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STATION HILL, READING PHASE 3A DRAINAGE STRATEGY AND SUDS REPORT

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1. INTRODUCTION

1.1 Objective

The objective of this document is to provide a detailed description of foul and surface water drainage systems for Phase 3A, of the proposed development at Station Hill, Reading RG1 1NF, Grid Reference (GR): E 471321, N 173741. Phase 2 (One Station Hill) and Phase 3 (Buildings AB, D and C) comprises land between Garrard Street (south) and Station Hill Street (north), and Greyfriars Road (west). Thames Tower forms the eastern boundary to the development site.

A Drainage Strategy and SuDS Report (SHR-RAM-XX-RP-C-00004) was previously issued for Phase 2 as part of the Reserve Matters Application for One Station Hill. This report included an overview description of Phase 3.

This report pertains only to Phase 3A (Plot A/B and D plus podium) and is submitted as part of the Reserve Matters Application for this part of the development only. A further Drainage Strategy and SuDS Report will be submitted for Phase 3B (Plot C) at a future date when this part of the development is brought forward.

The document is to be presented to key project stakeholders to confirm that they understand the current proposals and are in agreement that the philosophy which will be adopted during future design stages.

1.2 Constraints and Limitations

This report has been prepared for exclusive use by SH Reading Master LLP (hereafter the Applicant) for the purpose of explaining the proposed drainage strategy and associated constraints and opportunities that have been integrated within this development. The information presented in this report is based on the information outlined in the sections below.

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2. SITE INFORMATION

2.1 Records Review

The key reports and websites reviewed as part of this study are listed in Table 1, below.

Table 1 – Key Documents and Reports

TITLE	AUTHOR	DATE
SITE TOPOGRAPHICAL AND UNDERGROUND SERVICES SURVEY (REF. 40652-01T-01 TO 04 AND 40652-007T-03-1 TO 3)	Plowman Craven	September 2018 and 2020
SITE TOPOGRAPHICAL SURVEY (REF. TS24-177-1)	Terrain Surveys	May 2024
UTILITY SEARCH REPORT (REF. PK/40652-001)	Plowman Craven	October 2018
FLOOD RISK ASSESSMENT (REF. CIV13174 ES 003)	Waterman	March 2013
PHASE 3A ARCHITECT STAGE 2 LAYOUT DRAWINGS	Gensler	December 2025
PHASE 3A LANDSCAPE STAGE 2 LAYOUT DRAWINGS	LDA	December 2025
PHASE 3A PUBLIC HEALTH STAGE 2 DRAWINGS	Horea Ilea	December 2025
STATION HILL NORTH SITE GROUND INVESTIGATION REPORT (SHR-RAM-NB-XX-RP-S-000022)	Ramboll	July 2020
STATION HILL PHASE 1 DRAINAGE STRATEGY AND SUDS REPORT (SHR-RAM-XX-RP-C-000002)	Ramboll	March 2019
STATION HILL PHASE 2 DRAINAGE STRATEGY AND SUDS REPORT (SHR-RAM-XX-RP-C-000004)	Ramboll	December 2019

2.2 Consultation

A Drainage Strategy and SUDS report was submitted to Thames Water in March 2019 for the Station Hill Phase 1 (South Site), and a second report was submitted to Thames Water in December 2019 for the Station Hill Phase 2 (North Site). Both reports were accepted by Thames water as part of the Reserve Matters Application process. The Phase 2 (North Site) report included preliminary assessment of Phase 3 thus allowing Thames Water to assess the development as a whole when considering storm and foul drainage infrastructure capacity.

As was done during Phases 1 and 2 of the Station Hill development, the Lead Local Flood Authority, Reading Borough Council, is to be contacted to obtain their review and comment on the proposed drainage strategy. The Lead Local Flood Authority has stated in email correspondence dated 12 February 2019 relating to the South site development that they have no objection in principle to the proposal considering an allowance of 40% for climate change and on the basis of the pre-development rates previously agreed.

An existing services survey was undertaken by Plowman Craven in October 2018. A separate report was prepared by Ramboll assessing the impact of the proposed development on existing drainage within the site boundary, and adjacent to the development site.

Where identified in the existing foul and surface water report prepared by Ramboll, existing drainage services, identified as relevant, are to be maintained live for the duration of the proposed works and following completion.

This drainage strategy is based upon providing connections to existing Thames Water public surface water chambers in Garrard Street, Station Hill and Greyfriars Road. New connections are proposed to the existing Thames Water public foul sewer approx. 1150 x 750 (R) in size to the north of Garrard Street.

Foul water drainage will outfall unattenuated to the aforementioned Thames Water sewerage infrastructure. Surface water flows will be attenuated and restricted to discharge rates previously agreed with Thames Water as outlined in the Storm Water Drainage Strategy report prepared by Building Service Engineers, Hoare Lea, dated 13 July 2015 (refer to Appendix 1 for the full report).

2.3 Site Topography and Geology

The existing brownfield site that forms Phase 3 of the proposed development is located to the south of Station Hill, Reading, and comprises an office building, Xafinity House, and a grade level car park.

For this Drainage Strategy report, only the Phase 3A development site totalling an area of 0.6 ha is considered (see Figure 2-1).

The topography of the site generally ranges in levels from circa 39.000 m AOD in Garrard Street to the south, and circa 40.400m AOD in Station Hill to the north. Site levels fall toward the southwest of the site.

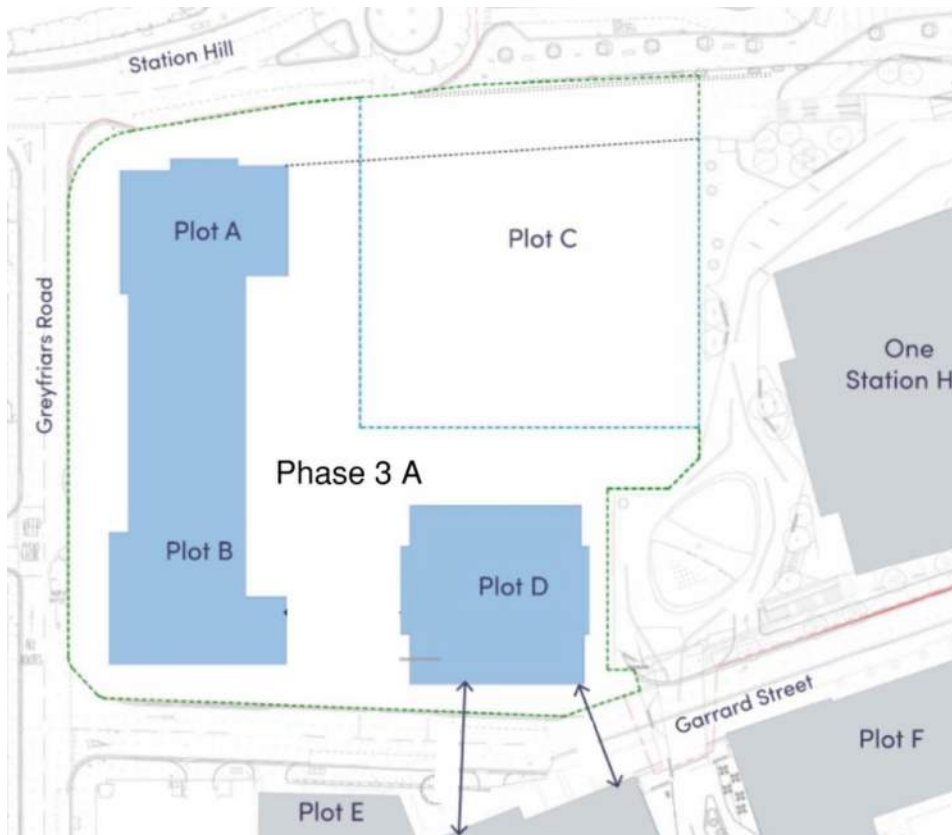
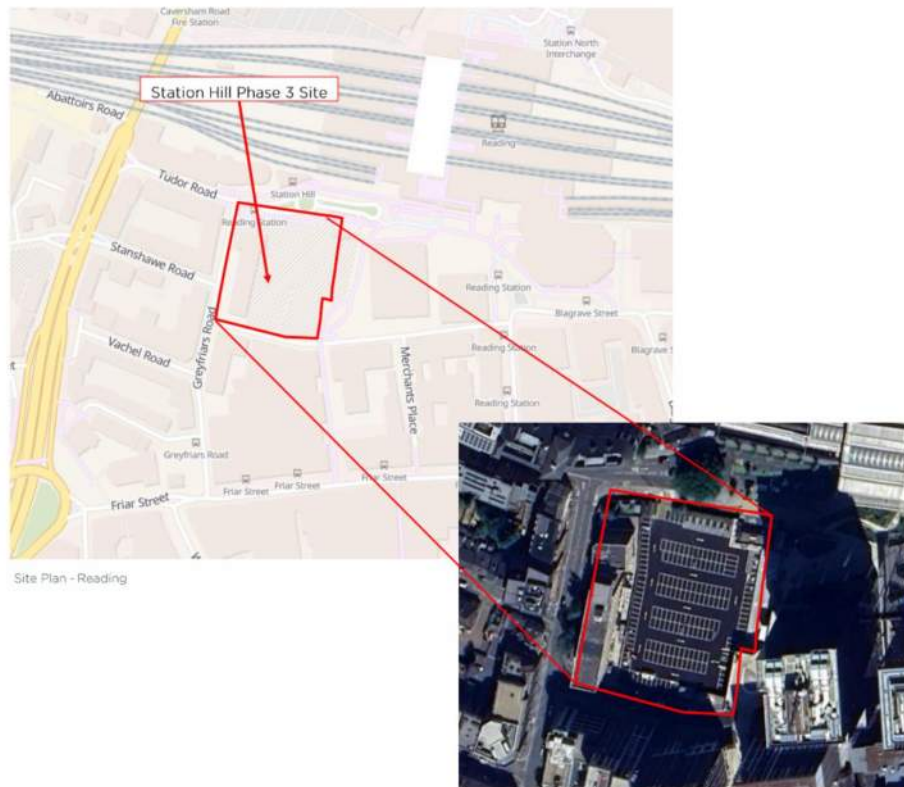


Figure 2-1 Site Extents of Phase 3 and Phase 3A

2.4 Surface Waters

The River Thames and River Kennet are located in close proximity to the site, with the Thames approximately 420m to the northwest and the Kennet approximately 500m southeast of the development site.

The Environment Agency (EA) website has been interrogated to determine the hydrogeology of the area. The EA classifies the Alluvium and Taplow Gravel Formation as Secondary A aquifers and the Upper Chalk formation as a Principal Aquifer.

The EA¹ defines these as follows;

Principal Aquifer: *layers of bedrock or drift deposits with high intergranular and/or fracture permeability able to provide a high level of water storage. These aquifers may support water supply and/or river base flow on a strategic scale.*

Secondary A Aquifer: *permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.*

Although the site is not located within a Source Protection Zone, 12 groundwater extraction sites were recorded within a 1km radius of the development site. The closest borehole is 0.16km southwest of the development and is understood to be used as drinking and washing water.

2.5 Ground Conditions and Groundwater

The geology of the site comprises superficial deposits of Alluvium and Taplow Gravel Formation, underlain by the Upper Chalk Formation². The upper layers of the Upper Chalk Formation comprise variable and significant thicknesses of Structureless Chalk.

Shallow groundwater was found within the Alluvium, Taplow Gravel Formation and Upper Chalk Formation, at depths between 2.7m bgl and 5.3m bgl, usually at or near the boundary of the Alluvium and Taplow Gravel Formation, or within the Structureless Chalk when the other forms of geology were absent.

The surface water drainage strategy for the proposed site is a hybrid system utilising shallow depth attenuation storage units (permavoid) located on the ground floor podium (blue podium) and below ground attenuation storage tanks at P-2 level. The surface water attenuation tanks serving the proposed site will be located above the ground water table and is not expected to increase the risk of ground water flooding.

As advised in Sustainable Design and Construction Supplementary Planning Guidance, where the ground water is close to the surface, special considerations must be given when designing drainage systems such as inclusions of SuDS, soft landscaping as well as provision of adequate drainage. These parameters were all taken into consideration and implemented in the drainage strategy.

¹ **Environment Agency & British Geological Survey (BGS)** (2026) *Aquifer Designation Dataset for England and Wales* Available at: <https://www.data.gov.uk/dataset/616469ae-3ff2-41f4-901f-6686feb1d5b6/aquifer-designation-dataset-for-england-and-wales> (Accessed 17 February 2026)

² **British Geological Survey (BGS)** (2026) *BGS Geology Viewer*. Available at: <https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/> (Accessed: 17 February 2026)

2.6 Existing Foul and Surface Water Drainage

As discussed, the proposed development site comprises Xafinity House and grade level car park.

In accordance with Thames Asset records (see Figure 2-2 and Appendix 2) several existing public sewers were identified in Garrard Street, Station Hill and Greyfriars Road.

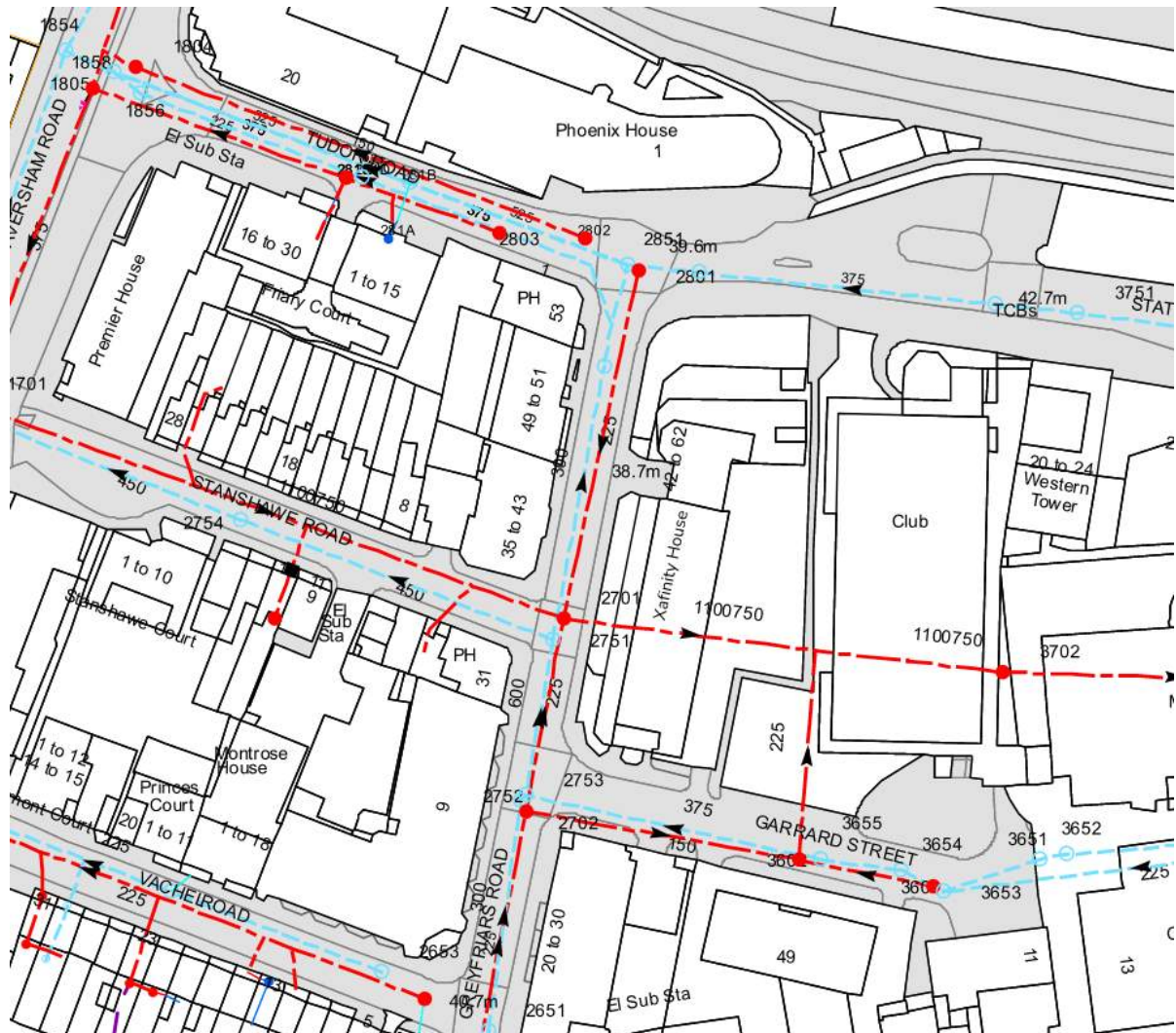


Figure 2-2 Thames Water Asset Map

A foul water sewer north of Garrard Street is noted on the Thames Water Asset Plans as 1100 x 750 egg-shaped sewer, presumably of brick construction, depth and condition unknown. The foul water sewers in Greyfriars Road are noted to be of 225mm diameter respectively. In accordance with the asset maps a 225mm diameter sewer is also located within the Phase 3A site boundary, connecting to the 1100 x 750 egg-shaped sewer west of Xafinity House.

The existing surface water sewers in Garrard Street and Station Hill are noted on the Thames Water asset plans as 375mm diameter, depth and condition unknown. Both of these assets are understood to be branch connections to the sewer located in Greyfriars Road. This pipe is indicated to be predominantly 300mm diameter, with a 600mm diameter section between manholes 2752 and 2701. From chamber 2701 there is an outgoing 450mm diameter pipe within

Stanshowe Road, and a 300 mm diameter pipe continue to flow north within Greyfriars Road, changing direction at the junction with Station Hill and Tudor Road. From this junction 2No. 375mm diameter parallel surface water pipes are shown to be located within Tudor Road flowing in a westerly direction.

Existing private infrastructure serving Xafinity House were identified as part of the underground services survey by Plowman Craven³ (see Appendix 3). A foul drain was recorded to the east of the existing building flowing towards Greyfriars Road, however connection to the public foul sewer not confirmed. A series of surface water drains were also recorded around the perimeter of the building, with one confirmed connection to the public surface water sewer within Greyfriars Road. It is proposed to demolish the Xafinity House, therefore all the surface water and foul drains serving the building will become redundant.

A conditional site investigation and associated CCTV survey works were undertaken to validate and identify the existing drainage infrastructure on, and adjacent to, the site, particularly to identify the location of discharge points for both foul and surface water systems. The findings of this survey are included in a separate report entitled Party Wall Below Ground Drainage Report (ref. SHR-RAM-XX-XX-RP-C-000001), dated 28 February 2019.

2.7 Existing Drainage Consideration

2.7.1 Foul Drainage

The total Station Hill development comprising Phases 1 to 3 (South and North) covers an area of circa 2.56 ha. The Phase 3 site boundary includes an area to the north of Garrard Street of approximately 0.72 ha. The Phase 3A application is for an area of approximately 0.6 ha which been used and referenced for all hydraulic network calculations and greenfield/brownfield run-off estimates in this report.

The existing peak foul water discharge rate from Xafinity House is not known. However, as-built information were made available to Ramboll which was used to estimate the peak foul flows in accordance with British Water Flows and Loads⁴. The results of the calculations are presented in Table 2.

Table 2 – Existing Peak Foul Water Discharge Rates

EXISTING LAND-USE	NO. FLOORS (APPROX.)	AREA (M ²)	USE	OCCUPANCY (1 IN 13) ⁵	DWF (L/S) ⁶	PEAK FOUL FLOW (L/S) ⁷
XAFINITY HOUSE	Ground Floor	913	Office	70	0.07	0.24
	First Floor	913	Office	70	0.07	0.24
	Second Floor	913	Office	70	0.07	0.24
	Third Floor	913	Office	70	0.07	0.24
	Fourth Floor	913	Office	70	0.07	0.24
	Fifth Floor	724	Office	55	0.05	0.19
	Sixth Floor	113	Plant	0	0.00	0.00
TOTAL						1.39

The existing peak foul water discharge rate into the public sewer from the site has been calculated as 1.39 l/s.

³ Refer to drawing no. 40652-01T-01 to 04 (dated October 2018)

⁴ **British Water** (2014) *Flows and Loads – 4: Sizing Criteria, Treatment Capacity for Sewage Treatment Systems*. London: British Water

⁵ **Homes and Communities Agency** (2015) *Employment Density Guide: 3rd Edition*. London: Homes and Communities Agency. Available at: https://www.kirklees.gov.uk/beta/planning-policy/pdf/examination/national-evidence/NE48_employment_density_guide_3rd_edition.pdf (Accessed: 17 February 2026)

⁶ 90 litres / person / day assumed for each full-time day staff

⁷ 10% allowance for infiltration included as well as a 3 DWF multiplier to account for and estimated 12-hour application of the building

2.7.2 Surface Water Drainage

The application site for Phase 3A covers an area of 0.47 ha and understood to be 100% impermeable. Existing peak surface water runoff rates for the application site were calculated using the Wallingford Procedure and Modified Rational Method. The summary of the calculations is included in Table 3. Detailed calculations are also provided in Appendix 4.

Table 3 – Existing Surface Water Runoff Rates

	M1-15 (L/S)	M30-15 (l/s)	M100-15 (l/s)
EXISTING SURFACE WATER RUNOFF RATE	37	91	117

In accordance with the outline planning application (refer to PL/13/0436) post-development surface water discharge rates associated with Plot A – F were established by Hoare Lea and agreed with the LPA based on a restriction set to the existing 1 year 30-minute storm events (see Appendix 1). The extract of the post-development discharge rate allowances for the Phase 3A site are included in the Table 4.

Table 4 – Post-Development Discharge Rate Allowance as per Outline Planning Application

PLOT	AREA (m²)	POST-DEVELOPMENT RUNOFF RATE (l/s)
A	2,397	17.76
B	2,672	19.80
D	2,119	15.70



Figure 2-3 Hoare Lea Plot Delineation as per Outline Planning Application

The requirements set by Hoare Lea for the outline planning application were applied for the proposed surface water drainage design presented in this report.

2.8 Existing Site Constraints with Public Sewers

Existing drainage connections with public sewers will be retained and utilised where possible to avoid the need for any excavation near existing services and in public highway. The precise size, location and levels are subject to verification and confirmation from intrusive CCTV survey investigations.

The ability and suitability of on-site infiltration of surface water was discounted given the extent of development proposed, which includes a podium level with two levels of accommodation and plant rooms below. It is intended that surface water run-off from the development site would be attenuated in shallow depth tanks on the ground floor podium, supplemented by below ground storage tanks – the size and location of these is indicated on the surface water strategy sketches included in this report and will be further developed during detailed design to be coordinated with the final foundation layouts and other buried services.

2.9 Stakeholder Consultations

Thames Water

A pre-planning application was submitted to Thames Water for the South site, with Stage 1 North site supporting information, in November 2018, with a further update in March 2019. The North site information was appended to the current pre-planning application, in December 2019, to enable Thames Water to reassess the site.

Thames Water considers the 3 Phases of the Station Hill development as one development. In their assessment to determine capacity within the existing Thames Water drainage network, Thames Water model the impact of the final development on the existing public drainage network. Therefore, on completion of the Stage 3 (draft) Drainage Design, the Phase 3A drainage strategy, associated drawings and calculations are to be submitted to Thames Water to complete their impact assessment.

The pre-planning application enables Thames Water to carry out a capacity assessment of the connections proposed from the development to the existing Thames Water sewers adjacent to and within the proposed development site. The pre-planning application included options to re-use existing connections into the public sewer network where such arrangements are found to be of a suitable size, location, condition and level for re-use, as well as new connection to existing Thames Water sewers. The purpose of this application is to verify and establish capacity available in the existing public sewers to accommodate the proposed discharge from the development site.

It is proposed that surface water run-off is restricted to the proposed post-development run-off rates agreed in the Storm Water Drainage Strategy prepared by Hoare Lea, dated 13 July 2015. Surface water run-off will be attenuated on-site prior to discharging, at the restricted peak discharge rate, into the Thames Water public surface water sewer.

The foul water drainage from the development site is proposed to be discharged unattenuated into existing Thames Water utility sewerage network.

Any new connections and acceptance of the proposed discharge rates into to the public surface water and foul sewers respectively will require prior approval from Thames Water.

A pre-development enquiry was submitted to Thames Water on 18/02/2026 to confirm that the additional foul load from the development and the proposed surface water discharge rates can be accommodated within the public network.

2.9.1 Thames Water Build Over Agreement

The requirements from Thames Water associated with building over the existing egg-shaped sewer between manholes 2701 and 3702 were discussed at a Teams meeting on 21 July 2025. The minutes from this meeting are included in Appendix 5.

Based on the consultation with Thames Water the following key requirements were established and summarised in Table 5 below.

Table 5 – Thames Water Build Over Requirements

THAMES WATER REQUIREMENT	DESIGNER RESPONSE
a 4000-gallon combi unit (12 m length and 5 m height) to have full unrestricted access to manhole 3702 (which is positioned underneath Plot D). Maximum spacing with full access between two Thames Water manholes to be 90m.	This request has been fully considered by the design team, and therefore the proposed P2 level layout accommodates the maintenance access requirements for manhole 3702. The existing access openings currently located at either side of Xafinity House are proposed to be made redundant and new access to be provided as part of the proposed foul drainage network. The new chamber complies with the 90m requirement and deemed acceptable by Thames Water (see Appendix 5 for e-mail correspondence)
Impact assessment to be provided to Thames Water.	To be provided by the structural engineer at detailed design stage.
Proposed poles to be positioned minimum 15m away from the edge of the sewer. All piles to be bored or CFA	To be considered by the structural engineer at detailed design stage.
CCTV survey footage to be provided to Thames Water to understand the condition of the sewer to be built over (any defects found to be remediated by the developer)	To be provided at detailed design stage. Requirement associated with any potential remedial works were communicated to the client.

Subject to complying with all the requirements set by Thames Water a build-over agreement is deemed feasible for the development. Details on the specific requirements to be provided to Thames Water as part of the detailed design stage.

The approximate position of the sewer and the required easement zone to be considered for the design is highlighted on all relevant drawings submitted for planning.

3. PROPOSED DRAINAGE STRATEGY

3.1 Proposed Surface Water Drainage

The Phase 3 development will be submitted for Planning in two separate phases, Phase 3A (Plot A/B and Plot D and associated podium) as well as Phase 3B (Plot C and associated podium). For drainage design purposes the Phase 3A application site is understood to be divided into 4 separate catchments (see Figure 3-1):

- Plot A/B (total footprint of the building and associated podium)
- Plot D (total footprint of the building and associated podium)
- External hard paving along the frontage of Plot A/B and Plot D (this area will be offered for adoption and will be designed by Stantec and therefore excluded from the drainage strategy presented in this report)
- Enabling works (small portion of podium associated with Plot C)

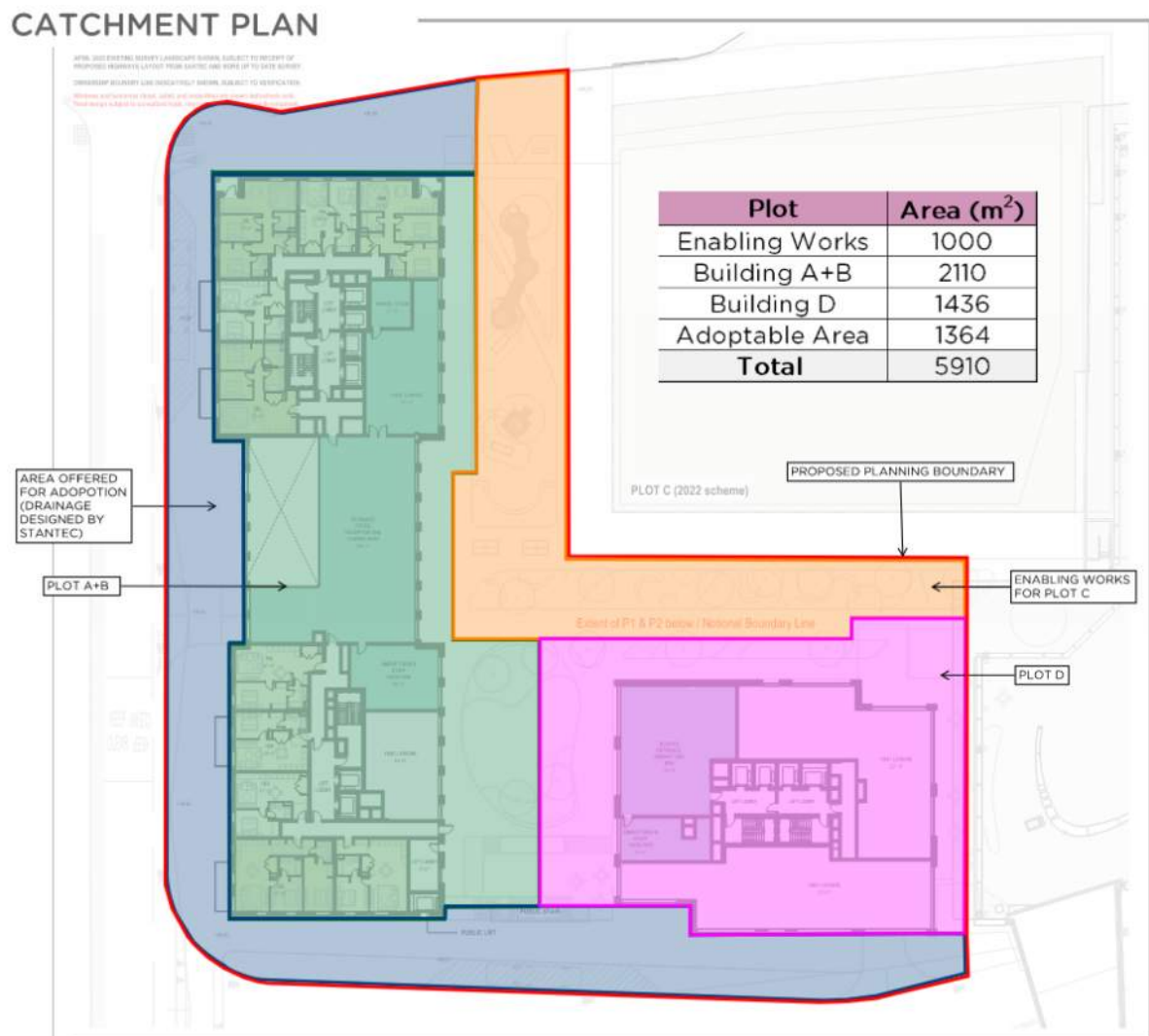


Figure 3-1 Phase 3A Catchment Plan

Although the proposed drainage strategy is based on the discharge rates agreed in the Storm Water Drainage Strategy produced by Hoare Lea, dated 13 July 2015, the catchment areas for Phase 3A are different as to what was submitted for outline planning, therefore an area proportion approach was applied when establishing the allowable post-development discharge rates (see Table 6 below).

Table 6 - Post-Development Discharge Rates and Required Storage Volumes

PLOT	IMPERMEABLE AREA FROM PLANNING REPORT (M ²)	DISCHARGE RATE FROM PLANNING REPORT (L/S)	STORAGE REQUIREMENT FROM PLANNING REPORT (M ³)	PROPOSED IMPERMEABLE AREA (M ²)	PROPOSED DISCHARGE RATE (L/S)	STORAGE REQUIREMENT (M ³)
PLOT A/B	2,397	17.76	83	2,110	15.63	125
PLOT D	2,119	15.70	69	1,436	10.64	86
PLOT C	2,672	19.80	96	-	-	-
PLOT C - ENABLING WORKS	-	-	-	1,000	7.41	59

The storage requirements for each sub-catchment of Phase 3A have been calculated using FEH data for the 1 in 100 annual return period event including 40% allowance for climate change⁸. The volumes are indicated in Table 6 above.

Considering the constraints associated with the site as well as the lack of external space around each building, it is proposed to attenuate runoff generated by the podium in sub-base replacement at source, whilst roof drainage will be attenuated in cellular storage underneath each building. The position and depth of the crated systems were established taking into account the easement zone at either side of the egg-shaped sewer, the proposed foundation layout as well as the requirement to achieve gravity connection to the public sewers at the proposed connection points. The proposed attenuation features and the relevant storage volumes are included in Table 7.

Table 7 – Proposed Storage

Plot	Attenuation Feature	Storage Volume (m ³)
Plot A/B	Podium sub-base replacement (podium level)	37
	Cellular storage tank (or similar and approved at P2 level)	97
Plot D	Podium sub-base replacement (podium level)	34
	Cellular storage tank (or similar and approved at P2 level)	54
Plot C – Enabling works	Cellular storage tank (or similar and approved at P2 level)	59

⁸ Environment Agency (2023) *Flood risk assessments: climate change allowances*. Available at: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> (Accessed: 15 October 2025)

It is proposed to incorporate orifice controls at the vertical outlets of the podium level sub-base replacement systems to efficiently utilise the storage provided by these features and to slow down the runoff entering the proposed below ground drainage network at P2 level. Roof drainage will be conveyed to the cellular storage tanks via private gravity drains located underneath the buildings. The exact position of RWP penetration points above slab level is to be coordinated with the PH engineer at detailed design stage. Discharge rates associated with all catchments considered within this report will be achieved via hydro-brake flow controls positioned last proposed chambers prior to connection is made to the public surface water sewer.

It is proposed that surface water runoff from Plot A/B is discharged into the existing sewer within Greyfriars Road. The surface water runoff from Plot D is discharged into the existing sewer in Garrard Street and the surface water runoff from the Building C podium enabling works is discharged into existing sewer on Station Hill.

The precise outfall locations and connection details will be agreed with Thames Water as part of the detailed design stages as necessary. For proposed connections into the existing public sewers, an application will be made to Thames Water under a Section 106 Consent to Discharge application of the Water Industry Act 1991, at detail design stage.

The proposed surface water drainage layout serving the development is provided in Appendix 6.

The proposed surface water drainage network was modelled in InfoDrainage. The hydraulic simulations results confirm that no flooding occurs for events up to 1 in 100 annual probability including 40% allowance for climate change, whilst maintaining the maximum discharge rates as set in Table 6 above. The detailed simulation results are included in Appendix 7.

3.1.1 Proposed Foul Water Drainage

It is proposed to collect wastewater from the buildings via a private below ground drainage network. Gravity connection from the private network to the existing foul sewers are deemed feasible. The proposed foul network layout serving the development is included in Appendix 8.

The post-development peak foul water discharge rate into the public sewer was established using British Water Flows and Loads 4. Based on the type and number of units specified by the Architect, the estimated peak foul flow rate generated by the development is 23.58 l/s. Detailed calculations are provided in Table 8.

Table 8 – Proposed Peak Foul Water Discharge Rates

PROPOSED BUILDING	UNIT TYPE	NUMBER OF UNITS	OCCUPANCY RATE ⁹	DWF (L/S) ¹⁰	PEAK FOUL FLOW (L/S) ¹¹
PLOT A/B	Studio	15	3	0.08	0.52
	1 bed	249	3	1.30	8.56
	2 bed	138	4	0.96	6.33
	3 bed	15	5	0.13	0.86
PLOT D	Studio	19	3	0.10	0.65
	1 bed	81	3	0.42	2.78
	2 bed	76	4	0.53	3.48
	3 bed	7	5	0.06	0.40

As discussed in Section 2.9 a pre-development enquiry has been submitted to Thames Water to confirm that the additional foul load can be accommodated within their public network.

⁹ In accordance with British Water – Flows and Loads 4

¹⁰ 150 litres / person / day assumed for each full-time day staff

¹¹ 10% allowance for infiltration included as well as a 6 DWF multiplier to account for and estimated 24-hour application of the building

4. LEGISLATION

Design Standards and Criteria

It is proposed that all below ground surface and foul water drainage from the development site will be collected in separate gravity drainage networks and discharged off site to the existing Thames Water sewerage network in Garrard Street, Station Hill and Greyfriars Road. The precise location and levels of the existing sewerage network and outfall systems are subject to verification and confirmation from intrusive CCTV survey investigations.

The proposed surface water and foul water drainage networks will be designed and installed to achieve self-cleaning velocity. Flows will generally be kept above 0.75m/s and 1 m/s, respectively, within the pipelines to ensure that self-cleaning velocities are achieved. This is subject to the condition, location and level of the existing off-site below ground drainage and sewerage network.

The development will be drained by dedicated and fully segregated surface and foul water systems designed in accordance with the following documents (where appropriate);

- Building Regulations - Approved Document Part H;
- BS EN 12056: Parts 1-5: Gravity Drainage Systems Inside Buildings
- BS EN 752: Drain and Sewer Systems outside buildings
- CIRIA C753: The SuDS Manual (2015)
- Design and Construction Guidance for foul and surface water sewers offered for adoption under the Code for Adoption Agreements (Version 2.3, 11 November 2023)
- BS 8000-14: Workmanship on Building Sites: Code of Practice for Below Ground Drainage
- The Local Authorities guidelines, rules and regulations (such as Lead Local Flood Authority Representative (LLFA)).
- Sustainable Design and Construction Supplementary Planning Guidance (April 2014)
- National Standards for Sustainable Drainage Systems (SuDS) (last updated July 2025)
- Reading Borough Council (Lead Local Flood Authority) requirements.

To give a long design life, with minimum embodied energy, the buried pipework will generally be;

- Vitrified clay, where possible; and
- Cast iron when laid below or cast within or through foundations or building structures.

Chambers will generally be either (subject to availability of space);

- Polypropylene inspection chambers (if less than 1.2m to invert level), or
- Pre-cast manholes (if deeper than 1.2m to invert and in areas subject to vehicle over-run)
- In-situ concrete manholes (cast within the basement slab in basement car parking level)
- Non-entry polypropylene inspection chamber will be used, where required, up to a depth of 3.0m.

Pipe diameters will generally be as follows;

- Foul water drainage – DN150 to minimise the risk of blockage; and
- Connections from appliances and stacks – DN100 to maintain self-cleansing flows.

The actual below ground drainage sizes will be determined once the flow rates are available from building services engineers, during the design development stages.

5. SITE AND PROJECT CONSTRAINTS

Table 9 below, details the site-specific constraints which have been evaluated in order to determine the most appropriate drainage solution. Where elements are yet to be fully considered, this is noted alongside any additional comments. If the constraints lead to a specific risk, this have been highlighted and transferred to the Risk Register within Section 6.

Table 9 – Site and Project Constraints

Site / Project Constraints	Potential Impact on Development	Considered in Current Drainage Strategy	Comments	Linked to Risk Register
Environment				
Sensitive environmental receptors	Restrictions on foul and surface water discharge location and quality; inclusion of additional polishing techniques such as separators, reed beds etc.	~~Yes~~ /No	Discharge is to local utility sewerage systems.	~~Yes~~ /No
Presence of contamination	Restricts the use of infiltration for surface water disposal	~~Yes~~ /No	Proposed drainage strategy comprises attenuation storage – no infiltration considered.	~~Yes~~ /No
Presence of shallow aquifers	Restricts the use of infiltration for surface water disposal	Yes/ ~~No~~	Shallow groundwater in some locations of the site are present.	Yes/ ~~No~~
Presence of nearby watercourses	Restrictions on discharging water quality	~~Yes~~ /No	Discharge to nearby watercourses not considered. Discharge to existing Thames Water sewers	~~Yes~~ /No
Flood zone/flood relief areas	Limitations on SUDS systems that can be used (retention of attenuation capacity during flood events)	Yes/ ~~No~~	Known high water table and sensitivity requires significant storm water management and control.	Yes/ ~~No~~
Ground Conditions				

Site / Project Constraints	Potential Impact on Development	Considered in Current Drainage Strategy	Comments	Linked to Risk Register
Infiltrations rates (at required location/depth)	Applicability of infiltration devices for surface water disposal; size of infiltration devices	Yes/No	Proposed drainage strategy comprises attenuation storage – no infiltration considered.	Yes/ ~~No~~
Groundwater level	Restricts infiltration potential; authorities may prevent discharge from potential sources of pollution, i.e. paved areas. Pumping in excavations.	Yes/ ~~No~~	High water table. Location/depth of proposed attenuation structures located above ground water level.	Yes/ ~~No~~
Buried obstructions	May require localised removal within drainage locations or drainage to be re-routed around obstruction	Yes/ ~~No~~	Existing obstructions to be surveyed and where applicable grubbed out and removed.	Yes/ ~~No~~
Existing Infrastructure				
Foul water discharge point locations and invert levels	May require pumping; restrictions on pipe routing (shortest length); additional protection to shallow drains	Yes/ ~~No~~	Levels subject to survey works to be defined during detailed design for the drainage systems.	Yes/ ~~No~~
Surface water discharge point locations and invert levels	May require pumping; restrictions on pipe routing (shortest length); additional protection to shallow drains	Yes/ ~~No~~	Gravity connection to public surface water sewers deemed feasible. Levels subject to survey works to be defined during detailed design for the drainage systems	Yes/ ~~No~~
Availability of foul water infrastructure nearby	May require 'self sufficiency' i.e. packaged treatment units, reed beds etc.	Yes/No	Existing drainage outfall systems to be utilised for disposal to utility sewerage systems.	Yes/No
Off-site drainage infrastructure capacity	Upgrading of water company assets; use of flow restrictors; additional storage/attenuation	Yes/ ~~No~~	Existing drainage outfall systems to be utilised for disposal to utility sewerage systems. Flows thus assumed capacity is available.	Yes/ ~~No~~
Authority Requirements				
Allowable discharging flow rates	Impacts on volume of attenuation required	Yes/ ~~No~~	Pre-development discharge rates agreed in FRA by Waterman dated March 2013 used to calculate proposed storm water flows and attenuation capacity. It is proposed that foul flows will discharge off-site unattenuated.	Yes/ ~~No~~

Site / Project Constraints	Potential Impact on Development	Considered in Current Drainage Strategy	Comments	Linked to Risk Register
Allowable discharging flow volumes	Allowable impermeable area/volume of long-term attenuation	Yes/ ~~No~~	Pre-development discharge rates agreed in FRA by Waterman dated 2013 proposed for storm water flows and attenuation capacity.	Yes/ ~~No~~
Specific authority requirements	Limits SUDS systems/materials specifications that can be used	Yes/ ~~No~~	Not advised as any specific requirements from Local Authority.	~~Yes~~ /No
Easements for services, rivers, critical infrastructure	Reduces available space; restricts drainage element locations	Yes/ ~~No~~	Known service routes and existing infrastructure does not affect the drainage systems.	~~Yes~~ /No
BREAAM/CfSH credit requirement	Enhanced restriction of surface water discharge requiring additional controls and increased attenuation	Yes/ ~~No~~	Attenuation and surface water management targeted for BREEAM Excellent.	~~Yes~~ /No
Site Requirements				
Available external area (space for SUDS)	Limits SUDS systems that can be used (low land take)	Yes/ ~~No~~	Attenuation tanks located below the proposed building.	~~Yes~~ /No
Land use (appropriateness for open water)	Limits SUDS systems that can be used (health and safety)	~~Yes~~ /No	Not considered within development site.	~~Yes~~ /No
Traffic level type/volume	Pervious paving foundation thickness	Yes/ ~~No~~	Infrequent use by traffic; i.e. maintenance and or fire tender access, usage. Loading for access and manoeuvring requires suitable surface and sub-grade arrangements.	~~Yes~~ /No
Construction phasing	Position of attenuation; pipe routing; temporary oversizing of elements due to temporary retention of buildings	Yes/ ~~No~~	Not anticipated as required. Works contractor to programme drainage installations as required.	~~Yes~~ /No
Construction hoarding lines/access routes	Position of attenuation; pipe routing	Yes/ ~~No~~	Not anticipated as required. Works contractor to programme drainage installations as required.	~~Yes~~ /No
Future development (i.e. extensions)	Oversizing of elements to provide additional capacity	~~Yes~~ /No	Proposed development occupies the total site available.	~~Yes~~ /No
Need for new outlets/headwalls to watercourses	Additional correspondence (fees) with authorities; construction of headwall to approved standards; issues relating to banks/bed (scour)	~~Yes~~ /No	Not applicable.	~~Yes~~ /No

Site / Project Constraints	Potential Impact on Development	Considered in Current Drainage Strategy	Comments	Linked to Risk Register
Abnormal foul water discharge requirements (i.e. laboratories)	Separate laboratory waste; chemically and temperature resistant pipework; inclusion of sample chambers; inclusion of grease separators.	~~Yes~~ /No	Not applicable, domestic foul waste water discharge only.	~~Yes~~ /No
Retained trees	Limitation in excavation location/depth to prevent root damage	~~Yes~~ /No	Not applicable, brownfield site (100% impermeable). Details covered in appropriate report with the Application.	~~Yes~~ /No
Maintenance requirements	Required maintenance regime is not acceptable to client requiring amendments to proposed drainage scheme	Yes/ ~~No~~	Maintenance of drainage and pumping systems (where required) and storm water attenuation tanks required.	Yes/ ~~No~~

6. RISK REGISTER

Table 10 below details the site-specific drainage related risks which are currently outstanding, and the implication on the project should that risk transpire. The action required in order to mitigate the risk is also stated alongside the proposed owner of that action. Should a 'closed' item retain an agreed residual risk to the client, this will be described within the drainage strategy section and should be included within any operation and maintenance manual documentation.

Table 10 – Risk Register

Risk	Implication	Action to close out risk	By	Status
Specialist sub-contractor design input required (i.e. previous paving)	Late selection of preferred supplier prevents incorporation of proprietary information. May impact on associated elements i.e. kerb setting out, formation levels, drainage connections etc.	Preferred specialist sub-contractor to be nominated/selected during design stage.	Cli/Con	~~Live~~ /Closed Not applicable
Condition of existing drainage system (recent CCTV surveys complete)	Existing system may require significant remedial works. Routing of pipework may differ from that expected requiring modification to the proposed system.	CCTV survey to be commissioned of proposed retained drains.	Cli/Con	~~Live~~ /Closed Surveys required
Local Authority approvals	Local authorities may request changes to proposed scheme at planning.	Proposed drainage network to be designed to national and local requirements.	Ram	~~Live~~ /Closed
Existing drainage connection point invert levels are different to that anticipated.	Requirement for pumping; shallow drains requiring additional protection; use of backdrops.	Level survey to be undertaken of proposed connection point drainage inverts.	Cli/Con	~~Live~~ /Closed Surveys required
Movement/addition of foul water drain points	Additional drain runs/manholes required. Possible requirement to pump if distance to discharge point increases.	Frozen above ground drainage layouts to be issued to Ramboll prior to issue of project stage information.	Arch/M&E	~~Live~~ /Closed Surveys required
Change of legislation during project	Reduced allowable flow rates/volumes leading to greater volumes of attenuation. Change of material specifications.	Ramboll to keep abreast of proposed legislation changes and inform Client, design team of possible implications where appropriate.	Ram	~~Live~~ /Closed Subject to consultation with Local Authority
Change of building drainage strategy (i.e. move to siphonic rainwater pipes)	Siphonic break manholes/drainage laterals required. Possible need to introduce velocity reducing measures to prevent erosion of SUDS.	Preferred roof rainwater strategy to be agreed and design team informed.	Arch/M&E	~~Live~~ /Closed Design principles agreed
Client/design team approval of philosophy (i.e. acceptability/inclusion of open water)	Addition/increased volume of below ground attenuation. Lack of SUDS train may require introduction of additional cleansing measures.	Present drainage philosophy to design team and inform client of residual H&S risks, maintenance risks. Obtain Client approval to proceed.	Ram/Cli	~~Live~~ /Closed Design principles agreed

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Risk	Implication	Action to close out risk	By	Status
Co-ordination with foundations/other below ground services	Additional drain runs/manholes required. Realignment of pipework. Increased embedment of pipework.	Co-ordinated below ground services and foundation drawings to be produced and agreed by design team.	Arch/Ram/M&E	Live/ ~~Closed~~ To be developed as part of detailed design
Previously unidentified contamination found on site	Infiltration devices restricted. Drainage philosophy re-evaluated.	Detailed assessment of contamination risk to be undertaken during design stages.	Cli/Con	Live/ ~~Closed~~
Buried Obstructions	Localised removal required at proposed drainage locations or drainage to be re-routed around obstruction.	Detailed desk study of construction history to be undertaken during design stages. Possible use of geophysical maps.	Cli/Con	Live/ ~~Closed~~

Action by:

- Client (Cli)
- Contractor (Con)
- Architect (Arch)
- M&E Engineer (M&E)
- Ramboll (RAM)

7. CONSTRUCTION APPROACH

Table 11 below details the site specific approach to construction of the below ground drainage system. In order to provide the most cost-efficient solution, the preferred design option or material specification for each element of the system has been determined in accordance with Clients and/or contractors requirements.

Table 11 – Construction Method

Element	Standard Options	Selected Option
Pipework Below Ground	Clay Plastic Ductile iron HDPE Concrete	Clay Ductile Iron Concrete (300mm dia and above)
Pipework External	Clay Plastic Ductile iron HDP Concrete	Clay Plastic Ductile Iron Concrete (300mm dia and above)
Access chambers	Concrete rings Brick chambers PPIC Reduced access	Concrete rings PPIC
Building Drain Point Connection	Below slab 'y' connections External 'y' connections Connect to internal manholes Connect to external manholes	Below slab 'y' connections External 'y' connections Connect t internal Manholes Connect to external manholes
Repair to existing drainage systems	No re-use of existing drains Localised pipe replacement Pipe lining/patching	No re-use of existing Drains (exception of final outfall systems of-site)
Pipework through foundations/floor slabs	Cast within rafts/ground beams/pile caps Cast below rafts/ground beams/pile caps	Cast below raft/ground Beams/pile caps
Below ground attenuation	Oversized pipework Geocellular modular storage units GRP tanks Gravel filled pits	Geo-cellular modular storage units
Infiltration devices	Granular pits/trenches Concrete ring chambers Geocellular modular storage units Borehole soakaways	N/A
Pervious Paving Finishes	Interlocking blocks Pervious asphalt Reinforced gravel/grass	N/A
Pipe Bedding	Standard single sized aggregate Recycled aggregate	Standard single size Aggregate Recycled aggregate (Contractors choice)
Significant invert level changes	Backdrops (at what level change) Steep graded pipework	N/A

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Element	Standard Options	Selected Option
Point Drainage Preference	Gullies Channel drains Channel drains at door thresholds	Gullies Channel drains Channel drains at door thresholds
Pump Stations	Preferred supplier Single/dual pumps Storage time period/volume	Single/dual pumps

8. MAINTENANCE REQUIREMENTS OF DRAINAGE COMPONENTS

The maintenance requirements associated with the proposed drainage network are summarised in Table 12.

Table 12 – Maintenance Requirements

Item No.	Item	Description	Maintenance Issues	Details of Inspection/Maintenance Activity/Plant Requirements
1.1	Catchpit/ Manhole/ Inspection Chamber	Manholes, catchpits and inspection chambers provide rodding and jetting access to pipework.	Manholes/catchpits/inspection chambers can become blocked by excessive build up in silt and debris.	Manhole chambers should be inspected annually, and catchpit chambers should be inspected every spring and autumn after leaf fall. Silt and debris should be removed using a gully sucker if required.
1.2	Orifice flow control device / Hydro-brake flow control	Flow control devices downstream of the proposed below ground attenuation tanks	There is a low risk of blockage. However, the orifice plates/hydro-brakes do not require power and have no moving parts therefore only needs minimal operational attention.	Follow the maintenance requirements as per the manufacturer's recommendation.
1.3	Cellular crate system	Runoff water is stored within the void of the cellular crate system and discharged into the carrier drain network in a controlled rate.	Silt accumulating at the base of the cellular crate system	<u>Regular Maintenance:</u> - Inspect and identify any areas that are not operating correctly. If required, take remedial action (monthly for 3 months, then annually). - Remove debris monthly from the catchment surface (where it may cause risk to performance). - Remove sediment from pre-treatment structures annually. <u>Remedial Actions:</u> - Repair/rehabilitate inlets, outlet, overflows and vents as required. <u>Monitoring:</u>

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Item No.	Item	Description	Maintenance Issues	Details of Inspection/Maintenance Activity/Plant Requirements
				- Annually inspect/check all inlets, outlets, vents and overflows to ensure that the are in good condition and operating as designed. - Every 5 years or as required survey the inside of the tank for sediment build-up and remove if necessary.

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**APPENDIX 1
HOARE LEA – STORM WATER DRAINAGE STRATEGY REPORT**



Redevelopment of Station Hill & Garrard Street Reading

Stormwater Drainage Strategy – Revision D 13-07-15

1. Background

- 1.1 A large, phased development of the area south of Reading Station is proposed. Existing buildings will be demolished and reconstructed to a different pattern, with areas of hard landscaping breaking up the development into a series of large blocks annotated Blocks A – F(See Figure 1).
- 1.2 This strategy looks at how the whole development can be drained whilst meeting run-off constraints that are likely to be imposed by the approving authorities. There has been a series of communications over a number of years during the gestation of the scheme between Waterman and the Environment Agency (EA) regarding the proposed run-off. The EA have stated that they would wish to see a PPS25 (now superseded by the National Planning Policy Framework (NPPF) and associated technical guidance) approach to the drainage design with allowances for climate change of 30%, based on assuming a 100 year design life for residential elements of the project.
- 1.3 Discussions have taken place between Hoare Lea and Thames Water to establish their outline requirements subject to a formal developer enquiry and/or Section 106 connection application. It has been agreed that for initial design guidance the same parameters as recently approved for a large Hoare Lea project in Bracknell can be assumed. This would limit the discharge to the lesser of the 1 year, 30minute run-off or the surcharged capacity of the existing discharge drain(s).

2. SUDs Options Considered

- 2.1 SUDs Options for this highly urbanised site are limited and the options considered are tabulated as follows:

Option	Site Constraints/Opportunities
Infiltration/Soakaways	The site has a history of previous uses with a potential risk of contamination. Soakaways could mobilise contaminants through creation of groundwater flows. Much of the site will be occupied by foundations for the new structures and with the size of soakaways required, there may be a risk of affecting groundbearing slabs and footings.
Swales or other shallow storage	Insufficient space to create large areas of soft landscaping together with concerns over public safety and ongoing maintenance issues.
Permeable surfaces	Similar perceived risk of contamination mobilisation as the soakaway option. Programming and services installation difficulties with permeable paving build-ups and concerns over long term performance in heavily used public realm areas with regular use of cleaning plant.
Ponds/Wetlands	Insufficient space and concerns over public safety and ongoing maintenance issues.

Option	Site Constraints/Opportunities
Attenuation Storage	Potential option using sealed units positioned away from foundation zones
Green Roofs	Green/brown roofs may help to reduce peak run-off by lengthening the rainfall hydrograph. As a precautionary measure at this stage no allowance for green/brown roofs has been included in the calculations

- 2.2 The above table demonstrates the limited opportunities for true SUDs provision for the new development, the most viable option being attenuation to control and manage the rate of run-off into the receiving drainage system.

3. Design Methodology

- 3.1 Based on the run-off constraints outlined in Section 2 we have developed a stormwater control strategy that considers the phasing proposals and provides a series of individual attenuation volumes and flow controls to serve each development plot. Included in each catchment is an amount of associated hard landscaping/public realm area. Existing adopted highway land has not been included in the calculation of attenuation volumes as it is assumed to drain as existing albeit via renewed gullies and channels forming part of the new paving scheme. The catchment areas used to determine the run-off in each case are shown in Figure 1 and the areas are tabulated below.
- 3.2 To assess the pre development 1 year 30 minute storm run-off we have used the Flood Estimation Handbook (FEH) to establish the appropriate rainfall depth. For comparison we have also calculated the 100 year 30 min. run-off. The results are tabulated in Section 5.
- 3.3 For each catchment we have calculated the range of storage volumes that may be required including a 30% addition to the rainfall figures to account for climate change. This has been done using Microdrainage 'quick storage calculation', which gives an upper and lower range of potential storage. The actual storage will depend on site topography and detailed hydraulic design of the storage and controls. We have run a check on one of the catchments to gauge whether the range of storage volumes is realistic given the actual site levels and using a hydrobrake flow control on the outlet of a typical storage tank. The storage and flow rates correlated fairly accurately so we consider the use of the larger storage volume in the 'quick storage estimate' is a reasonable, slightly conservative approach at this stage in the design process.
- 3.4 The attenuation storage is designed to accommodate a 100year storm event including 30% climate change on the basis that the scheme is seeking a BREEAM 'Excellent' rating, which requires 100 year storage where attenuation needs to be provided. Should any of the storage be adopted, agreement will need to be sought with Thames Water for adoption in excess of the 30 year volume, which is normally their maximum statutory requirement.
- 3.5 In order to establish the approximate plan area of each attenuation storage volume we have assumed the construction would be 1.2m deep using either cellular crates or a proprietary system such as 'Carlow' pre cast concrete tank. The design used will depend on whether the attenuation is to be adopted by Thames Water, who normally do not adopt cellular tanks due to perceived maintenance problems. The tank sizes are tabulated below and indicated in sketch form on the drainage scheme shown in Figure 2.

4. Calculation of Pre development run-off rates

Project: **Station Hill Reading** Date: **June 2014**
OSGR: **E471457 N173667**

The Rational Formula: $Q_p = C_i A$ (formula 7.18 Wallingford Procedure Vol. 1)

Where Q_p = discharge rate

C = Coefficient where $C = C_v \times C_r$ (C_v =volumetric run-off coefficient & C_r =routing coefficient) (formula 7.19)

i = rainfall intensity mm/hr

$\bar{i}$ = mean rainfall intensity mm/hr

A = Area (ha) = (drained hard paved area, refer to drawing CSK2 for zones).

For Q_p in litres per second the formula becomes $Q_p = C_i A \div 0.36$

Determination of C :

From Wallingford Procedure Vol.1 $C_v = 0.9$ for full urbanised catchment and $C_r = 1.3$.
 $\therefore C = 1.17$

The storm duration will be taken as 30 minutes as initially agreed with Thames Water

Determination of i from FEH CD ROM

1 year 30 min. rainfall depth = 11.4mm $\therefore$ mean rainfall for design = 22.8mm/hr

30 year 30 min. rainfall depth = 34.2mm $\therefore$ mean rainfall for design = 68.4mm/hr

100 year 30 min. rainfall depth = 50.5mm $\therefore$ mean rainfall for design = 101mm/hr

5. Post development run-off

- 5.1 The following table shows the 1 year 30min. duration storm run-off rate, the 100 year 30 minute run-off (for comparison) and the range of attenuation storage volumes that result assuming up to the 100 year (1% annual probability) storms are attenuated to match the 1 year 30min flow rate. The resulting storage volumes are indicated in their preliminary locations on the site plan shown in Figure 2.

Plot	Area m2	% imp. area	Imp. area m2	1 yr 30min. discharge l/s	100yr 30min.** discharge (un-attenuated) l/s	Storage min (inc. 30% climate change) m3	Storage max (inc. 30% climate change) m3	Storage width x length x depth(m)	Post development run-off limited to: l/s
A	2397	100	2397	17.76	78.68	47.00	83.00	23x3x1.2	17.76
B	2672	100	2672	19.80	87.71	55.00	96.00	27x3x1.2	19.80
C	4859	100	4859	36.01	159.50	137.00	212.00	34x4x1.5	36.01
D	2119	100	2119	15.70	69.56	39.00	69.00	19x3x1.2	15.70
E	5731	100	5731	42.47	188.12	112.00	197.00	10x17x1.2	42.47
F	2721	100	2721	20.16	89.32	53.00	94.00	5x16x1.2	20.16
** for illustration purposes only									



Figure 1. Drainage Catchment Areas

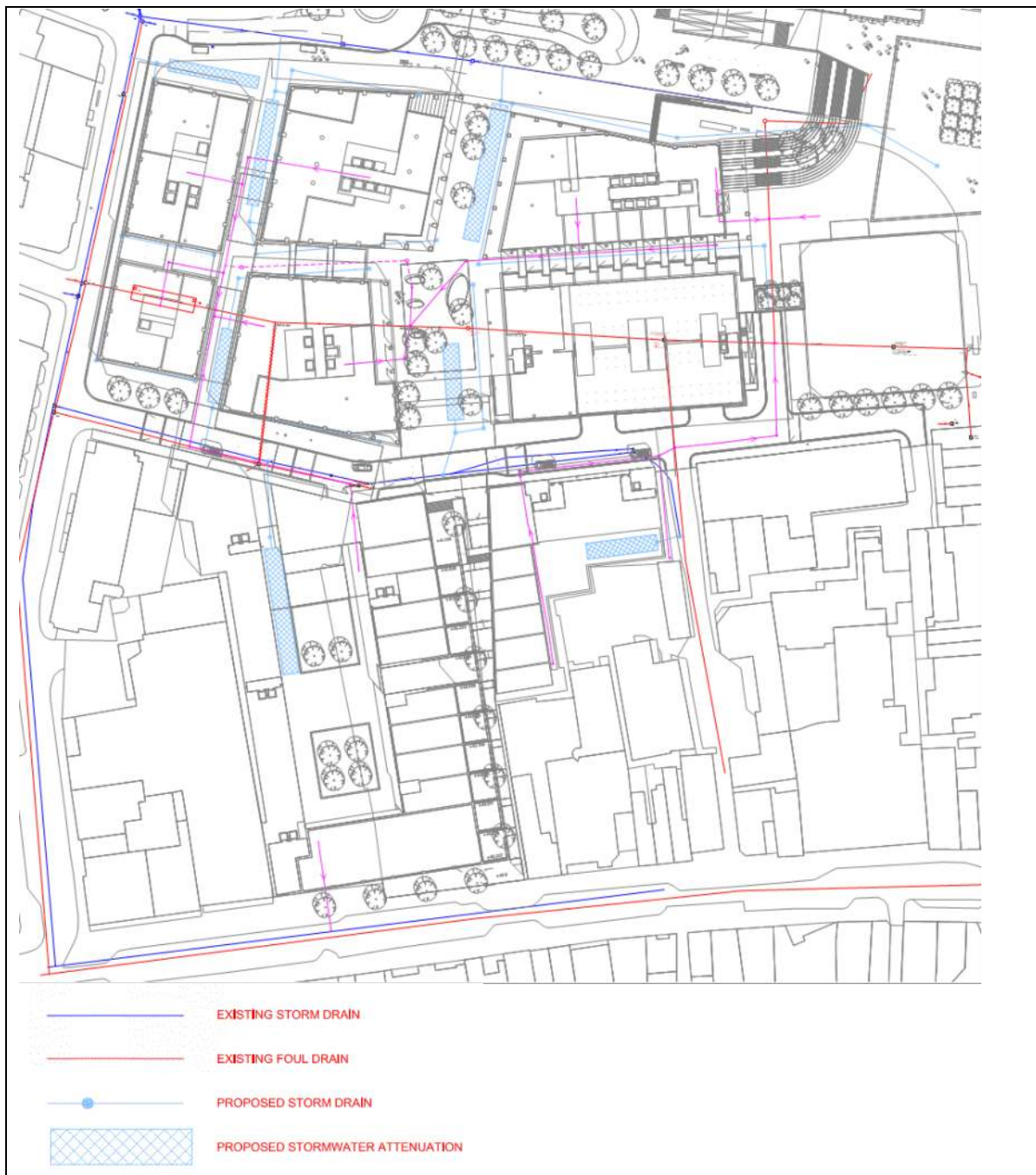
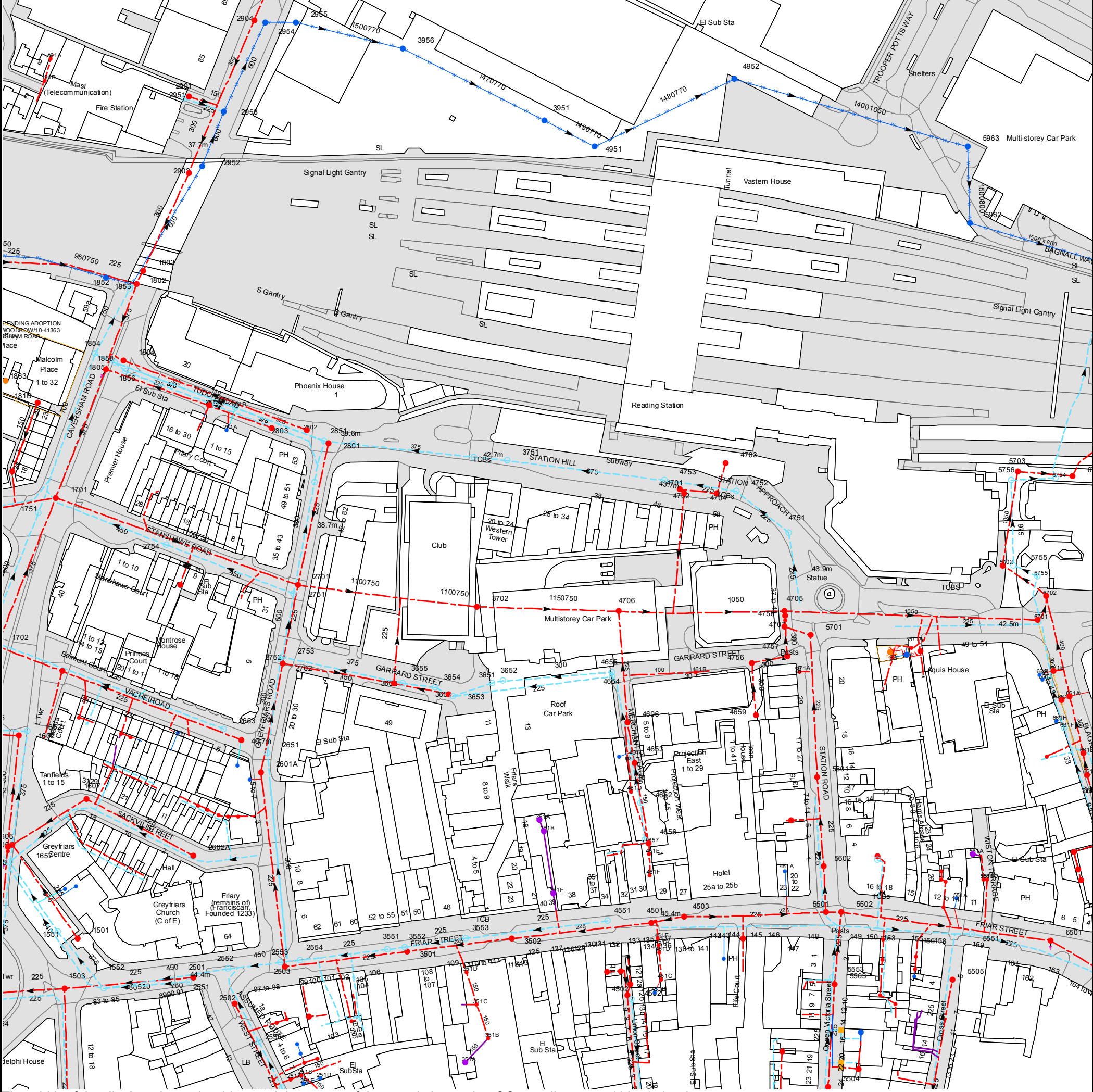


Figure 2. Indicative Storm Drainage Scheme Layout (based on 100yr 30min. max. storage volumes).

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APPENDIX 2 THAMES WATER ASSET MAPS

Asset Location Search Sewer Map - ALS/ALS Standard/2015 3120507



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 471384,173758

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

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

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

Manhole Reference	Manhole Cover Level	Manhole Invert Level
571A	n/a	n/a
571D	n/a	n/a
56MN	n/a	n/a
56MM	n/a	n/a
56EN	n/a	n/a
561A	n/a	n/a
561B	n/a	n/a
561C	n/a	n/a
661I	n/a	n/a
661J	n/a	n/a
n/a	n/a	n/a
661E	42.63	38.08
661H	n/a	n/a
661D	42.87	38.01
661F	43.05	41.55
661A	42.78	37.43
66LN	n/a	n/a
66MD	n/a	n/a
66ME	n/a	n/a
661B	43.24	39.25
661C	43.49	39.65
5504	45.12	41.59
5553	45.17	43.99
5503	45.17	41.91
5502	45.29	41.75
55JJ	n/a	n/a
55JK	n/a	n/a
551B	n/a	n/a
5555	n/a	n/a
551D	n/a	n/a
551C	n/a	n/a
551E	n/a	n/a
551F	n/a	n/a
5557	n/a	n/a
55EM	n/a	n/a
5505	45.13	42.55
551A	n/a	n/a
5551	44.92	43.39
6501	44.72	41.17
351E	n/a	n/a
4654	39.53	n/a
4655	39.49	38.06
461G	n/a	n/a
4606	41.29	39.93
461D	n/a	n/a
4653	42.67	41.26
461C	n/a	n/a
4652	44.08	42.78
4656	n/a	n/a
4657	n/a	n/a
461E	n/a	n/a
461F	n/a	n/a
461B	n/a	n/a
4756	n/a	n/a
4659	n/a	n/a
461A	n/a	n/a
4757	n/a	n/a
46NL	n/a	n/a
471A	n/a	n/a
5601	44.61	40.83
5602	45.13	n/a
5603	n/a	n/a
5604	n/a	n/a
n/a	n/a	n/a
571B	n/a	n/a
n/a	n/a	n/a
4558	n/a	n/a
4551	45.62	43.9
4557	n/a	n/a
4502	45.53	n/a
4556	n/a	n/a
4552	45.52	n/a
4501	45.54	42.35
451B	n/a	n/a
451E	n/a	n/a
451A	n/a	n/a
451D	n/a	n/a
451C	n/a	n/a
4503	n/a	n/a
451G	n/a	n/a
45MJ	n/a	n/a
45NE	n/a	n/a
5501	45.39	n/a
5701	44.08	39.83
4707	44.01	39.53
6701	42.59	34.03
4758	n/a	n/a
4705	44.01	34.08
4706	38.12	n/a
6702	42.54	35.12
6755	41.95	35.5

Manhole Reference	Manhole Cover Level	Manhole Invert Level
5755	42.31	35.24
5702	42.51	33.45
4751	43.65	40.84
4704	n/a	n/a
4702	n/a	n/a
4752	n/a	n/a
4701	n/a	n/a
5756	41.55	n/a
4753	n/a	n/a
6754	n/a	n/a
6704	n/a	n/a
5703	41.51	n/a
4703	n/a	n/a
5962	37.75	35.61
4951	37.92	35.82
5963	n/a	n/a
3951	37.92	35.83
4952	37.91	35.8
2557	n/a	n/a
251E	n/a	n/a
251A	n/a	n/a
251D	n/a	n/a
251B	n/a	n/a
25KH	n/a	n/a
351A	n/a	n/a
25KK	n/a	n/a
251G	n/a	n/a
251H	n/a	n/a
2556	n/a	n/a
351B	n/a	n/a
251K	n/a	n/a
25LL	n/a	n/a
251J	n/a	n/a
25MK	n/a	n/a
25LF	n/a	n/a
351C	n/a	n/a
2502	44.93	41.96
251I	n/a	n/a
2501	44.74	41.58
351D	n/a	n/a
2552	44.85	42.93
2503	45.08	41.21
2553	44.94	42.74
2554	45.13	43.01
3501	45.42	41.65
3551	45.36	43.37
3552	45.43	43.4
3553	45.49	43.51
3502	45.59	41.92
161B	n/a	n/a
261B	n/a	n/a
2602A	44.09	41.59
261F	n/a	n/a
261D	n/a	n/a
261C	n/a	n/a
2653	40.43	39.04
n/a	n/a	n/a
261H	n/a	n/a
n/a	n/a	n/a
261A	n/a	n/a
261G	n/a	n/a
2601A	41.69	38.63
2651	41.08	39.26
2752	38.9	37.14
2753	38.85	37.12
2702	38.93	36.87
3602	38.96	36.25
3655	38.96	37.43
3654	39.02	37.52
3601	39.03	36.67
3653	39.07	37.54
3702	38.8	n/a
3651	39.09	37.42
3652	39.08	37.54
361A	n/a	n/a
361B	n/a	n/a
1802	38.03	35.55
1803	37.86	35.57
2754	n/a	n/a
27MH	n/a	n/a
2951	38.06	36.67
2902	37.55	35.75
2901	38.05	36.26
2952	37.6	n/a
281E	n/a	n/a
281C	n/a	n/a
281D	n/a	n/a
2953	37.83	n/a
281A	n/a	n/a
281B	n/a	n/a
2954	37.91	n/a
2803	38.61	36.58
2751	38.4	36.89

Manhole Reference	Manhole Cover Level	Manhole Invert Level
2955	38.25	36.07
2701	38.42	34.43
2802	38.81	36.59
271A	n/a	n/a
2851	39.01	36.39
2801	39.02	36.6
281F	n/a	n/a
3956	37.94	35.91
371B	n/a	n/a
3751	42.39	36.71
2904	37.97	n/a
1551	43.35	41.1
1503	44.38	41.04
1501	43.4	40.34
1552	44.5	41.85
2551	44.67	42.97
1656	n/a	n/a
1605	42.88	38.69
1657	42.13	39.43
1606	n/a	n/a
1602	39.48	37.13
1652	39.44	38.24
161A	n/a	n/a
151A	n/a	n/a
161I	n/a	n/a
161F	n/a	n/a
161E	n/a	n/a
1607	43.34	40.4
161C	n/a	n/a
161D	n/a	n/a
161G	n/a	n/a
161H	n/a	n/a
1863	38.36	34.4
1761	n/a	36.29
181B	38.5	36.63
1751	n/a	n/a
191B	n/a	n/a
191A	n/a	n/a
1701	n/a	n/a
1854	38.31	36.21
1805	38.45	35.43
1852	38.37	n/a
1858	38.38	n/a
1804	38.41	35.7
1856	38.45	36.46
1853	38.07	35.99
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

Notes:

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

Sewer Fittings

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

	Air Valve
	Dam Chase
	Fitting
	Meter
	Vent Column

Operational Controls

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

	Control Valve
	Drop Pipe
	Ancillary
	Weir

End Items

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

	Outfall
	Undefined End
	Inlet

Other Symbols

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

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

Areas

Lines denoting areas of underground surveys, etc.

	Agreement
	Operational Site
	Chamber
	Tunnel
	Conduit Bridge

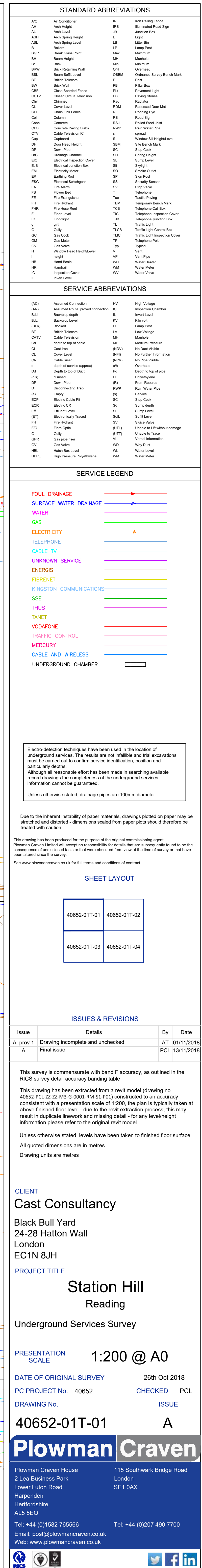
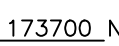
Other Sewer Types (Not Operated or Maintained by Thames Water)

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

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

PHASE 3A DRAINAGE STRATEGY AND SUDS REPORT STATION HILL, READING

APPENDIX 3 UNDERGROUND SERVICES SURVEY



**APPENDIX 4
EXISTING RUNOFF CALCULATIONS**

1 in 1 year storm event

Total Depth of rainfall - The Manual Method According to the Wallingford Procedure

i)	M5-60 = 18.8 mm
	r = 0.4

ii) **M5-D = Z1 (M5-60)**

Storm Duration	Total Rainfall	Z1	Z2
M5-15	11.89 mm	0.63	0.61
M5-30	15.04 mm	0.80	0.62
M5-60	18.80 mm	1.00	0.64
M5-120	22.28 mm	1.19	0.65
M5-240	26.74 mm	1.42	0.67
M5-360	29.56 mm	1.57	0.68
M5-600	34.45 mm	1.83	0.69
M5-1440	42.77 mm	2.28	0.71

iii) **MT-D = Z2 (M5-D)**

Storm Duration	Total Rainfall	Total Rainfall + 40% CC	Intensity
M1-15	7.3 mm	10.2 mm	29.2 mm/hr
M1-30	9.3 mm	13.1 mm	18.7 mm/hr
M1-60	11.9 mm	16.7 mm	11.9 mm/hr
M1-120	14.5 mm	20.2 mm	7.2 mm/hr
M1-240	17.8 mm	25.0 mm	4.5 mm/hr
M1-360	20.1 mm	28.1 mm	3.3 mm/hr
M1-600	23.7 mm	33.2 mm	2.4 mm/hr
M1-1440	30.2 mm	42.2 mm	1.3 mm/hr

Impermeable Area	
0.47 ha	Existing
ha	Proposed

Peak run-off calculated using Modified Rational Method

Peak Run-off -- $Q_p = 3.61CviA$ (l/s)

Storm Event	Existing Peak Runoff (l/s)
M1-15	37
M1-30	24
M1-60	15
M1-120	9
M1-240	6
M1-360	4
M1-600	3
M1-1440	2

1 in 30 year storm event

Total Depth of rainfall - The Manual Method According to the Wallingford Procedure

i)	M5-60 = 18.8 mm
	r = 0.4

ii) **M5-D = Z1 (M5-60)**

Storm Duration	Total Rainfall	Z1	Z2
M5-15	11.89 mm	0.63	1.51
M5-30	15.04 mm	0.80	1.53
M5-60	18.80 mm	1.00	1.54
M5-120	22.28 mm	1.19	1.54
M5-240	26.74 mm	1.42	1.52
M5-360	29.56 mm	1.57	1.51
M5-600	34.45 mm	1.83	1.50
M5-1440	42.77 mm	2.28	1.46

iii) **MT-D = Z2 (M5-D)**

Storm Duration	Total Rainfall	Total Rainfall + 40% CC	Intensity
M30-15	17.9 mm	25.1 mm	71.6 mm/hr
M30-30	23.0 mm	32.2 mm	46.0 mm/hr
M30-60	28.9 mm	40.5 mm	28.9 mm/hr
M30-120	34.2 mm	47.9 mm	17.1 mm/hr
M30-240	40.7 mm	57.0 mm	10.2 mm/hr
M30-360	44.7 mm	62.6 mm	7.4 mm/hr
M30-600	51.6 mm	72.2 mm	5.2 mm/hr
M30-1440	62.3 mm	87.2 mm	2.6 mm/hr

Impermeable Area	
0.47 ha	Existing
ha	Proposed

Peak run-off calculated using Modified Rational Method

Peak Run-off -- $Q_p = 3.61CviA$ (l/s)

Storm Event	Existing Peak Runoff (l/s)
M30-15	91
M30-30	59
M30-60	37
M30-120	22
M30-240	13
M30-360	9
M30-600	7
M30-1440	3

1 in 100 year storm event

Total Depth of rainfall - The Manual Method According to the Wallingford Procedure

i)	M5-60 = 18.8 mm
	r = 0.4

ii) **M5-D = Z1 (M5-60)**

Storm Duration	Total Rainfall	Z1	Z2
M5-15	11.89 mm	0.63	1.94
M5-30	15.04 mm	0.80	1.99
M5-60	18.80 mm	1.00	2.02
M5-120	22.28 mm	1.19	2.02
M5-240	26.74 mm	1.42	2.00
M5-360	29.56 mm	1.57	1.97
M5-600	34.45 mm	1.83	1.93
M5-1440	42.77 mm	2.28	1.87

iii) **MT-D = Z2 (M5-D)**

Storm Duration	Total Rainfall	Total Rainfall + 40% CC	Intensity
M100-15	23.1 mm	32.3 mm	92.3 mm/hr
M100-30	29.9 mm	41.9 mm	59.9 mm/hr
M100-60	38.0 mm	53.2 mm	38.0 mm/hr
M100-120	45.0 mm	63.0 mm	22.5 mm/hr
M100-240	53.4 mm	74.7 mm	13.3 mm/hr
M100-360	58.3 mm	81.7 mm	9.7 mm/hr
M100-600	66.6 mm	93.3 mm	6.7 mm/hr
M100-1440	79.9 mm	111.8 mm	3.3 mm/hr

Impermeable Area	
0.47 ha	Existing
ha	Proposed

Peak run-off calculated using Modified Rational Method

Peak Run-off -- $Q_p = 3.61CviA$ (l/s)

Storm Event	Existing Peak Runoff (l/s)
M100-15	117
M100-30	76
M100-60	48
M100-120	29
M100-240	17
M100-360	12
M100-600	8
M100-1440	4

PHASE 3A DRAINAGE STRATEGY AND SUDS REPORT STATION HILL, READING

APPENDIX 5 THAMES WATER CONSULTATION

Minutes of meeting

Project name **Station Hill Reading – Phase 3**
 Project no. **1620018049-001**
 Subject **Thames Water – Build over discussion**
 Meeting date **21/07/2025**
 Location **Teams**
 Meeting no. **01**
 Called by **Rita Knight (Ramboll)**
 Taken by **Rita Knight (Ramboll)**
 Participants **James Mayfield (Thames Water); Keith Jones (Ramboll); Jamie Clay (Ramboll)**
 Absent **Gary Chisholm (Ramboll)**
 Copy to **James Mayfield**
 Next meeting **TBC**

Agenda
 1 [Overview](#)
 2 [Thames Water Requirements](#)
 3 [Next Steps](#)

Date 21/07/2025

Ramboll
 Twenty3
 Brunswick Place
 Southampton
 SO15 2AQ
 United Kingdom

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<https://uk.ramboll.com>

1 Overview

Plan overview presented by RK explaining the build over extent of the Thames Water (TW) public foul sewer between manholes no. 2701 - 3702 as well as manhole no. 3602. It was noted that some build over extent will be to podium level (2 storeys).

An additional survey was introduced indicating additional manholes on the existing sewer line (which are not shown on the TW asset plan). Accurate position of these chambers will be shown on the proposed plans that will be designed by Ramboll.

It was noted by TW that the section of the sewer impacted by the build over is used as storage for the pumping station located further downstream i.e. it has high sensitivity with regards to any changes proposed (this includes any new construction of chambers or even lowering the cover level of existing manholes).

2 Thames Water Requirements

Generic requirements:

- 4000-gallon combi unit (12m length and 5m height) to have full access to manholes and space to turn for jetting purposes (access to be provided within a couple of metres from the chamber position) – designer to provide evidence via swept path analysis
- Maximum spacing with full access to manholes is 90m
- Impact assessment to be provided to TW

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 London
 SE1 8NW

- Designer to highlight if any existing chamber cover levels are proposed to being lowered (so TW can check the hydraulic impact of the proposed changes)

Further considerations

- 3m of either edge of a TW sewer triggers a build over agreement
- Piles to be positioned minimum 1.5m away from the edge of the sewer (plus any survey error and piling tolerance accounted for). It was also noted that piles need to be bored or CFA.
- CCTV survey is required to understand the condition of the sewer to be built over (any defects found to be remediated by the developer).
- As part of the build over agreement the developer will be required to sign a clause in the contract that provides the rights to TW to demolish the building in the event that TW need to maintain the sewer (it was noted that there is no precedence of TW using this right)
- Sewer to be monitored during construction

3 Next Steps

- RK to overlay the updated survey to show the position of the additional chambers
- Ramboll to develop a proposed design which complies with the requirements clarified in Section 2 of this memo and present it to TW for feedback.
- Post-development estimated peak foul flow rates to be calculated and included in the proposal for TW to comment on the available capacity.
- Potential to arrange another Teams call to discuss the proposals

Rita Knight

From: James Mayfield <James.Mayfield@thameswater.co.uk>
Sent: 22 October 2025 13:55
To: Rita Knight
Cc: Jamie Clay; Keith Jones; Gary Chisholm
Subject: Re: RE: SHRP3 - Existing CCTV survey

Hi Rita,

As the manhole on the western side, doesn't seem to give us access to the sewer directly, a new manhole would likely be required.

As these look to be slightly unusual lateral connections how they are removed will need to be carefully considered.

Kind regards,

James Mayfield

Senior Project Engineer – Developer Services, Major Projects

Mobile: 07747 642 662

James.Mayfield@thameswater.co.uk

Clearwater Court, Vastern Road, Reading, RG1 8DB



From: Rita Knight <rita.knight@ramboll.co.uk>
Sent: 22 October 2025 13:30
To: James Mayfield <James.Mayfield@thameswater.co.uk>
Cc: Jamie Clay <James.Clay@ramboll.co.uk>; Keith Jones <keith.jones@ramboll.co.uk>; Gary Chisholm <gary.chisholm@ramboll.co.uk>
Subject: RE: RE: SHRP3 - Existing CCTV survey

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Hi James,

Following up on this e-mail chain, we have managed to obtain some further evidence on the enclosure associated with the public sewer (as per the dashed line area shown on the screen shot below). Photos taken inside of the enclosure at the time of the CCTV (which was shared with you previously) are attached. Based on the photos it is assumed that the enclosure provides means of access for the building connections. As all these laterals will become redundant due to the planned demolition, we would propose to seal these access openings and provide a new TW access chamber closer to Greyfriars Road as previously discussed.

Could you please confirm that this proposal is acceptable to Thames Water?



Kind regards

Rita Knight

Principal Engineer

M +44 7973677452

rita.knight@ramboll.co.uk

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Working days Monday - Thursday



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From: James Mayfield <James.Mayfield@thameswater.co.uk>

Sent: 30 September 2025 16:06

To: Rita Knight <rita.knight@ramboll.co.uk>

Cc: Jamie Clay <James.Clay@ramboll.co.uk>; Keith Jones <keith.jones@ramboll.co.uk>; Gary Chisholm <gary.chisholm@ramboll.co.uk>

Subject: Re: SHRP3 - Existing CCTV survey

Hi Rita,

Thank you for the survey.

The blockages in the sewer indicate the need to provide Thames Water with good access to maintain its asset and serve the upstream customers.

Kind regards,

James Mayfield

Senior Project Engineer – Developer Services, Major Projects

Mobile: 07747 642 662

James.Mayfield@thameswater.co.uk

Clearwater Court, Vastern Road, Reading, RG1 8DB



From: Rita Knight <rita.knight@ramboll.co.uk>

Sent: 30 September 2025 15:59

To: James Mayfield <James.Mayfield@thameswater.co.uk>

Cc: Jamie Clay <James.Clay@ramboll.co.uk>; Keith Jones <keith.jones@ramboll.co.uk>; Gary Chisholm <gary.chisholm@ramboll.co.uk>

Subject: SHRP3 - Existing CCTV survey

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Hi James,

Following up on our discussion yesterday please find attached the existing CCTV survey we have on record.

40652-006 Station Hill Reading CCTV Report 1

- This survey is dated from 04/2020 and was completed on the main line, i.e. between TW2701 and TW3702.
- Approx. 8m downstream of TW2701 survey was abandoned as equipment was unable to pass.
- Survey upstream of TW3702 was completed to approx. 66m then survey was abandoned as equipment was unable to pass.
- Based on CAD measurements the approx. length between TW2701 and TW3702 is 83m, i.e. 9m of this sewer was not surveyed (see red highlighted section not surveyed below).

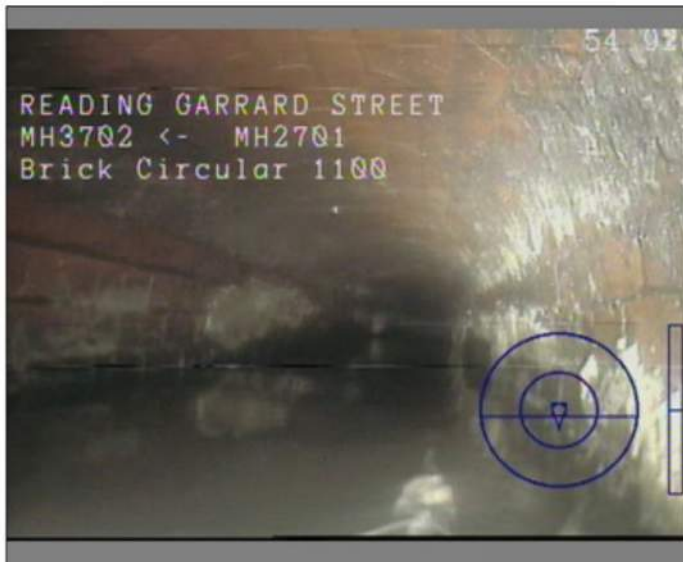
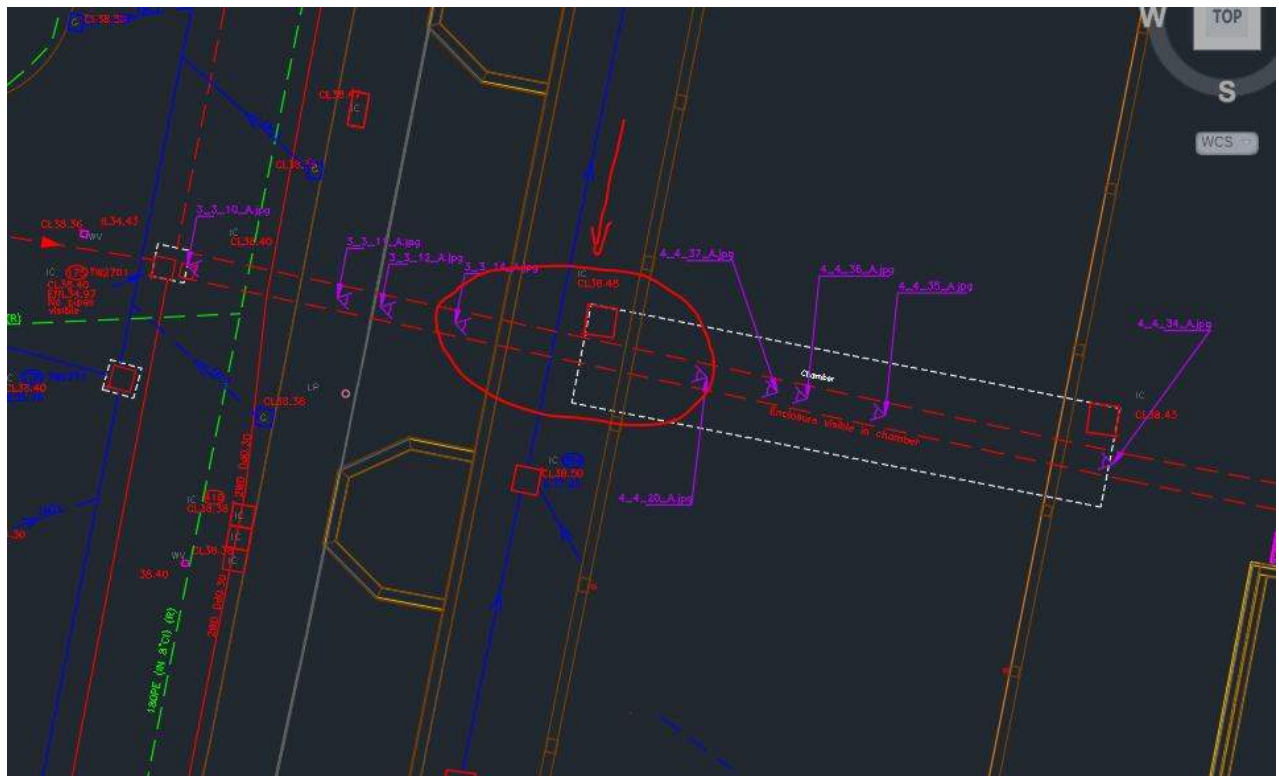


Photo: 4_4_34_A.jpg
54.02m, Attached deposits, encrustation, from 2 to 5 o'clock, 20% cross-sectional area loss, Start

- Image 4_4_34_A does not indicate the presence of a chamber/enclosure, so the type of access at either end of this enclosure is unknown (downstream access chamber is not visible on the relevant image).
- The survey has concluded that the sewer structurally is in good condition.

I will be in touch in due course if any further surveys on the TW sewers are made available to Ramboll. Will also look into the vehicle tracking exercise to confirm the feasibility of accessing TW3702 via reverse manoeuvring from Garrath Street.

Kind regards

Rita Knight

MSc BSc FDS MICE IEng
Principal Engineer
Structures Central

M +44 7973677452
rita.knight@ramboll.co.uk

Ramboll

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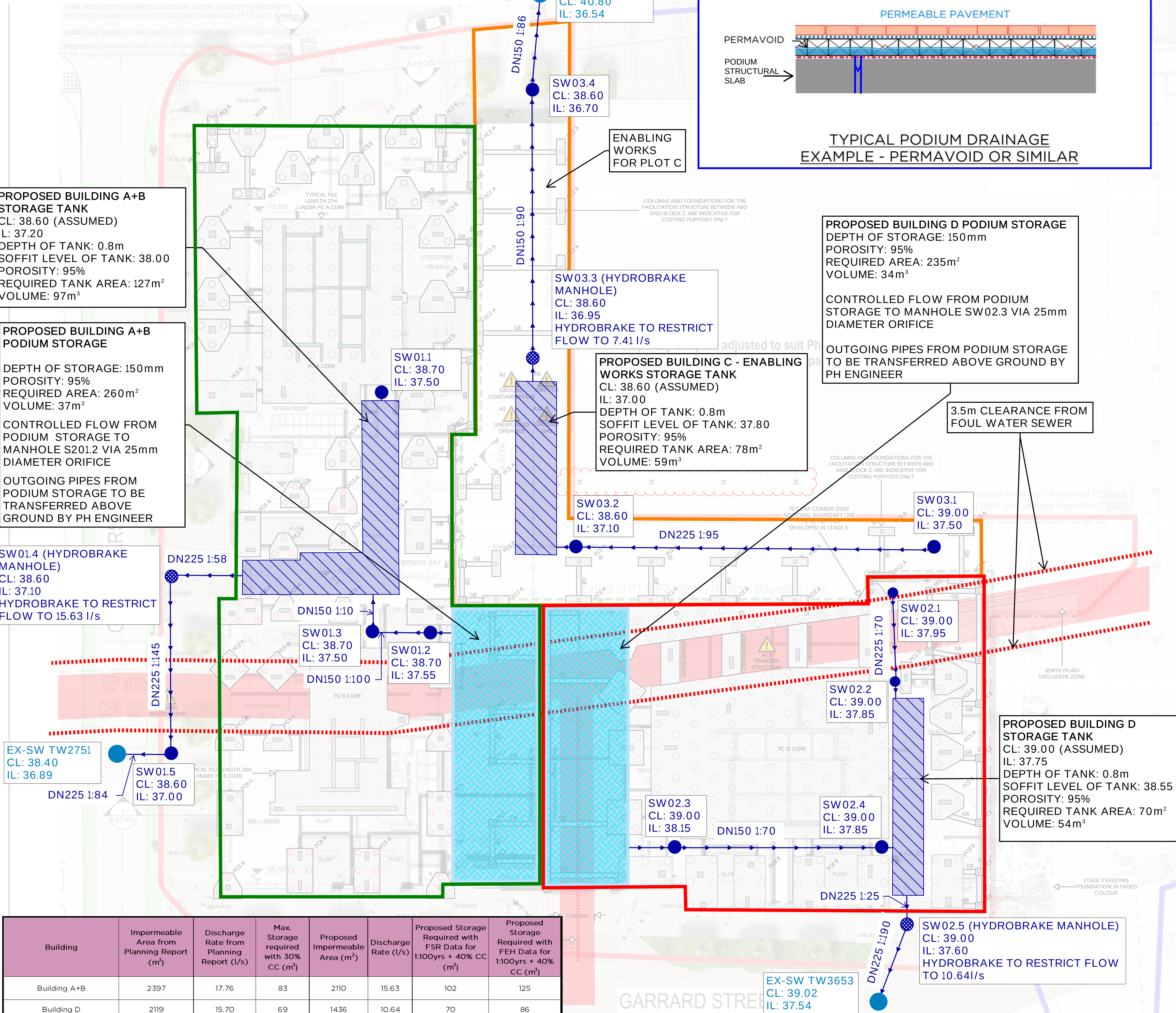
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**APPENDIX 6
PROPOSED SURFACE WATER DRAINAGE LAYOUT**

SURFACE WATER STRATEGY



- NOTES FOR THE DRAWING:
- DO NOT SCALE FROM THIS DRAWING.
 - THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS AND SPECIFICATIONS.
 - THIS DRAWING IS BASED ON THE ARCHITECTS DRAWING, DRAWING NO: SHP3-GEN-XX-P2-D-A-011208.
 - ALL COVER LEVELS INDICATED ARE APPROXIMATE. PROPOSED EXTERNAL LEVELS ARE TO BE DEVELOPED BY THE LANDSCAPE ARCHITECT AND FFL TO BE CONFIRMED BY ARCHITECT.
 - FOR THE FOUNDATION LAYOUT REFER TO DRAWING NO. SHP3-RAM-XX-XX-SK-S-000015.
 - PRELIMINARY LOCATIONS FOR RWP'S WERE OBTAINED ON 20/11/25 FROM THE PH ENGINEER. RWP LOCATIONS TO BE COORDINATED AT THE NEXT STAGE OF THE PROJECT WITH PROPOSED BELOW GROUND DRAINAGE AND FOUNDATION PLANS. OPPORTUNITIES SHOULD BE SOUGHT TO OFFSET RWP'S AT HIGH LEVEL TO AVOID CLASH WITH FOUNDATIONS.
 - SOFFIT TO SOFFIT CONNECTION TO THE THAMES WATER PUBLIC SURFACE WATER SEWERS FROM THE PROPOSED DEVELOPMENT IS NOT ACHIEVABLE. IT IS PROPOSED TO CONNECT TO THE PUBLIC SEWERS INVERT TO INVERT AT THE HIGHLIGHTED CONNECTION POINTS WHICH ALLOWS MAINTAINING SELF-CLEANSING VELOCITIES FOR THE PROPOSED BELOW GROUND PIPEWORK SERVING THE DEVELOPMENT.
- NOTE: THERE IS AN OPPORTUNITY TO USE BLUE ROOFS ON THE ENTIRE PROPOSED ROOF WHICH WILL REDUCE THE NEED FOR BELOW GROUND TANKS.

KEY

- PLOT C - ENABLING WORKS
- PLOT A+B
- PLOT D

KEY

- PROPOSED SURFACE WATER MANHOLE
- PROPOSED SURFACE WATER HYDROBRAKE MANHOLE
- EXISTING THAMES WATER SURFACE WATER MANHOLE
- PROPOSED SURFACE WATER DRAINAGE

RAMBOLL

SURFACE WATER STRATEGY

STATION HILL ENG: ZA

CHK: RK

17/02/26 APP: GC/DK

STAGE 2B ISSUE

SHP3-RAM-XX-XX-SK-C-000002_P04

**APPENDIX 7
HYDRAULIC CALCULATIONS**

Project: Station Hill Reading Phase 3	Date: 11/02/2026		
	Designed by: ZA	Checked by: RK	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Plot A-B	Company Address:		





Buildings A/B Tank

Type : Tank

Dimensions

Exceedance Level (m)	38.600
Depth (m)	1.400
Base Level (m)	37.200
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	95
Average Slope (1:X)	0.00
Total Volume (m³)	97.120

Depth (m)	Area (m²)	Volume (m³)
0.000	127.00	0.000
0.800	127.00	96.520

Inlets

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	A/B.01
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (2)

Inlet Type	Point Inflow
Incoming Item(s)	A/B.04
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	A/B.05
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	20.291

Project: Station Hill Reading Phase 3	Date: 11/02/2026		
	Designed by: ZA	Checked by: RK	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Plot A-B	Company Address:		





Building A/B - Podium Tank

Type : Tank

Dimensions

Exceedance Level (m)	50.000
Depth (m)	0.400
Base Level (m)	49.600
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	95
Average Slope (1:X)	0.00
Total Volume (m³)	37.262

Depth (m)	Area (m²)	Volume (m³)
0.000	259.735	0.000
0.150	259.735	37.012

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Buildings A/B - Podium
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	A/B.02
Outlet Type	Orifice
Diameter (m)	0.025
Coefficient of Discharge	0.600
Invert Level (m)	49.600

Advanced

Perimeter	Circular
Length (m)	28.428

Project: Station Hill Reading Phase 3		Date: 11/02/2026			
		Designed by: ZA	Checked by: RK		Approved By:
Report Details: Type: Inflow Summary Storm Phase: Plot A-B		Company Address:			

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Buildings A/B	SW01.1		Time of Concentration	0.114	100	0	100	0.114
Buildings A/B - Podium	Building A/B - Podium Tank		Time of Concentration	0.026	100	0	100	0.026
Buildings A/B (1)	SW01.3		Time of Concentration	0.072	100	0	100	0.072
TOTAL		0.0		0.213				0.213

Project: Station Hill Reading Phase 3	Date: 11/02/2026		
	Designed by: ZA	Checked by: RK	Approved By:
Report Details: Type: Network Design Criteria Storm Phase: Plot A-B	Company Address:		



Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

FEH - Station Hill

Type: FEH

Site Location	GB 471322 173756 SU 71322 73756
Return Period (years)	100.0
Rainfall Version	2022

Pipe Options

Lock Slope Options	None
Design Options	Minimise Excavation
Design Level	Level Soffits
Min. Cover Depth (m)	1.200
Min. Slope (1:X)	500.00
Max. Slope (1:X)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☒

Manhole Options

Apply Offset	☐
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Project: Station Hill Reading Phase 3	Date: 11/02/2026			
	Designed by: ZA	Checked by: RK	Approved By:	
Report Details: Type: Outfall Details Storm Phase: Plot A-B	Company Address:			

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
EX-SW TW2751	Free Discharge		

Project: Station Hill Reading Phase 3	Date: 11/02/2026		
	Designed by: ZA	Checked by: RK	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Plot D	Company Address:		





Building D Tank

Type : Tank

Dimensions

Exceedance Level (m)	39.000
Depth (m)	1.250
Base Level (m)	37.750
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	95
Average Slope (1:X)	0.00
Total Volume (m³)	53.650

Depth (m)	Area (m²)	Volume (m³)
0.000	70.00	0.000
0.800	70.00	53.200

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	D.05
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (2)

Inlet Type	Point Inflow
Incoming Item(s)	D.02
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	D.06
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	18.338

Project: Station Hill Reading Phase 3	Date: 11/02/2026		
	Designed by: ZA	Checked by: RK	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Plot D	Company Address:		





Building D - Podium Tank

Type : Tank

Dimensions		
Exceedance Level (m)	50.000	
Depth (m)	0.400	
Base Level (m)	49.600	
Freeboard (mm)	0	
Initial Depth (m)	0.000	
Porosity (%)	95	
Average Slope (1:X)	0.00	
Total Volume (m³)	33.751	
Depth (m)	Area (m²)	Volume (m³)
0.000	235.093	75.466
0.150	235.093	75.466

Inlets	
Inlet	
Inlet Type	Point Inflow
Incoming Item(s)	Building D - Podium
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets	
Outlet	
Outgoing Connection	D.03
Outlet Type	Orifice
Diameter (m)	0.025
Coefficient of Discharge	0.600
Invert Level (m)	49.600

Advanced	
Perimeter	Circular
Length (m)	30.926

Project: Station Hill Reading Phase 3		Date: 11/02/2026			
		Designed by: ZA	Checked by: RK		Approved By:
Report Details: Type: Inflow Summary Storm Phase: Plot D		Company Address:			

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Building D	SW02.1		Time of Concentration	0.119	100	0	100	0.119
Building D - Podium	Building D - Podium Tank		Time of Concentration	0.024	100	0	100	0.024
TOTAL		0.0		0.142				0.142

Project: Station Hill Reading Phase 3	Date: 11/02/2026		
	Designed by: ZA	Checked by: RK	Approved By:
Report Details: Type: Network Design Criteria Storm Phase: Plot D	Company Address:		



Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

FEH - Station Hill

Type: FEH

Site Location	GB 471322 173756 SU 71322 73756
Return Period (years)	100.0
Rainfall Version	2022

Pipe Options

Lock Slope Options	None
Design Options	Minimise Excavation
Design Level	Level Soffits
Min. Cover Depth (m)	1.200
Min. Slope (1:X)	500.00
Max. Slope (1:X)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☒

Manhole Options

Apply Offset	☐
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Project: Station Hill Reading Phase 3	Date: 11/02/2026			
	Designed by: ZA	Checked by: RK	Approved By:	
Report Details: Type: Outfall Details Storm Phase: Plot D	Company Address:			

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
EX-SW TW3653	Free Discharge		

Project: Station Hill Reading Phase 3	Date: 11/02/2026		
	Designed by: ZA	Checked by: RK	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Plot C - Enabling Works	Company Address:		





Building C - Tank

Type : Tank

Dimensions

Exceedance Level (m)	38.600
Depth (m)	1.600
Base Level (m)	37.000
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	95
Average Slope (1:X)	0.00
Total Volume (m³)	60.080

Depth (m)	Area (m²)	Volume (m³)
0.000	78.00	0.000
0.800	78.00	59.280

Inlets

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	C.02
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet (1)

Outgoing Connection	C.03
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	20.762

Project: Station Hill Reading Phase 3		Date: 11/02/2026			
		Designed by: ZA	Checked by: RK		Approved By:
Report Details: Type: Inflow Summary Storm Phase: Plot C - Enabling Works		Company Address:			

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Building C - Enabling Works	SW03.1		Time of Concentration	0.10	100	0	100	0.10
TOTAL		0.0		0.10				0.10

Project: Station Hill Reading Phase 3	Date: 11/02/2026			
	Designed by: ZA	Checked by: RK	Approved By:	
Report Details: Type: Network Design Criteria Storm Phase: Plot C - Enabling Works	Company Address:			

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

FEH - Station Hill

Type: FEH

Site Location	GB 471322 173756 SU 71322 73756
Return Period (years)	100.0
Rainfall Version	2022

Pipe Options

Lock Slope Options	None
Design Options	Minimise Excavation
Design Level	Level Soffits
Min. Cover Depth (m)	1.200
Min. Slope (1:X)	500.00
Max. Slope (1:X)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☒

Manhole Options

Apply Offset	☐
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Project: Station Hill Reading Phase 3	Date: 11/02/2026			
	Designed by: ZA	Checked by: RK	Approved By:	
Report Details: Type: Outfall Details Storm Phase: Plot C - Enabling Works	Company Address:			

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
EX-SW TW2810	Free Discharge		

Project: Station Hill Reading Phase 3	Date: 11/02/2026			
	Designed by: ZA	Checked by: RK	Approved By:	
Report Title: Rainfall Analysis Criteria	Company Address:			

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall		
FEH - Station Hill		Type: FEH
Site Location	GB 471322 173756 SU 71322 73756	
Rainfall Version	2022	
Summer	☒	
Winter	☒	

Return Period

Return Period (years)	Increase Rainfall (%)
2.0	0.000
30.0	35.000
100.0	40.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880
2160	4320
2880	5760
4320	8640
5760	11520
7200	14400
8640	17280
10080	20160

Project: Station Hill Reading Phase 3		Date: 11/02/2026			
		Designed by: ZA	Checked by: RK		Approved By:
Report Details: Type: Junctions Summary Storm Phase: Plot A-B		Company Address:			



FEH - Station Hill: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item: Rank By: Max. Outflow

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Status
EX-SW TW2751	FEH - Station Hill: 30 years: +35 %: 15 mins: Summer	38.400	36.890	0.000	15.6	OK
SW01.5	FEH - Station Hill: 30 years: +35 %: 15 mins: Summer	38.600	37.000	0.000	15.6	OK
SW01.4 (HYDROBR AKE)	FEH - Station Hill: 30 years: +35 %: 15 mins: Summer	38.600	37.100	0.000	15.6	Surcharged
SW01.1	FEH - Station Hill: 30 years: +35 %: 15 mins: Summer	38.700	37.500	0.000	76.0	OK
SW01.3	FEH - Station Hill: 30 years: +35 %: 15 mins: Summer	38.700	37.500	0.000	42.9	Surcharged
SW01.2	FEH - Station Hill: 30 years: +35 %: 60 mins: Summer	38.700	37.550	0.000	0.6	OK

Project: Station Hill Reading Phase 3		Date: 11/02/2026			
		Designed by: ZA	Checked by: RK		Approved By:
Report Details: Type: Junctions Summary Storm Phase: Plot A-B		Company Address:			



FEH - Station Hill: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Outflow

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Status
EX-SW TW2751	FEH - Station Hill: 100 years: +40 %: 360 mins: Summer	38.400	36.890	0.000	15.6	OK
SW01.5	FEH - Station Hill: 100 years: +40 %: 360 mins: Summer	38.600	37.000	0.000	15.6	OK
SW01.4 (HYDROBR AKE)	FEH - Station Hill: 100 years: +40 %: 180 mins: Summer	38.600	37.100	0.000	15.6	Surcharged
SW01.1	FEH - Station Hill: 100 years: +40 %: 15 mins: Summer	38.700	37.500	0.000	104.9	OK
SW01.3	FEH - Station Hill: 100 years: +40 %: 15 mins: Summer	38.700	37.500	0.000	56.5	Surcharged
SW01.2	FEH - Station Hill: 100 years: +40 %: 15 mins: Summer	38.700	37.550	0.000	1.3	Surcharged

Project: Station Hill Reading Phase 3		Date: 11/02/2026			
		Designed by: ZA	Checked by: RK		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Plot A-B		Company Address:			



FEH - Station Hill: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item:
Rank By: Max. Flooded Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residant Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Buildings A/B Tank	FEH - Station Hill: 30 years: +35 %: 15 mins: Summer	37.556	37.556	0.356	0.356	118.9	42.982	0.000	0.000	15.7	20.557	55.743	OK
Building A/B - Podium Tank	FEH - Station Hill: 30 years: +35 %: 15 mins: Summer	49.631	49.631	0.031	0.031	17.7	7.595	0.000	0.000	0.2	0.204	79.617	OK

Project: Station Hill Reading Phase 3		Date: 11/02/2026			
		Designed by: ZA	Checked by: RK		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Plot A-B		Company Address:			



FEH - Station Hill: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item:
Rank By: Max. Flooded Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residant Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Buildings A/B Tank	FEH - Station Hill: 100 years: +40 %: 15 mins: Summer	37.722	37.722	0.522	0.522	161.4	63.004	0.000	0.000	14.9	15.443	35.128	OK
Building A/B - Podium Tank	FEH - Station Hill: 100 years: +40 %: 15 mins: Summer	49.642	49.642	0.042	0.042	23.9	10.304	0.000	0.000	0.2	0.265	72.348	OK

Project: Station Hill Reading Phase 3		Date: 11/02/2026			
		Designed by: ZA	Checked by: RK		Approved By:
Report Details: Type: Junctions Summary Storm Phase: Plot D		Company Address:			



FEH - Station Hill: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item: Rank By: Max. Outflow

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Status
EX-SW TW3653	FEH - Station Hill: 30 years: +35 %: 120 mins: Winter	39.020	37.540	0.000	10.6	OK
SW02.5 (HYDROBR AKE)	FEH - Station Hill: 30 years: +35 %: 60 mins: Summer	39.000	37.600	0.000	10.6	Surcharged
SW02.1	FEH - Station Hill: 30 years: +35 %: 15 mins: Summer	39.000	37.950	0.000	75.5	Surcharged
SW02.2	FEH - Station Hill: 30 years: +35 %: 15 mins: Summer	39.000	37.850	0.000	73.4	Surcharged
SW02.3	FEH - Station Hill: 30 years: +35 %: 60 mins: Winter	39.000	38.150	0.000	0.4	OK
SW02.4	FEH - Station Hill: 30 years: +35 %: 180 mins: Summer	39.000	37.850	0.000	0.7	Surcharged

Project: Station Hill Reading Phase 3		Date: 11/02/2026			
		Designed by: ZA	Checked by: RK		Approved By:
Report Details: Type: Junctions Summary Storm Phase: Plot D		Company Address:			



FEH - Station Hill: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Outflow

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Status
EX-SW TW3653	FEH - Station Hill: 100 years: +40 %: 240 mins: Summer	39.020	37.540	0.000	10.6	OK
SW02.5 (HYDROBR AKE)	FEH - Station Hill: 100 years: +40 %: 480 mins: Summer	39.000	37.600	0.000	10.6	Surcharged
SW02.1	FEH - Station Hill: 100 years: +40 %: 15 mins: Summer	39.000	37.950	0.000	100.9	Flood Risk
SW02.2	FEH - Station Hill: 100 years: +40 %: 15 mins: Summer	39.000	37.850	0.000	97.3	Surcharged
SW02.3	FEH - Station Hill: 100 years: +40 %: 180 mins: Summer	39.000	38.150	0.000	0.5	Surcharged
SW02.4	FEH - Station Hill: 100 years: +40 %: 240 mins: Summer	39.000	37.850	0.000	0.7	Surcharged

Project: Station Hill Reading Phase 3		Date: 11/02/2026			
		Designed by: ZA	Checked by: RK		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Plot D		Company Address:			



FEH - Station Hill: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item:
Rank By: Max. Flooded Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residant Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Building D Tank	FEH - Station Hill: 30 years: +35 %: 15 mins: Summer	38.142	38.142	0.392	0.392	73.4	26.118	0.000	0.000	10.9	11.331	51.319	OK
Building D - Podium Tank	FEH - Station Hill: 30 years: +35 %: 15 mins: Summer	49.631	49.631	0.031	0.031	15.9	6.848	0.000	0.000	0.2	0.203	79.709	OK

Project: Station Hill Reading Phase 3		Date: 11/02/2026			
		Designed by: ZA	Checked by: RK		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Plot D		Company Address:			



FEH - Station Hill: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item:
Rank By: Max. Flooded Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residant Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Building D Tank	FEH - Station Hill: 100 years: +40 %: 15 mins: Summer	38.303	38.303	0.553	0.553	97.3	36.807	0.000	0.000	12.0	12.938	31.394	OK
Building D - Podium Tank	FEH - Station Hill: 100 years: +40 %: 15 mins: Summer	49.641	49.641	0.041	0.041	21.3	9.252	0.000	0.000	0.2	0.263	72.587	OK

Project: Station Hill Reading Phase 3		Date: 11/02/2026			
		Designed by: ZA	Checked by: RK		Approved By:
Report Details: Type: Junctions Summary Storm Phase: Plot C - Enabling Works		Company Address:			



FEH - Station Hill: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item: Rank By: Max. Outflow

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Status
SW03.1	FEH - Station Hill: 30 years: +35 %: 15 mins: Summer	39.000	37.500	0.000	61.0	Surcharged
SW03.2	FEH - Station Hill: 30 years: +35 %: 15 mins: Summer	38.600	37.100	0.000	57.9	OK
SW03.3 (HYDROBR AKE)	FEH - Station Hill: 30 years: +35 %: 240 mins: Summer	38.600	36.950	0.000	7.4	Surcharged
SW03.4	FEH - Station Hill: 30 years: +35 %: 15 mins: Winter	38.600	36.700	0.000	7.4	OK
EX-SW TW2810	FEH - Station Hill: 30 years: +35 %: 15 mins: Winter	40.900	36.540	0.000	7.4	OK

Project: Station Hill Reading Phase 3		Date: 11/02/2026			
		Designed by: ZA	Checked by: RK		Approved By:
Report Details: Type: Junctions Summary Storm Phase: Plot C - Enabling Works		Company Address:			



FEH - Station Hill: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Outflow

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Status
SW03.1	FEH - Station Hill: 100 years: +40 %: 15 mins: Summer	39.000	37.500	0.000	81.1	Surcharged
SW03.2	FEH - Station Hill: 100 years: +40 %: 15 mins: Summer	38.600	37.100	0.000	79.5	Surcharged
SW03.3 (HYDROBR AKE)	FEH - Station Hill: 100 years: +40 %: 180 mins: Winter	38.600	36.950	0.000	7.4	Surcharged
SW03.4	FEH - Station Hill: 100 years: +40 %: 240 mins: Winter	38.600	36.700	0.000	7.4	OK
EX-SW TW2810	FEH - Station Hill: 100 years: +40 %: 240 mins: Winter	40.900	36.540	0.000	7.4	OK

Project: Station Hill Reading Phase 3		Date: 11/02/2026			
		Designed by: ZA	Checked by: RK		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Plot C - Enabling Works		Company Address:			



FEH - Station Hill: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item:
Rank By: Max. Flooded Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residant Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Building C - Tank	FEH - Station Hill: 30 years: +35 %: 15 mins: Summer	37.311	37.311	0.311	0.311	57.9	23.075	0.000	0.000	7.4	9.312	61.594	OK

Project: Station Hill Reading Phase 3		Date: 11/02/2026			
		Designed by: ZA	Checked by: RK		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Plot C - Enabling Works		Company Address:			

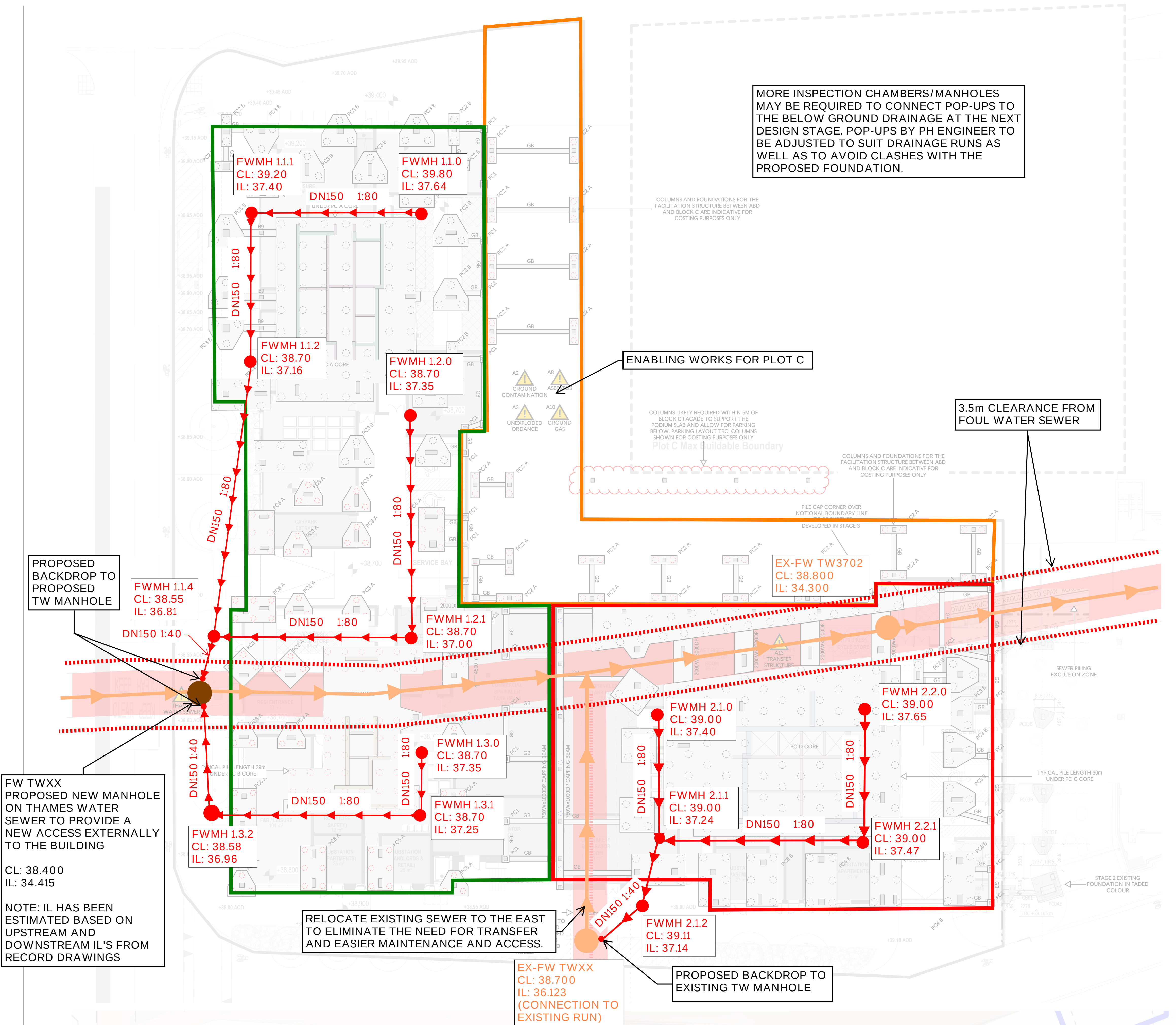


FEH - Station Hill: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item:
Rank By: Max. Flooded Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residant Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Building C - Tank	FEH - Station Hill: 100 years: +40 %: 15 mins: Summer	37.448	37.448	0.448	0.448	79.5	33.198	0.000	0.000	7.0	7.571	44.743	OK

**APPENDIX 8
PROPOSED FOUL DRAINAGE LAYOUT**

FOUL WATER STRATEGY



NOTES FOR THE DRAWING:

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS AND SPECIFICATIONS.
3. THIS DRAWING IS BASED ON THE ARCHITECTS DRAWING, DRAWING NO: SHP3-GEN-XX-P2-D-A-011208.
4. ALL COVER LEVELS INDICATED ARE APPROXIMATE. PROPOSED EXTERNAL LEVELS ARE TO BE DEVELOPED BY THE LANDSCAPE ARCHITECT.
5. FOR THE FOUNDATION LAYOUT REFER TO DRAWING NO. SHP3-RAM-XX-XX-SK-S-000015.
6. PRELIMINARY LOCATIONS FOR SUBSTACKS and FOUL GULLIES WERE OBTAINED ON 20/11/25 FROM THE PH ENGINEER. FOUL WATER LOCATIONS TO BE COORDINATED AT THE NEXT STAGE OF THE PROJECT WITH PROPOSED BELOW GROUND DRAINAGE AND FOUNDATION PLANS. OPPORTUNITIES SHOULD BE SOUGHT TO OFFSET FOUL CONNECTIONS AT HIGH LEVEL TO AVOID CLASH WITH FOUNDATIONS.

KEY

-  PLOT C - ENABLING WORKS
-  PLOT A+B
-  PLOT D

KEY

-  PROPOSED FOUL WATER MANHOLE
 EXISTING THAMES WATER FOUL WATER MANHOLE
 PROPOSED FOUL WATER DRAINAGE
 EXISTING THAMES WATER DRAINAGE

FOUL WATER STRATEGY

STATION HILL ENG: ZA

CHK: RK

19/02/26

APP: GC/DK

STAGE 2B ISSUE

SHP3-RAM-XX-XX-SK-C-000003 P04