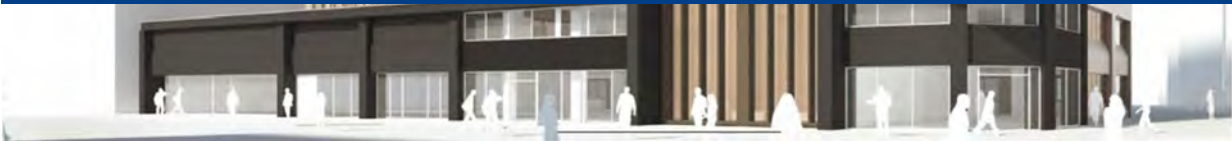


Brunel Walk Redevelopment and Turner Avenue Estate Improvements

Below Ground Drainage Strategy

Issue P06 – 07 December 2022

Doc. Ref.: 2821-MHT-CV-RP-002



BRUNEL WALK REDEVELOPMENT AND TURNER AVENUE ESTATE IMPROVEMENTS

BELOW GROUND DRAINAGE STRATEGY

ISSUED FOR COMMENT

Quality Assurance Page

Issue	Date	Prepared By	Checked By	Approved By	Remarks
P01	26/02/21	Mr. D. Heyna-Francis	Mr C. Ryan	Mr C. Ryan	Issued for Comment
P02	20/02/22	Mr. L. Hornblow	Mr. G. Bansal	Mr. G. Bansal	Issued for Comment
P03	11/08/22	Mr. L. Hornblow	Mr. G. Bansal	Mr. G. Bansal	Issued for Comment
P04	16/08/22	Mr. L. Hornblow	Mr. G. Bansal	Mr. G. Bansal	Issued for Comment
P05	09/09/22	Mr. L. Hornblow	Mr. G. Bansal	Mr. G. Bansal	Issued for Comment
P06	07/12/22	Mr. L. Hornblow	Mr. G. Bansal	Mr. G. Bansal	Issued for Comment

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Executive Summary

Meinhardt UK Ltd has been appointed by the London Borough of Haringey (LBH) to undertake foul and surface water drainage design for the proposed development at 1-36 Brunel Walk, Tottenham, London, N15 5HQ.

The proposed new build development will increase the impermeable area within the Brunel Walk development, however surface water will be attenuated as close to Greenfield runoff rates as reasonably practicable, as per the Sustainable Urban Drainage Systems (SuDS) Non-Statutory Technical Standards and London Borough of Haringey (LBH) requirements. The site will reduce surface water to a rate of 2.5 l/s for the 1 in 100 year plus climate change rainfall event. This provides a 92.2% betterment on the existing 1 in 1 year peak discharge rate and a 98.0% improvement on the existing 1 in 100 year peak discharge rate. The scheme achieves this by providing SuDS in the form of green roofs on all buildings, as well as raingardens and traditional below ground attenuation.

Thames Water have been consulted on the surface water discharge rate and foul water discharge rate for the new development and have agreed this is a suitable rate and the associated sewers can cater for these flows.

For the wider Turner Estate, the proposed landscaping scheme as indicated with reference to drawing "5350-OOB-ZZ-00-DR-L-0050" from the landscape architect (Oobe) provides new areas of permeable paving which in turn will aid in any reductions of surface water runoff from the Turner Estate which has the further benefit of reducing surface water rates from the development as a whole.

Overall the scheme complies with National and local policy requirements in terms of SuDS and drainage by providing SuDS features and reducing surface water runoff rates.

1 Introduction

Meinhardt UK Ltd has been appointed by the London Borough of Haringey (LBH) to undertake foul and surface water drainage design for the proposed development at 1-36 Brunel Walk, Tottenham, London, N15 5HQ. This report outlines the proposed below ground drainage strategy to date.

This report has been carried out in accordance with the National Planning Policy Framework (NPPF) and DEFRA's Non-Statutory Technical Standards for Sustainable Drainage Systems (NTSSUDS). LBH policies and guidance have also been referred to, including the Sustainable Drainage Design & Evaluation Guide (SDDED), the LBH Surface Water Management Plan (SWMP) and the LBH Strategic Flood Risk Assessment (SFRA). This report also incorporates advice and guidance from the Environment Agency and CIRIA documents.

This report will outline the proposed drainage strategy for the site including a detailed Sustainable Drainage Systems (SuDS) assessment. The NTSSUDS states that *"for developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event"*.

This report aims to adopt the most sustainable drainage solution for the proposed development, aiming to reduce the run-off from the proposed development to Greenfield rates.

Reference should be made to the Flood Risk Assessment (document ref: 2844-MHT-CV-RP-001).

2 Existing Site

2.1 Site Description and Location

The site is Brownfield and is located at 1-36 Brunel Walk, Tottenham, London, N15 5HQ. Brunel Walk is bound by the wider Turner Avenue estate both of which are owned by LBH. Brunel Walk and Turner Estate are bound by West Green Road to the north, Elmar Road to the west, residential properties to the south, and Kirkton Road and Braemar Road to the east. Brunel Walk and Turner Avenue Estate are access via Elmar Road and Kirkton Road. The Brunel Walk site is currently occupied by five two-storey buildings including 35 single person flats, 1 family house and communal facilities, along with associated soft landscaping and paths. Parking for Brunel Walk is available from Braemar Road to the south east.

The site has approximate OS coordinates of 533110, 189010 at Grid Reference TQ331890.

The Brunel Walk new build development area is shown by a red line and the wider Turner Estate Improvements boundary by a blue line in Figure 2.1 below.



Figure 2.1: Site Location Plan

The site is relatively flat, falling slightly northwest-southeast, from approximately 13.50mAOD to 12.22mAOD, with a step down to the carpark in the east portion of the site with a level of approximately 10.53mAOD. The Topographical survey can be found in Appendix B.

2.2 Ground Conditions

A detailed site investigation report was not available at the time of writing, it is anticipated that a detailed ground investigation will be completed to confirm the onsite ground conditions prior to detailed design. However, the BGS map shown in Figure 2.2 shows that the site is underlain by bedrock of London Clay (clay, silt and sand) with no recorded superficial deposits.

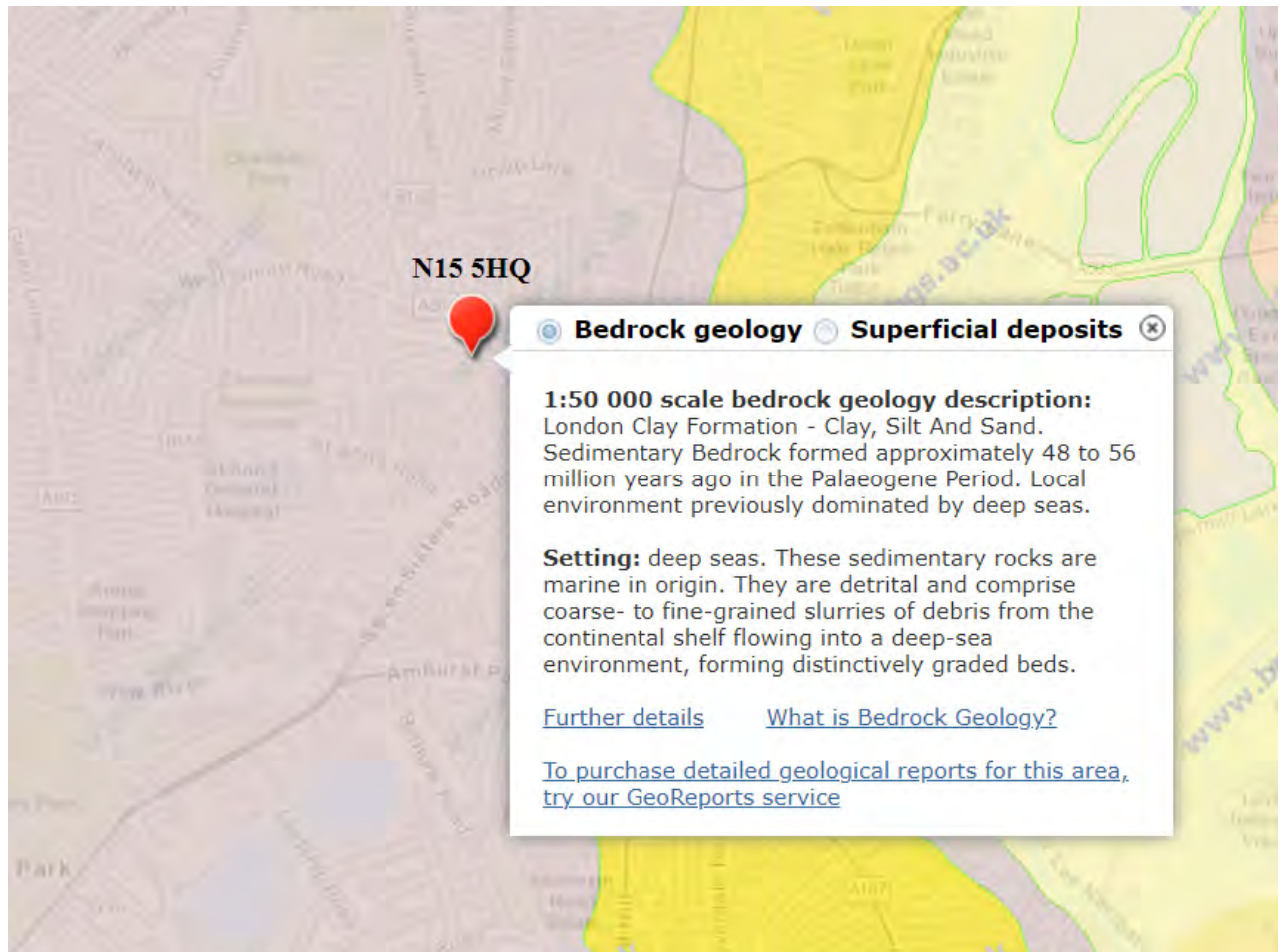


Figure 2.2: Local Geology (BGS, 2021)

2.3 Existing Drainage

2.3.1 Thames Water Sewers

Thames Water (TW) has provided asset records of the site and the immediate surrounding area, shown below in Figure 2.3. The records show that the site is served by a separate foul and surface water sewers.

There are surface water sewers bounding the site to the north in West Green Road (606mm dia.), to the east in Kirkton Road and Braemar Road (300mm dia.), to the south along the southern boundary of Brunel Walk (300mm dia.), to the south west serving an allotment (300mm dia.), and to the west in Elma Road (225mm dia.). Foul sewers bound the site to the north in West Green Road (300mm dia.), to the east in Kirkton Road (229mm dia.) and Braemar Road (686x457mm) and the west in Elmar Road (229mm dia.). The records show that there is a 300mm Thames Water surface water sewer within the site boundary running along the southern boundary of the site, discharging into the sewers in Braemar Road. The records also show that there are two Thames Water foul sewers within the ownership boundary, a 150mm dia. sewer along Turner Avenue (part of the Turner Avenue estate) which discharges into West Green Road, and 150mm dia. sewer serving the houses in the eastern section of Brunel Walk which discharges into the sewer in Braemar Road.

Refer to Appendix C for the complete TW Asset Records.

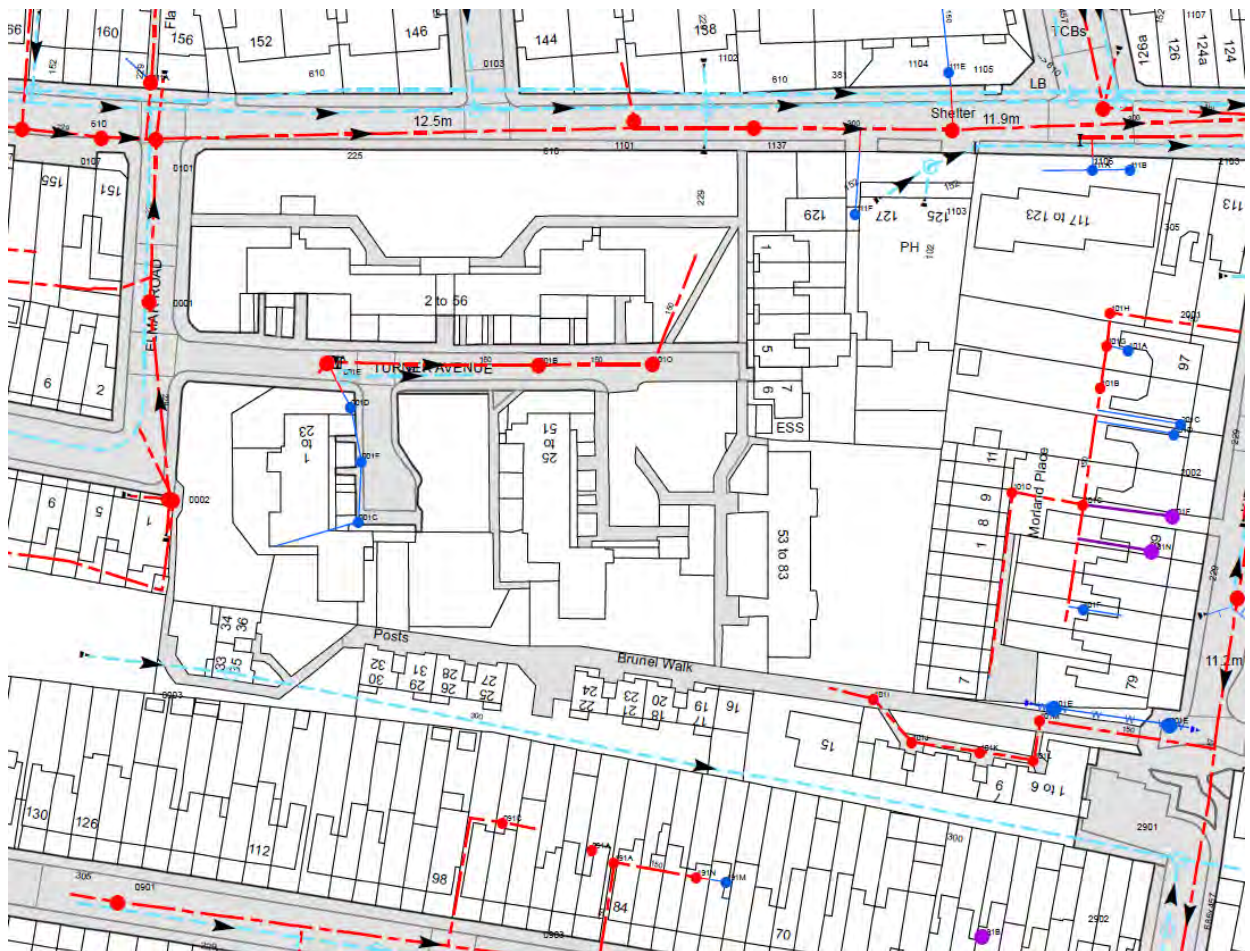


Figure 2.3: TW Asset Records Plan

2.3.2 Existing Onsite Drainage

A utility survey was carried out by Site Engineering Surveys Ltd and a CCTV survey by Insewer in January 2021. The utility survey results indicated that the existing site drains surface water unrestricted via gravity to the TW surface water sewer in Braemar Road. Foul was shown to drain via gravity to the foul sewer in Kirkton and Braemar Road.

3 Development Proposal

Redevelopment of Brunel Walk to provide 45 new Council rent homes in four buildings ranging from 3 to 4-storeys high including 39 apartments and 6 maisonettes. Provision of associated amenity and play space, cycle and refuse/recycling stores and 4 wheelchair parking spaces. Reconfiguration and enhancement of existing parking areas and outdoor communal areas and play spaces on the Turner Avenue Estate.

The full development proposals can be found in Appendix D.

4 Surface Water Drainage Strategy

The surface water strategy outline below focuses on the new build development, it is proposed that as part of the wider Turner Estate landscape improvements, lined permeable paving is being introduced into the site to help improve surface water runoff as well as some raingardens. The full details of the improvement are referred to in the landscaping strategy. The addition of permeable paving in the wider Turner Estate has not been considered as part of the drainage strategy below, the full details of the strategy within the Turner Estate will be determined post planning, however with the additional pockets of permeable paving their will be a further reduction of surface water runoff from the wider Turner Estate site.

4.1 Design Parameters

The industry standards, best practice and Sewers for Adoption 8th Edition dictate for below ground surface water drainage that:

- There will be no surcharging of the drainage system for a 1 in 2 year storm;
- The drainage can be surcharged with no flooding for a 1 in 30 year storm; and
- The drainage can flood on-site for a 1 in 100 year storm with a 40% climate change allowance provided the flood water remains on site and does not flood habitable areas or affect safe ingress and egress to the site for occupiers.

All surface water drainage alterations outlined in this report adhere to these principles.

4.2 Initial Consultations

4.2.1 Council/Lead Local Flood Authority

LBH will be contacted to discuss the proposed development and surface water strategy for the site.

The LBH Local SuDS requirements states that runoff is to be restricted in line with the SuDS Non-Statutory Technical Standards (NSTS), which state that *“For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event”*.

The proposed surface water drainage has been designed to restrict runoff rates as close as practicable to the Greenfield run-off rates.

4.3 Surface Water Discharge Rates

The total site area for the wider Turner Estate is approximately 1.45 ha of which 0.86 ha is impermeable. However, works on the Turner Avenue Estate are limited to landscaping improvements and as such the scheme will attempt to reuse as much of the existing drainage serving the Turner Avenue estate as possible, subject to replacement/remedial works and/or modifications. Therefore, this area is not considered in the existing surface water discharge calculations or the proposed surface water drainage design.

4.3.1 Existing Discharge Rates

The development area for the new residential blocks in the southern portion of the site is 0.4564 ha of this 0.2168 ha is existing impermeable. It is assumed that the existing site discharges unrestricted into the TW surface water sewer located in Braemar Road to the east of the site.

The existing peak run-off rate for the design storm events was calculated using Microdrainage with calculations as found within Appendix E.

FEH data was used to calculate the existing and proposed discharge rates for a range of storm events, using the worst case result for each storm to determine the discharge rate.

A summary of results is provided in Table below. Refer to Appendix E for the full existing surface water calculations.

Storm Event	Contributing Area	Existing Discharge Rate
1 in 1 year	2,168m ²	31.9 l/s
1 in 30 year	2,168m ²	95.9 l/s
1 in 100 year	2,168m ²	126.5 l/s

Table 4.1: Existing Surface Water Discharge Rate

4.3.2 Climate Change

The current EA guidance states that for the years 2070 to 2115 there is a 50% chance the peak rainfall intensity will increase by 20% or more and that there is a 10% change it will increase by 40% or more. For this building, which is classed as More Vulnerable with a design life of 100 years an allowance of an additional 40% is considered appropriate.

4.3.3 Proposed Discharge Rates

DEFRA's Non-statutory technical standards for SuDS states *"For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event."* This is in line with the The LBH Local SuDS Standards states requires runoff to be restricted in line with the SuDS Non-Statutory Technical Standards.

The Greenfield run off-rate was calculated using the UKSuds Greenfield Run-off Rate Calculator. The calculations showed that Qbar for the site is 1.79 l/s and the 1 in 100 year rate is 5.71 l/s. However, Microdrainage software shows flooding on site, as the design fails to meet the Building Regulations requirements (75mm diameter is the minimum for surface water drainage). A flow control of at least 75mm

was therefore used in Microdrainage software to calculate the minimum peak rate for the development for storm events up to the 1 in 100 year storm (+40% climate change allowance); this was found to be 2.5 l/s.

Critical Storm	Existing Discharge Rate	Proposed Maximum Discharge Rate	% Betterment
1 in 1 year	31.9 l/s	2.5 l/s	92.2%
1 in 30 year	95.9 l/s	2.5 l/s	97.4%
1 in 100 year	126.5 l/s	2.5 l/s	98.0%
1 in 100 year (+40% climate change allowance)	176.9 l/s	2.5 l/s	98.6%

Table 4.2: Proposed Surface Water Discharge Rates

Greenfield run-off calculations and Microdrainage calculations in Appendices E and F.

4.4 SuDS Assessment and Proposed Strategy

In accordance with the Haringey Council Strategic Flood Risk Assessment, EA guidelines and CIRIA documents, surface water run-off should be managed as close to its source as possible.

The possibility of implementing SuDS at the site was assessed using a hierarchy of preferred surface water management methods. The following paragraphs discuss the various methods in order of that hierarchy and evaluate the site's suitability for each method.

4.4.1 Infiltration

The site is underlain by London Clay which is relatively impermeable, therefore it has been assumed that infiltration techniques such as soakaways will not be possible and as such infiltration has not been allowed for in the surface water storage calculations.

4.4.2 Attenuation

0.299ha has been used in the MicroDrainage model as the total positively drained area, this is only slightly less than the total impermeable area of 0.299ha outlined on the catchment plan found within Appendix A.

Based on the above, storage volumes have been calculated without allowing for infiltration. It is proposed to attenuate surface water runoff using a below ground attenuation tank and green roofs.

Initial calculations in Microdrainage software determined that two separate below ground modular attenuation tanks will be required. The tank furthest West is to provide a total storage volume of 115m³ and the tank furthest East is to provide a total 199.5m³. The sites total provided storage volume is therefore 314.4m³. It is proposed that two separate flow control structures will be used to utilise attenuation provided.

In addition to the below ground attenuation approximately 916m² of green roof is to be provided, as well as tree pits and raingardens where possible, subject to detailed design. At this design stage these systems have been excluded from the Microdrainage model however will be added at a later stage.

All of the aforementioned systems will further improve the drainage conditions in the local area, as surface water from the site currently discharges unrestricted and untreated into the local sewers system. Attenuation on the site has been maximised as far as reasonably practicable.

The drainage strategy drawings can be found in Appendix A, Greenfield run-off calculations in Appendix E and Microdrainage calculations in Appendix F.

4.4.3 Discharge to Public Surface Water Sewer

As there are no nearby watercourses, it is proposed that the site will discharge via gravity and the existing site connection to the local Thames Water surface water sewer in Braemar Road.

The impermeable areas will be decreased post development. Attenuation has been proposed below the communal garden areas between each of the blocks. Surface water will be attenuated to a restricted peak discharge rate of 2.5 l/s which will provide a 92.2% betterment on the existing 1 in 1 year peak discharge rate and a 98.0% improvement on the existing 1 in 100 year peak discharge rate. Green roofs, tree pits, raingardens and permeable paving will be used where possible.

4.4.4 Site Sustainability Summary

Sustainability of the Site Sustainability is a key element to consider when working on any project in an urban environment and the use of SuDS can help a development to be more resilient to future climate change. Unlike more rural sites, where there is greater space to include larger SuDS methods; cities are a more challenging area to include sustainability into a development. The existing sewers have not been designed for an ever increasing demand for drainage and therefore the need to increase the amount of time the water takes to reach the sewer or reduce the amount of water entering the sewer can prevent future flooding. The drainage for the development has been made sustainable through the use of green roofs and permeable paving, which will slow the flow of water into the drainage network. The green roofs will mimic a greenfield site and provide an ecological benefit to the site by encouraging wild life and improving air quality. The green roofs and permeable paving will remove pollutants from the rain water that lands on each surface. This improves the water quality that enters the sewer, which eventually discharges into a water course. There is also a thermal benefit to having green roofs as they act as insulation to keep the building warm in the winter and cool in the summer. The attenuation tank will be fitted with flow control devices, which will limit the flow of water into the existing sewers, reducing the current intake of water. This will help to reduce the risk of future flooding in the local sewers and sewers further down the network.

4.5 Sustainable Drainage Maintenance Strategy

The proposed maintenance strategy is in line with the SuDS Manual as well as the manufacturer's guidance. An inspection checklist should be generated based on the maintenance strategy to facilitate consistent inspection of the condition of the system and as a method for recording inspections. Inspections should also be accompanied by photographic records to assist with the monitoring of the system.

The full maintenance regime is to be outlined in the Operation and Maintenance Manual and overseen by the Building Management team. The manufacturer's maintenance guidance shall be placed in the Operation and Maintenance Manual and it is recommended that an annual maintenance report should be prepared and retained within the Operation and Maintenance Manual.

Specific maintenance needs of the system should be monitored, and maintenance schedules adjusted to suit the specific requirements of the site.

All inspections of the SuDS system should comply with relevant health and safety legislation.

All inlets to the attenuation tanks will have catchpits, to prevent and aid in reducing the risk of debris/silts entering the attenuation tanks.

SUDS Element	Maintenance		
	Activity	Required Action	Typical Frequency
Green Roofs	Monitoring / Inspections	Inspect all components including soil substrate, vegetation, drains, irrigation systems, membranes and roof structure for proper operation, integrity of waterproofing and structural stability	Annually and after severe storms
		Inspect soil substrate for evidence of erosion channels and identify any sediment sources	
		Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system	
		Inspect underside of roof for evidence of leakage	
	Regular Maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth	Half yearly and annually or as required
		During establishment i.e. year one, replace dead plants as required	Monthly -but usually responsibility of manufacturer
		Post establishment, replace dead plants where > 5% of coverage	Annually in autumn
		Remove fallen leaves and debris from deciduous plant foliage	Half yearly or as required
		Remove nuisance and invasive vegetation, including weeds	
		Mow grasses, prune shrubs and manage other planting (if appropriate) as required – clippings should be removed and not allowed to accumulate	
	Remedial Actions	If erosion channels are evident, these should be stabilised with extra soil substrate similar to the original material, and sources of erosion damage should be identified and controlled	As required
		If drain inlet has settled, cracked or moved, investigate and repair as appropriate	
Attenuation Tank	Monitoring / Inspections	Inspect all inlets, outlets, vents, overflows and control structures to ensure they are working as they should	Annually or after severe storms
		Inspect and identify any elements that are not operating correctly.	Monthly for three months, then half yearly or as required.
	Regular Maintenance	Remove sediments / debris from catch pits / gullies and control structures	Annually, after severe storms or as required
	Remedial Actions	Repair inlets, outlets, vents, overflows and control structures.	As required

Table 4.3: SuDS Maintenance Strategy taken from the CIRIA SUDS Manual

SuDS design must assess all foreseeable risks during construction and maintenance. These are to be mitigated during detailed design stages where effective design will aim to avoid, reduce and mitigate risks.

This process will also require input from the principle contractor who must ensure the construction of SuDS is carried out in a safe and sustainable manner.

5 Foul Water Drainage Strategy

5.1 Design Parameters

The belowground foul drainage network will be designed to Sewers for Adoption 8th Edition, BS EN 752 Parts 3 and 4, and the Building Regulations Document H where appropriate.

5.2 Initial Consultations

5.2.1 Thames Water

A pre-development enquiry has been submitted to TW. This application is for Thames Water to confirm capacity available in existing adopted networks to accommodate the proposed discharge from the development site and their approval in principle of the drainage scheme. TW have confirmed that capacity exists for the redevelopment. Please refer to Appendix C for consultation.

5.3 Foul Water Discharge Rates

Using Building Regulations Part H, Table 5, based on 36 dwellings the peak flow rate from the existing development is estimated to be 6.3 l/s. Proposed foul water calculations have been calculated by TW as part of the predevelopment enquiry.

6 Conclusions

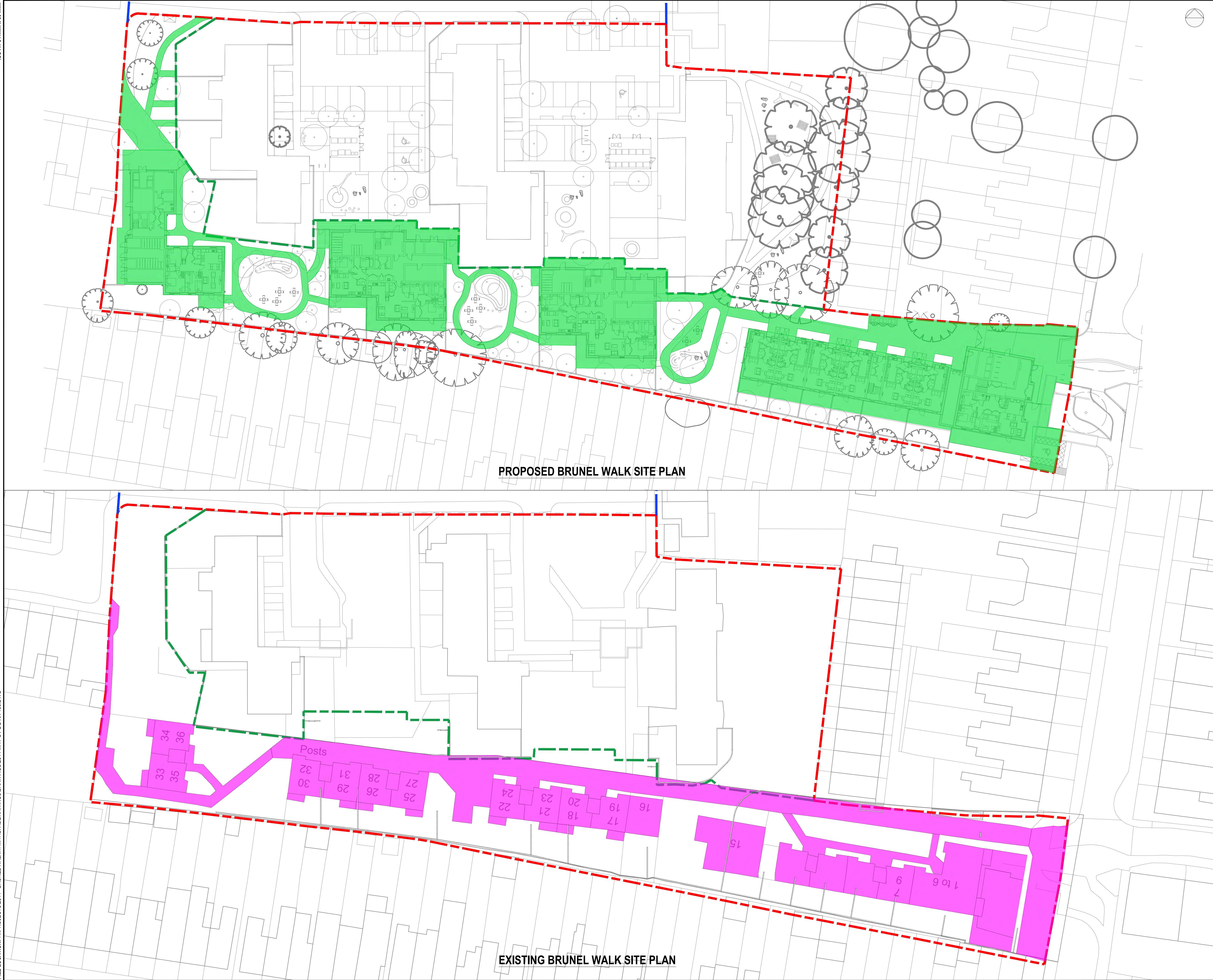
- I. Surface water and foul water from the site currently drain via gravity at unrestricted rates to TW surface and foul water sewers. Surface water discharges via gravity through several connections to the TW surface water sewer running along the sites southern boundary. Foul water discharges via gravity through a single onsite connection in the western section Brunel Walk.
- II. The local geology suggests that infiltration techniques are not likely to be suitable, and there are no local watercourses for the site to discharge into
- III. Development proposals include the redevelopment of Brunel Walk to provide 45 new residential dwellings along with associated hard and soft landscape, and landscaping improvements to the Turner Avenue Estate.
- IV. The proposed development will increase the impermeable area within the Brunel Walk development from 0.2168 ha from 0.2990 ha. Surface water will be attenuated as close to Greenfield runoff rates as reasonably practicable, as per the Sustainable Urban Drainage Systems (SuDS) Non-Statutory Technical Standards and London Borough of Haringey (LBH) requirements.
- V. The surface water drainage strategy has assessed opportunities of implementing different SUDS using a hierarchy of preferred methods, and has provided justification for the SUDS that have been recommended. Attenuation has been proposed for the area affected by the new residential development, which will restrict surface water discharge to 2.5 l/s, for the 1 in 100 year plus climate change rainfall event. Providing a 92.2% betterment on the existing 1 in 1 year peak discharge rate and a 98.0% improvement on the existing 1 in 100 year peak discharge rate.
- VI. New foul and surface water networks will be constructed to serve the proposed residential development and will discharge via gravity and the existing connections to their respective public sewers.
- VII. The existing and proposed surface water discharge rates for the site are outlined in Table 6.1 below.

	Surface Water Discharge Rate (1 in 100 year storm)
Existing Site	126.5 l/s
Proposed Development	2.5 l/s

*NB: Surface water rates above are only for new residential development.

Table 6.1: Existing and Proposed Discharge Rates

Appendix A – Proposed Drainage Strategy Layout

[illegible]



VIEWPORT B

[illegible]

1. DO NOT SCALE FROM THIS DRAWING
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
3. THIS DRAWING IS FOR INFORMATION ONLY.
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 APPLICATION BOUNDARY
 ADDITIONAL TURNER ESTATE AREA
 AREA CONSIDERED IN DRAINAGE STRATEGY - NEW BUILD DEVELOPMENT
 EXCEEDANCE FLOW PATH

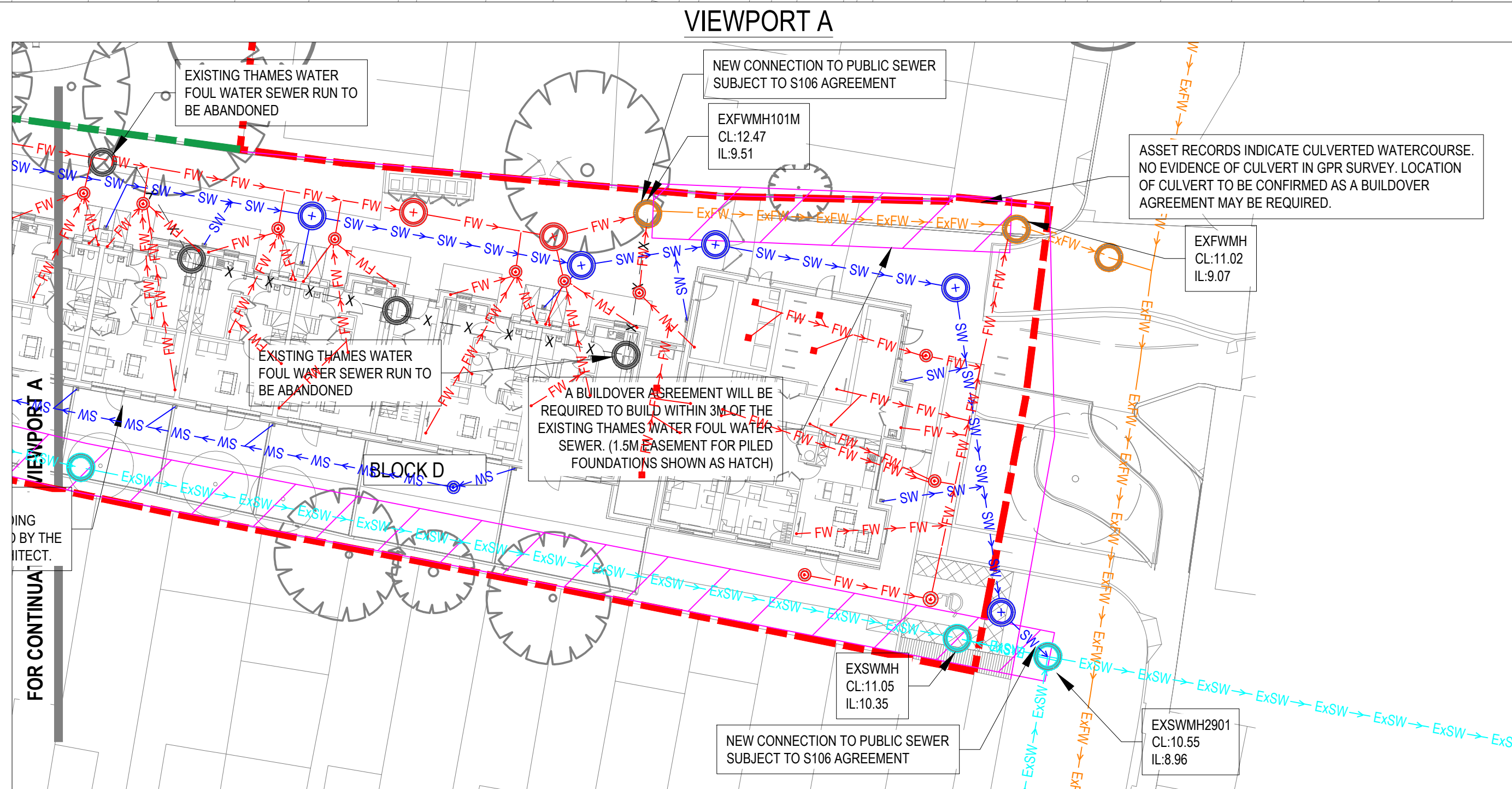
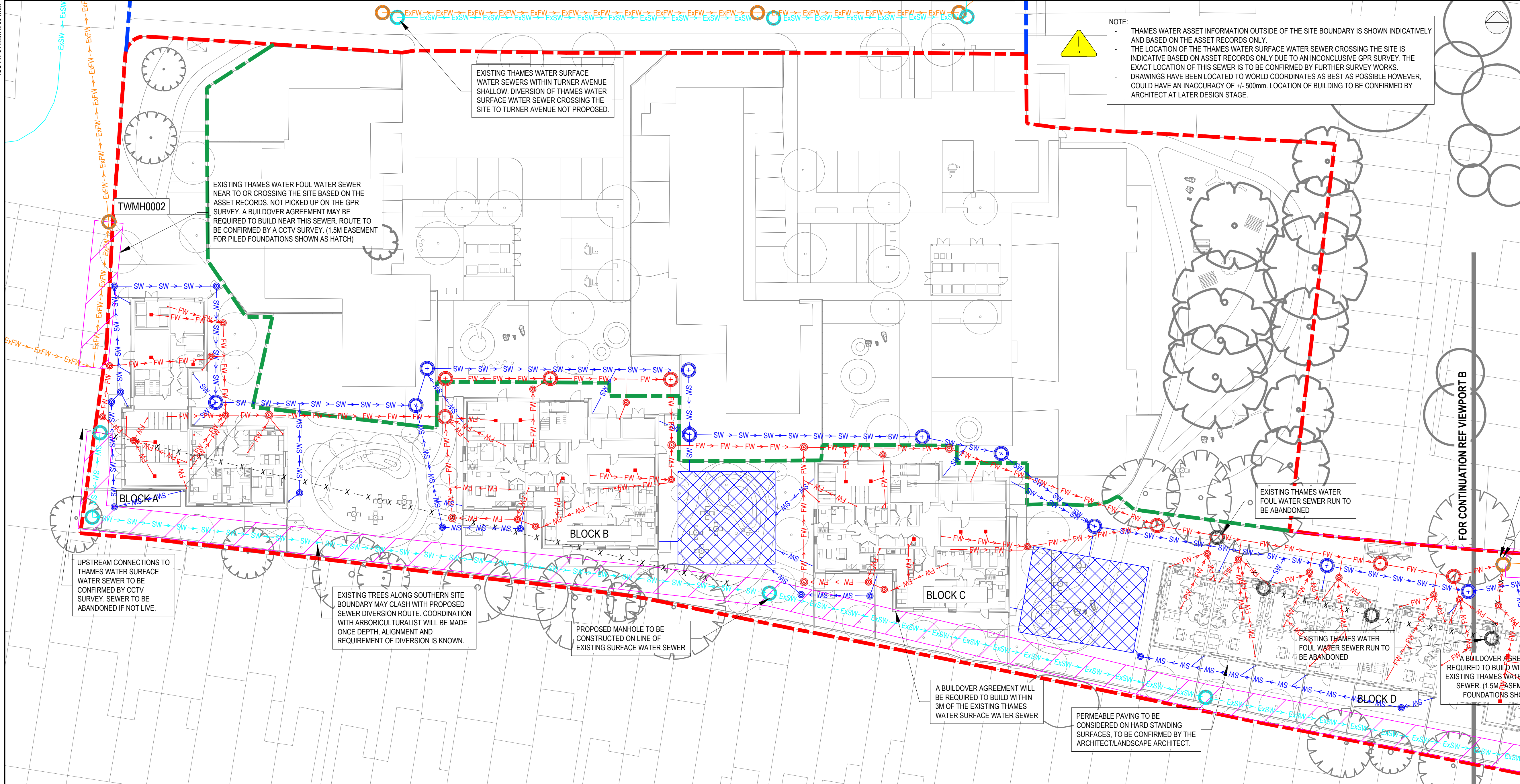
FLOW

CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISKS



TITLE
EXCEEDANCE FLOW PATHS

DISCIPLINE CIVIL			SCALE 1:250
DRAWN LH	DESIGNED LH	CHECKED GB	APPROVED GB
DRAWING No 2844-MHT-CV-BG-XX-111			ISSUE P01



PRELIMINARY
NOT FOR CONSTRUCTION

REV	DESCRIPTION	BY	DATE
P01	STAGE 3 ISSUE	LH	06.05.22
P02	UPDATED TO SUIT SCHEME CHANGES	GB	09.09.2022
P03	REVISED TO SUIT COMMENTS	LH	08.12.22

NOTES:

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5. THIS DRAWING IS NOT REPRESENTATIVE OF THE SITE'S COMPLETE EXISTING DRAINAGE NETWORK AND IS SUBJECT TO CHANGE PENDING FURTHER CCTV DRAINAGE SURVEY RESULTS.

6. REMEDIAL WORKS AND/OR REPLACEMENT ARE TO BE ALLOWED FOR TO RETAIN THE EXISTING DRAINAGE SYSTEM.

7. FOUL AND SURFACE WATER DRAIN POINT LOCATIONS ARE INDICATIVE AND TBC BY MEP ENGINEER.

8. THAMES WATER APPROVAL REQUIRED FOR NEW CONNECTIONS TO PUBLIC SEWER.

NOTE:

FOUL WATER SLAB PENETRATIONS IN ABEYANCE AND RAIN WATER DOWN POINTS REQUIRED. LOCATION OF FOUNDATIONS AND BLOCKS APPROXIMATE ONLY. ARCHITECT TO LOCATE SITE AND BUILDINGS TO WORLD COORDINATES AT LATER DESIGN STAGE.

KEY:

APPLICATION BOUNDARY

ADDITIONAL TURNER ESTATE AREA

AREA CONSIDERED IN DRAINAGE STRATEGY - NEW BUILD DEVELOPMENT

PROPOSED SURFACE WATER SEWER

EXISTING THAMES WATER SURFACE WATER SEWER

PROPOSED THAMES WATER SURFACE WATER SEWER DIVERSION

PROPOSED FOUL WATER SEWER

EXISTING THAMES WATER FOUL WATER SEWER

EXISTING SEWER TO BE MADE REDUNDANT

PROPOSED SURFACE WATER MANHOLE

EXISTING SURFACE WATER MANHOLE

PROPOSED FOUL WATER MANHOLE

EXISTING FOUL WATER MANHOLE

PROPOSED BELOW GROUND SURFACE WATER ATTENUATION TANK

CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISKS

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PROJECT

1-36 BRUNEL WALK
TOTTENHAM
LONDON
N15 5HQ

CLIENT

LONDON BOROUGH OF HARINGEY

TITLE

PROPOSED BELOW GROUND DRAINAGE
COMBINED LAYOUT

DISCIPLINE

CIVIL

SCALE

1:250

DRAWN

LH

DESIGNED

LH

CHECKED

GB

APPROVED

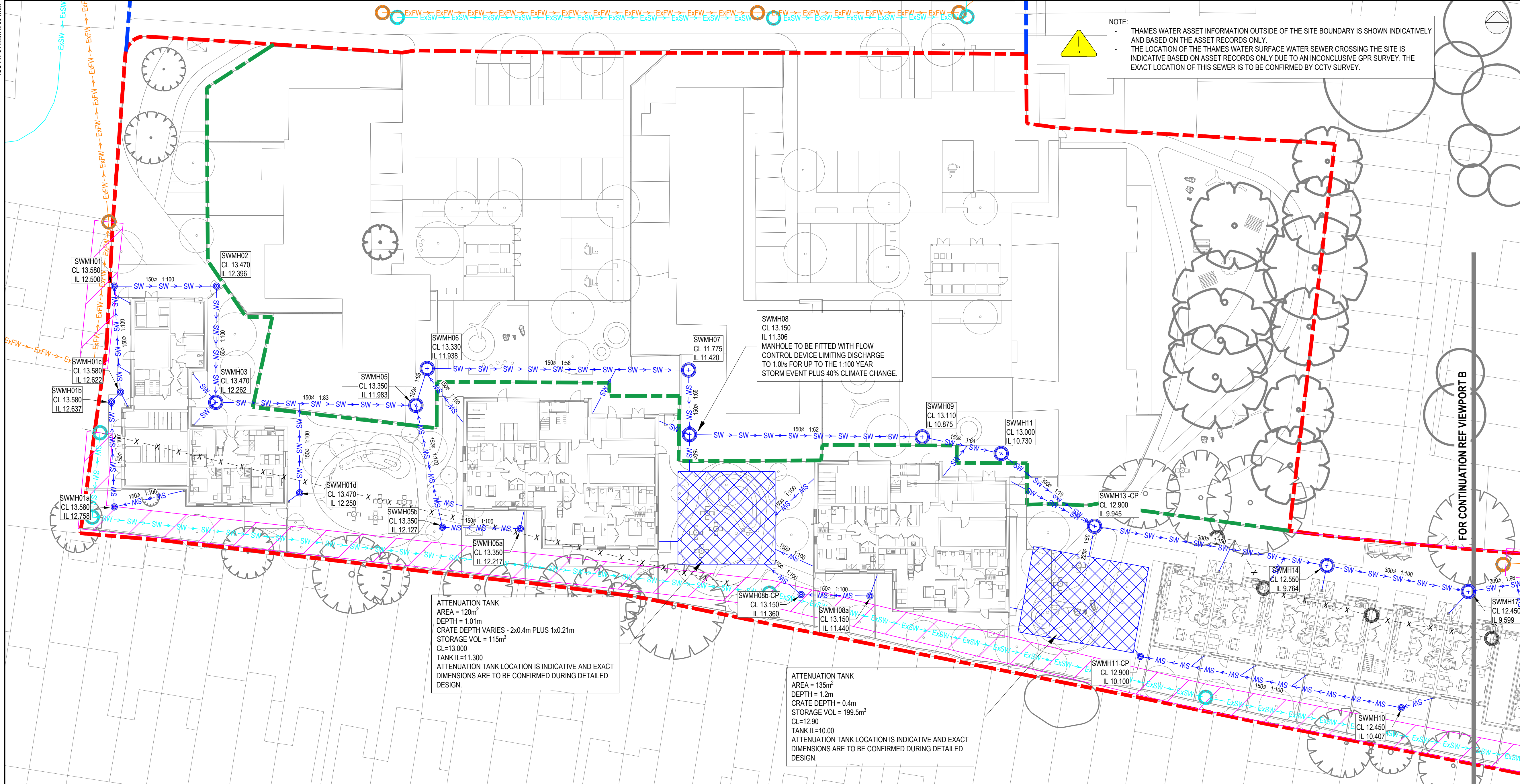
GB

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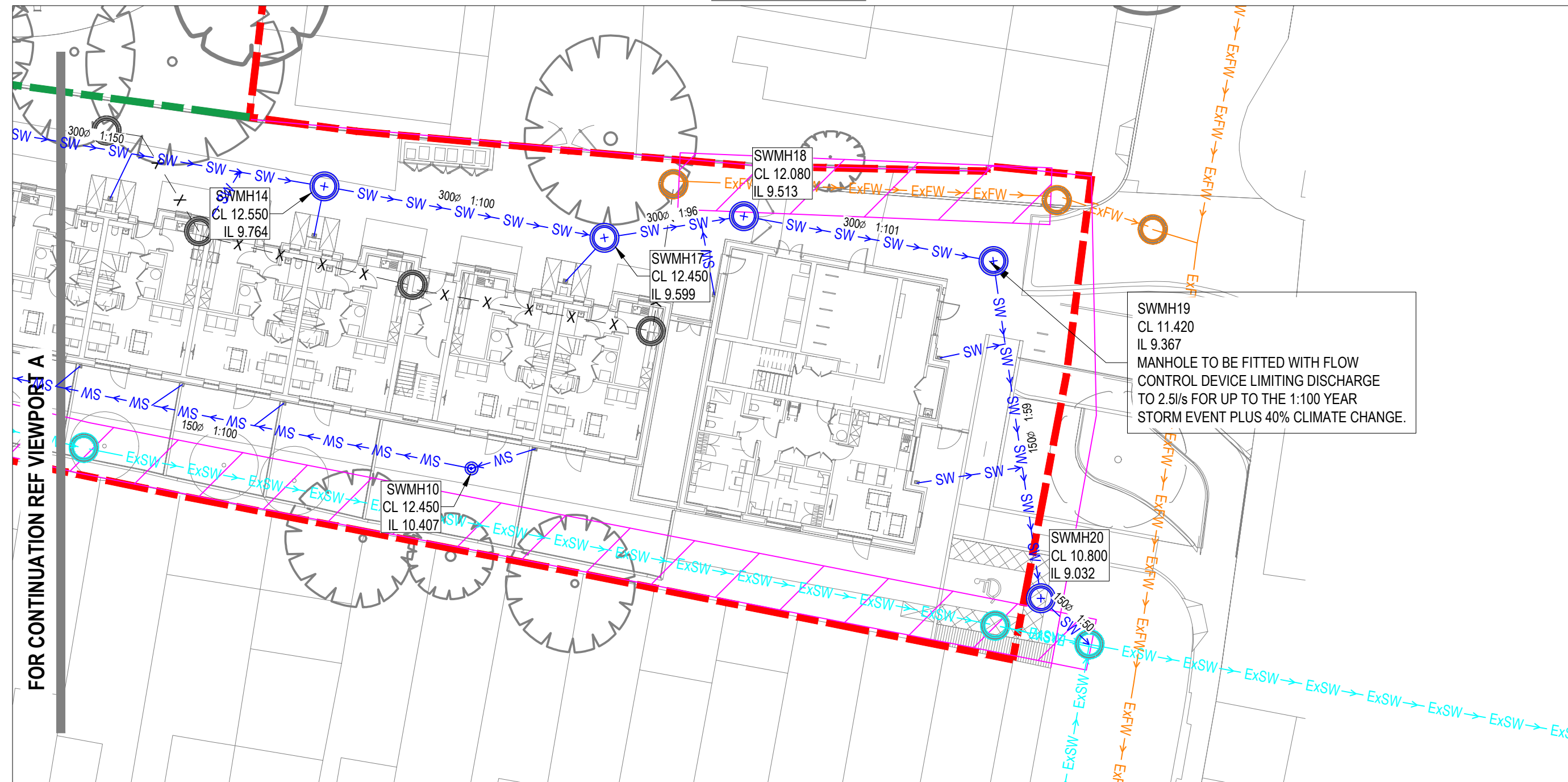
2844-MHT-CV-BG-XX-100

ISSUE

P03



VIEWPORT A



VIEWPORT B

PRELIMINARY
NOT FOR CONSTRUCTION

REV	DESCRIPTION	BY	DATE
P01	STAGE 3 ISSUE	LH	06.05.22
P02	REVISED TO SUIT SCHEME CHANGES	GB	09.09.22
P03	REVISED TO SUIT COMMENTS	LH	07.12.22

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- FOUL AND SURFACE WATER DRAIN POINT LOCATIONS ARE INDICATIVE AND TBC BY MEP ENGINEER.
- THAMES WATER APPROVAL REQUIRED FOR NEW CONNECTIONS TO PUBLIC SEWER.

NOTE:
RAIN WATER DOWN POINTS REQUIRED.
LOCATION OF FOUNDATIONS AND BLOCKS APPROXIMATE ONLY. ARCHITECT TO LOCATE SITE AND BUILDINGS TO WORLD COORDINATES AT LATER DESIGN STAGE.

KEY:

- APPLICATION BOUNDARY
- ADDITIONAL TURNER ESTATE AREA
- AREA CONSIDERED IN DRAINAGE STRATEGY - NEW BUILD DEVELOPMENT
- PROPOSED SURFACE WATER SEWER
- EXISTING THAMES WATER SURFACE WATER SEWER
- PROPOSED THAMES WATER SURFACE WATER SEWER DIVERSION
- EXISTING THAMES WATER FOUL WATER SEWER
- EXISTING SEWER TO BE MADE REDUNDANT
- PROPOSED SURFACE WATER MANHOLE
- EXISTING SURFACE WATER MANHOLE
- EXISTING FOUL WATER MANHOLE
- PROPOSED BELOW GROUND SURFACE WATER ATTENUATION TANK
- EXCEEDANCE FLOW PATH

CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISKS

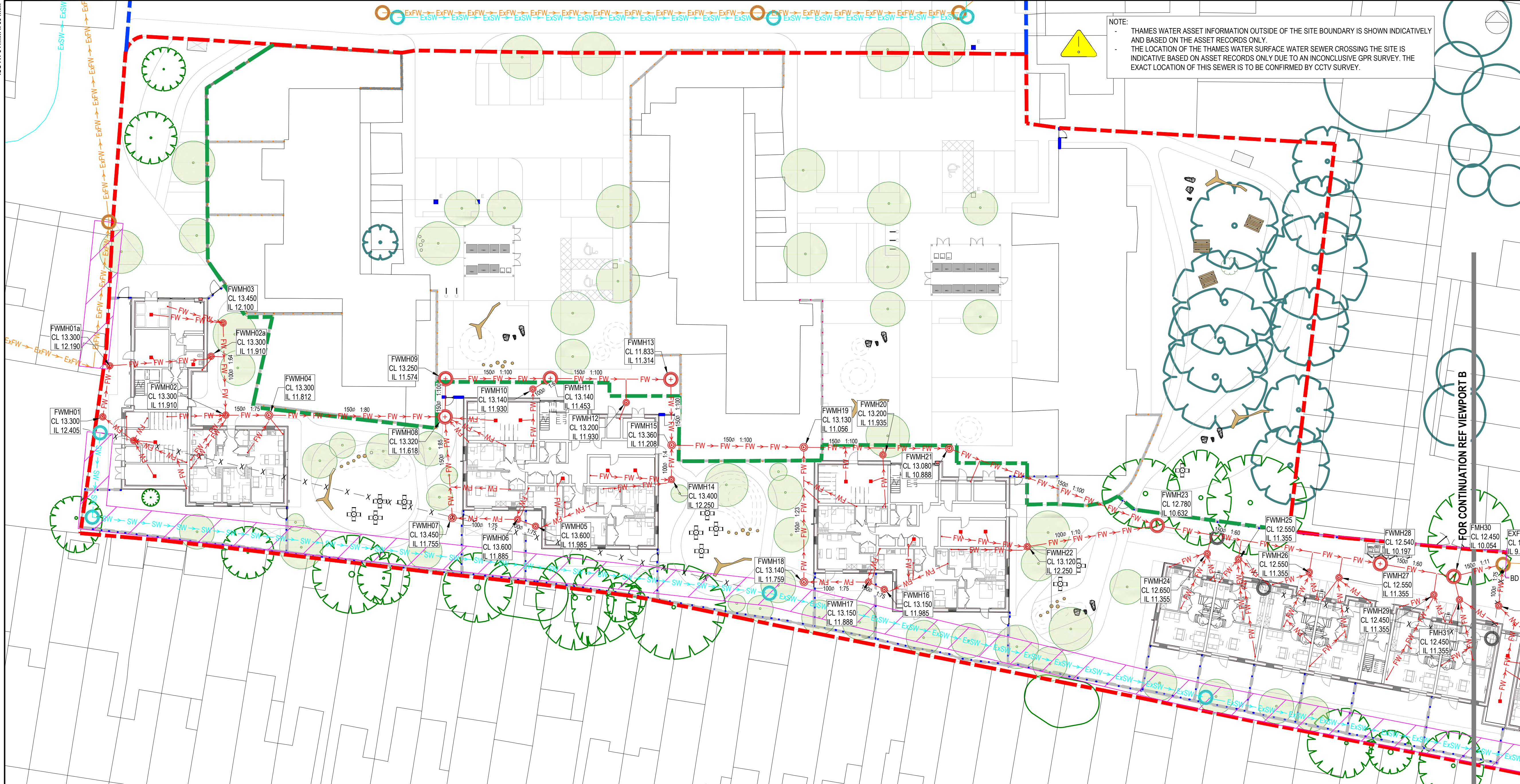


PROJECT
1-36 BRUNEL WALK
TOTTENHAM
LONDON
N15 5HQ

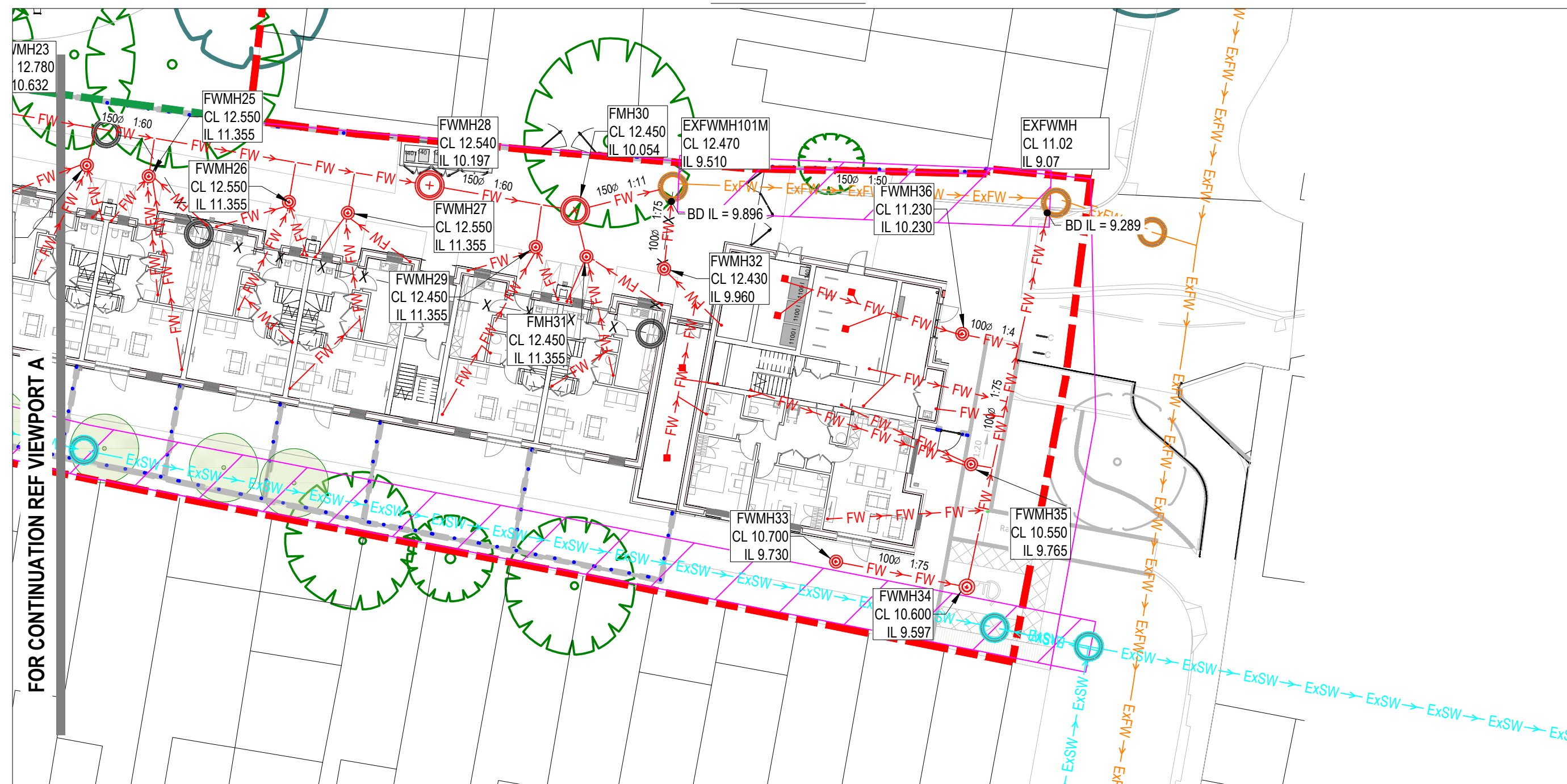
CLIENT
LONDON BOROUGH OF HARINGEY

TITLE
PROPOSED BELOW GROUND DRAINAGE
SURFACE WATER LAYOUT

DISCIPLINE	SCALE
CIVIL	1:250
DRAWN	DESIGNED
LH	LH
CHECKED	APPROVED
GB	GB
DRAWING No	ISSUE
2844-MHT-CV-BG-XX-110	P03



VIEWPORT A



VIEWPORT B

PRELIMINARY NOT FOR CONSTRUCTION

REV	DESCRIPTION	BY	DATE
P01	STAGE 3 ISSUE	LH	06.05.22
P02	UPDATED TO SUIT LATEST DRAWINGS	GB	07.09.22

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- THAMES WATER APPROVAL REQUIRED FOR NEW CONNECTIONS TO PUBLIC SEWER.

NOTE:
FOUL WATER SLAB PENETRATIONS IN ABEYANCE.
LOCATION OF FOUNDATIONS AND BLOCKS APPROXIMATE ONLY. ARCHITECT TO LOCATE SITE AND BUILDINGS TO WORLD COORDINATES AT LATER DESIGN STAGE.

KEY:	
	APPLICATION BOUNDARY
	ADDITIONAL TUNER ESTATE AREA
	AREA CONSIDERED IN DRAINAGE STRATEGY - NEW BUILD DEVELOPMENT
	EXISTING THAMES WATER SURFACE WATER SEWER
	PROPOSED THAMES WATER SURFACE WATER SEWER DIVERSION
	PROPOSED FOUL WATER SEWER
	EXISTING THAMES WATER FOUL WATER SEWER
	EXISTING SEWER TO BE MADE REDUNDANT
	EXISTING SURFACE WATER MANHOLE
	PROPOSED FOUL WATER MANHOLE
	EXISTING FOUL WATER MANHOLE

CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISKS



PROJECT
1-36 BRUNEL WALK
TOTTENHAM
LONDON
N15 5HQ

CLIENT
LONDON BOROUGH OF HARINGEY

TITLE
PROPOSED BELOW GROUND DRAINAGE
FOUL WATER LAYOUT

DISCIPLINE	SCALE
CIVIL	1:250
DRAWN	DESIGNED
LH	LH
CHECKED	APPROVED
GB	GB
DRAWING No	ISSUE
2844-MHT-CV-BG-XX-120	P02



VIEWPORT A



VIEWPORT B

PRELIMINARY
NOT FOR CONSTRUCTION

[illegible]

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KEY:

	APPLICATION BOUNDARY
	AREA CONSIDERED IN DRAINAGE STRATEGY - NEW BUILD DEVELOPMENT
	GREEN ROOF AREA
	TRADITIONAL ROOF AREA CATCHMENTS (NOT DRAINING VIA GREEN ROOF)

CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISKS

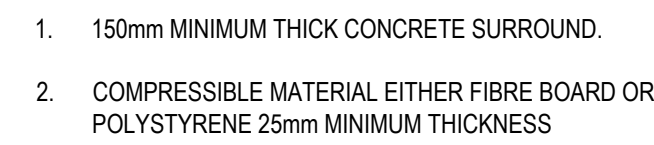


PROJECT
1-36 BRUNEL WALK
TOTTENHAM
LONDON
N15 5HQ

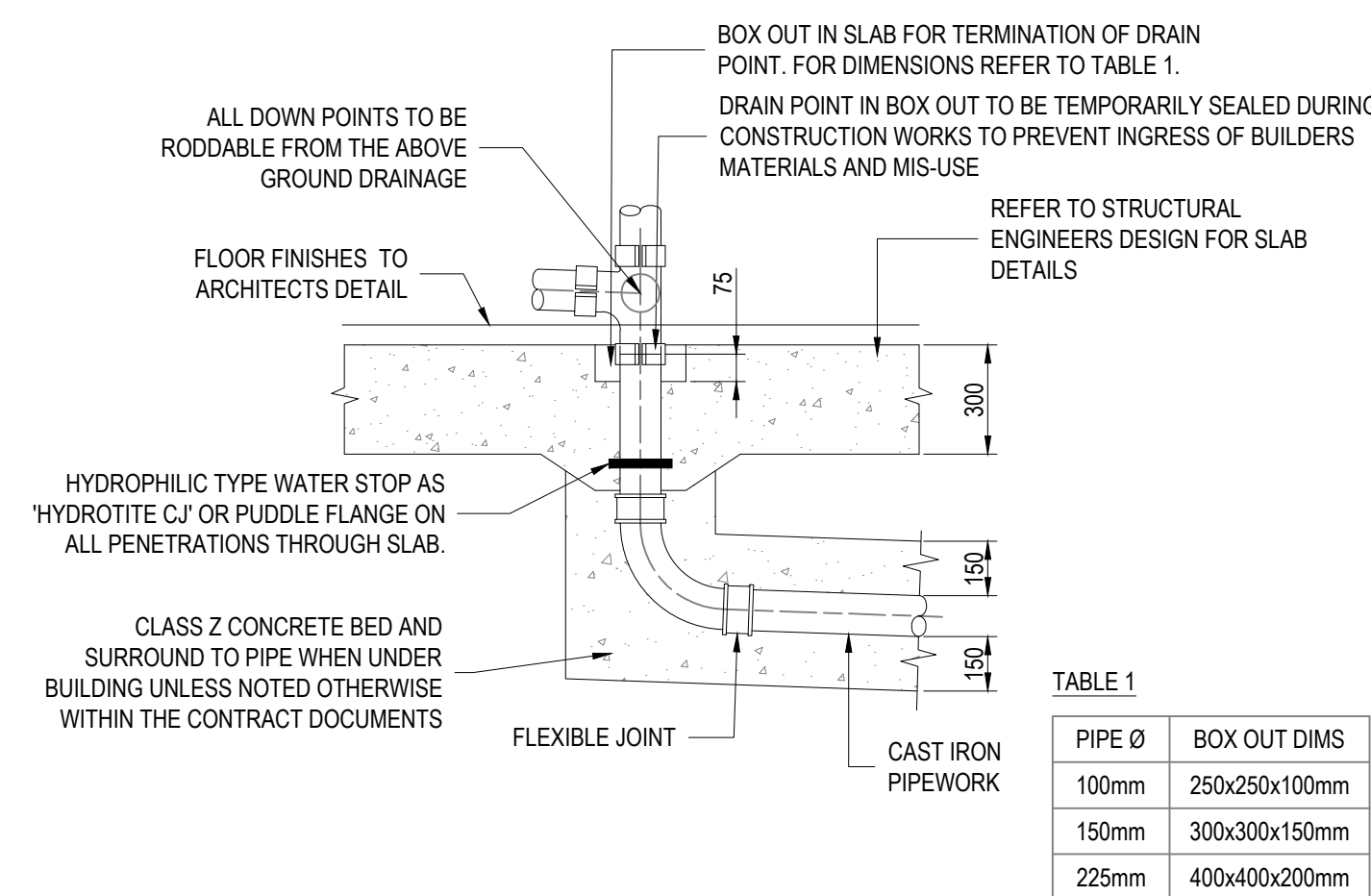
CLIENT
LONDON BOROUGH OF HARINGEY

TITLE
PROPOSED SURFACE WATER
BLUE ROOF PLAN

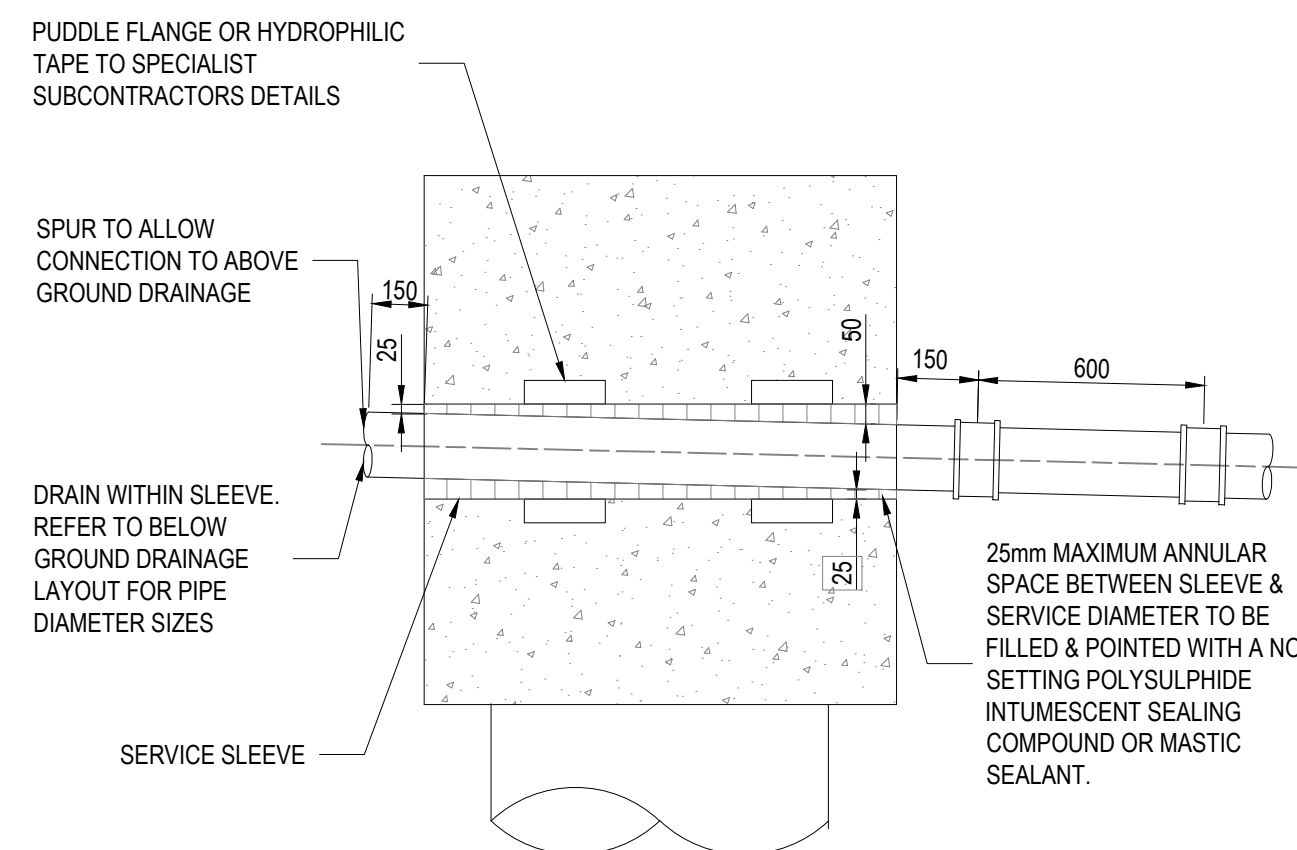
DISCIPLINE CIVIL			SCALE 1:100
DRAWN LH	DESIGNED LH	CHECKED GB	APPROVED GB
DRAWING No 2844-MHT-CV-RF-XX-110			ISSUE P02



DRAIN WITH CONCRETE SURROUND



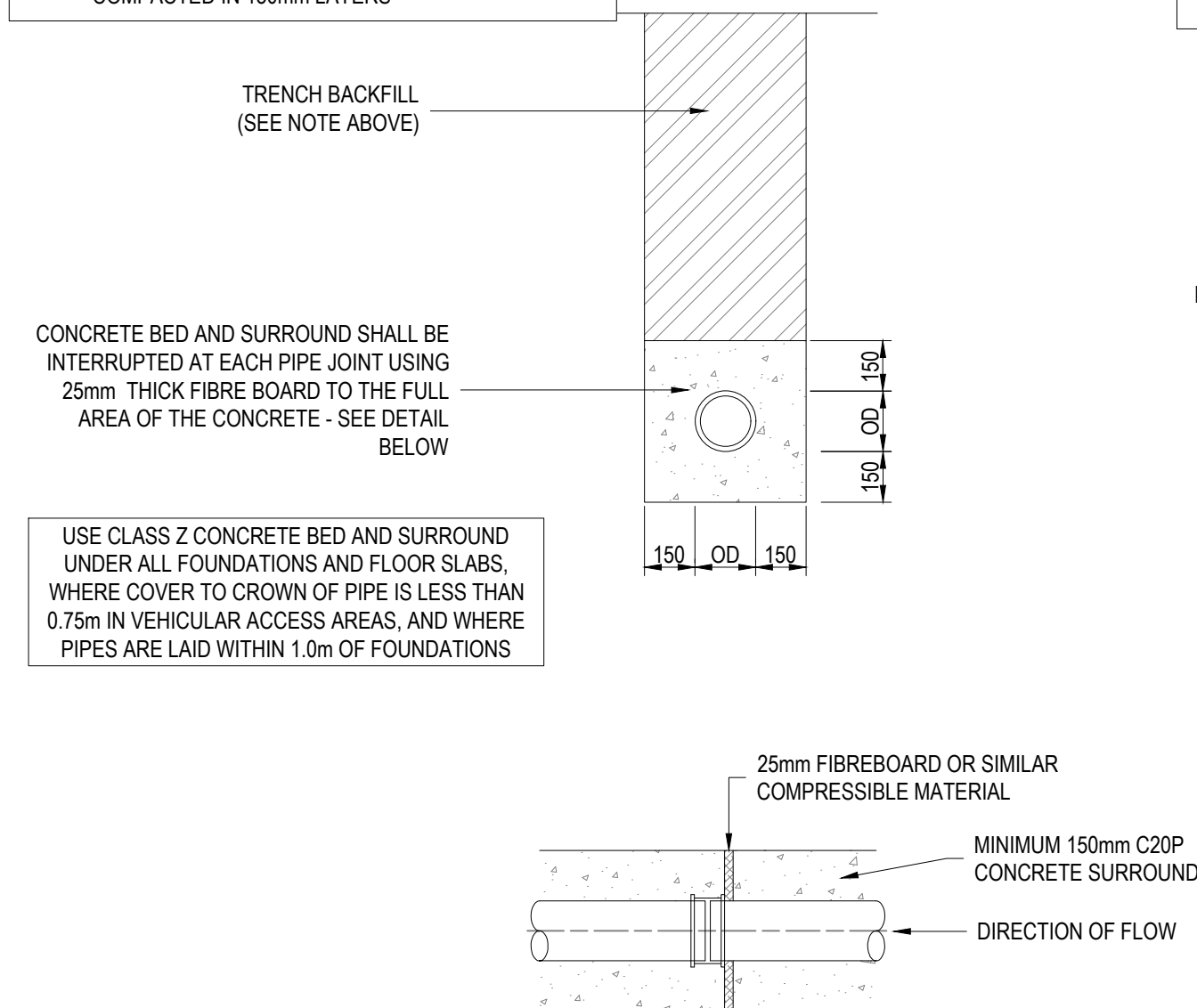
TYPICAL DRAIN POINT



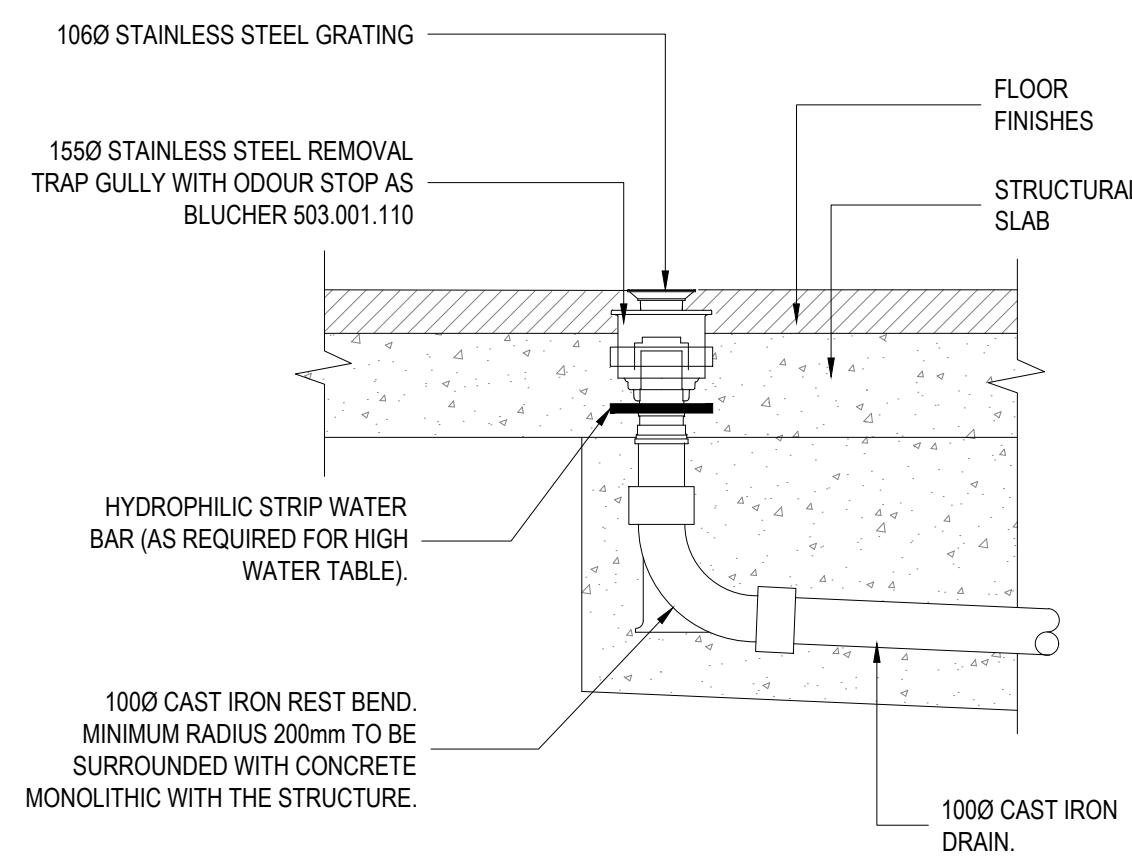
INDICATIVE PILED RAFT FOUNDATION
PENETRATION DETAIL

TRENCH BACKFILL NOTE

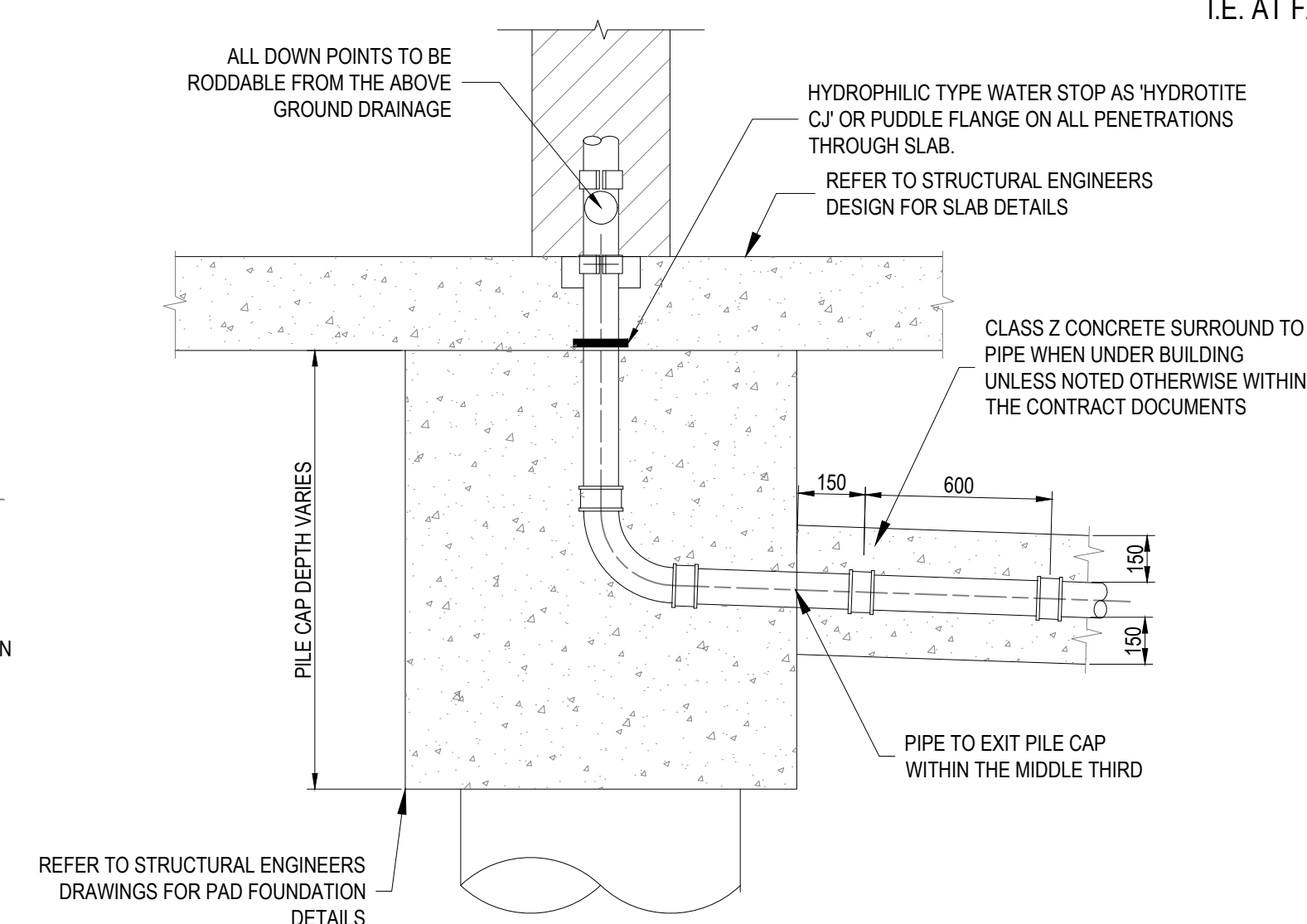
1. ROADS AND FOOTPATHS: TYPE 1 GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO THE UNDERSIDE OF SURFACE CONSTRUCTION
2. ELSEWHERE: SELECTED EXCAVATED MATERIAL COMPACTED IN 150mm LAYERS



CLASS Z CONCRETE BED AND SURROUND



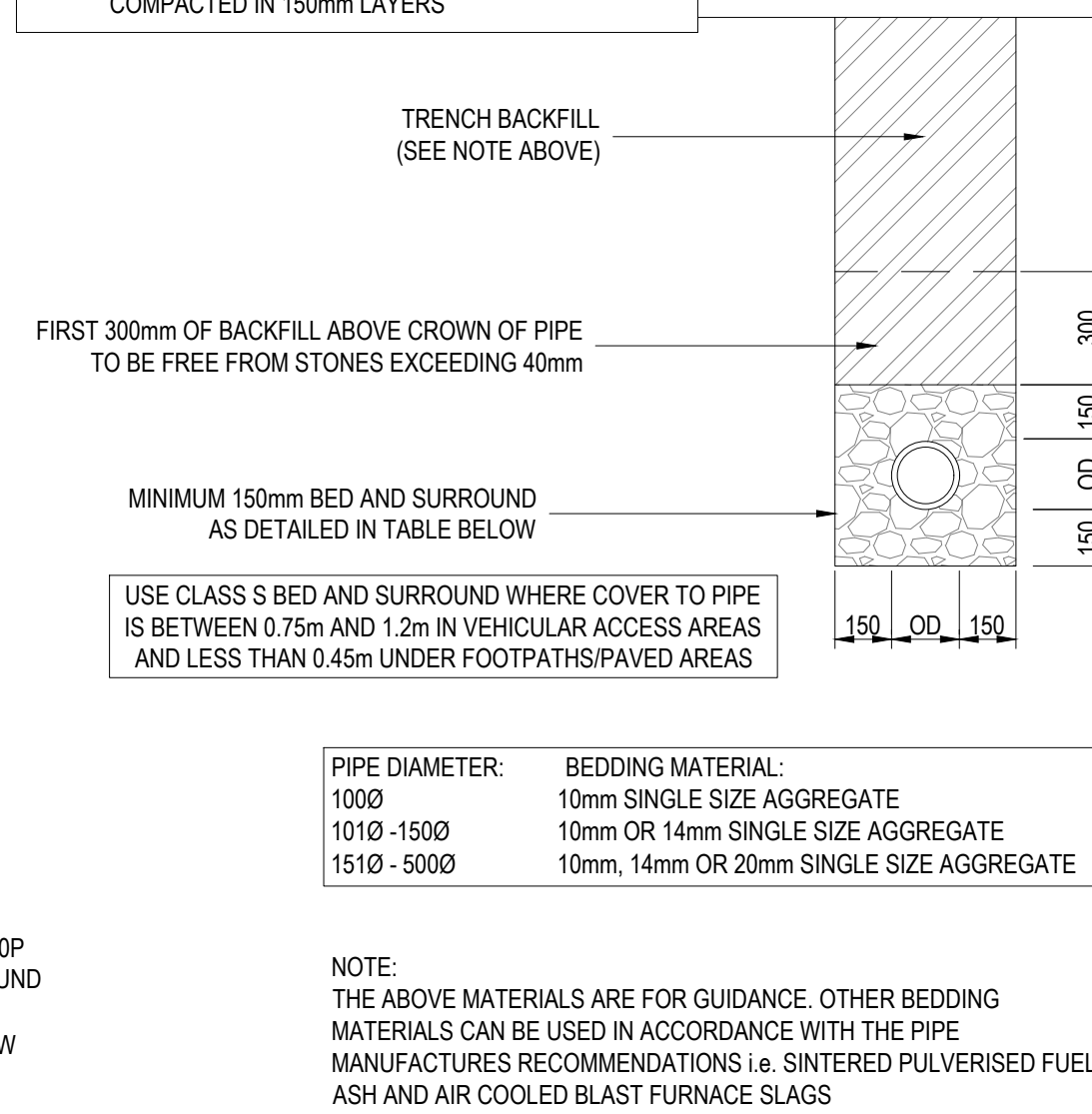
INTERNAL FLOOR GULLY WITH ODOUR STOP



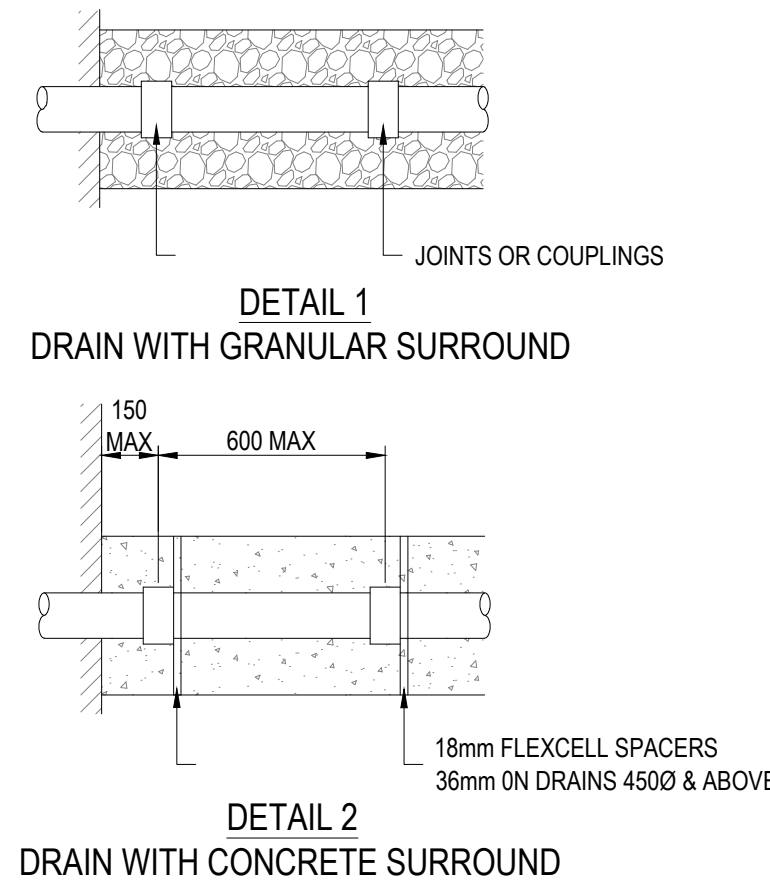
TYPICAL DRAIN POINT
STARTING WITHIN PILE CAP

TRENCH BACKFILL NOTE

1. ROADS AND FOOTPATHS: TYPE 1 GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO THE UNDERSIDE OF SURFACE CONSTRUCTION
2. ELSEWHERE: SELECTED EXCAVATED MATERIAL COMPACTED IN 150mm LAYERS



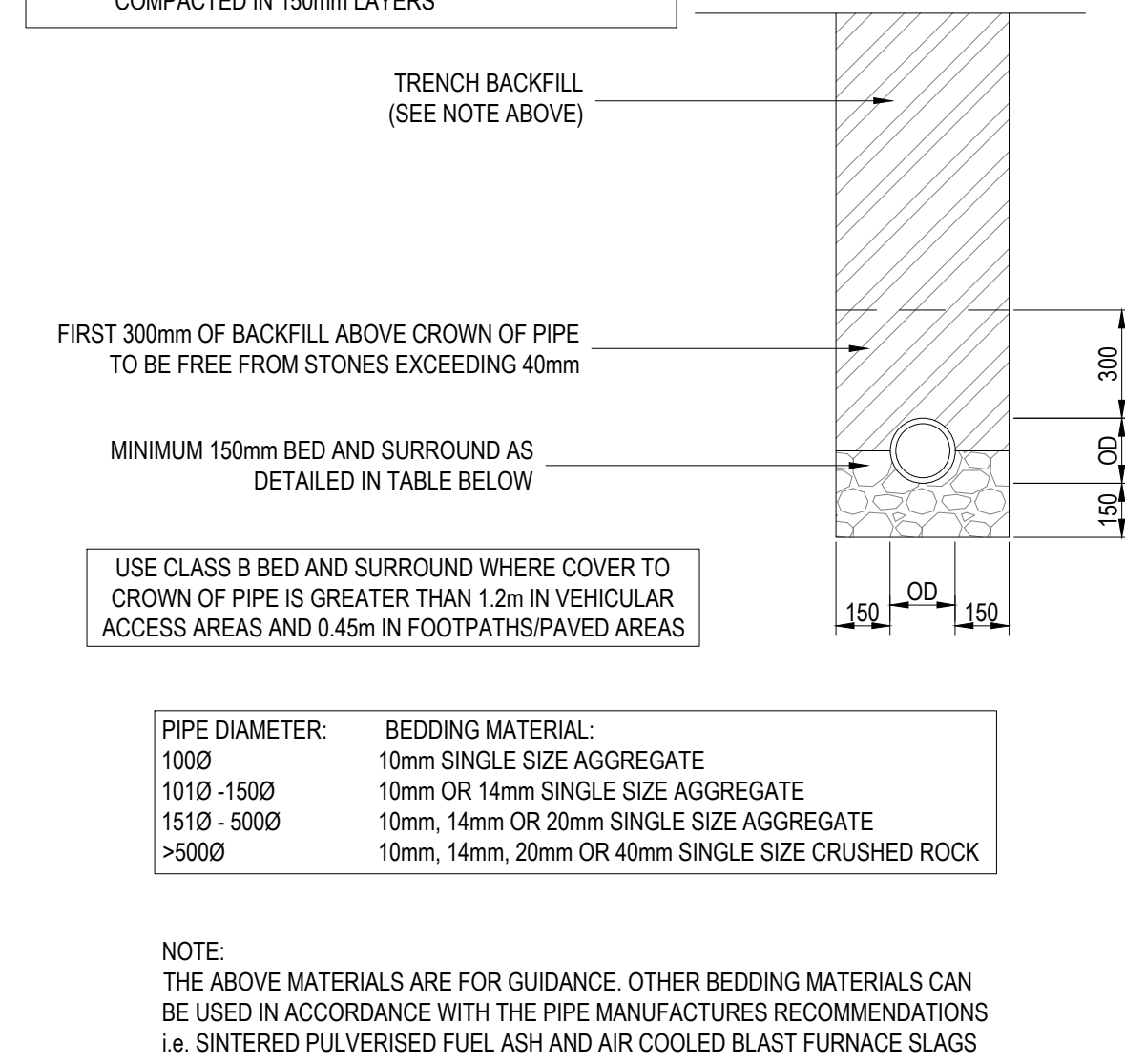
CLASS S GRANULAR BED AND SURROUND



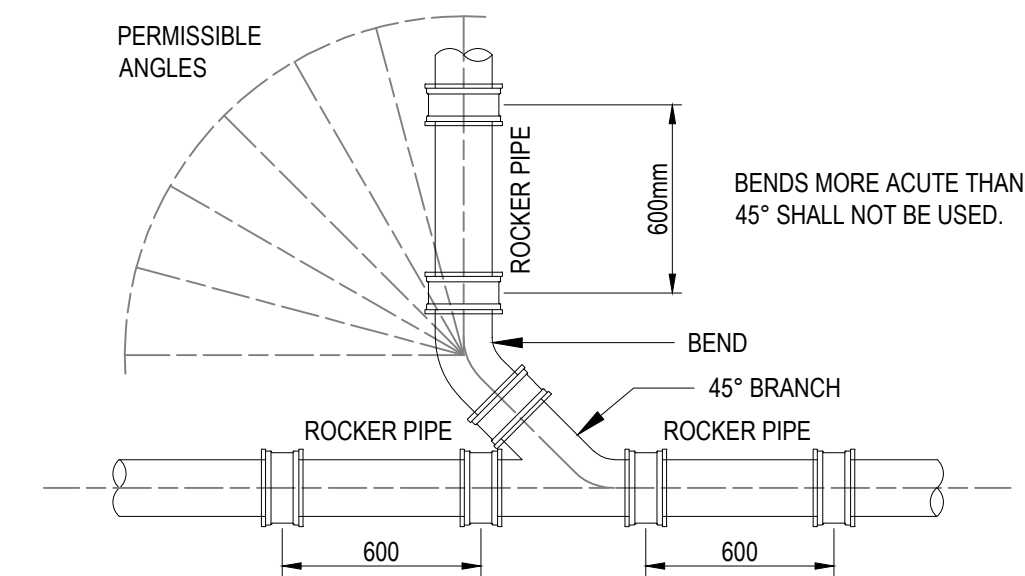
ROCKER PIPE ASSEMBLY
THESE DETAILS APPLY TO ALL DRAINS AT FIXED POINTS
I.E. AT FACE OF STRUCTURE, CHAMBERS ETC.

TRENCH BACKFILL NOTE

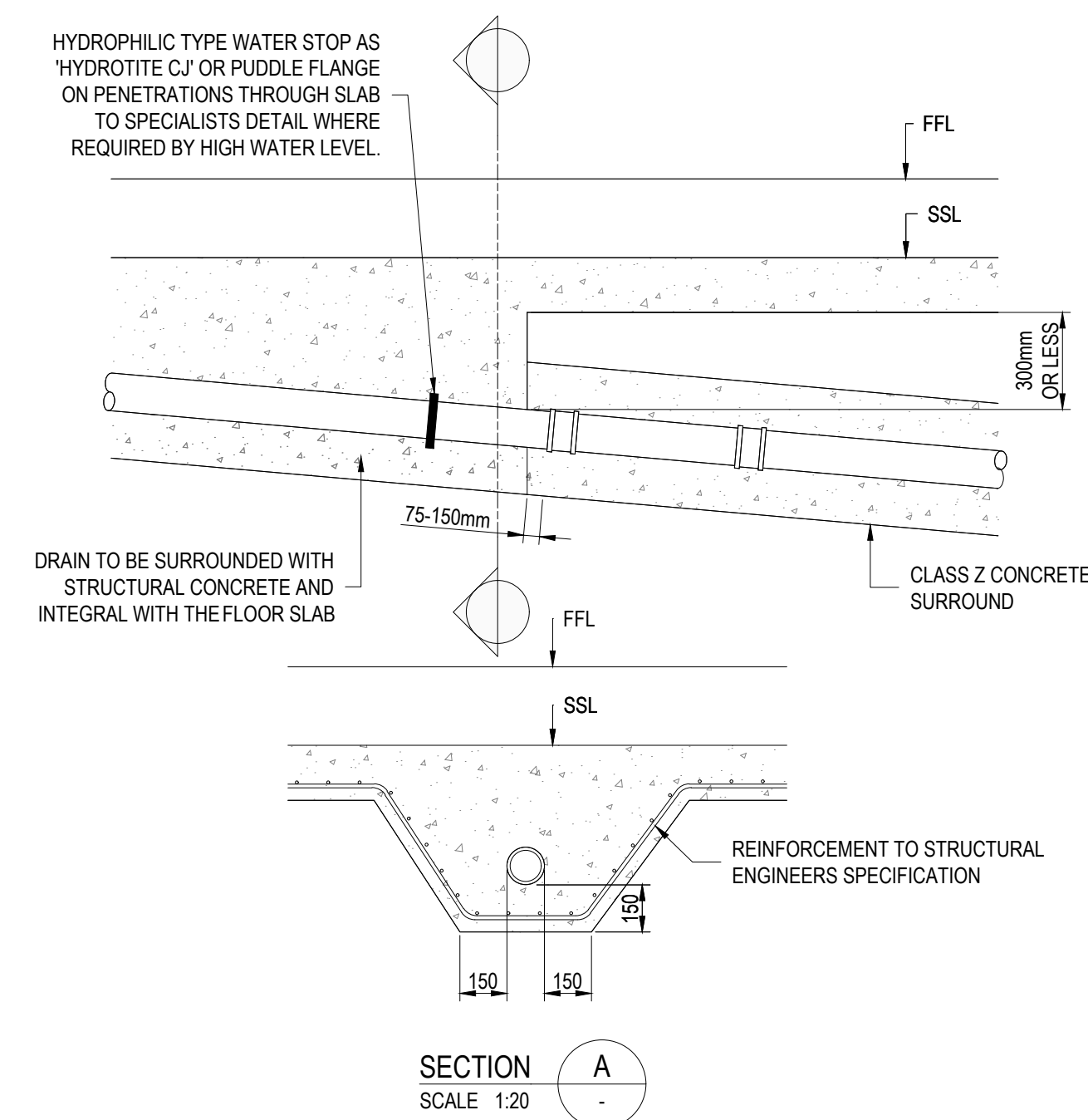
1. ROADS AND FOOTPATHS: TYPE 1 GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO THE MATERIAL SIDE OF SURFACE CONSTRUCTION
2. ELSEWHERE: SELECTED EXCAVATED MATERIAL COMPACTED IN 150mm LAYERS



CLASS B GRANULAR BED AND SURROUND



OBLIQUE JUNCTION ARRANGEMENT DETAIL



CLASS Y CONCRETE SURROUND DETAILS (PIPE WITHIN 300mm OF FLOOR SLAB)

PRELIMINARY
NOT FOR CONSTRUCTION

[illegible]

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CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISKS

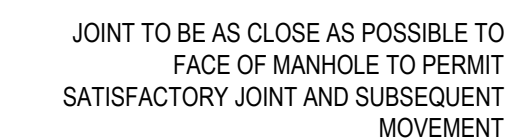
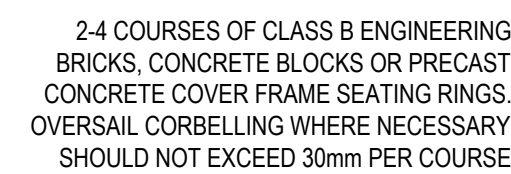
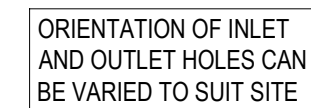
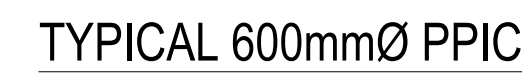


PROJECT
1-36 BRUNEL WALK
TOTTENHAM
LONDON
N15 5HQ

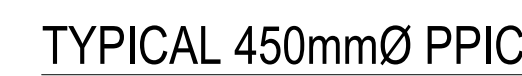
CLIENT
LONDON BOROUGH OF HARINGEY

TITLE
PROPOSED DRAINAGE
STANDARD DETAILS
SHEET 1

DISCIPLINE CIVIL			SCALE 1:20
DRAWN LH	DESIGNED LH	CHECKED GB	APPROVED GB
DRAWING No 2844-MHT-CV-XX-XX-200			ISSUE P01



<u>MANHOLE DEPTH</u>	<u>PIPE Ø</u>	<u>INTERNAL DIAMETER OF MANHOLE</u>
< 1.5m	≤ 150	1000Ø
	225 - 300	1200Ø
	300 - 700	1500Ø
	≥ 700	THE LARGER OF 1800Ø OR (DN+450)
>1.5m	100 - 375	1200Ø
	375 - 700	1500Ø
	≥ 700	THE LARGER OF 1800Ø OR (DN+775)



PRELIMINARY
NOT FOR CONSTRUCTION

[illegible]

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CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISKS



PROJECT
1-36 BRUNEL WALK
TOTTENHAM
LONDON
N15 5HQ

CLIENT
LONDON BOROUGH OF HARINGEY

TITLE
PROPOSED DRAINAGE
STANDARD DETAILS
SHEET 2

DISCIPLINE CIVIL			SCALE 1:20
DRAWN LH	DESIGNED LH	CHECKED GB	APPROVED GB
DRAWING No 2844-MHT-CV-XX-XX-201			ISSUE P01

[illegible]

FOUL WATER MANHOLE SCHEDULE													
MANHOLE No.	COVER LEVEL (m)	DEPTH TO INVERT (m)	PIPE IN DIAMETER (mm)	PIPE IN INVERT LEVEL (m)	PIPE OUT DIAMETER (mm)	PIPE OUT INVERT LEVEL (m)	MANHOLE SIZE & TYPE	COVER SIZE (mm) & GRADE	COMMENTS	BACKDROP DISTANCE (m)	EASTING (m)	NORTHING (m)	
FWMH01	13.300	0.895	100	12.405	100	12.405	450mmØ, PPIC	450 x 450 B125	PPIC	- -	533017.950	189027.773	
FWMH01a	13.300	1.300	100	12.190	100	12.190	450mmØ, PPIC	450 x 450 B125	PPIC	- -	533018.730	189033.650	
FWMH02	13.300	1.390	100 100 100	11.980 11.960 11.925 11.960	150	11.910	450mmØ, PPIC	450 x 450 B125	PPIC	- - - -	533029.702	189027.965	
FWMH03	13.450	1.350	100	12.150	100	12.100	450mmØ, PPIC	450 x 450 B125	PPIC	-	533031.831	189038.984	
FWMH04	13.300	1.488	100 100 150	11.942 11.922 11.812	150	11.872	600mmØ, PPIC	450 x 450 B125	PPIC	- - -	533037.124	189027.965	
FWMH05	13.600	1.615	100 100	12.055 12.000	100	11.985	450mmØ, PPIC	450 x 450 B125	PPIC	-	533067.886	189015.151	
FWMH06	13.600	1.715	100 100 100	11.935 11.955 11.955	100	11.885	450mmØ, PPIC	450 x 450 B125	PPIC	- - -	533065.808	189015.935	
FWMH07	13.450	1.695	100	11.785	150	11.755	600mmØ, PPIC	450 x 450 B125	PPIC	-	533058.290	189016.110	
FWMH08	13.320	1.702	150 150 100	11.618 11.618 11.668	150	11.618	1200mmØ, Type B	600 x 600 B125	PCC Circular Manhole	- - -	533057.442	189027.770	
FWMH09	13.250	1.676	150	11.574	150	11.574	1200mmØ, Type B	600 x 600 B125	PCC Circular Manhole	-	533057.507	189032.179	
FWMH10	13.140	1.210	100	12.000	100	11.930	450mmØ, PPIC	450 x 450 B125	PPIC	-	533067.579	189030.969	
FWMH11	13.140	1.687	150 100	11.453 11.503	150	11.453	1200mmØ, Type B	600 x 600 B125	PCC Circular Manhole	-	533069.593	189032.205	
FWMH12	13.200	1.270	100	12.000	100	11.930	450mmØ, PPIC	450 x 450 B125	PPIC	-	533078.346	189029.422	
FWMH13	11.833	0.519	150	11.314	150	11.314	1200mmØ, Type B	600 x 600 B125	PCC Circular Manhole	-	533083.490	189032.090	
FWMH14	13.400	1.150	100 100	12.270 12.300	100	12.250	450mmØ, PPIC	450 x 450 B125	PPIC	- -	533083.556	189020.535	
FWMH15	13.360	2.152	150 100	11.238 11.238	150	11.208	600mmØ, PPIC	450 x 450 B125	PPIC	-	533083.592	189024.514	
FWMH16	13.150	1.165	100 100	12.000 12.005	100	11.985	450mmØ, PPIC	450 x 450 B125	PPIC	-	533108.105	189007.860	
FWMH17	13.150	1.262	100 100 100	11.958 11.938 11.958	100	11.888	450mmØ, PPIC	450 x 450 B125	PPIC	- - -	533106.295	189008.709	
FWMH18	13.140	1.381	100	11.789	150	11.759	600mmØ, PPIC	450 x 450 B125	PPIC	-	533098.844	189008.717	
FWMH19	13.130	2.074	150 150	11.056 11.086	150	11.056	600mmØ, PPIC	450 x 450 B125	PPIC	- -	533098.825	189024.257	
FWMH20	13.200	1.265	100	11.950	100	11.935	450mmØ, PPIC	450 x 450 B125	PPIC	-	533107.961	189023.387	
FWMH21	13.080	2.192	150	10.888	150	10.888	600mmØ, PPIC	450 x 450 B125	PPIC	-	533115.627	189024.110	
FWMH22	13.120	0.870	100 100	12.265 12.320	100	12.250	450mmØ, PPIC	450 x 450 B125	PPIC	- -	533124.618	189012.791	
FWMH23	12.780	2.148	150 100	10.632 10.682	150	10.632	1200mmØ, Type B	600 x 600 B125	PCC Circular Manhole	- -	533139.603	189015.231	
FWMH24	12.650	1.295	100 100 100	11.425 11.370 11.425	100	11.355	450mmØ, PPIC	450 x 450 B125	PPIC	- - -	533145.377	189011.988	
FWMH25	12.550	1.195	100 100 100	11.370 11.425 11.425	100	11.355	450mmØ, PPIC	450 x 450 B125	PPIC	- - -	533148.980	189011.353	
FWMH26	12.550	1.195	100 100 100	11.370 11.425 11.425	100	11.355	450mmØ, PPIC	450 x 450 B125	PPIC	- - -	533157.150	189009.852	
FWMH27	12.550	1.195	100 100 100	11.370 11.425 11.425	100	11.355	450mmØ, PPIC	450 x 450 B125	PPIC	- - -	533160.576	189009.219	
FWMH28	12.540	2.343	150	10.197	150	10.197	1200mmØ, Type B	600 x 600 B125	PCC Circular Manhole	-	533165.340	189010.825	
FWMH29	12.450	1.095	100 100 100	11.370 11.425 11.425	100	11.355	450mmØ, PPIC	450 x 450 B125	PPIC	- - -	533171.521	189007.235	
FWMH32	12.430	2.470	100	10.030	100	9.960	450mmØ, PPIC	450 x 450 B125	PPIC	-	533179.005	189005.964	
FWMH33	10.700	0.970	100	9.800	100	9.730	450mmØ, PPIC	450 x 450 B125	PPIC	-	533189.008	188988.907	
FWMH34	10.600	1.003	100	9.627	100	9.597	600mmØ, PPIC	450 x 450 C250	PPIC	-	533196.627	188987.434	
FWMH35	10.550	0.785	100	9.780	100	9.765	450mmØ, PPIC	450 x 450 B125	PPIC	-	533196.878	188994.582	
FWMH36	11.230	1.000	100	10.300	100	10.230	450mmØ, PPIC	450 x 450 B125	PPIC	-	533196.359	189002.164	

[illegible]

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CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISKS



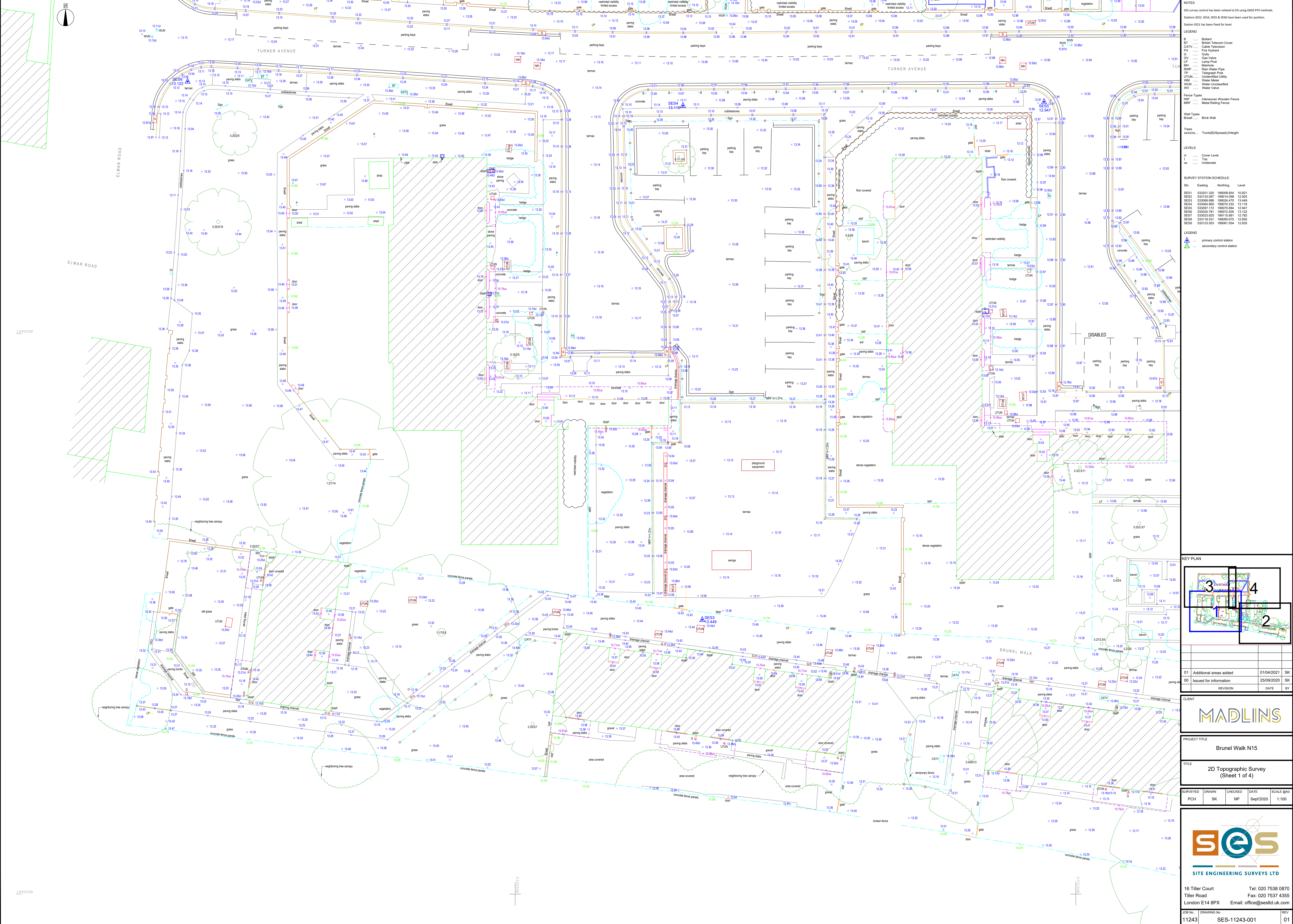
PROJECT
1-36 BRUNEL WALK
TOTTENHAM
LONDON
N15 5HQ

CLIENT
LONDON BOROUGH OF HARINGEY

TITLE
PROPOSED BELOW GROUND DRAINAGE
FOUL WATER
MANHOLE SCHEDULE

DISCIPLINE			SCALE
CIVIL			NTS
DRAWN	DESIGNED	CHECKED	APPROVED
LH	LH	GB	GB
DRAWING No			ISSUE
2844-MHT-CV-XX-XX-251			P02

Appendix B – Topographical Survey



NOTES

SES survey control has been related to OS using GNSS RTK methods.

Stations SES3, SES4, SES5 & SES6 have been used for position.

Station SES3 has been fixed for level.

LEGEND

B Botland
BT British Telecom Cover
CATV Cable Television
G Gas Valve
GP Gas Post
LP Lamp Post
MH Manhole
RWP Rain Water Pipe
TP Telegraph Pole
WM Water Meter
WUN Water Unclassified
WV Water Valve

Fence Types

WVF Interwoven Wooden Fence
MRF Metal Rolling Fence

Wall Types

BW Brick Wall

Trees

XXXXXX..... Trunk(D)/Spread(S)/Height

LEVELS

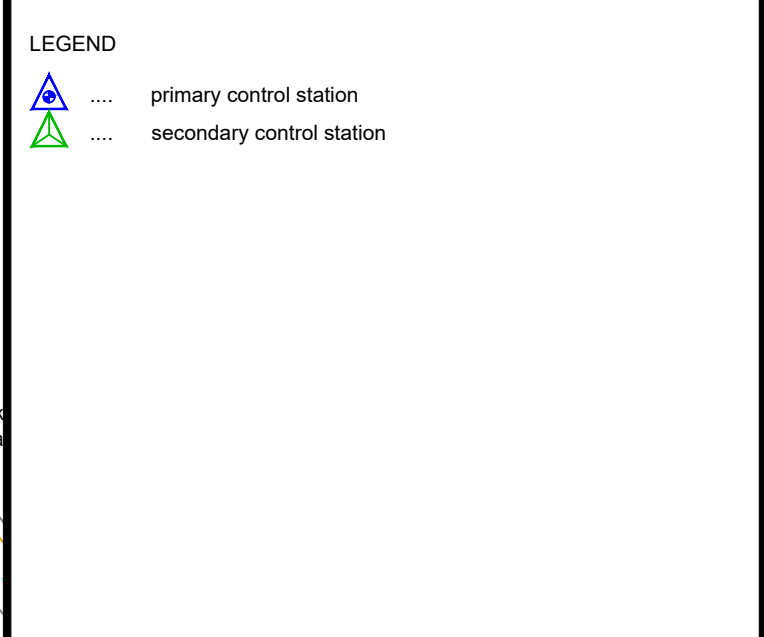
UL Cover Level
T Top
US Underside

SURVEY STATION SCHEDULE

Stn	Easting	Northing	Level
SES1	533201.320	189006.654	10.921
SES2	533133.007	189014.068	12.025
SES3	533066.686	189024.470	13.449
SES4	533066.985	189070.332	13.116
SES5	533097.172	189070.684	12.847
SES6	533098.001	189072.009	13.122
SES7	533023.825	189115.881	12.782
SES8	533118.831	189095.676	12.860
SES9	533123.503	189061.504	12.835

LEGEND

▲ primary control station
△ secondary control station



01	Additional areas added	01/04/2021	SK
00	Issued for information	25/09/2020	SK
	REVISION	DATE	BY

CLIENT

MADLINS

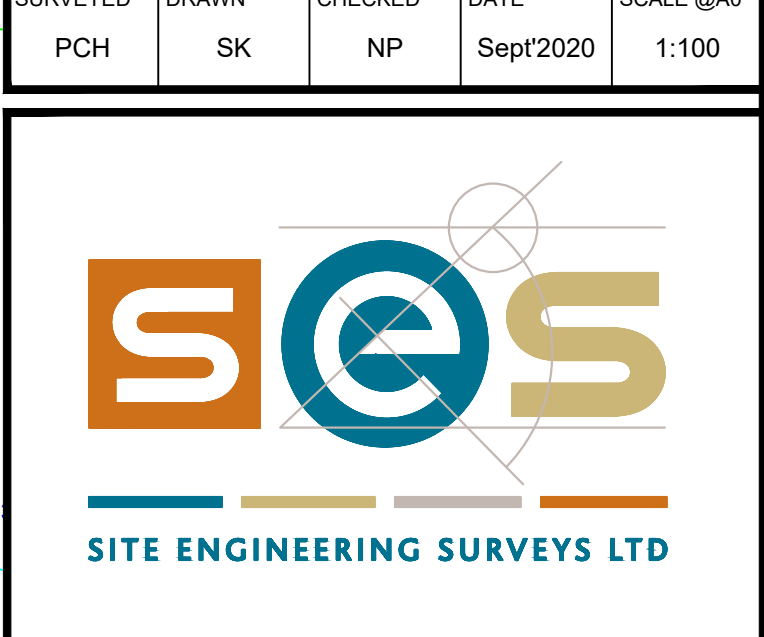
PROJECT TITLE

Brunei Walk N15

TITLE

2D Topographic Survey
(Sheet 1 of 4)

SURVEYED	DRAWN	CHECKED	DATE	SCALE
PCH	SK	NP	Sept2020	1:100



16 Tiller Court
Tiller Road
London E14 8PX

Tel: 020 7538 0870
Fax: 020 7537 4355
Email: office@sesltd.uk.com

JOB No: 11243
DRAWING No: SES-11243-001
REV: 01