pipe is unachievable.

1.4 Surface Water Drainage Strategy

The revised proposed surface water drainage strategy is shown in drawing AVD-IES-P2ZZ-00-DR-D-3000 Below ground Drainage General Arrangement. This Drawing can be found in Appendix B. The surface water drainage strategy proposes 4 attenuation tanks, and two private networks of surface water sewers which run adjacent to the proposed buildings to provide collection points for rainwater pipes and surface runoff from the properties, and connections to channel drains and yard gullies within the landscaped areas of the development to serve surface water runoff. The two networks are proposed to connect into the existing surface water sewer system from flow control chambers to restrict the outlet. All proposed surface water drainage is a gravity system. The landscaped areas for the development in some areas utilise pervious paving, to reduce the risk of flooding and allow surface water to infiltrate into the ground.

The development is split into an east and west side, each being served by a separate drainage network. The west side includes a section of the Phase 2 building with a catchment area of 1092.0m², and the surrounding landscaped area was divided in the same way as the building to be served by the two separate networks, which added a catchment area of the proposed hard paving of 370.7m². With a total impermeable area of 1462.7m² on the west side being served by this one network, an attenuation tank was required to provide storage, and was sized as 14.40m x 16.80m x 0.52m. The recommendation for the tank is Stormcell, or similar, and it is to be located beneath the car park area of the Phase 2 building on the west side. The proposed outlet of the system is to connect to the as-built surface water system that was completed in Phase 1a. A flow control chamber is proposed to restrict the design flow to 1l/s at the outlet and it will have an acceptable design head of 0.8m. This is based on the design completed and constructed for the building Phase 1a with connection to an existing inspection chamber from this first phase.

The east side of the development comprises of the remaining area of the Phase 2 building and all of the Phase 1b building. The total area of both of these buildings is 4580.7m². The surface water network that serves these buildings also serves the remainder of the hard landscaped areas within this development, which is an additional area of 1542.2m². The total area of catchment for the eastern surface water network is 6122.9m². As part of the strategy, storage was required. Three attenuation tanks were proposed to provide an adequate volume. All tanks are recommended to be Stormcell or similar, and the locations and sizes for each are as follows; tank sized 542.9m² x 0.52m beneath the car park area on the east side of the Phase 2 building, tank sized 129.6m² beneath the landscaped area between the Phase 2 and Phase 1b buildings, tank sized 518.4m² beneath the car parking area within the Phase 1b building. The tanks link into the proposed surface water pipe system that runs around the perimeter of the two buildings to a flow control chamber to restrict the outlet into the existing surface water sewer system. The flow control is to be set to 2.3l/s as per the initial drainage strategy provided by Whitby Wood, found in Appendix A. From the flow control chamber the network will connect to existing surface water manhole MH7201.

1.5 MAINTENANCE ACTIVITIES

The maintenance strategy for the scheme is outlined below, detailing the optimal frequencies and operations required by Higgins Partnerships to ensure the drainage system functions as designed throughout its full intended lifespan.

1.5.1 PIPES, MANHOLES AND CATCHPITS

The maintenance strategy should be implemented to ensure the drainage network is cleaned regularly, with the routine maintenance and cleansing regime properly documented. It is recommended that the drainage system be inspected at least twice a year, as well as after any major storm event.

Significant sediment deposition is expected in storage areas, which may necessitate post-cleanup operations, including the removal of litter, vegetation, sewage debris, and larger objects.

Long-term management practices include monthly sweeping of external paved areas. This sweeping program will remove sand and contaminants directly from paved surfaces before they become mobilized during storm events and transported into the drainage system.

During winter months, drainage features such as gullies and channels should be cleared of ice, snow, debris, and litter.

Sediment and material removal should be conducted in consultation with the environmental regulator to confirm appropriate protocols—particularly in cases where runoff is collected from potentially contaminated areas such as filter drains and upstream/downstream manholes. Manholes have been strategically located at the head of each run, at direction changes, and at pipe size transitions in accordance with Building Regulations Part H.

Appropriate health and safety equipment must be used when accessing Manholes. Personnel entering a manhole must hold confined space certification, and the required permits must be obtained from the Maintenance Manager before access is granted.

Pipes are proprietary products, with materials varying across the site. As such, manufacturer recommendations must be followed. Regardless of the specific product used, all pipes will comply fully with the Sewer Sector Guidance.

Pipes, where oversized, contribute to the attenuation volume required to regulate discharge rates. Designed to remain dry except during rainfall events, smaller-diameter pipes incorporate self-cleaning mechanisms, while larger-diameter pipes reduce obstruction risks due to their size. Maintenance access is provided through access manholes.

Regular inspection and maintenance are crucial to identifying any blockages or drainage inefficiencies that may increase flood risk.

The anticipated maintenance requirements for pipes, manholes and catchpits are outlined in Table A.

Table A: Typical Pipe, Manholes and Catchpits Maintenance Requirements

Maintenance Schedule	Required Action	Minimum Frequency
Initial monitoring (to be undertaken regularly within first year of operation)	Inspect for evidence of poor operation via water level in Manholes. If required, take remedial action.	As required.
Regular Maintenance	Initial Inspection should be provided as post construction CCTV survey.	NA
	Inspect for evidence of poor operation via water level in Manholes. If required, take remedial action.	3-monthly, 48 hours after large storms.
	Check and remove large vegetation growth near pipe runs.	Monthly (or as required).
Remedial Action	Rod through poorly performing runs as initial remediation.	As required.
	If continued poor performance jet and CCTV survey poorly performing runs.	As required.
	Seek advice as to remediation techniques suitable for the type of performance issue and location	As required if above does not result in improved performance.

1.5.2 PERVIOUS PAVEMENTS

The proposed drainage scheme includes pervious paving to allow for infiltration of surface water to the ground. The anticipated maintenance and management for this feature is outlined in Table B.

Table B: Pervious Pavements Maintenance Requirements

Maintenance Schedule	***Required Action***	***Minimum Frequency***
Regular Maintenance	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 surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Action	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)
Monitoring	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

1.5.3 ATTENUATION STORAGE TANKS

Attenuation storage tanks will require maintenance to ensure continual operation to design performance standards. The anticipated maintenance for attenuation storage tanks outlined in Table C.

Table C: Typical Pipe, Manholes and Catchpits Maintenance Requirements

Maintenance Schedule	***Required Action***	***Minimum Frequency***
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial Action	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

2 CONCLUSION

The main conclusions and a summary of the changes to the initial drainage strategy, and the revised proposed strategy are detailed below.

- Site layout and landscaping revisions have significantly impacted the original drainage strategy.
- Building footprint changes required relocation and reshaping of the originally proposed attenuation tanks and redesign of the foul water network to avoid clashes with new building positions.
- The revised strategy includes two gravity foul sewer networks, each serving one of the proposed buildings in the new phases.
- A diversion of a section of the existing foul water sewer is proposed, due to its proximity to the building foundations. A build-over agreement may also be necessary.
- All proposed connections and diversions are subject to approval by Thames Water.
- Two gravity-based surface water networks serving the east and west sides of the development are proposed.
- Four attenuation tanks are proposed to manage runoff from buildings and landscaped areas.
- The west side is served by one tank beneath the Phase 2 car park, with flow restricted to 1 l/s and connected to the Phase 1a system.
- The east side is served by three tanks located beneath car parks and landscaped areas, with flow restricted to 2.3 l/s and connected to existing manhole MH7201.
- Pervious paving is used in landscaped areas to support infiltration where possible.

3 APPENDIX A – 76551_APP_2021_4502P450729-WW-AV-XX-RP-C-0002 P2 (DRAINAGE STRATEGY)

whitby wood

Avondale Drive

Drainage Strategy

Client: Hillingdon

Date: 29/11/2021

P450729-WW-AV-XX-RP-C-0002

whitby wood

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REVISION RECORD

Rev	Date	Description	Prepared	Reviewed	Approved
P1	23/11/2021	Initial Issue	RW	RS	RW
P2	29/11/2021	Revised for Planning	RW	RS	RW

Prepared by:	Reviewed by:	Approved by:
Ryan Williams	Ryan Saunders	Ryan Williams
Senior Engineer – Civils	Design Engineer - Civils	Senior Engineer - Civils

TABLE OF CONTENTS

APPENDICIES

TABLES

FIGURES

1 INTRODUCTION

This drainage strategy has been prepared in accordance with National Planning Policy Framework (NPPF) to support the development of the Avondale Drive Estate, Hillingdon, hereby referred to as 'The Site'. This strategy has been developed to ensure a viable surface water and foul water system can be implemented, whilst maximising the sites potential for use of SuDS. This includes drainage that is suspended or cast below the building as well as external drainage up to and including connections to the public sewer.

1.1 Sources of Information

A review of the relevant information from a range of sources has been undertaken and includes the following:

- Ministry of Housing Communities & Local Government, National Planning Policy Framework (NPPF), July 2021;
- Sustainable Drainage Systems Non-Statutory Technical Standards, March 2015;
- Sewage Sector Guidance Appendix C, May 2021;
- London Plan, March 2021. Chapter 9;
- CIRIA, The SuDS Manual Version C735, 2015;
- Hillingdon Surface Water Management Plan, January 2014;
- Hillingdon Local Plan Part 1, November 2012; and
- Hillingdon Local Plan Part 2, January 2020.

1.2 Environment Agency Data

The following information has been gathered from DEFRA's Spatial Data Catalogue of data.gov.uk [accessed September 2021].

- Flood Map for Planning (Rivers and Sea) – Flood Zone 2;
- Flood Map for Planning (Rivers and Sea) – Flood Zone 3;
- Risk of Flooding from Reservoirs – Maximum Flood Extent;
- Risk of Flooding from Surface Water Extent (1%, 3.3% and 0.1% AEP);
- Statutory Main River Map; and
- Preliminary Flood Risk Assessment for England, October 2018.

2 THE SITE

2.1 Site Location

The site is located adjacent to Avondale Drive in Hayes and accommodates the Avondale Drive Estate, built in the 1960s consisting of 144 homes. The site is bound to the south by Avondale Drive and to the north by the Minet School Playing Fields. The site is approximately 1.07ha and its approximate centre is located at an easting and northing of 510705 and 180271 respectively. A site location plan has been included in Figure 1 which can also be found in **Appendix A**.

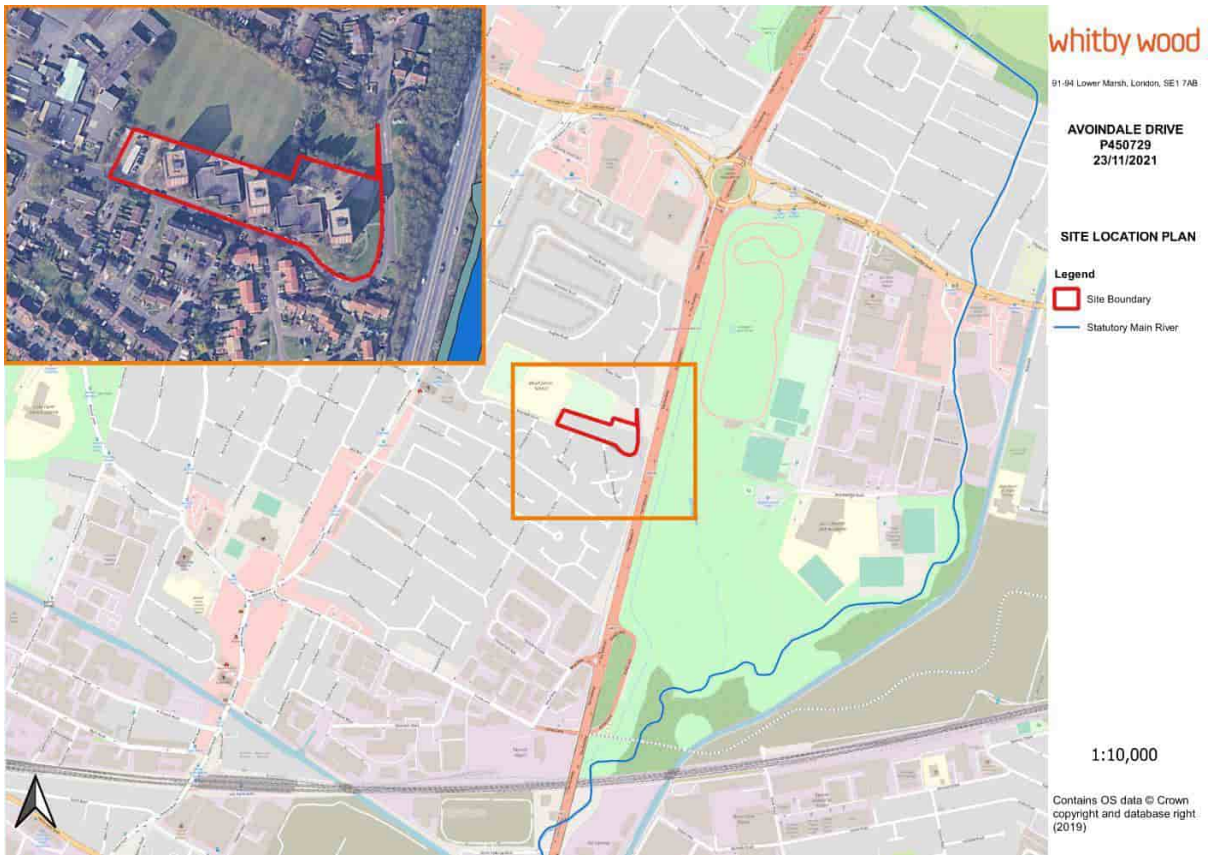


FIGURE 1 - SITE LOCATION PLAN

2.2 Watercourses

The nearest main watercourse is the River Crane which lies approximately 70m east of the site. Between the site and the River Crane is the A312 Dual Carriageway. There are no other watercourses within proximity.

2.3 Geology

The British Geological Survey's Geology of Britain map has been reviewed and it indicates a superficial geology of Langley Silt Members (clay and silt), underlain by a bedrock geology of London Clay Formation (Clay, Silt and Sand). The site is not located within a source protection zone. The aquifer designation map

shows the both the superficial drift and the bedrock as unproductive. A site investigation was not available at the time of drafting this report.

2.4 Proposed Development

Current proposals involve the phased demolition of the estate to provide 240 new homes of both affordable and private sale. New public open space and pedestrian/cycle connectivity all form part of the emerging proposals.

The Proposed Development is subject to a Hybrid Planning Application which seeks planning permission, part in outline and part in detail for the following description of development. The Detailed First Phase comprises 30 residential units and the Outline Area relates to 210 units based on outline parameters. Combined, these form the Illustrative Masterplan. This drainage strategy is therefore based on the Illustrative masterplan in considering the proposed development as a whole, to include an estate-wide drainage strategy.

“Development in outline (with all matters reserved) for residential floorspace (Class C3) to comprise: demolition of all existing buildings and structures; erection of new buildings; new pedestrian and vehicular accesses; associated amenity space, open space, landscaping; car and cycle parking spaces; plant, refuse storage, servicing area and other works incidental to the proposed development; and

Detailed planning consent for Block A comprising 30 residential units (Class C3); new pedestrian access; associated amenity space and landscaping; cycle parking, refuse storage, and other associated infrastructure.”

3 DRAINAGE PRINCIPLES

3.1 Requirements

There are a range of requirements which the proposed drainage system is expected to meet. These have been set out by various guidance documents and stakeholders. The main requirements from each guidance document or stakeholder have been set out in the table below.

TABLE 1 - REQUIREMENTS FOR THE PROPOSED DRAINAGE SYSTEM

Source/Stakeholder	Requirements
DEFRA Non-statutory technical standards for sustainable drainage systems	• For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event. • Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event. • The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30-year rainfall event. • The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development. • The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100-year rainfall event are managed in exceedance routes that minimise the risks to people and property.
Design and Construction Guidance – Sewerage Sector Guidance Appendix C	• Where a component is designed to convey or store flows in excess of the 1 in 30 year return period event, the designer should demonstrate that the upstream system (including any inlets such as gullies or pervious paving) has the capacity to allow the flows to reach the component. • Where an overland flow route is used, it should not be designed to operate more frequently than in a 1 in 30-year return period design rainfall event. • Design foul water peak flow rates should be 4000L per dwelling per day.
Building Regulations Approved Document H	• Surface water shall discharge to one of the following listed in order of priority: a) An adequate soakaway or some other adequate infiltration system; or, where that is not reasonably practicable, b) A watercourse; or where that is not reasonably practicable, c) A sewer.

Thames Water	• A pre-development application is required to check the public sewer has capacity for the proposed discharge rates. • A section 106 application to connect to the public sewer will need to be submitted for any new connections to the public sewer. • Where the network is to be adopted, then a S104 application will need to be made. • Where existing sewers require diverting, an application to Thames Water to divert a public sewer under section 185 will need to be made. • A section 116 application for the removal of public sewers will be required for any abandoned public sewers.
Borough of Hillingdon (LLFA)	• Acting as the LLFA, any guidelines and policies outlined in the local Surface Water Management Plan or Local Plan should be adhered to. These have been detailed further in the Flood Risk Assessment (P450729-WW-AV-XX-RP-D-0001). • Where possible the proposed discharge rates should be discussed and approved with the LLFA as early as possible.

3.2 Network Design Specifications

The network will likely be designed to the following specifications:

- **Pipe** materials will be uPVC or concrete.
- **Inspection Chambers** will be Polypropylene or similar.
- **Manholes** will be concrete.
- **Flow Controls** will be a vortex flow control such as Hydrobrake and will be set to QBAR for the drained area.
- **SuDS** Refer to drainage layout drawing for details. Attenuation tanks are to be geo-cellular crates.

4 EXISTING DRAINAGE INFRASTRUCTURE

4.1 Existing Arrangement

A Thames Water Asset search and GPR survey has been carried out and shows a mix of existing foul and existing surface water infrastructure both surrounding and within the site confines. This is shown within drawing P450729-WW-AV-00-DR-C-0001 in **Appendix B**. The asset search information can be found in **Appendix C**. Information on the levels of the existing drainage infrastructure is sparse, especially for the foul water infrastructure, and to be confirmed upon receipt of further site investigations post planning.

Build-overs and Diversions

There are two Thames Water sewers which may require a build-over agreement or will be subject to a diversion. Upon receipt of further investigations post planning, it will be possible to ascertain which sewers are live and serve properties outside of the site confines. The required 3m easement has been imposed onto the affected sewers and is shown on drawing P450729-WW-AV-00-DR-C-0003 within **Appendix D**. If required, the build-overs and diversions will be agreed with Thames Water through the respective S185 agreement post planning.

5 PROPOSED DRAINAGE INFRASTRUCTURE

5.1 Runoff Rates

Greenfield runoff rates have been calculated using IH124 methodology. The table below shows the greenfield runoff rates for the whole development (1.04 ha – total drained area) and factored to provide a runoff rate per hectare. The table also shows the current brownfield discharge rates, calculated using the modified rational method. A percentage of impermeable area (PIMP) of 70% and a time of concentration of 5 minutes were assumed at this stage. A runoff coefficient (Cv) of 1 has been used in the calculations.

TABLE 2 - GREENFIELD RUNOFF AND EXISTING DISCHARGE RATES

Return Period	Greenfield runoff rates		Existing Discharge Rates (l/s)
	Whole Site [1.04 ha] (l/s)	Per hectare (l/s/ha)	
QBAR	4.3	4.13	-
1-year	3.7	3.55	143
30-year	10.4	10	340
100-year	13.8	13.2	431

5.1.1 Storage Volumes

Using the QBar rate of 4.3 l/s, a quick storage estimate for the site can be calculated from the hydraulic software Causeway Flow. The output value shows that between 550m³ – 736m³ of attenuation will be required. This is based on no flooding of the network or site up to and including the 1 in 100year storm event plus climate change. The storage requirements are subject to change upon confirmation of site area, proposed impermeable areas and further detailed hydraulic modelling. A pre-planning enquiry has been submitted at the time of drafting this report, and co-ordination will continue through the planning process. As the strategy proposes to restrict to QBAR for all storm events, no capacity concerns are envisaged.

The proposals to restrict to 4.3l/s (QBAR) represents a betterment of 99% against the 100year brownfield rate and a 96% betterment against the 1 year brownfield rate.

5.2 Surface Water

The proposed drainage arrangement is shown on drawing P450729-WW-AV-00-DR-C-0002 within **Appendix E**. The design works on the principle that rainfall will be largely attenuated within below ground geo-cellular tanks up to and including the 1 in 100year plus 40% allowance for climate change event.

Two outfalls have been proposed, both into Avondale Drive. This is to coincide with the sites construction phasing strategy and ensure the correct proportion of attenuation is built in the relation to new structure and hardstanding. A hydro-brake device or similar will restrict flows to QBAR. Green roofs at high level and rain gardens, with permeable paving systems at ground level will ensure water treatment is provided and SuDS are incorporated into the landscaping strategy.

5.3 Foul Water

The foul water network will be designed in more detail during the next design phase once internal building arrangements are complete. Foul water will discharge un-attenuated to the nearest foul water sewer by gravity.

The proposed development will result in an increase in foul water flows, when compared against the existing site. Using 4000 l/dwelling/day, the total flow rate is calculated to be approximately 11.1 l/s.

5.4 Delivering a SuDS Scheme

The 'four pillars' of SuDS design as described by the SuDS Manual are;

- Water Quantity;
- Water Quality;
- Amenity; and
- Biodiversity.

The philosophy of SuDS is about maximising the benefits and minimising the negative impacts of surface water runoff from developed areas throughout its life cycle. This is known as the treatment train philosophy and uses drainage techniques to systematically control the three elements of runoff; pollution, flow rates and volumes.

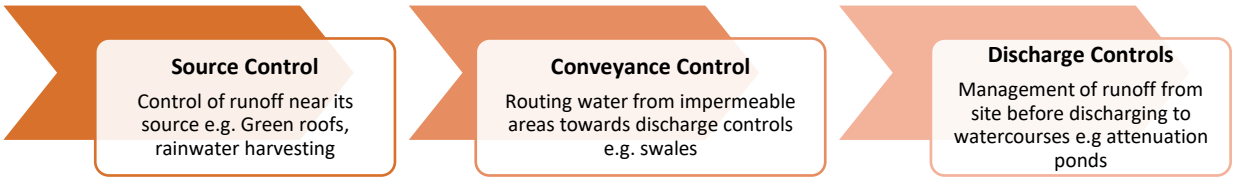


FIGURE 2 - TREATMENT TRAIN

SuDS can improve the quality of life in developments by making them more vibrant, visually attractive, sustainable and more resilient to change, by improving urban air quality, regulating building temperatures, reducing noise and delivering recreation and education opportunities. The SuDS design should therefore as much as possible, be based around the following;

- Using surface water runoff as a resource;
- Managing rainwater close to where it falls;
- Managing runoff on the surface;
- Allowing rainfall to soak into the ground;
- Promoting evapotranspiration;
- Slowing and storing runoff to mimic natural runoff characteristics;
- Reducing contamination of runoff through pollution prevention and controlling the runoff at source; and
- Treating runoff to reduce the risk of urban contaminants causing environmental pollution.

By following the above the proposed development has the potential to maximise SuDS and conform to SuDS best practice. Ultimately a well designed and constructed SuDS scheme will provide a robust and reliable surface water drainage network, whilst providing increased amenity and biodiversity.

5.4.1 SuDS Component Performance

The effectiveness of SuDS components in improving development surface water run-off quality is summarised in, Table 1 below. Combinations of treatments can be used to reduce potential pollutants from reaching the receiving course.

TABLE 3 - SUDS TREATMENT TRAIN

	Interception	Peak flow control: Low	Peak flow control: High	Volume reduction	Volume control	Gross sediments	Fine sediments	Hydrocarbons/PAHs	Metals	Nutrients
Rainwater Harvesting	Y	Y	S	Y	N	N	N	N	N	N
Pervious Pavement	Y	Y	Y	Y	Y	Y	Y	Y	Y	Varies
Filter Strips	Y	N	N	N	N	Y	N	Y	Y	Varies
Swales	Y	Y	S	Y (*)	N	Y	Y (+)	Y	Y	Y (-)
Trenches	Y	Y	S	Y (*)	N	N	N	Y	Y	Y (-)
Detention Basins	Y	Y	Y	N	Y	Y	Y (+)	Y	Y	Varies
Ponds	N	Y	Y	N	Y	N (~)	Y	Limited	Y	Varies
Wetlands	N	Y	S	N	Y	N (~)	Y	Limited	Y	Y
Green Roofs	Y	Y	N	N	N	N	N	Y	N	N
Bioretention Systems	Y	Y	S	Y (*)	N	N (~)	Y	Y	Y	Y
Proprietary Treatment Systems	N	N	N	N	N	Y	Y	Y (!)	Y (!)	Y (!)
Subsurface Storage	N	Y	Y	N	Y	N (~)	N	N	N	N
Subsurface Conveyance Pipes	N	N	N	N	Y	N (~)	N	N	N	N

Notes:

- S: Not normally with standard designs, but possible where space is available and designs mitigate impact of high flow rates.
- Y (*): Where infiltration is facilitated by the design.
- N (~): Gross sediment retention is possible, but not recommended due to negative maintenance and performance implications.
- Y (+): Where designs minimise the risk of fine sediment mobilisation during larger events.
- Y (!): Where designs specifically promote the trapping and breakdown of soils and PAH based constituents.
- Y (“): Where subsurface soil structure facilitates the trapping and breakdown of oils and PAH based constituents.
- Varies: The nutrient removal performance is variable, and can be negative in some situations.
- Y (~): Good nutrient removal performance where subsurface bio-filtration system with a permanently saturated zone included within the design.

5.4.2 Hydraulic Design Criteria

The below outlines the best practice criteria for hydraulic control required for interception, runoff rate control and volume control.

Interception

To fulfil the requirements for Interception, there should normally be no runoff from the site for an initial depth of rainfall, usually 5mm. This is usually achieved through the use of infiltration, evapotranspiration, or rainwater harvesting. In this case infiltration is not possible on site, so preference will be given to the use of green roofs, tanked permeable paving and soft landscaping to achieve this.

Flow and Volume Control

Discharge rates are to be managed to current Greenfield run-off rates or 2 l/s minimum flow. The site is a brownfield development, therefore it is proposed to restrict runoff rates to QBAR.

Attenuation and hydraulic controls will be used to manage flow rates

Rainwater harvesting, or the use of Long Term Storage can be used to achieve Greenfield runoff volume control. Where volume control is not practicable, flows discharged from the site will be constrained to QBAR or 2 l/s/ (whichever is the greater). Flows will be restricted to QBAR and storage provided for all events up to and including to 100year plus 40% climate change allowance.

Water Quality Design Criteria

Current best practice takes a risk-based approach to managing discharges of surface runoff to the receiving environment. The following sections provide guidance on the extent of water quality management likely to be appropriate for the site.

Hazard Classification

Runoff from clean roof surfaces (i.e. not metal roofs, roofs close to polluted atmospheric discharges, or roofs close to populations of flocking birds) is classified as Low in terms of hazard status.

Runoff from roads, parking and other areas of residential, commercial and industrial sites (that are not contaminated with waste, high levels of hydrocarbons, or other chemicals) is classified as Medium in terms of hazard status.

Treatment requirements for disposal to surface water systems

Roof runoff will require 1 treatment stage prior to discharge. Runoff from other parts of this site such as roads, parking and other areas will require ideally 2 treatment stages prior to discharge.

5.5 Drainage Hierarchy

As stated in the National Planning Practice Guidance, the aim should be to discharge surface water run-off as high up the drainage hierarchy, as reasonably practicable. Local Authorities and Water Boards often require proof that each option is not feasible before considering the next.

The drainage hierarchy is as follows:

1. Discharge into the ground (infiltration);
2. Discharge to a surface water body;
3. Discharge to a surface water sewer, highway drain, or another drainage system;
4. Discharge to a combined sewer.

For this site, infiltration will not be feasible due the potential high groundwater levels and London Clay geology. Discharge will therefore be to the closest available foul and surface water sewer respectively.

As denoted in section 5.2, the following forms of SuDS have been identified for use across the site:

- Below ground attenuation tanks;
- Permeable paving;
- Filter drains/rain gardens;
- Green roofs.

5.5.1 Water Cycle Strategy

The water cycle strategy puts emphasis on four key areas of interest:

- Consumption;
- Quality;
- Re-use; and
- Re-cycle.

Water consumption is covered as part of the energy strategy in further detail. It is currently proposed that water usage will be no more than 105 litres per person per day. Rainwater will be heavily 'treated' through its discharge process by passing through numerous stages through its cycle. Green roofs will provide treatment at roof level, rain gardens and filter drains at ground level, with permeable paving providing deeper below ground treatment. Rainwater harvesting is not currently proposed at this stage however more localised re-use of rainwater through rainwater butts etc is to be considered during the next design stage to allow for localised irrigation of soft landscaping where practical.

6 ADOPTION AND MAINTENANCE

It is assumed that drainage on site will remain private and not be adopted by Thames Water under a Section 104 agreement. However, where applicable drainage will be designed to adoptable standards set out by the Design and Construction Guidance; Sewerage Sector Guidance Appendix C.

6.1 Typical SuDS Maintenance Schedule

The SuDS manual has been reviewed and the operation and maintenance guidance for different surface water systems has been extracted and is provided in the following tables.

6.1.1 Permeable Paving

Pervious pavements need to be regularly cleaned of silt and other sediments to preserve their infiltration capacity. Before handing over the pavement to the client, it should be inspected for clogging, litter, weeds and water ponding. After handover the pavement should be inspected regularly, preferably during and after heavy rainfall to check effective operation and to identify and areas of ponding.

TABLE 4 - MAINTENANCE REQUIREMENTS FOR PERMEABLE PAVING

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	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 surface from adjacent impermeable areas as this area is likely to collect the most sediment
Occasional Maintenance	Stabilise and mow contributing 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
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm 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)
Monitoring	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

6.1.2 Green Roofs

The table below has been extracted from table 12.1 of the SuDS manual, and provides guidance on the type of operation and maintenance requirements that may be appropriate. The list of actions is not exhaustive, and some actions may not always be required. Actual requirements will depend on the planting, the desired aesthetic and visual effect and the biodiversity objectives for the system. Maintenance specifications and schedules should therefore be specified for any individual green roof.

TABLE 5 - MAINTENANCE REQUIREMENTS FOR GREEN ROOFS

Maintenance Schedule	Required Action	Typical Frequency
Regular Inspections	Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable), membranes and roof structure for proper operation, integrity of waterproofing and structural stability.	Annually and after severe storms.
	Inspect soil substrate for evidence of erosion channels and identify any sediment sources.	Annually and after severe storms.
	Inspect drain inlets to ensure unrestricted run-off from the drainage layer to the conveyance or roof drain system.	Annually and after severe storms.
	Inspect underside of roof for evidence of leakage.	Annually and after severe storms.
Regular Maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth.	Six monthly and annually or as required.
	During establishment (ie year one), replace dead plants as required.	Monthly (but usually responsibility of a manufacturer)
	Post establishment, replace dead plants as required (where >5% of coverage)	Annually (in autumn)
	Remove nuisance and invasive vegetation, including weeds.	Six monthly or as required.

	Remove fallen leaves and debris from deciduous plant foliage.	Six monthly or as required.
	Mow grasses, prune shrubs and manage other planting (if appropriate) as required. Clippings should be removed and not allowed to accumulate.	Six monthly or as required.
Remedial Actions	If erosion channels are evident, those should be stabilised with extra soil substrate similar to the original material, and sources of erosion damage should be identified and controlled.	As required
	If drain inlet has settled, cracked or moved, investigate and repair as appropriate.	As required

6.1.3 Filter Drains / Rain Gardens

Regular inspection and maintenance is important for the effective operation of filter drains and rain gardens as designed. Adequate access should always be provided for inspection and maintenance. If implemented on private property, owners should be educated on their routine maintenance needs. The table below has been extracted from table 16.1 of the SuDS manual.

TABLE 6 - MAINTENANCE REQUIREMENTS FOR FILTER DRAINS

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly (or as required)
	Inspect filter drain surface, inlet/ outlet pipework and control system for blockages, clogging, standing water and structural damage	Six monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six monthly
	Remove sediment from pre-treatment devices	Six monthly, or as required
Occasional Maintenance	Remove or control tree roots where they are encroaching the sides of the filter drains, using recommended methods (e.g NJUG, 2007 or BS 3998:2010)	As Required
	At locations with high pollution loads, remove surface geotextile and replace, and was or replace overlying filter medium	Five yearly, or as required
	Clear perforated pipework of blockages	As required

6.1.4 Attenuation Storage Tanks

Regular inspection and maintenance is required to ensure the effective long-term operation of below-ground storage systems. Maintenance responsibility for systems should be placed with a responsible organisation. The table below is extracted from table 21.3 of the SuDS manual and provides guidance on the type of operational and maintenance requirements that may be appropriate. The list of actions is not exhaustive, and some actions may not always be required.

TABLE 7 - MAINTENANCE REQUIREMENTS FOR ATTENUATION STORAGE TANKS

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then annually.
	Remove debris from the catchment surface (where it may cause risks to performance).	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface water or filter for blockage by sediment, algae, or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and / internal forebays.	Annually, or as required.
Remedial Actions	Repair/rehabilitate inlets, outlet, overflows and vents.	As required.
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually.
	Survey inside of tank for sediment build-up and remove if necessary.	Every 5 years or as required.

6.1.5 Pipework

In addition to the above pipework should usually be jetted and cleaned as and when blockages appear to have occurred. Pipes should be checked for build-up of debris and other waste that could cause blockages or damage to the pipework. Occasional maintenance should be carried out annually or as required.

6.1.6 Flow Controls

Little maintenance is required as there are no moving parts within the Flow Control. Experience has shown that if blockages occur, they do so at the intake.

Following the installation of the Flow Control it is vitally important that any extraneous material i.e. building materials are removed from the unit and the chamber. After the system is made live, and assuming that the chamber design is satisfactory, it is recommended that each unit be inspected monthly for three months and thereafter at six monthly intervals with hose down if required. If problems are experienced contact the manufacturer so that an investigation may be made.

All Flow Control units are typically manufactured from grade 304 Stainless Steel, and if required they can also be manufactured in grade 316 Stainless Steel. Both materials have an estimated life span in excess of the design life of drainage systems.

6.1.7 Timetable

Maintenance should be carried out and timetabled from the date of installation. Each SuDS feature and component has a recommended and typical frequency for inspection which should be adhered to as close as practically possible. The landowner or management company are responsible for its implementation.

7 RISKS AND UNCERTAINTIES

The following outlines the current uncertainties and associated risks for aspects related to the below ground drainage and SuDS.

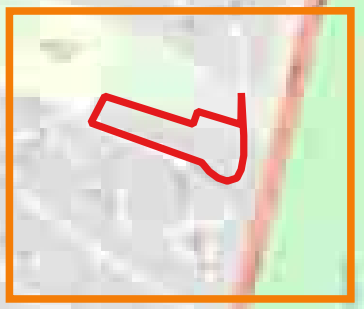
- **Public Sewer Levels –** Levels of the TW sewers situated within the road have been taken from a GPR survey which has been partially completed. Prior to commencement on site these invert levels should be checked to ensure a gravity connection is viable and the current network can meet the outfall level.
- **MEP coordination –** As per standard practice, the proposed drainage layout is subject to change upon receipt of a proposed above ground drainage plan and schematic from the appointed MEP engineer. Any changes will be picked up at the next design stage when detailed design co-ordination is carried out.
- **Build-overs and diversions –** Build overs and diversion may be required and an approval in principle is still to be sought. Until these are obtained, they remain a project risk.

8 CONCLUSIONS AND RECOMMENDATIONS

The main conclusions from this flood risk assessment are detailed below. These conclusions and recommendations may change if further site investigations become available and the proposals are developed.

- The site is well served by both foul and surface water public sewer infrastructure. Connection points are therefore available adjacent to the site boundary for both networks.
- There is a low risk of groundwater flooding based on available data from the SFRA. This should be reviewed as further site investigations are conducted.
- The predicted presence of clay means infiltration on site is not recommended at this stage.
- There are two sewers which have been identified as potential diversion or build-over agreements. At the time of drafting this report, an agreement is still required with Thames Water and this will be sought post planning via a S185 agreement.
- There is existing drainage within proximity to the site, any outfall location will need to be agreed via a pre-planning enquiry with Thames Water to check for capacity within the network. This has been submitted and engagement will continue through the planning process.
- Currently the surface water is proposed to discharge at QBar equalling 4.3l/s, with foul water unrestricted. Overall a betterment will be achived.
- The proposed development provides the opportunity to utilise SuDS. Not all SuDS techniques will be suitable for this site but through assessing the benefits and constraints the most appropriate SuDS techniques should be selected. Permeable paving, green roofs, rain gardens, soft landscaping and below ground attention tanks are all deemed appropriate at this stage.

Appendix A – Site Location Plan



whitby wood

91-94 Lower Marsh, London, SE1 7AB

AVOINDALE DRIVE
P450729
23/11/2021

SITE LOCATION PLAN

Legend

- Site Boundary
- Statutory Main River

1:10,000

Appendix B – Existing Drainage Layout

0 5 10 20 30 40 50m

1 : 500

HEALTH AND SAFETY INFORMATION

CONSTRUCTION
THIS DRAWING SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING:

MAINTENANCE/CLEANING/OPERATION.
MAINTENANCE OF SUDS FEATURES AND THE DRAINAGE SYSTEM SHOULD BE CARRIED OUT IN ACCORDANCE WITH THE CIRIA SUDS MANUAL AND MANUFACTURERS SPECIFICATIONS

DECOMMISSIONING/DEMOLITION.
REFER TO DRAWING FOR EXTENT OF EXISTING SITE DRAINAGE TO BE ABANDONED/REMOVED

NOTES

1. DO NOT SCALE FROM THIS DRAWING. ONLY FIGURED DIMENSIONS ARE TO BE USED.
2. ALL DIMENSIONS ARE IN MILLIMETRES U.N.O.
3. ALL LEVELS ARE IN METRES ABOVE ORDANCE DATUM U.N.O.
4. THE EXISTING DRAINAGE LAYOUT INFORMATION HAS BEEN TAKEN FROM THAMES WATER ASSET PLANS.
5. EXISTING DRAINAGE LINE AND LEVEL TO BE CONFIRMED BY CCTV SURVEY.
6. EXISTING MANHOLES ARE NOT TO SCALE.

KEY

- RED LINE BOUNDARY
- EXISTING COMBINED SEWER
- EXISTING FOUL WATER SEWER
- EXISTING SURFACE WATER SEWER
- MH EXISTING MANHOLE

REV	DESCRIPTION	DRN	CHK	APP	DATE
P2	SITE BOUNDARY UPDATED	GRH	RS	RW	22.11.21
P1	PRELIMINARY ISSUE	GRH	RS	RW	08.11.21

whitby wood
81-84 LONG LANE
LONDON SE1 4AL, UNITED KINGDOM
+44 (0)20 7403 2216 www.whitbywood.com

CLIENT
HILLINGDON

PROJECT
AVONDALE DRIVE

PRELIMINARY

DRAWING TITLE
EXISTING DRAINAGE LAYOUT

DATE	SCALES @ A1	DRAWN BY	CHECKED	APPROVED
28.10.2021	1:500	GRH	RW	RW

DRAWING NUMBER
P450729-WW-AV-00-DR-C-0001

REVISION
P2

W:\WW General\Projects\P450700\P450729 Austin Rd & Avondale Drive\03 BIM\02 Drawings\DWG\P450729-WW-AV-00-DR-C-0001.dwg Plotted on 22/11/21 at 16:19 by g.hall

Appendix C – Thames Water Asset Search

Asset location search

Property Searches

National One Call Plan To Dig
Mill Place,1 Li,Mill Place

WEST LOTHIAN
EH49 7TL

Search address supplied Avondale Drive
Hayes
UB3 3PW

Your reference NOC/BGJHM742

Our reference ALS/ALS Standard/2021_4505245

Search date 15 September 2021

Knowledge of features below the surface is essential for every development

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

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

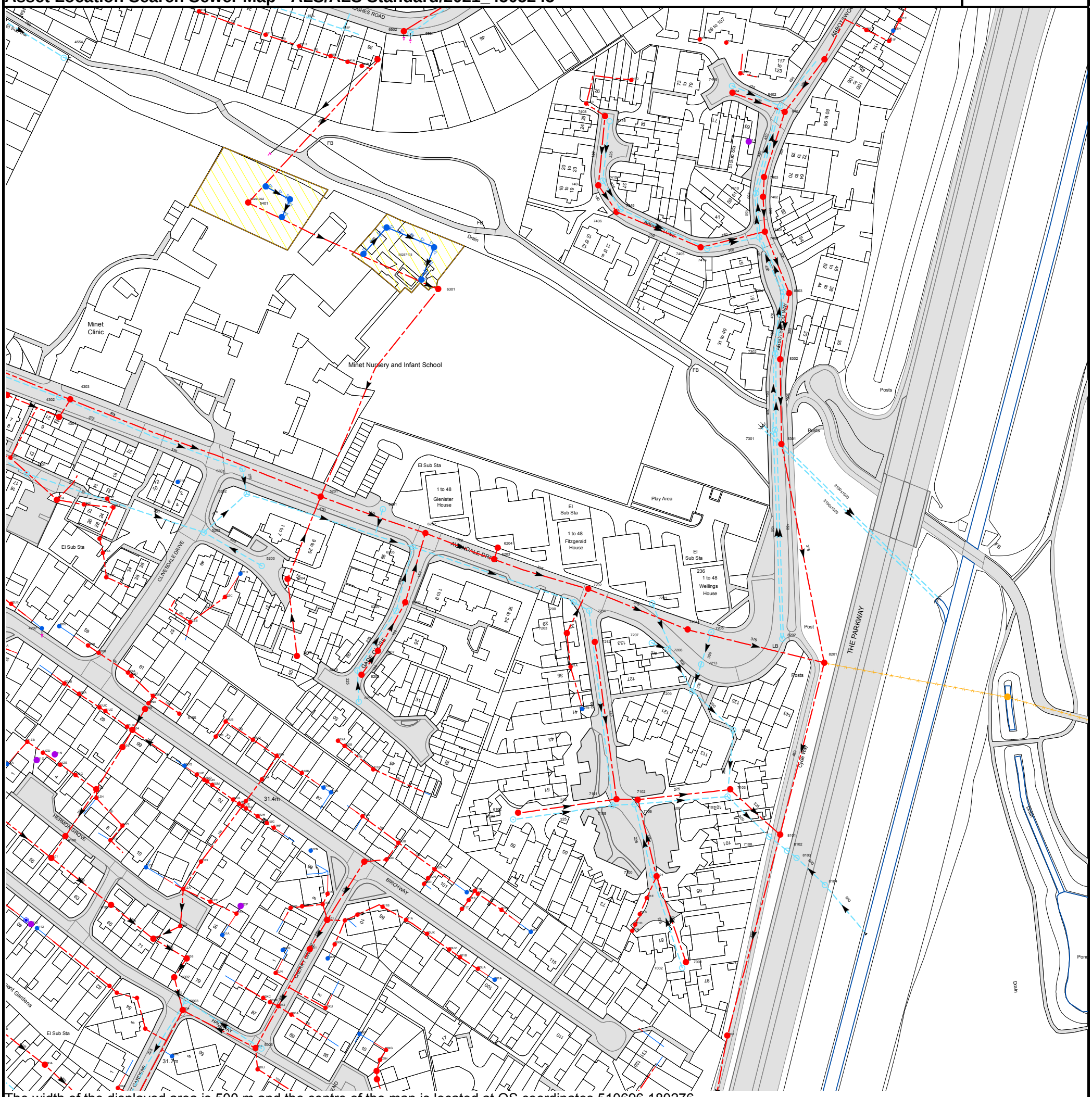
Contact us to find out more.

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

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

0800 009 4540

Asset Location Search Sewer Map - ALS/ALS Standard/2021_4505245



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 510696,180276

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

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

Manhole Reference	Manhole Cover Level	Manhole Invert Level
851H	n/a	n/a
6301	n/a	n/a
n/a	n/a	n/a
n/a	n/a	n/a
n/a	n/a	n/a
n/a	n/a	n/a
511B	n/a	n/a
611E	n/a	n/a
512P	n/a	n/a
5201	31.038	27.588
551I	n/a	n/a
651F	n/a	n/a
641A	n/a	n/a
641B	n/a	n/a
651A	n/a	n/a
6502	31.61	30.17
6501	31.32	28.66
741C	n/a	n/a
7407	n/a	n/a
7415	n/a	n/a
7408	n/a	n/a
7416	n/a	n/a
741D	n/a	n/a
751B	n/a	n/a
751A	n/a	n/a
7446	n/a	n/a
7404	n/a	n/a
741B	n/a	n/a
741A	n/a	n/a
7410	n/a	n/a
7402	n/a	n/a
7403	n/a	n/a
8402	n/a	n/a
8401	n/a	n/a
851A	n/a	n/a
851G	n/a	n/a
851F	n/a	n/a
851E	n/a	n/a
4554	31.86	30.54
551B	n/a	n/a
5401	n/a	n/a
551G	n/a	n/a
n/a	n/a	n/a
551K	n/a	n/a
n/a	n/a	n/a
551H	n/a	n/a
551L	n/a	n/a
4305	n/a	n/a
431B	n/a	n/a
42UB	n/a	n/a
4301	31.48	30.16
431A	n/a	n/a
4206	n/a	n/a
4302	31.38	30.16
4304	n/a	n/a
4303	n/a	n/a
421C	n/a	n/a
421A	n/a	n/a
421X	n/a	n/a
421W	n/a	n/a
421Z	n/a	n/a
421Z	n/a	n/a
531A	n/a	n/a
52ZB	n/a	n/a
5202	n/a	n/a
52ZC	n/a	n/a
521H	n/a	n/a
5301	n/a	n/a
7207	n/a	n/a
7212	n/a	n/a
7203	n/a	n/a
7205	n/a	n/a
7204	n/a	n/a
7211	n/a	n/a
6209	n/a	n/a
7201	n/a	n/a
6206	n/a	n/a
7200	n/a	n/a
7202	n/a	n/a
5204	n/a	n/a
5203	n/a	n/a
6203	n/a	n/a
6204	n/a	n/a
6205	n/a	n/a
6202	n/a	n/a
6201	n/a	n/a
5302	n/a	n/a
7413	n/a	n/a
7405	n/a	n/a
7409	n/a	n/a
n/a	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
7406	n/a	n/a
7445	n/a	n/a
7401	n/a	n/a
7108	n/a	n/a
7301	n/a	n/a
7302	n/a	n/a
8101	n/a	n/a
8302	n/a	n/a
8301	n/a	n/a
8202	n/a	n/a
8304	n/a	n/a
8102	n/a	n/a
8303	n/a	n/a
8103	n/a	n/a
8201	n/a	n/a
8104	n/a	n/a
41ZA	n/a	n/a
41ZB	n/a	n/a
411O	n/a	n/a
4207	n/a	n/a
41ZD	n/a	n/a
4101	n/a	n/a
411N	n/a	n/a
41ZE	n/a	n/a
52UB	n/a	n/a
4108	n/a	n/a
411G	n/a	n/a
52UA	n/a	n/a
4208	n/a	n/a
4102	n/a	n/a
41ZH	n/a	n/a
42XB	n/a	n/a
51UC	n/a	n/a
51UZ	n/a	n/a
411M	n/a	n/a
4107	n/a	n/a
4105	n/a	n/a
41ZI	n/a	n/a
51UX	n/a	n/a
52XA	n/a	n/a
5207	n/a	n/a
5104	n/a	n/a
52NB	n/a	n/a
51ZC	n/a	n/a
52NA	n/a	n/a
5206	n/a	n/a
5105	n/a	n/a
51ZA	n/a	n/a
51UQ	n/a	n/a
51UP	n/a	n/a
5103	n/a	n/a
51UO	n/a	n/a
51UN	n/a	n/a
51ZE	n/a	n/a
51UM	n/a	n/a
512O	n/a	n/a
51UB	n/a	n/a
51UL	n/a	n/a
51HK	n/a	n/a
51UE	n/a	n/a
51BA	n/a	n/a
51UJ	n/a	n/a
51UD	n/a	n/a
51UH	n/a	n/a
511A	n/a	n/a
51UG	n/a	n/a
51HF	n/a	n/a
51UA	n/a	n/a
51XP	n/a	n/a
5205	n/a	n/a
51UK	n/a	n/a
51XS	n/a	n/a
512N	n/a	n/a
51XR	n/a	n/a
51UF	n/a	n/a
51XT	n/a	n/a
5106	n/a	n/a
61XA	n/a	n/a
61XB	n/a	n/a
6210	n/a	n/a
6211	n/a	n/a
6208	n/a	n/a
61UA	n/a	n/a
6101	n/a	n/a
611P	n/a	n/a
6207	n/a	n/a
611B	n/a	n/a
61UC	n/a	n/a
61UB	n/a	n/a
61UD	n/a	n/a
61UH	n/a	n/a
61UE	n/a	n/a
611T	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
61UF	n/a	n/a
611S	n/a	n/a
611R	n/a	n/a
611Q	n/a	n/a
6103	n/a	n/a
6102	n/a	n/a
721A	n/a	n/a
721B	n/a	n/a
7105	n/a	n/a
7101	n/a	n/a
7106	n/a	n/a
7102	n/a	n/a
711E	n/a	n/a
7100	n/a	n/a
7104	n/a	n/a
7206	n/a	n/a
7209	n/a	n/a
7213	n/a	n/a
7107	n/a	n/a
7103	n/a	n/a
7109	n/a	n/a
60XF	n/a	n/a
50FA	n/a	n/a
50XU	n/a	n/a
501J	n/a	n/a
50XB	n/a	n/a
50XC	n/a	n/a
601A	n/a	n/a
50JN	n/a	n/a
60UA	n/a	n/a
7002	n/a	n/a
7001	n/a	n/a
50XN	n/a	n/a
601B	n/a	n/a
50XQ	n/a	n/a
60UV	n/a	n/a
5001	n/a	n/a
50XM	n/a	n/a
60UX	n/a	n/a
611D	n/a	n/a
711A	n/a	n/a
711D	n/a	n/a
611C	n/a	n/a
5101	n/a	n/a
611A	n/a	n/a
611F	n/a	n/a
711B	n/a	n/a
4110	n/a	n/a
4112	n/a	n/a
40HA	n/a	n/a
4004	n/a	n/a
4005	n/a	n/a
40XA	n/a	n/a
5010	n/a	n/a
5011	n/a	n/a
5007	n/a	n/a
40XC	n/a	n/a
5002	n/a	n/a
5102	n/a	n/a
5004	n/a	n/a
5003	n/a	n/a
5008	n/a	n/a
501A	n/a	n/a
7003	n/a	5.35
5005	n/a	n/a
50XJ	n/a	n/a
5006	n/a	n/a
6006	n/a	n/a
6005	n/a	n/a
60XH	n/a	n/a
60XG	n/a	n/a

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

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

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

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

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

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

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

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

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

Control Valve

Drop Pipe

Ancillary

Weir

End Items

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

Outfall

Undefined End

Inlet

Other Symbols

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

Public/Private Pumping Station

Change of characteristic indicator (C.O.C.I.)

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

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

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.

2) All measurements on the plans are metric.

3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.

4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.

5) 'na' or '0' on a manhole level indicates that data is unavailable.

6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Searches on 0800 009 4540.

Appendix D – Existing Drainage Easement Zones

0 5 10 20 30 40 50m

1 : 500

HEALTH AND SAFETY INFORMATION

CONSTRUCTION
THIS DRAWING SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING:

MAINTENANCE/CLEANING/OPERATION.
MAINTENANCE OF SUDS FEATURES AND THE DRAINAGE SYSTEM SHOULD BE CARRIED OUT IN ACCORDANCE WITH THE CIRIA SUDS MANUAL AND MANUFACTURERS SPECIFICATIONS

DECOMMISSIONING/DEMOLITION.
REFER TO DRAWING FOR EXTENT OF EXISTING SITE DRAINAGE TO BE ABANDONED/REMOVED

NOTES

1. DO NOT SCALE FROM THIS DRAWING. ONLY FIGURED DIMENSIONS ARE TO BE USED.
2. ALL DIMENSIONS ARE IN MILLIMETRES U.N.O.
3. ALL LEVELS ARE IN METRES ABOVE ORDANCE DATUM U.N.O.
4. THE EXISTING DRAINAGE LAYOUT INFORMATION HAS BEEN TAKEN FROM THAMES WATER ASSET PLANS.
5. EXISTING DRAINAGE LINE AND LEVEL IS TO BE CONFIRMED BY CCTV SURVEY.
6. HATCHED EASEMENT ZONES SHOW SEWERS AT RISK OF DIVERSION OR BUILD-OVER AGREEMENT. THIS IS NOT EXHAUSTIVE AND TO BE CONFIRMED UPON RECEIPT OF THE CCTV SURVEY.
7. BUILD-OVER AND DIVERSIONS MUST BE AGREED WITH THAMES WATER.
8. ALL SEWERS TO BE ABANDONED MUST BE CONFIRMED TO NOT BE LIVE PRIOR TO ABANDONMENT.

KEY

- RED LINE BOUNDARY
- EXISTING FOUL WATER SEWER
- EXISTING SURFACE WATER SEWER
- EASEMENT ZONE
- MH EXISTING MANHOLE

REV	DESCRIPTION	DRN	CHK	APP	DATE
P2	SITE BOUNDARY UPDATED	GRH	RS	RW	22.11.21
P1	PRELIMINARY ISSUE	GRH	RS	RW	08.11.21

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CLIENT
HILLINGDON

PROJECT
AVONDALE DRIVE

PRELIMINARY

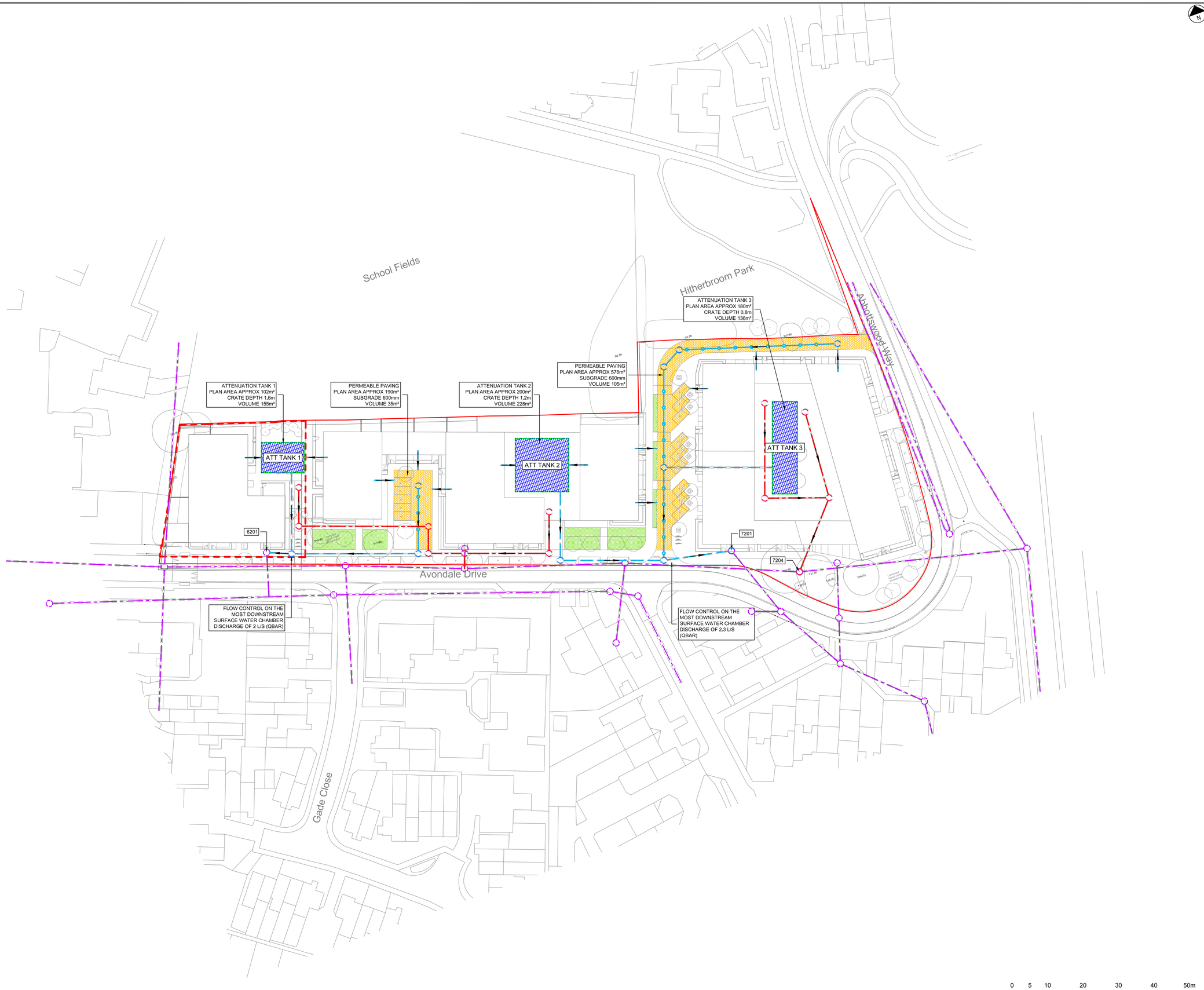
DRAWING TITLE
EXISTING DRAINAGE EASEMENT ZONES

DATE	SCALES @ A1	DRAWN BY	CHECKED	APPROVED
03.11.2021	1:500	GRH	RW	RW

DRAWING NUMBER
P450729-WW-AV-00-DR-C-0003

REVISION
P2

Appendix E – Proposed Drainage Layout



0 5 10 20 30 40 50m

1 : 500

W:\WW General\Projects\P450700\P450729 Austin Rd & Avondale Drive\03 BIM\02 Drawings\DWG\P450729-WW-AV-00-DR-C-0002.dwg Plotted on 22/11/21 at 16:20 by g.hall

HEALTH AND SAFETY INFORMATION

CONSTRUCTION
THIS DRAWING SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING:

MAINTENANCE/CLEANING/OPERATION.
MAINTENANCE OF SUDS FEATURES AND THE DRAINAGE SYSTEM SHOULD BE CARRIED OUT IN ACCORDANCE WITH THE CIRIA SUDS MANUAL AND MANUFACTURERS SPECIFICATIONS

DECOMMISSIONING/DEMOLITION.
REFER TO DRAWING FOR EXTENT OF EXISTING SITE DRAINAGE TO BE ABANDONED/REMOVED

NOTES

1. DO NOT SCALE FROM THIS DRAWING. ONLY FIGURED DIMENSIONS ARE TO BE USED.
2. ALL DIMENSIONS ARE IN MILLIMETRES U.N.O.
3. ALL LEVELS ARE IN METRES ABOVE ORDANCE DATUM U.N.O.
4. THIS DRAWING IS TO BE READ IN CONJUCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
5. THE EXISTING DRAINAGE LAYOUT INFORMATION HAS BEEN TAKEN FROM THAMES WATER ASSET PLANS.
6. ALL FOUL AND SURFACE WATER PIPEWORK TO BE LAID AT 1:40 AND 1:100 RESPECTIVELY U.N.O.
7. PIPEWORK TO BE UPVC OR VITRIFIED CLAY.
8. ROCKER PIPES TO BE INSTALLED AT CONNECTION POINTS TO STRUCTURES TO ALLOW FOR MOVEMENT CAUSED BY SETTLEMENT.

KEY

- RED LINE BOUNDARY
- EXISTING FOUL WATER SEWER
- EXISTING SURFACE WATER SEWER
- PROPOSED RAIN GARDEN PERFORATED PIPE
- PROPOSED FOUL WATER SEWER
- PROPOSED SURFACE WATER SEWER
- ATTENUATION TANK
- PERMEABLE PAVING
- RAIN GARDEN

RWP	RAIN WATER PIPE
SVP	SOIL VENT PIPE
SS	STUB STACK
FG	FLOOR GULLY
G	ROAD GULLY
CD	CHANNEL DRAIN
MH	EXISTING MANHOLE
FW	PROPOSED FOUL WATER MANHOLE
SW	PROPOSED SURFACE WATER MANHOLE

AC	-	ACCESS FITTING/CHAMBER
CD	-	CHANNEL DRAIN
FG	-	FOUL WATER GULLY
FW	-	FOUL WATER
IC	-	INSPECTION CHAMBER
MH	-	MANHOLE
RE	-	RODDING EYE
RWP	-	RAIN WATER PIPE
SG	-	SURFACE WATER GULLY
SS	-	STUB STACK
SVP	-	SOIL VENT PIPE
SW	-	SURFACE WATER

REV	DESCRIPTION	DRN	CHK	APP	DATE
P2	SITE BOUNDARY UPDATED	GRH	RS	RW	22.11.21
P1	PRELIMINARY ISSUE	GRH	RS	RW	08.11.21

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CLIENT
HILLINGDON

PROJECT
AVONDALE DRIVE

PRELIMINARY

DRAWING TITLE
PROPOSED DRAINAGE LAYOUT

DATE	SCALES @ A1	DRAWN BY	CHECKED	APPROVED
28.10.2021	1:500	GRH	RW	RW

DRAWING NUMBER
P450729-WW-AV-00-DR-C-0002

REVISION
P2

whitby wood

[redacted]

4 APPENDIX B – AVD-IES-A1-00-DR-C-3540_DRAINAGE GA-P02

1. NO PART OF THIS DRAWING MAY BE COPIED, TRANSFERRED, OR MADE AVAILABLE TO USERS OTHER THAN THE ORIGINAL RECIPIENT, INCLUDING ELECTRONICALLY, WITHOUT PRIOR PERMISSION FROM IESIS.

2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS & ENGINEERS AND SPECIALIST DRAWINGS & SPECIFICATIONS.

3. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER FOR ACTION PRIOR TO CONSTRUCTION.

4. THIS DRAWING IS BASED ON:

- TOPOGRAPHIC SURVEY DWG 56562 DATED AUG 2022 BY SUBSIGHT
- - SITE PLAN GROUND LEVEL GA REVISION P10 - PRELIMINARY DRAWING AVD-PRP-ZZ-00-DR-A-10050 DATED SEP 2025 BY PRP

5. ALL DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL AUTHORITY AND IN CONJUNCTION WITH ALL RELEVANT BRITISH STANDARDS, CODES OF PRACTICE AND 'CODE TO ADOPTION' AND ADDENDUMS AS APPROPRIATE. ALL DRAINAGE SHALL COMPLY WITH THE TYPICAL DRAINAGE CONSTRUCTION DETAILS AND THE REQUIREMENTS OF BS EN 752.

6. ALL EXISTING DRAINAGE ON SITE TO BE CONFIRMED BY CONTRACTOR. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER FOR ACTION PRIOR TO ANY NEW CONSTRUCTION. PROPOSED DRAINAGE SHOWN ON THIS DRAWING IS SUBJECT TO CHANCE UPON RECEIPT OF REVISED EXISTING DRAINAGE INFORMATION.

7. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT AND DIVERSION WORKS NECESSARY, TO ALL EXISTING SERVICES TO THE SATISFACTION OF THE STATUTORY UNDERTAKER.

8. THE PROPOSED BUILDING OUTLINES SHOWN ON THIS DRAWING ARE FOR INFORMATION ONLY. REFER TO ARCHITECTS PLANS FOR SETTING OUT INFORMATION AND DETAILS.

9. FOR SETTING OUT DIMENSIONS OF SS'S, SVP'S, RWP'S, FLOOR GULLY & OTHER DRAINAGE 'POP UP' LOCATIONS, REFER TO ARCHITECTS OR MECHANICAL & ELECTRICAL ENGINEERS DRAWINGS. LOCATION OF EXTERNAL CHANNEL DRAINS AND GULLY LOCATIONS / REQUIREMENTS TO BE CONFIRMED BY ARCHITECT.

10. ALL DRAINAGE PIPEWORK SHOWN SHALL BE 100MM DIAMETER FOR FOUL AND 150MM FOR SURFACE WATER UNLESS NOTED OTHERWISE. ALL DRAINAGE PIPEWORK SHALL BE LAID SOFFIT TO SOFFIT UNLESS NOTED OTHERWISE.

11. ALL UNDERSLAB DRAINAGE SHALL BE LAID AT GRADIENTS OF 1:40 MIN. FOR FOUL PIPEWORK AND 1:150 MIN. FOR SURFACE WATER UNLESS NOTED OTHERWISE.

12. ALL SURFACE WATER PIPES 300MMØ OR LESS TO BE UPVC OR SIMILAR APPROVED. SURFACE WATER PIPES GREATER THAN 300MMØ TO BE CONCRETE. ALL 100MM AND 150MM DIAMETER FOUL WATER DRAINS TO BE UPVC.

13. ALL UNDERSLAB DRAINAGE SHALL BE CLEAR OF FOUNDATIONS UNLESS SHOWN OTHERWISE. ALL BENDS IN PIPEWORK TO BE AS LARGE A RADIUS AS POSSIBLE (EXCLUDING CONNECTIONS TO CHAMBERS) TO ENSURE FREE FLOW. SHORT RADIUS BENDS TO BE AGREED WITH DRAINAGE ENGINEER.

14. ALL SURFACE WATER DROP DOWN POSITIONS SHALL HAVE A BEND SET AT INVERT LEVEL NO GREATER THAN 1.3M BELOW FINISH FLOOR LEVEL.

15. AT LEAST ONE SOIL PIPE AT THE HEAD OF EACH FOUL RUN SHALL BE VENTED TO THE ATMOSPHERE. ALL SVPS, SSS AND RWP DOWNPIPES SHALL BE ACCESSIBLE AT GROUND LEVEL FOR RODDING PURPOSES.

16. COVER LEVELS SHOWN ON THIS DRAWING ARE APPROXIMATE AND SHALL BE ADJUSTED TO SUIT LEVELS ON SITE BY CONTRACTOR. COVERS SHALL BE ORIENTATED TO SUIT PAVEMENT FINISHES WHERE APPROPRIATE. ALL COVER LEVELS ARE TO BE CONFIRMED BY THE ARCHITECT

17. ACCESS COVERS AND FRAMES SHALL COMPLY WITH THE LOADINGS SPECIFIED AND TO BS EN 124 AND KITEMARKED OR IF RECESSED COVERS ARE SPECIFIED THEN IN ACCORDANCE WITH FACTA ASSOCIATION EQUIVALENT. ALLOW FOR RECESS MANHOLE COVERS TO ACCEPT LANDSCAPE ARCHITECT FINISHES TO ALL LANDSCAPED AREAS

18. ALL PRIVATE DRAINAGE PIPEWORK FOR FOUL AND SURFACE WATER SYSTEMS HAVE BEEN DESIGNED ON THE BASIS OF UPVC TO BS EN 1401-1, UNLESS NOTED OTHERWISE. ALL PRIVATE DRAINAGE WORKS TO BE CARRIED OUT IN ACCORDANCE WITH BUILDING REGULATIONS PART H.

19. CONCRETE ENCASEMENT OF THE PIPEWORK SHALL BE REQUIRED WHERE VERTICAL CLEARANCE BETWEEN TWO PIPES CROSSING IS LESS THAN 300MM. ROCKER PIPES ARE TO BE PROVIDED AT ALL CONCRETE CASED INTERFACES. WHERE NEW DRAINAGE IS SITUATED WITHIN 5 METRES OF NEW OR EXISTING TREES THE PIPEWORK SHALL BE ENCASED IN CONCRETE TO REDUCE THE RISK OF ROOT INGRESS.

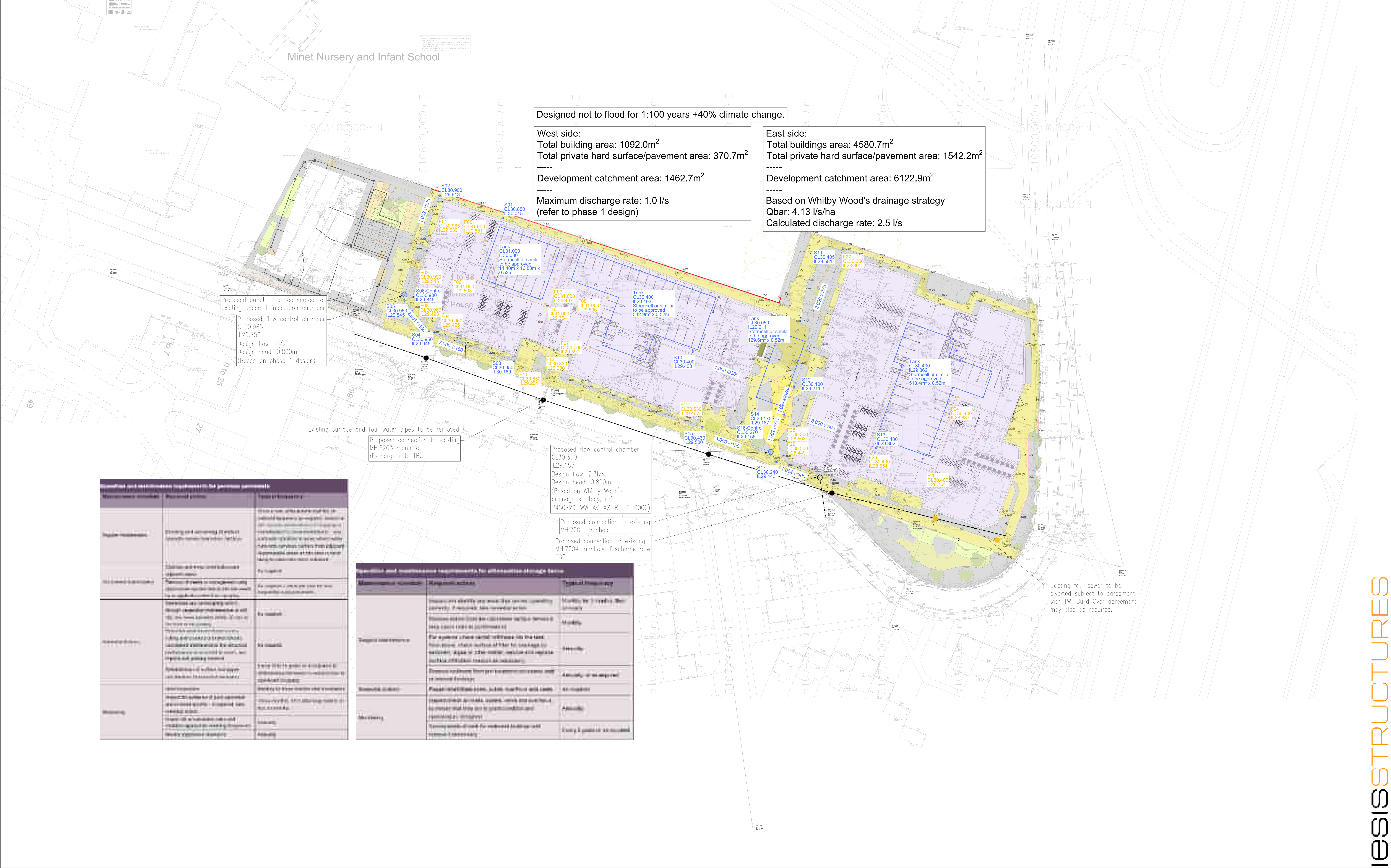
20. ALL DRAINAGE CONNECTING TO THE PUBLIC SEWER NETWORK SHALL NOT COMMENCE UNTIL RECEIPT OF THE APPROVAL FROM THE DRAINAGE AUTHORITY AND SHALL COMPLY WITH REQUIREMENTS USING VITRIFIED CLAY PIPEWORK TO BS EN 295 WITH PLAIN SLEEVED OR SOCKETED FLEXIBLE JOINTS SUBJECT TO APPROVAL.

21. PRIOR TO CONSTRUCTION THE FLOW CONTROL MANUFACTURER'S DRAWING AND HYDRAULIC TABLE SHALL BE PROVIDED TO THE ENGINEER FOR APPROVAL.

22. PRIOR TO CONSTRUCTION THE ATTENUATION TANK MANUFACTURER'S DRAWINGS SHALL BE PROVIDED TO THE ENGINEER FOR APPROVAL.

23. ALL PROPOSED DRAINAGE IS SUBJECT TO APPROVAL FROM THE LLFA. DISCHARGE IS SUBJECT TO FORMAL APPROVAL BY THAMES WATER. WHERE DRAINAGE WORKS ARE CARRIED OUT IN THE PUBLIC HIGHWAY THE RELEVANT NECESSARY APPROVALS AND ROAD OPENING NOTICES SHALL BE OBTAINED FROM THE HIGHWAY AUTHORITY AND UTILITY COMPANIES.

24. UPON COMPLETION ALL NEW DRAINAGE INSTALLATION TOGETHER WITH ANY EXISTING DRAINAGE RETAINED SHALL BE JETTED AND CCTV SURVEYED UPON COMPLETION. CONTRACTOR TO ENSURE THAT THE DRAINAGE SYSTEM IS FULLY OPERATIONAL, FREE OF EXCESS DEBRIS/SILT AND ALL IDENTIFIED FAULTS RECTIFIED.



N
Minet Nursery and Infant School
Minet Nursery and Infant School
Designed not to flood for 1:100 years +40% climate change.
West side:
Total building area: 1092.0m2
Total private hard surface/pavement area: 370.7m2
Development catchment area: 1462.7m2
Maximum discharge rate: 1.0 l/s
(refer to phase 1 design)
East side:
Total buildings area: 4580.7m2
Total private hard surface/pavement area: 1542.2m2
Development catchment area: 6122.9m2
Based on Whitby Wood's drainage strategy
Qbar: 4.13 l/s/ha
Calculated discharge rate: 2.5 l/s
Proposed outlet to be connected to existing phase 1 inspection chamber
Proposed flow control chamber
CL30.985
IL29.750
Design flow: 1l/s
Design head: 0.800m
(Based on phase 1 design)
Existing surface and foul water pipes to be removed
Proposed connection to existing MH.6203 manhole discharge rate TBC
Proposed flow control chamber
CL30.300
IL29.155
Design flow: 2.3l/s
Design head: 0.800m
(Based on Whitby Wood's drainage strategy, ref.: P450729-WW-AV-XX-RP-C-0002)
Proposed connection to existing MH.7201 manhole
Proposed connection to existing MH.7204 manhole. Discharge rate TBC
Existing foul sewer to be diverted subject to agreement with TW. Build Over agreement may also be required.

NOTES:

HEALTH & SAFETY: THE WORKS SHALL BE CARRIED OUT BY SPECIALIST COMPETENT AND EXPERIENCED CONTRACTORS. ALL OPERATIVES SHALL HAVE RECEIVED FULL AND APPROPRIATE TRAINING WITH APPROPRIATE QUALIFICATIONS FOR THE OPERATIONS THEY ARE REQUIRED TO UNDERTAKE. ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH THE RELEVANT HEALTH & SAFETY REGULATIONS.

ATTENUATION VOLUME HAS BEEN CALCULATED BASED ON REQUIRED STORAGE FOR A 1 IN 100YR EVENT + 40% CLIMATE CHANGE

TOTAL DISCHARGE FROM SITE TO PUBLIC SEWER NETWORK TO BE RESTRICTED TO 5l/s/ha BASED ON THAMES WATER REQUIREMENT

KEY:

LEGEND:

- Existing surface water drainage
- Existing foul water drainage
- Proposed surface water flow control chamber
- Surface water drain
- Surface water inspection chamber
- Foul water drain
- Foul water access point
- Foul water inspection chamber
- Surface water impermeable area hard surface/pavement
- Surface water impermeable area building
- Proposed channel drain
- Proposed gully

REV	DATE	DRAWN/CHK	REVISION INFO
P02	16.09.25	GH/JAK	LAYOUT UPDATED.
P01	13.08.25	PB/JAK	PRELIMINARY ISSUE.

STATUS:

PRELIMINARY

CLIENT:

HIGGINS PARTNERSHIPS

PROJECT:

AVONDALE DRIVE
PHASE 2,3,5

DRAWING TITLE:

BELOW GROUND DRAINAGE
GENERAL ARRANGEMENT

JOB NUMBER:	SCALE AT A1:	REV. STATUS:
SE2508	1:500	P2

DRAWING NUMBER:	REVISION:
AVD-IES-A1-00-DR-D-3000	S2

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