

# FLOOD RISK ASSESSMENT

Enderby Place, Greenwich

for

Maritime View Limited



## Enderby Place, Greenwich

### Flood Risk Assessment

REF: 0711

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Rev	Description	Date
P1.1	Issued for Planning	06/11/23
P2	Updated Red Line Boundary	29/11/23

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## EXECUTIVE SUMMARY

- The proposed development includes 564 residential units across three tower blocks up to 35 storeys in height, together with 1453m<sup>2</sup> commercial space (including employment, community and café uses). Amenity and public space provision, pedestrian routes, vehicular access, circulation and cycle and car parking will also be provided within a basement below a new podium level.
- The site is located on the western side of Greenwich Peninsular off of Telegraph Avenue and Telcon Way.
- The site is located in Flood Zone 3a, but does benefit from the Thames Barrier and defences, providing a level of protection to the current 0.5% tidal event.
- As the site has been granted planning consent previously (ref: 15/09753/F and 10/3063/F) and is draft allocated within the Site Allocations Proposed Submission (2021) ref: GP1, the Sequential Test is deemed to have been passed.
- An assessment of the flood risks in the area found the risk to be low for all sources, but with a danger for all residual risk.
- The river defences will be raised to 6.20m AOD and the ground floor of any residential units will be set above the 0.5% including climate change level.
- Residential units are above the breach level and a flood plan will manage the residual risk to the commercial units and car park.
- The site falls within an overall drainage area masterplan which was approved as a function of the Enderby Wharf development which has since been constructed.
- A SUDS scheme has been considered utilising permeable paving and green roofs.
- The proposed development does not impact the flood morphology of the area and will bring an improvement to the surface water flood risk in the area.

## **1 INTRODUCTION**

MAB Consultancy Ltd have been commissioned by Maritime View Limited to produce a Flood Risk Assessment (FRA) in support of a full planning application for a proposed development includes 564 residential units across three tower blocks up to 35 storeys in height, together with 1453m<sup>2</sup> commercial space (including employment, community and café uses). Amenity and public space provision, pedestrian routes, vehicular access, circulation and cycle and car parking will also be provided within a basement below a new podium level.

### **1.1 FRA Aims and Objectives**

The purpose of this report is to provide information on the flood risks associated with the proposed development and to advise on mitigation measures at the site to enable the development to proceed without objection from the Environment Agency (EA), Lead Local Flood Authority (LLFA) or others.

This is to be achieved by ensuring that the development is safe from flooding to the recognised standards and does not increase flood risk to the development or to third parties.

This report follows the guidance set out in the National Planning Policy Framework (NPPF), alongside other national guidance such as the CIRIA SUDS Manual (C753) and DEFRA Climate Change Allowances guidance. The report also follows relevant local authority policies and guidance from bodies such Royal Borough of Greenwich (acting as the Lead Local Flood Authority - LLFA), the Environment Agency (EA) and Thames Water (TW).

### **1.2 Data Collected**

The following data was collected as part of this assessment.

- Topographic survey of the site to a GPS datum.
- EA Flood Data
- EA Pre-Application Consultation
- Thames Water Sewer Records
- Thames Water Pre-Application consultation
- On line flood maps and records

## **2 PLANNING POLICY**

### **2.1 NPPF**

The NPPF is explicit in that it directs any proposed development away from sites which are at a risk of flooding. In addition, it states that any proposed development should not increase the risk of flooding and should in itself be safe from flooding.

This should be done in the first instance via the sequential test which is detailed within the NPPF Technical Guidance. This should be applied at a strategic and specific site level.

### **2.2 London Plan and London Sustainable Drainage Action Plan (2021)**

The LSDAP has a vision that by 2040 London will manage its rainwater more sustainably and improve water quality and security. This is an outworking of the London Plan Policy 5.13 Sustainable Drainage, which states that SUDS should be utilised in line with the following hierarchy:

1. Store Water for later use.
2. Use infiltration techniques where possible.
3. Attenuate rainwater in open features for gradual release.
4. Attenuate rainwater in tanks for gradual release.
5. Discharge rainwater direct to a watercourse.
6. Discharge rainwater to a surface water sewer/drain.
7. Discharge rainwater to the combined sewer.

### **2.3 Local Plan**

The existing development plan is the Royal Borough of Greenwich Local Plan (2014). Within this Plan, there are a number of pertinent policies to flood risk, namely;

- Policy E2 Flood Risk
- Policy E3 Residual Flood Risk

It is noted that within Policy E3, the site is shown to have a high residual flood risk. It is also noted that the site is shown as a Strategic Development Location.

A Site Allocation Proposed Submission (Nov 2021) has been issued which identifies the site under the reference GP1. This document highlights that both Thames Water and the EA may require upgrades to the sewer network and river defences respectively as part of any development of the site.



## **2.4 Strategic Flood Risk Assessment (SFRA)**

Both a Level 1 (2017) and a Level 2 (2018) SFRA have been undertaken. In these documents the site is identified and analysed as reference GP13 Enderby Wharf/Enderby Place.

Within the SFRA, the site is not shown to have flooded historically in either the 1928 or 1953 historic events. The SFRA identifies that the River Thames defences protect the site to the current day 1% (1 in 1000 year) event.

In addition, the defences upstream of the Thames Barrier are due to be improved in 2065, with the defences downstream of the Thames Barrier improved in 2070.

A breach model is referenced in the SFRA which shows that the site is vulnerable to a breach event which could last up to 35 hours.

The site is not identified within the SFRA as being in a Critical Drainage Area or Local Flood Zone.

## **2.5 Lead Local Flood Authority (LLFA)**

The Royal Borough of Greenwich in their role as the LLFA require the SUDS proforma to be completed.

## **2.6 Previous Planning Applications**

The site benefits from several previous planning applications for similar sized mixed use commercial and residential developments. This includes:

- 10/3063/F which was granted consent in 2012
- 15/0973/F which was approved on the 23 December 2015

Several other applications relating to the amendment or discharge of conditions relevant to these applications have also been made, notable for drainage (ref: 16/1185/SD) and a flood evacuation plan (Ref: 16/1188/SD).

As part of the wider as built Enderby Wharf development, a drainage masterplan included the site area and connection points for the site.

## 2.7 Environment Agency Pre-Application Consultation

As part of the design process, the EA were consulted on the 27 October 2022 (ref: SL/2022/122257/01-L01) regarding the principles of the proposed development. The response is included within Appendix C. As well as requiring additional information to be included within the application, which this report takes into consideration, the EA also confirmed that;

- The flood defence should be raised to 6.20m AOD to meet the requirements of TE2100 if it has not done so already
- The sequential test has been passed on the basis of the previous application and masterplan for the area
- If needed, a new surface water outfall could be constructed into the River Thames
- The tidal breach scenario will need to be assessed and no sleeping accommodation located below the level of the breach

## 2.8 Climate Change

Due to the location of the site, the factors for climate change, as defined by DEFRA, should be applied to the peak rainfall intensity. A 100-year lifespan for the development has been considered as the proposed use is residential.

DEFRA provide climate change figures is shown in Table 1 below. It indicates that for small and urban catchments, a central level of 20% and upper end of 40% peak rainfall intensity allowance should be assessed in order to determine the future impacts of climate change.

Applies across all of England	Total Potential change anticipated 2022-2050	Total potential change anticipated 2051-2122
Upper End	40%	40%
Central	20%	25%

Table 1: DEFRA Climate change Allowances-Pluvial

For the purposes of this report, it is proposed that a conservative approach is considered and that a climate change factor of +40% is utilised on all drainage calculations.

With regards to climate change on coastal flooding, Table 2 below provides a summary of the data provided on the DEFRA climate change figures.

South East Area	2023 to 2035 (per year)	2036 to 2065 (per year)	2066-2095 (per year)	2096-2125 (per year)
Higher Central	5.7mm	8.7mm	11.6mm	13.1mm
Upper End	6.9mm	11.3mm	15.8mm	18.2mm

*Table 2: DEFRA Climate Change Allowances-Coastal*

Using the Upper End climate change figures, this means that the anticipated increase in sea level in the area is 1.36m for a 100-year design life by the year 2123.

### 3 DEVELOPMENT DESCRIPTION & LOCATION

#### 3.1 Type of Development with Location

The proposed development is included within Appendix A and consists of 564 residential units across three tower blocks up to 35 storeys in height, together with 1453m<sup>2</sup> commercial space (including employment, community and café uses). Amenity and public space provision, pedestrian routes, vehicular access, circulation and cycle and car parking will also be provided within a basement below a new podium level on an area measuring circa 1.17Ha.

From Figure 1, the site location can be seen to be on Greenwich Peninsular, with access off of Telcon Way and Telegraph Avenue. The site is bounded to the west by the River Thames, to the north by the Tunnel Glucose Wharf (a wharf safeguarded for river freight but currently not operational) which has been granted planning consent for a residential led development named Morgan Wharf, to the east by the remaining operational part of the Alcatel works and Victorian two storey residential properties, and to the south by Victorian two storey residential properties and the emerging predominately residential development of Lovell's Wharf. The site is roughly triangular in shape with a spur leading eastward to Blackwall Lane (A2203) to enable vehicular access.

The site itself is currently unused having previously been used for storage and as a site compound. The site location which is centred on Grid Reference 539195E,178797N (TQ392788).



Figure 1: Site Location

A topographical survey is included in Appendix B, which indicates that the site has an area of approximately 1.17Ha. The low point of the site is located on the eastern corner at circa 1.64m AOD, whilst the high point of the site is located in the south west corner of the site at circa 5.90m AOD. The site typically falls from west to east.

The majority of the site is impermeable, with the exception being the western end of the site which is noted on the topographic survey as ‘unmade ground’ and a few small areas of landscaping. The existing area also includes a significant proportion of Telcon Way and Telegraph Avenue which are private roads. A breakdown of the site area is included in Appendix D and summarised in Table 3 below.

### 3.2 Development Description

The proposed development is shown within Appendix A and the proposed site and existing areas are included within Appendix C, with Table 3 below containing a detailed breakdown of the proposed development:

Description	Existing Area	Proposed Area
Access Roads/ Parking/ Hardstanding	6,581m <sup>2</sup>	1,399m <sup>2</sup>
Roof Areas	0m <sup>2</sup>	2,472m <sup>2</sup>
Telcon Way/Enderby House	3,859m <sup>2</sup>	3,859m <sup>2</sup>
Landscaping	1,222m <sup>2</sup>	3,932m <sup>2</sup>
Total Area	11,662m <sup>2</sup>	11,662m <sup>2</sup>

Table 3: Site Areas

It is noted that Telcon Way is included within the proposed red line boundary for access purposes, but no works are proposed on the road itself. Therefore, the area of Telecon Way will be excluded from any drainage calculations as the current highway drainage arrangement will be maintained.

## 4 EXISTING FLOOD RISK

### 4.1 Flooding from Rivers

Fluvial flooding is flooding caused by rivers and other watercourses and occurs when the river or watercourse channel capacity is exceeded by the flow. The nearest watercourse is the River Thames, which is deemed to be tidally influenced at this location.

In addition, there is a culverted watercourse which runs through the site, as shown on the Thames Water Asset maps in Appendix E. This watercourse, known as Bendix Ditch, is a 900mm culvert which discharges into the River Thames south of Enderby House via a 750mm outfall. The culvert runs along the southern and eastern boundaries of the site and historically drained an area to the north of the site as well as the site itself.

An investigation into Bendix Ditch, as part of the 2016 Drainage Strategy undertaken by Aecom to discharge conditions 78 and 79 of the 2015 application (ref 16/1185/SD), established that Bendix Ditch had been abandoned and capped off upstream of the site boundary. In addition, the outfall flap valve had ceased to function. Therefore, whilst it could present a flow path for tidal flooding, the ditch did not present a fluvial flood risk.

The on-line flood maps (Figure 2 below) indicate that the site is within Flood Zone 2 and therefore is at a potential medium risk of flooding from river flooding.



Figure 2: Long Term Flood Risk of Rivers and Tidal Flooding

Therefore, the risk of flooding from fluvial events is considered as medium, although in reality this is low as the risk from the River Thames is dominated by the tidal risk.

#### 4.2 Flooding from the Sea

Tidal flooding from the sea occurs when high tides and storm surges raise the level of tidal waters above the level of the shore or river bank. These can be sudden and severe, but are dependent upon a number of factors which are well known and predictable. There are two ways in which the sea could potentially flood the site:

- a) From the Open Coast
- b) Flooding from Tidal Influence of Rivers

As the site is located within Flood Zone 2, the risk is considered as medium from both open coast and tidal influenced rivers. The EA have been contacted and they have provided flood data for the River Thames as shown in in Appendix F.

From the EA mapping for the area, the flood levels in the area for the 0.1% extreme event can be established as shown in Table 4 below.

Event	Current Flood Level	2100 Flood Level	With Climate Change to 2123
0.1% (1 in 1000)	4.700m AOD	5.68m AOD	6.067m AOD

*Table 4: Tidal Flood Levels Including Climate Change*

However, it is noted that the site does benefit from the Thames Defences. Along the site boundary, the level of the defences is typically 5.76m AOD to 5.85m AOD (see topographic survey in Appendix B). However, in the southernmost part of the site near Enderby House, this rises to 6.20m AOD where it ties into the defence line which was raised as part of the completed Enderby Wharf development to south.

The entire flood defence, regardless of height, is formed from a sheet piled wall, capped with a concrete beam as shown within Figure 3. The 6.20m AOD and lower wall both tie into higher ground at 5.86m AOD on the southern side of Enderby House to allow access to the River walk.

The residual risk of a breach event remains, but due to the location of the defences, the risk from tidal flooding can be considered as low.



Figure 3: Existing Site Flood Defences

#### 4.3 Flooding from a Breach

The London Thames Breach Assessment (May 2017) indicates that the site is susceptible to a residual risk of breach inundation in the design event, as shown in Figure 4 below.

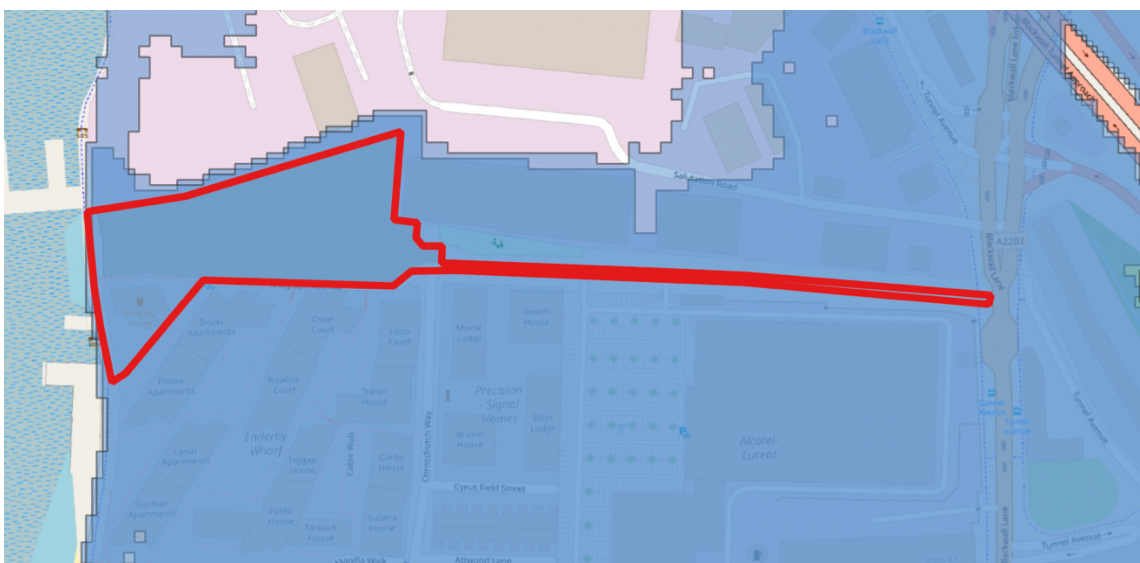




Figure 4: Breach Extent

Appendix F contains an analysis of the depth of the breach for seven nodes spread across the site. These nodes are summarised in Table 5 below.

Node	Breach Level
1	4.587m AOD
2	4.582m AOD
3	4.570m AOD
4	4.591m AOD
5	4.577m AOD
6	4.474m AOD
7	4.326m AOD

Table 5: Breach Levels

The range of levels across a relatively small footprint is considered to be a function of the EA modelling used and the higher levels are closer to the defence/ breach location which is to be expected. For the purpose of this report in considering a breach flood level for the site, the worst-case scenario from node 4 of 4.591m AOD is to be used.

The breach levels then give rise to flood depths of between 2 to 3m (see Appendix F). Given these depths of flooding, the risk of flooding is considered as a “danger for all” in line with FD2321/TR2. The residual risk from a breach is therefore considered as high. This is confirmed in the EA 2017 Breach model within Appendix F.

#### 4.4 Flooding from Surface Water

Within urban areas where there are large areas of impermeable surfacing e.g. roof areas, car parking and roads, it is possible for high intensity rainfall storms to be unable to soak into the ground or enter the man-made drainage system at a quick enough rate to cope with the volume of water. Where this occurs, the excess water can flow across land and potentially cause flooding.

The online map of Long Term Risk of Surface Water Flooding on the gov.uk website (see Figure 5 below) indicates that within the site boundary, there are areas which are at a low risk of surface water flooding.



Figure 5: Long Term Risk of Surface Water Flooding

These small areas within the site boundary are considered to be a function of the hardstanding on the site and is considered a low risk and be resolved through the introduction of suitable SUDS.

With regards to the existing greenfield flow rate from the site, Table 6 below displays the greenfield and existing runoff rates at the site derived using IH124 method (Appendix G contains the calculations), with the existing site calculations derived utilising FEH data.

With regards to the area used in determining the existing flow rates, only that area which is to be developed has been considered. i.e. the red line extends along Telcon Way, but as this is existing highway, this is excluded from the existing run off as it is considered to have its own existing drainage arrangement.

From the site drainage masterplan included within Appendix J, part of the site is to discharge to the River Thames directly (Area B) with no restriction and part to the Thames Water sewer at an agreed rate of 5l/s (Area A).

Both of these drainage outfalls are provided as a function of the wider as built Enderby Wharf scheme, with permission to connect to these manholes provided by the purchase of the site within the context of the masterplan for the area.

Event	Existing Site Runoff Rate	Greenfield Runoff Rate
Q <sub>bar</sub>	NA	3.07l/s
Q <sub>1</sub>	93.8l/s	2.61l/s
Q <sub>30</sub>	236.4l/s	7.06l/s
Q <sub>100s</sub>	308.7l/s	9.79l/s

Table 6: Existing Runoff Rates - Site

For the distinct Areas A and B identified within the drainage masterplan, the run-off rates have been calculated and are included within Table 7 below with the supporting calculations within Appendix G.

Event	Area A	Area A	Area B	Area B
	Greenfield Runoff Rate	Existing Site Runoff Rate	Greenfield Runoff Rate	Existing Site Runoff Rate
Area	2,550m <sup>2</sup>	2,550m <sup>2</sup>	4,935m <sup>2</sup>	4,935m <sup>2</sup>
Q <sub>bar</sub>	1.0l/s	NA	1.94l/s	NA
Q <sub>1</sub>	0.85l/s	33.77l/s	1.65l/s	60.03l/s
Q <sub>30</sub>	2.30l/s	85.10l/s	4.46l/s	151.30l/s
Q <sub>100</sub>	3.20l/s	111.13l/s	6.19l/s	197.57l/s

Table 7: Existing Runoff Rates

#### 4.5 Flooding from The Ground

In areas where the level of groundwater is high, rainfall that soaks into the ground can raise groundwater to a level where structures within the ground are at risk of flooding. Structures such as basements or detention ponds can be at risk, although this is dependent upon the ground conditions of the site.

The ground conditions from the British Geological Society (BGS) maps indicate that the site has bedrock of Lambeth Group-Clay Silt and Sand, with superficial deposits of Alluvial Clay, Silt, Sand and Peat.

The nearest historic borehole located within the site boundary (ref: TQ37NE1998) confirms that there is made ground to a depth of 4.7m bgl over clay with some silt over prat and then further clay to a depth of 7.5m bgl. Sand is then recorded to a depth of 9m bgl. Groundwater was encountered at 3.7m bgl.

As part of the 2015 application, Aecom undertook a site investigation (ref: 47068548). This undertook groundwater monitoring over a period of six weeks (September to November 2013). This demonstrated that the groundwater was in hydraulic continuity with tidal River Thames and varied between -0.8m AOD to -1.6m AOD.

The depth of groundwater is unlikely to cause a flood risk to the development, but this will be confirmed prior to development commencing through site investigation.

It is noted that the ground conditions are unlikely to be suitable for the use of infiltration devices, therefore, the use of soakaways is not considered suitable.

#### 4.6 Flooding from Artificial Sources

Infrastructure failure flooding includes that from sewers, reservoirs and canals. Sewer flooding occurs when the quantity of water flowing into the sewers exceeds the capacity of the sewer and backs up to an extent where it floods out of manholes or gullies.

Alternatively, and more commonly, sewers flood when a blockage occurs in a pipe. This is more likely in private drains, but is usually less severe than flooding from larger public sewers which can cause extensive flooding due to the greater quantity of surface area and properties which they drain.

**Adopted Drains:** From the Thames Water sewer maps in Appendix E, there are no public sewers within the vicinity of the site or within Telegraph Avenue or Telcon Way.

There are highway drains within the private roads and flooding from these will be as per that identified within Section 4.4 and the risk to the site from adopted sewers is considered as low.

**Private Drains:** Whilst there are private drains shown on the topographic survey within the site boundary, including Bendix Ditch, these are all to be abandoned and replaced with a new SUDS scheme and as such this is considered as a low risk. It is estimated that circa 60% of the current site surface water is discharged to Bendix Ditch, with the remainder discharging to the combined TW sewer within Blackwall Lane.

When Bendix Ditch was decommissioned, it is assumed that any spurs from the site were reconnected into the private sewer shown on the drainage masterplan as a function of the development to the south of the site.

As part of the masterplan drainage strategy for the site, a new surface water outfall was constructed into the River Thames. This then provides a surface water connection to the site, by a network of pipes around Enderby House. The outfall is understood to have been built with a double layer of protection in line with the EA requirements which presents a residual risk to the site.

Alongside this outfall, a new private surface water sewer was constructed within Telegraph Avenue connecting to the TW sewer to the south of the development in Christchurch Way. This is deemed to be a low risk to the site.

**Reservoirs:** The on-line flood maps indicate a very low risk of reservoir flooding in the area. Therefore, the risk from reservoir flooding is considered as low.

#### 4.7 Existing Flood Risk Summary

From the above assessment, the risks of flooding can be summarised in Table 8 below.

Source of Flooding	Risk
Rivers	Low
Sea	Low
Surface Water	Low
Ground	Low
From sewers	Low
From reservoirs	Low
Residual Breach Risk	Danger for all

Table 8: Flood Risk Summary

#### 4.8 Sequential Test All Sources

As the site has an extant planning consent on the site from the previous application (reference 10/3063/F and 15/0973/F) and is also identified within the RBG Site Allocation Proposed Submission (Nov 2021), the Sequential Test is considered to have been undertaken and not required as a function of this application as confirmed by the EA.

## **5 POST DEVELOPMENT FLOOD RISK**

### **5.1 Levels & Flood Defences**

All the residential units are to be set on the podium level or above. This is effectively the first floor above ground level and as such offers the opportunity to be set above the extreme 2123 flood level of 6.067m AOD. A 300mm freeboard has been applied to this level in the design and as such the podium will be set at 6.367m AOD or greater, resulting in all residential accommodation being above the extreme flood level including climate change.

For the ground floor/basement level, it is proposed that these will be protected by the flood defences in all but the residual risk breach event.

The current flood wall extent which is below 6.20m AOD will either be raised through an extension to the concrete capping beam or through ground raising associated with the proposed development as shown within Appendix H.

Where the raised river wall connects to the raised ground, a new sheet piled wall will be constructed. Where the current 6.20m AOD defence ties into high ground of 5.86m AOD, this will be raised locally to provide a level of 6.20m AOD so as to avoid the requirement for a flood gate.

In the event that the existing wall cannot be raised due to structural reasons, then a new sheet piled flood wall with concrete capping beam will be constructed as part of the development as near to the existing line of defence as reasonably possible.

The existing wall is understood to be a of a non-tied sheet wall design. The proposed sheet piled wall will be of a similar construction, with the detailed design proposed to be controlled by planning condition. All proposed structures will be located further than 8m from any flood defence wall.

It is proposed that the detailed design of the flood defence work is included within a suitably worded planning condition.

For the flood risk from surface water flooding, as the risk is considered as low, the level strategy for thresholds includes ensuring that thresholds are kept a minimum of 150mm above the surrounding land and that proposed levels should be designed so that they fall away from the doorways where possible.

## 5.2 Flood Resilience

It is proposed that the basement car park, including commercial space, will be allowed to flood in a breach event to ensure that there are no negative effects to the surrounding hydrological morphology in the potential residual risk breach event.

Flood Resilience relies on providing suitable finishes and treatments to the building to ensure that after a flood event, the building can be restored as quickly and as cost effectively as possible.

Whilst the final details of the flood resilience measures for the ground floor and commercial space are to be confirmed, they will include resilience measures such as floor finishes being tiled or finished with concrete float and walls being plasterboard lined or of a solid pre-cast construction to ensure quick repair or cleaning after a flood event.

In addition, service connections will be designed to be as high as possible within the scheme, ideally with any entry points sealed and made watertight through suitable ducting to above the breach design level of 4.591m AOD. Sewer connections will be fitted with non-return valves so ensure that any damage from sewer surcharge is minimised.

As the final details of the internal finishes have yet to be determined, it is proposed that the final resilience measures are controlled through a suitably worded planning condition or alternatively via Building Control.

## 5.3 Emergency Warning

It is possible to sign up for flood warnings. The EA flood warnings are delivered direct to the household/ property owner/occupier, although the owner/occupier does need to sign up to the flood warning system via the EA website [www.gov.uk/sign-up-for-flood-warning](http://www.gov.uk/sign-up-for-flood-warning) or via telephone 0345 988 1188. The flood warnings are delivered either via telephone, text, email or fax under a free service and come in one of three categories as shown within Table 9:




Flood Warning Code	Description/ Action
 <p><b>FLOOD ALERT</b></p>	<p>Flooding is possible. Be prepared. Issued 2 hours to 2 days before an event.</p> <ul style="list-style-type: none"> <li>• Be prepared to act on your flood plan.</li> <li>• Prepare a flood kit of essential items.</li> <li>• Monitor local water levels and the flood forecast on our website.</li> </ul>
 <p><b>FLOOD WARNING</b></p>	<p>Flooding is expected, immediate action required. Issued half an hour to one day before an event.</p> <ul style="list-style-type: none"> <li>• Move family, pets and valuables to a safe place.</li> <li>• Turn off gas, electricity and water supplies if safe to do so.</li> <li>• Put flood protection equipment in place.</li> </ul>
 <p><b>SEVERE FLOOD WARNING</b></p>	<p>Severe flooding. Danger to life. Issued when flooding poses a significant threat to life.</p> <ul style="list-style-type: none"> <li>• Stay in a safe place with a means of escape.</li> <li>• Be ready should you need to evacuate from your home.</li> <li>• Co-operate with the emergency services.</li> <li>• Call 999 if you are in immediate danger.</li> </ul>

Table 9: Flood Warning Codes

The owners and occupiers of the residential properties and commercial units, will join the Flood Warning scheme which will provide them with 24 hours prior to the site flooding to act, which is sufficient time to evacuate the property.

The key principle is that if an occupier or resident receives a ‘Severe Flood Warning’, then they will evacuate the site. This is applicable to the entire site not just those areas located in breach risk zones.

Given the potential location of the breach adjacent to the site, any breach will occur quickly and without warning. Therefore, in the event of a breach occurring without previous flood warning, residents will be able to stay within the safe refuge areas defined by at podium level or above. The commercial properties will have a safe refuge available at the podium level if they are occupied at the time of a breach.



#### **5.4 Emergency Access and Egress**

For the residential and commercial properties, prior to floods occurring, the access and egress route will be to the east as shown in Appendix I. If this becomes inundated, then safe refuge is available within individual properties. It is highlighted that the entire podium platform will function as a safe refuge for any local pedestrians and non-residents in the area.

#### **5.5 Flood Plan and Safe Refuge**

A full flood plan for each development aspect will be provided as part of the sale/lease of the property which will be based upon the information within this FRA. A typical flood plan for the site is included within Appendix I with priority given to the evacuation of the property in the event of a "Severe Flood Warning".

It is unlikely that there will be a power supply during this time and therefore a suitable flood kit should be prepared which will include water, food, torch and additional blankets as well as some form of communication such as a mobile phone so that the authorities / emergency services can be notified.

For the residential units, each property should have a flood kit kept. New site purchases or tenants should be briefed on the flood risk and flood plan at either purchase or rental agreement.

For the commercial properties, it is proposed that in the event of a 'Severe Flood Warning', the business will close and not be opened until such time as the all clear has been given by the relevant authorities.

## 5.6 Surface Water Drainage (SuDS)

### 5.6.1 Drainage Hierarchy

In identifying SuDS options, it is important to take into consideration any constraints at the site which may influence the preferred surface water drainage criteria of the London Plan of:

1. Store water for later use.
2. Use infiltration techniques where possible.
3. Attenuate rainwater in open features for gradual release.
4. Attenuate rainwater in tanks for gradual release.
5. Discharge rainwater direct to a watercourse.
6. Discharge rainwater to a surface water sewer/drain.
7. Discharge rainwater to the combined sewer.

It is proposed that where possible water is stored on site for irrigation, but according to the analysis in Section 4.4, infiltration is not deemed as feasible and therefore the site should look to mimic the existing discharge from the site which discharges into the River Thames or the surrounding TW sewers.

As part of the development to the south, the site has several private sewer connections. The drainage masterplan, included within Appendix J indicates which parts of the site are to flow to which connection points.

For those parts discharging to the River Thames connection, this has been designed to accommodate an un-attenuated flow from the site.

Those parts of the site which are connected to the Telcon Way outfall will be restricted to 5l/s in line with the drainage masterplan for the area. The existing Telcon Way and Telegraph Avenue private highways will maintain their current drainage arrangements.

It is noted that TW were consulted over the proposals and have stated that for the proposed development, that the sewers in the area will need to be reinforced and upgraded. This is to be done at the expense of TW, but may have an impact to the construction programme of the project. TW's pre-application response is included within Appendix E.

### 5.6.2 SuDS Options

From those SuDS detailed within Table 7.1 of the SuDS Manual, the following shown in Table 10 are considered suitable.

Component Type	Collection Mechanism	Design Criteria						Suitable	Reason	
		Water Quantity			Water Quality	Amenity	Biodiversity			
		Peak Run off Rate	Runoff Volume							
			Small Events	Large Events						
Rainwater Harvesting Systems	P		●	●			●		Y	
Green Roofs	S	○	●			●	●	●	Y	
Infiltration Systems	P	●	●	●	●	●	●	●	N	Made Ground & clay
Proprietary Treatment Systems	P				●				Y	
Filter Strips	L		●		●	○	○		N	
Filter Drains	L	●			●	○	○		N	
Swales	L	●	●	●	●	●	●	●	N	
Bio-retention Systems	P	●	●	●	●	●	●	●	Y	
Trees	P	●	●		●	●	●	●	Y	
Pervious Pavements	S	●	●	●	●	○	○		Y	But only as a treatment train, not as an infiltration solution.
Attenuation Storage Tanks	P	●							Y	
Detention Basins	P	●	●		●	●	●		N	
Rainwater Gardens, Ponds and Wetlands	P	●			●	●	●		Y	

Table 10: SuDS Component Assessment

**Key:** P = Point, L=Lateral, S=Surface, ●=Likely Valuable Contribution, ○=Some potential contribution

With respect to water quality, it is proposed to use a simple index approach to water quality as described in Table 26.1 of the SuDS Manual (C753). Table 26.2 indicates the pollution indices for types of development which are considered as residential. Table 11 below summarises the pollution indices for the site.

Land Use	Pollution Hazard Level	Total Suspended Solids	Metals	Hydro-carbons
Residential roofs	Very Low	0.2	0.2	0.05
Individual driveways and low traffic roads (e.g. cul-de-sacs)	Low	0.5	0.4	0.4

Table11: Pollution Hazard Indices

### 5.6.3 Proposed SuDS Scheme

From the above, it is proposed that green roofs, which are likely to be either intensive or extensive, will be utilised on all aspects of the design. The exact classification is proposed to be designed post planning subject to site investigation and structural design.

The podium will also effectively function as a green roof, with those areas of landscaping contributing similar characteristics and as such will be designed as green roof areas alongside the actual roof areas.

For those elements of the podium which are not landscaped or roof areas, these will be drained through the permeable paving which will act as a suitable treatment train. The podium drainage will then discharge via a surface water drains as shown within Appendix K as per the masterplan for the area, with the contributing areas A and B shown in Appendix K and table 12 below.

The existing highways of Telcon Way and Telegraph Avenue will be drained via the existing arrangement of highway drains.

Description	Area A	Area B
Green Roof	1,917.7m <sup>2</sup>	3,035.7m <sup>2</sup>
Impermeable Roof	NA	349.5m <sup>2</sup>
Permeable Paving	349.8m <sup>2</sup>	601.2m <sup>2</sup>
Landscaping	282.8m <sup>2</sup>	948.6m <sup>2</sup>
TOTAL	2,550m <sup>2</sup>	4935m <sup>2</sup>

Table 12: Proposed Areas A&B

From Table 26.3 of the SuDS Manual (C753), the combination of permeable paving and green roofs is deemed to reduce the pollution indices to an acceptable level. Table 13 below includes the assessment.

Land Use	Total Suspended Solids	Metals	Hydro-carbons
Residential roofs	0.2	0.2	0.05
Green Roof	0.8	0.7	0.9
Suitable	Yes	Yes	Yes
Individual driveways and low traffic roads (e.g. cul-de-sacs)	0.5	0.4	0.4
Permeable Paving	0.7	0.6	0.7
Suitable	Yes	Yes	Yes

Table 13: Pollution Hazard Indices Post Development

The Microdrainage calculations included within Appendix K provide the flow from Areas A and B and also, for Area B, the storage required for the restricted run-off rate. Table 14 below provides a summary of the improvement to the existing site for Area A in line with the London Plan and NNPF. Area B will discharge in an un-attenuated form into the River Thames.

It is noted that for both areas, should a connection to the drain provided as part of the masterplan not be available for any reason, a new outfall into the River Thames could be provided and that this has been agreed in principle with the EA as shown in Appendix C.

<b>Greenfield Runoff Rate (Qbar)(l/s)</b>	1.0l/s		
<b>Existing Discharge Rate (l/s)</b>	Up to 111.13l/s		
<b>Proposed Attenuation Volume (m3)</b>	107m <sup>3</sup>		
<b>Site Runoff and Storage Volume</b>	<b>Runoff/Discharge Rate and betterment %</b>		<b>Required Storage Volume (m3)</b>
	<b>Existing Runoff Rate</b>	<b>Proposed Discharge Rate (% Betterment)</b>	
<b>1 in 1 year</b>	33.77l/s	5l/s(85.2%)	NA
<b>1 in 30 year</b>	85.10l/s	5l/s(94.1%)	NA
<b>1 in 100 year</b>	113.13l/s	5l/s(95.6%)	NA
<b>1 in 100 year + CC</b>	NA	5	107m <sup>3</sup>

Table 14: Runoff Rates and Volumes Area A

Appendix L contains the required SUDS Profoma for Areas A and B. It is highlighted that whilst Area B does discharge in an un-attenuated rate, it is still a reduced compared to the existing run-off rate from the site.

It is proposed that the above demonstrates the feasibility of the SUDS scheme for the site and that the exact detailed design of the drainage could be controlled via a suitably worded condition could be applied to enable the detailed drainage design in due course.

It is proposed that a suitably worded drainage condition is applied to any planning approval with the demonstration of feasibility demonstrated within this report as its basis.

## 5.7 Displaced Flood Plain

In the event of a breach scenario, the volume of storage capacity on the site should replicate that of the site pre-development. From Appendix B, the sites condition pre-demolition is included which shows a number of buildings on site. The buildings were demolished as an enactment of 10/3063/F and 15/0973/F.

The historic buildings displaced approximately 915m<sup>2</sup>, whereas the proposed development will displace approximately 800m<sup>2</sup>, with the basement area providing free access for flood water to enter and exit.

Therefore, the breach displaced flood plain will be marginally improved in comparison to the historic site use.

## 5.8 Maintenance

The maintenance for the surface water system will be critical in ensuring that the components function as they are designed to do over their design life time. A Maintenance Plan is included within Appendix M.

In terms of responsibility for the maintenance, this will lie with the site owners either directly or via a management company. If delegated to the tenants, this will be clearly communicated in any contract, lease or ground rent arrangement.

## 5.9 Post Development Flood Risk

Table 15 below provides a summary of the post development flood risk to the site and surrounding area from various sources as a function of the changes undertaken from the construction of the scheme.

Source of Flooding	Risk	Acceptable Level of Risk
From rivers	low	Yes
From the sea	low	Yes
From the land	low	Yes
From the ground	low	Yes
From sewers	low	Yes
From reservoirs	low	Yes

*Table 15: Post Development Flood Risk Summary*

## **6 RESIDUAL RISKS**

The residual risks to the development are considered as:

### **6.1 Flood Exceedance**

In the event that the outfall is blocked or there is an event greater than the 1% plus climate change 360-minute storm, then the site will suffer from an exceedance event. In this instance, the levels are to be designed so that the flow paths are directed away from the site entrances which could manage with flows of up to 150mm deep as shown on the exceedance flood flow plan in Appendix N.

### **6.2 Construction Run-Off**

During construction, the SuDS will not be constructed and therefore the contractor should ensure that no exceedance or contaminated run off from the site enters into the ground or TW sewer without suitable measures in place to contain the relevant event.

As contractors vary in their approach and programme to a scheme and considering that at the time of the application no contractor has been approached, it is proposed that if required this item is conditioned to ensure that the risk to the area is mitigated appropriately.

### **6.3 Lack of Maintenance**

As discussed above, SUDS drainage systems are more susceptible to failure due to lack of maintenance. The Maintenance Plan within Appendix M will mitigate this risk.

### **6.4 Breach Event**

In the event of a breach event affecting the site, the risk to the commercial units could be 'danger for all'. This risk will be reduced by a suitable flood plan meaning that both the commercial units and residences can be evacuated if a breach is expected or observed, as long as there is time and it is safe to do so and by having a safe refuge for every property.

As the residential units are above the breach event level, they are considered at an acceptable risk as long as the flood plans are observed.



## 7 OFF SITE IMPACTS

### 7.1 Impact of Surface Water Drainage

The proposed surface water design optimises SuDS and as such will reduce the flow from the site and improve the water quality and direct more of the flow into the tidal River Thames away from the existing TW sewers. Therefore, the proposal is deemed to have a **positive** impact on the surface water drainage in the area.

### 7.2 Impact of Development on Hydrological Morphology

The proposed system will not impact hydrological morphology in the area and therefore the site is considered as **neutral**.

### 7.3 Impact on Groundwater

The proposed development will not negatively impact on the groundwater in the local area and therefore the site is considered as **neutral**.

## 8 SUMMARY

The proposed development includes 564 residential units across three tower blocks up to 35 storeys in height, together with 1453m<sup>2</sup> commercial space (including employment, community and café uses). Amenity and public space provision, pedestrian routes, vehicular access, circulation and cycle and car parking will also be provided within a basement below a new podium level on an area measuring circa 1.17Ha.

The site is located off of Telcon Way and whilst in close proximity to the River Thames, benefits from the Thames Barrier and associated flood defences to the 100-year predicted extreme 0.1% event.

After a full assessment of policies, geographical and hydrology of the area, the site is considered at a low risk of flooding from the all sources of flooding. There is a 'danger for all' residual risk due to the nearby flood defences being breached or overtopped.

The river defence along the site boundary will be raised to 6.20m AOD where required and the ground floor of any residential properties will be set above the 0.5% event including Climate Change.

The residual risk is deemed acceptable through the use of mitigation measures which include a flood plan which details how the site will be evacuated and safe refuge provision. It is noted that all residential units are at the podium level or above meaning that they are above the modelled breach flood level.

Drainage calculations have been undertaken which provides a suitable strategy for discharging surface water and demonstrates the feasibility of the development proposals utilising SuDS in line with the London Plan and local policies.

The SuDS included are green roofs and permeable paving with discharge into the tidal River Thames and private sewer within Telcon Way as defined within the drainage masterplan for the area.

Overall, the proposals will have a positive impact to the flood risk in the area, reducing the flow off site into the local drain and sewer network and therefore lower the flood risk to the surrounding area, whilst the mitigation measures for the residual breach/overtopping event are considered acceptable.

**APPENDIX A**  
**Proposed Development**



### LEGEND

**GENERAL**

- Planning application boundary

**GENERAL ARRANGEMENT**

- Intensive green roof/ Vegetation over structure
- Flower-rich perennial planting
- Species-rich lawn
- Rain gardens
- Standard trees in ground
- Standard trees over structure
- Hedges
- Permeable paving
- Sealed surfaces
- Existing planting retained on site

### Urban Greening Factor Calculator

Surface Cover Type	Factor	Area (m <sup>2</sup> )	Contribution	Notes
Semi-natural vegetation (e.g. trees, woodland, species-rich grassland) maintained or established on site.	1	46	46	
Wetland or open water (semi-natural; not chlorinated) maintained or established on site.	1		0	
Intensive green roof or vegetation over structure. Substrate minimum settled depth of 150mm.	0.8	2233	1786.4	
Standard trees planted in connected tree pits with a minimum soil volume equivalent to at least two thirds of the projected canopy area of the mature tree.	0.8	885	708	
Extensive green roof with substrate of minimum settled depth of 80mm (or 60mm beneath vegetation blanket) – meets the requirements of GRO Code 2014.	0.7		0	
Flower-rich perennial planting.	0.7	742	519.4	
Rain gardens and other vegetated sustainable drainage elements.	0.7	416	291.2	
Hedges (line of mature shrubs one or two shrubs wide).	0.6	53	31.8	
Standard trees planted in pits with soil volumes less than two thirds of the projected canopy area of the mature tree.	0.6	378	226.8	
Green wall –modular system or climbers rooted in soil.	0.6		0	
Groundcover planting.	0.5		0	
Amenity grassland (species-poor, regularly mown lawns).	0.4	668	267.2	
Extensive green roof of sedum mat or other lightweight systems that do not meet GRO Code 2014.	0.3		0	
Water features (chlorinated) or unplanted detention basins.	0.2		0	
Permeable paving.	0.1	196	19.6	
Sealed surfaces (e.g. concrete, asphalt, waterproofing, stone).	0	2974	0	
<b>Total contribution</b>			<b>3896.4</b>	
<b>Total site area (m<sup>2</sup>)</b>				<b>9478</b>
<b>Urban Greening Factor</b>				<b>0.411099388</b>

Rev	Date	Description	By	CHK
PS1	25/11/2023	PLANNING	YL	RS

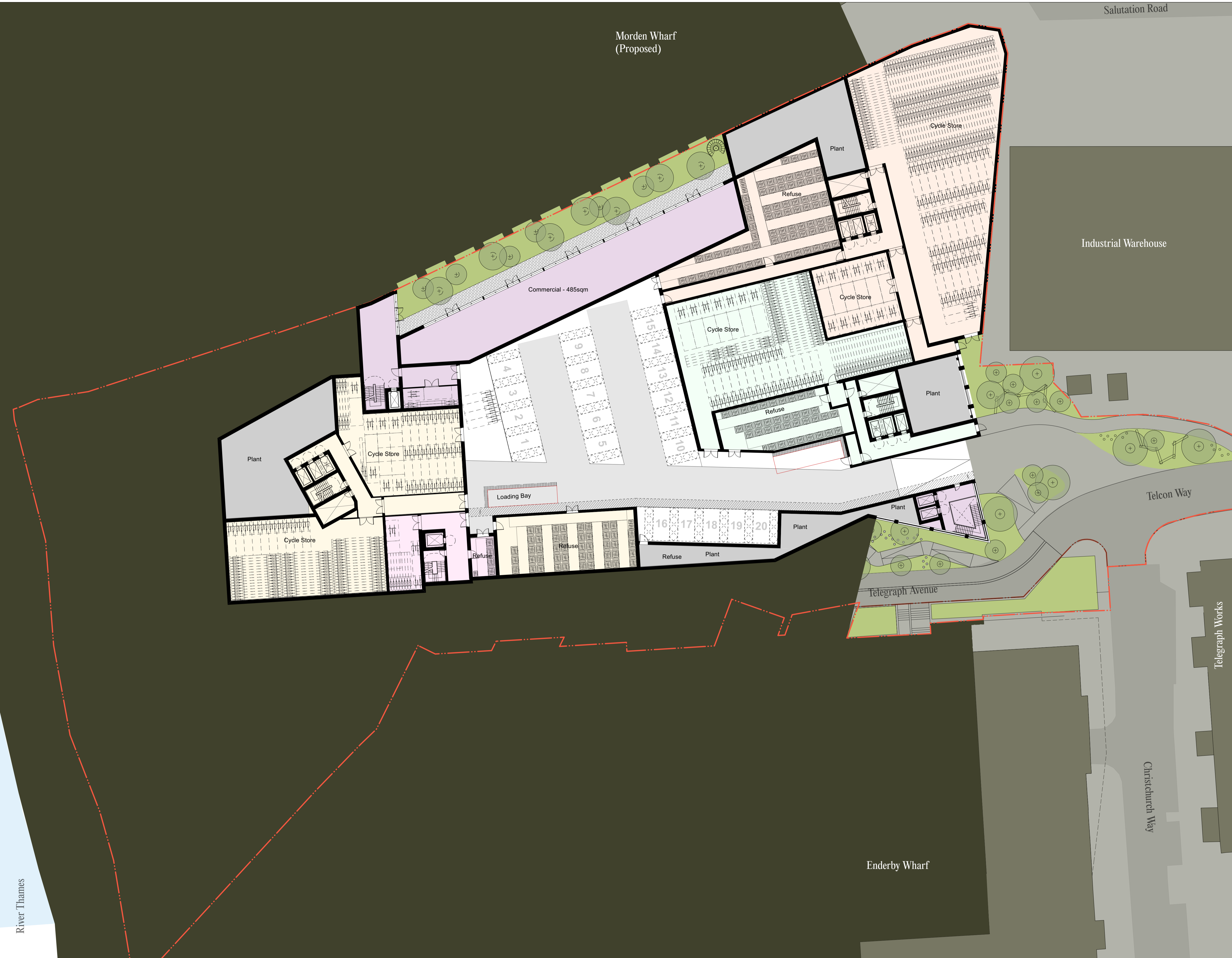
Project	Drawing status	Drawn by
Enderby Place	Planning	YL
Client	20/11/2023	RS
Maritime View Ltd	Drawing number	Rev
8416-PL-X-GA-102	Scale	1:200 @ AD

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Morden Wharf  
(Proposed)



GENERAL NOTES.

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All dimensions to be checked on site prior to commencement of any works, and/or preparation of any shop drawings.

Sizes of and dimensions to any structural elements are indicative only. See structural engineers drawings for actual sizes / dimensions.

Sizes of and dimensions to any service elements are indicative only. See service engineers drawings for actual sizes and dimensions.

This drawing to be read in conjunction with all other Architect's drawings, specifications and other Consultants' information.

All proprietary systems shown on this drawing are to be installed strictly in accordance with the Manufacturers/Suppliers recommended details.

Any discrepancies between information shown on this drawing and any other contract information or manufacturers/suppliers recommendations is to be brought to the attention of the Architect

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NOTES.

P1	10/11/23	PLANNING ISSUE		
REV. DATE	NOTE			DRAWN

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CLIENT  
**Criterion Capital**

PROJECT  
**Enderby Place**

DRAWING  
**Ground Level Plan**

SCALE  
**1:250 @ A1 (1:500 @ A3)**

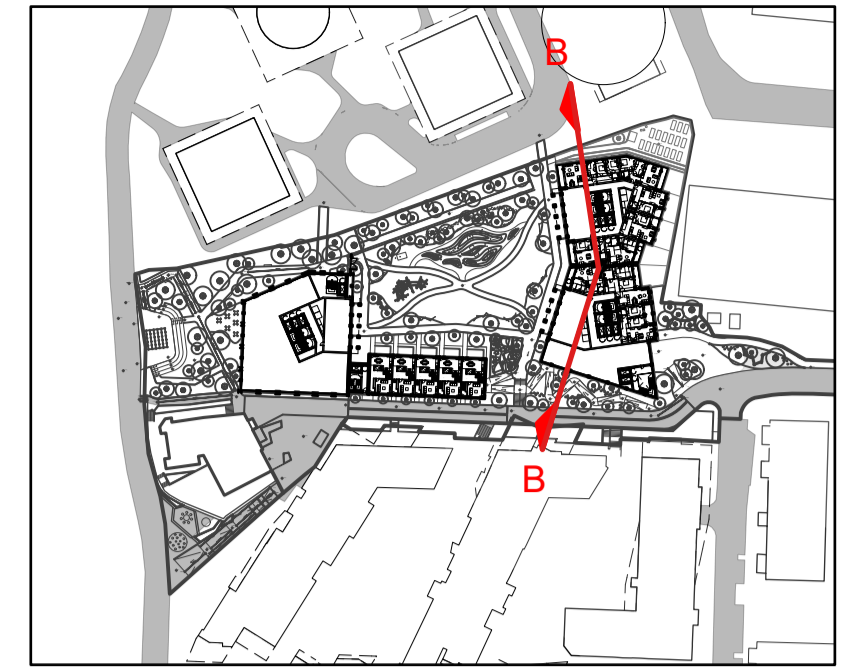
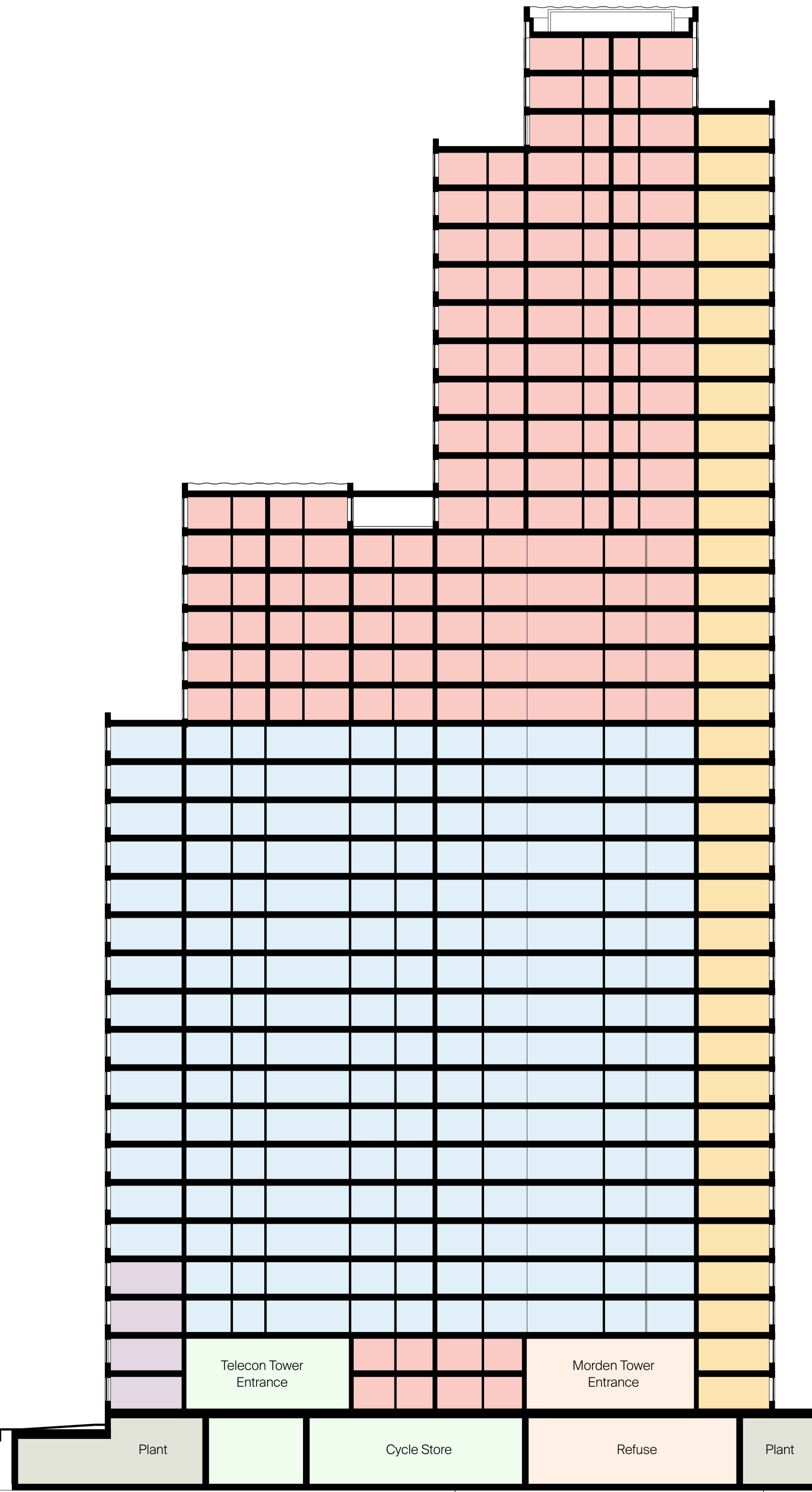
DATE  
**November 2023**

DWG No.  
**1136\_GA-00** REVISION  
**P1**

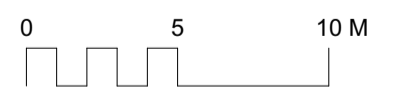
STATUS  
**PLANNING** APPROVED  
**AB**

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8.670 25  
8.370 24  
8.070 23  
7.760 22  
7.450 21  
7.140 20  
6.830 19  
6.520 18  
6.210 17  
5.900 16  
5.590 15  
5.280 14  
4.970 13  
4.660 12  
4.350 11  
4.040 10  
3.730 09  
3.420 08  
3.110 07  
2.800 06  
2.490 05  
2.180 04  
1.870 03  
1.560 02  
1.250 01  
9.470 Mezzanine  
6.370 Podium  
0.270 Ground

62.798 ROOF  
7.760 22  
7.450 21  
7.140 20  
6.830 19  
6.520 18  
6.210 17  
5.900 16  
5.590 15  
5.280 14  
4.970 13  
4.660 12  
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3.730 09  
3.420 08  
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2.800 06  
2.490 05  
2.180 04  
1.870 03  
1.560 02  
1.250 01  
9.470 Mezzanine  
6.370 Podium  
0.270 Ground



- KEY
- 1 BED
  - 2 BED
  - 3 BED
  - 4 BED



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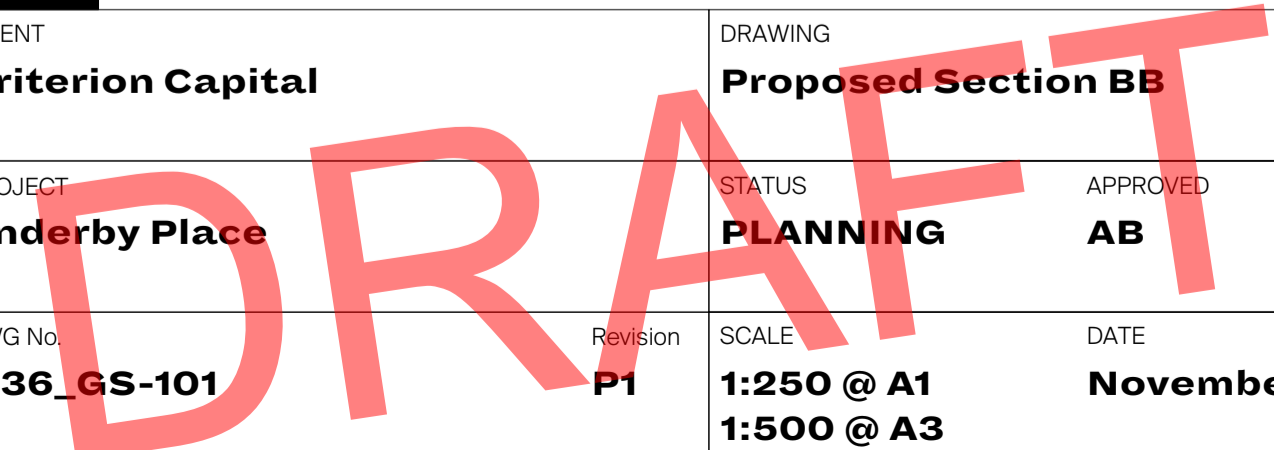
DRAWING NOTES:

P1	10/11/23	PLANNING ISSUE
REV.	DATE	NOTE
DRAWN		

CLIENT <b>Criterion Capital</b>	DRAWING <b>Proposed Section BB</b>
PROJECT <b>Enderby Place</b>	STATUS <b>PLANNING</b>
DWG No. <b>1136_GS-101</b>	APPROVED <b>AB</b>
Revision <b>P1</b>	DATE <b>November 2023</b>
SCALE <b>1:250 @ A1</b> <b>1:500 @ A3</b>	

CLIENT <b>Criterion Capital</b>	DRAWING <b>Proposed Section BB</b>
PROJECT <b>Enderby Place</b>	STATUS <b>PLANNING</b>
DWG No. <b>1136_GS-101</b>	APPROVED <b>AB</b>
Revision <b>P1</b>	DATE <b>November 2023</b>
SCALE <b>1:250 @ A1</b> <b>1:500 @ A3</b>	

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**APPENDIX B**  
**Topographic Survey**



RIVER THAMES

TELEGRAPH AVENUE

TELCON WAY

CHRISTCHURCH WAY



Notes

KEY  
 Grid - Local Plane Metric  
 Datum - OSBM 1.69m, Located on East face of No.33 Blackwell Lane  
 OSBM 2.8m, Located on North East face of 100 Turrell Avenue  
 A 20mm error was found between them, we took a mean.

STANDARD ABBREVIATIONS

ACU - AIR CON UNIT	MH - MANHOLE
AL - ALARM	Misc - MISCELLANEOUS
AV - AIR VALVE	MP - MILE STONE / POST
BA - BUOYANCY AID	NP - NAME PLATE
BE - BENCH	NYX - NYNEX
BB - BELISHA BEACON	OC - OLIVER CONTROL
BD - BOULDER	OH - OVERHEAD
BH - BOREHOLE	OSBM - ORDINANCE SURVEY
BL - BASEMENT LIGHT	BM - BENCH MARK
BO - BOLLARD	PB - PILLAR BOX
BP - BOUNDARY POST	PC - POST & CHAIN
BS - BUS STOP	PR - POST & RAIL
BU - BUSH	PS - PAUSAIDE
BW - BARBED WIRE	PC - PEDESTRIAN CROSSING
CA - CABLE	PH - PUBLIC HOUSE
CB - CONTROL BOX	PI - PIPE
C/B - CLOSE BOARD	PM - PARKING METER
CC - CLOSE CIRCUIT TV	PO - POST
CI - CORRUGATED IRON	PP - PETROL PUMP
CL - CHAIN LINK	P/W - POST & WIRE
CoJ - COLUMN	RE - ROODING EYE
CL - COVER LEVEL	RP - REFLECTOR POST
CP - CATHODIC TEST POINT	RS - ROAD SIGN
C/P - CONCRETE PANEL	RTW - RETAINING WALL
CJ - CULVERT	RWP - RAIN WATER PIPE
DP - DOWN PIPE	SA - STANCHION
D/Ch - DRAINAGE CHANNEL	SC - SPEED CAMERA
EL - ELECTRICITY	SMP - SERVICE MARKER POST
EP - ELECTRICITY PYLON	SI - SIGN
ER - EARTH ROD	SS - SECURITY SENSOR
FA - FENDOR ANCHOR	SL - SOFFIT LEVEL
FB - FOOTBRIDGE	ST - STOP TAP
FH - FIRE HYDRANT	STN - STATION
FL - FLOODLIGHT	SU - STUMP
FP - FOOTPATH	SV - STOP VALVE
FS - FLAG STAFF	SY - STAY
GA - GAS	TBM - TEMPORARY BENCH MARK
G - GIRTH	TCB - TELEPHONE CALL BOX
GP - GATE POST	Tel - TELECOM
GU - GULLY	TK - TANK
GV - GAS VALVE	TM - TICKET MACHINE
HT - HEIGHT	TS - TRAFFIC SIGNAL
IR - IRON RAILING	TP - TELEGRAPH POLE
IC - INSPECTION COVER	UTL - UNABLE TO LIFT
IL - INVERT LEVEL	VDP - VEHICLE DETECTOR PAD
IT - TRAFFIC COVER	VP - VENT PIPE
KO - KERB OFFSET	W - WIDTH
LA - LADDER	WL - WATER LEVEL
LB - LITTER BIN	WM - WIRE MESH
LC - LIGHTING COLUMN	WM - WATER METER
LI - LIGHT	WO - WASH OUT
LP - LAMP POST	
(FW) - FOUL WATER	(SW) - STORM WATER

SYMBOLS

TREE

GATE

BUILDING HATCH

SHEET LAYOUT

001 / 2	001 / 3	001 / 4
---------	---------	---------

Rev	Date	Drawn	Description	Chk'd	App'd
0	13.02.08		Original Drawing		

**ND OLIVER & CO**  
 CONSULTING ENGINEERS

**N D Oliver & Co Ltd**  
 Ptolemy House  
 7 School Road  
 Sale  
 Manchester M33 7XY

Telephone 0161 973 3495  
 Facsimile 0161 963 919  
 E-mail: mail@ndoliver.com

**RICS**

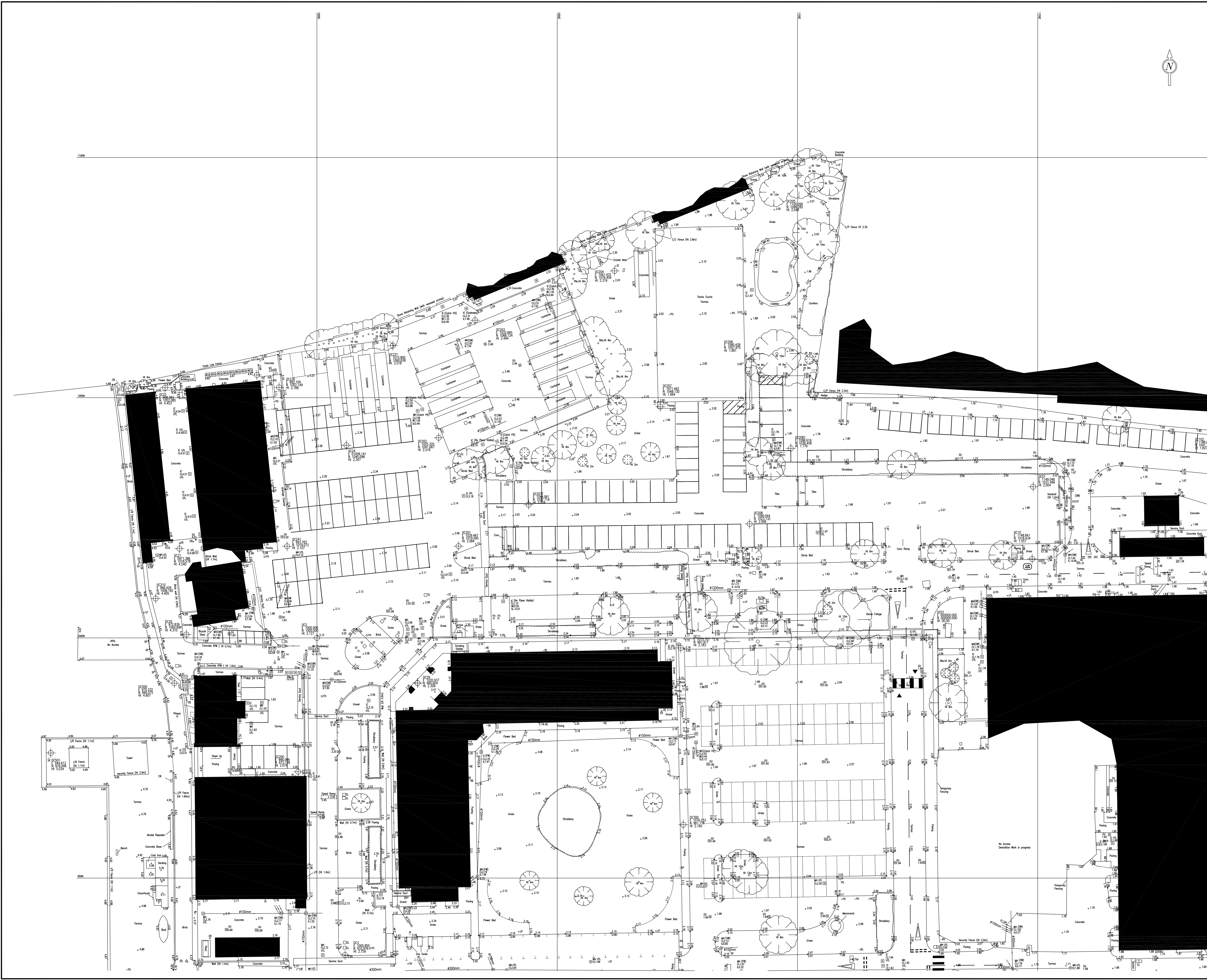
Client

**WEST PROPERTIES (UK) LTD**  
 STUDIO A  
 NEW CRANE WHARF  
 NEW CRANE PLACE  
 LONDON E1W 3TX

Title

**ALCATEL SITE  
 GREENWICH  
 LONDON  
 TOPOGRAPHICAL SURVEY  
 SHEET 1 OF 4**

Surveyed	TS	Drawn	TS
Drawn	AWP	Approved	NDO
Scale	1:250 @ A0	Project	6252
Scale	CAD file	Status	ORIG
Drawing No.	N6252 / W1034 - 9 / 001 / 1	Rev	0



**APPENDIX C**  
**EA Pre-Application Consultation**

Mark Bullen  
Taylor Yates  
Maritime View Ltd  
C/O Criterion Capital  
16 Babmaes Street  
London  
SW1Y 6HD

**Our ref:** SL/2022/122257/01-L01  
**Your ref:** Enderby Place

**Date:** 27 October 2022

Dear Mark

**ENPAC/1/KSL/00579 the proposed development includes circa 750 residential units across three tower blocks up to 32 storeys in height, together with approximately 1,900 m2 commercial space (including office, employment, restaurant and café uses) ('development'). Amenity and public space provision, pedestrian routes, vehicular access, circulation and cycle and car parking will also be provided within a basement.**

#### **Enderby Place Christchurch Way Greenwich SE10 0AG**

Thank you for consulting us on the above site for pre application advice. With regards to the submitted documentation we have the following comments in response to your email dated 22/09/2022.

1. The applicant will have to assess the flood defence and demonstrate that it will protect the site for the development's lifetime. This will mean showing that the defence will be structurally safe for the lifetime of the development, and that it will meet the future TE2100 defence levels. If the defence has already been raised to this level, the applicant will need to demonstrate this in their FRA/planning application.
2. The Sequential test would have been passed if a previous planning application has been granted, however they would still need to demonstrate this in their application.
3. A new surface water outfall can be constructed if completely necessary. This will require two lines of defence preventing tidal ingress flowing back through the pipe. And will require a Flood Risk Activity Permit to carry out the actual works. TTWE APT will need to agree to the proposed design of this outfall.
4. The FRA will need to cover the risk of a tidal breach, so demonstrate how the site occupants will stay safe during a breach event (essentially all areas of the site need to have access to), and show that there will be no sleeping accommodation below the breach level

We have some comments and questions in relation to the drawings provided, please see below.

### **Elevations**

1. Please clarify whether levels in the Site Layout package drawings are in metres Above Ordnance Datum?
2. We require all floor heights in metres Above Ordnance Datum (e.g., PODIUM MEZZANINE LEVEL", "LEVEL 1" etc.).
3. Is the carpark and commercial space in the basement, or at ground level?

### **Breach levels**

Once it is clarified by Applicant what the proposed elevations are in metres Above Ordnance Datum for their proposal, there are the following considerations:

1. Is the green area in drawing for "GROUND LEVEL" residential, and is this below breach level?
2. Is the Commercial area at "GROUND LEVEL", and the Residential area at "PODIUM LEVEL" below breach level?

### **Adjacent flood defence (i.e., S438/03):**

1. Are there an as-built drawing of the structure?
2. What is the current flood defence height? Not if it is below the TE2100 2100 level of 6.20m AOD we will require a raising strategy and clarity on whether the flood defence can support the extra load and maintain required design life.
3. What is the design life of the flood defence? Note it needs to be at least 100 years to ensure it is commensurate with the design-life of the proposed residential development.
4. What is the flood defence design type (e.g., cantilevered or including buried elements)? If it has buried elements, we would need to know how far these extend landward.
5. Please note that the TE2100 Plan 2065 level is 5.70m AOD and the 2100 level in 6.20mAOD.

We would like to remind the Riparian Owner of their responsibility to ensure a fit for purpose flood defence line is maintained in line with s.6 of the Metropolis Management (Thames River Prevention of Flood) Act 1879 to 1962 (The Act).

### **What is the Metropolis Management Act?**

The Metropolis Management Act 1879 to 1962 is a series of acts passed to ensure the flood defences in London are maintained, in order to protect the city from flooding. They set out the responsibilities of Riparian Owners within the London Excluded Area. The acts place full responsibility on Riparian Owners for the renewal and maintenance of flood defences. They also grant the Environment Agency powers to inspect flood defences, instruct Riparian Owners to carry out works, or deliver works where the Riparian Owners do not, and then reclaim the cost.

The full acts can be accessed here:

<https://www.legislation.gov.uk/ukla/1879/198/contents/enacted>

It should be noted that any works directly to or within 16 metres of a tidal flood defence will require a flood risk activity permit. For further guidance on permits and exemptions please visit our website at [www.gov.uk/guidance/flood-risk-activities-environmental-permits](http://www.gov.uk/guidance/flood-risk-activities-environmental-permits) or call our National Customer Contact Centre (NCCC) 03708 506 506.

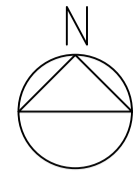
Please do not hesitate to contact me if needed.

Yours sincerely

**Mr Randeep Dhanjal**  
**Planning Advisor**

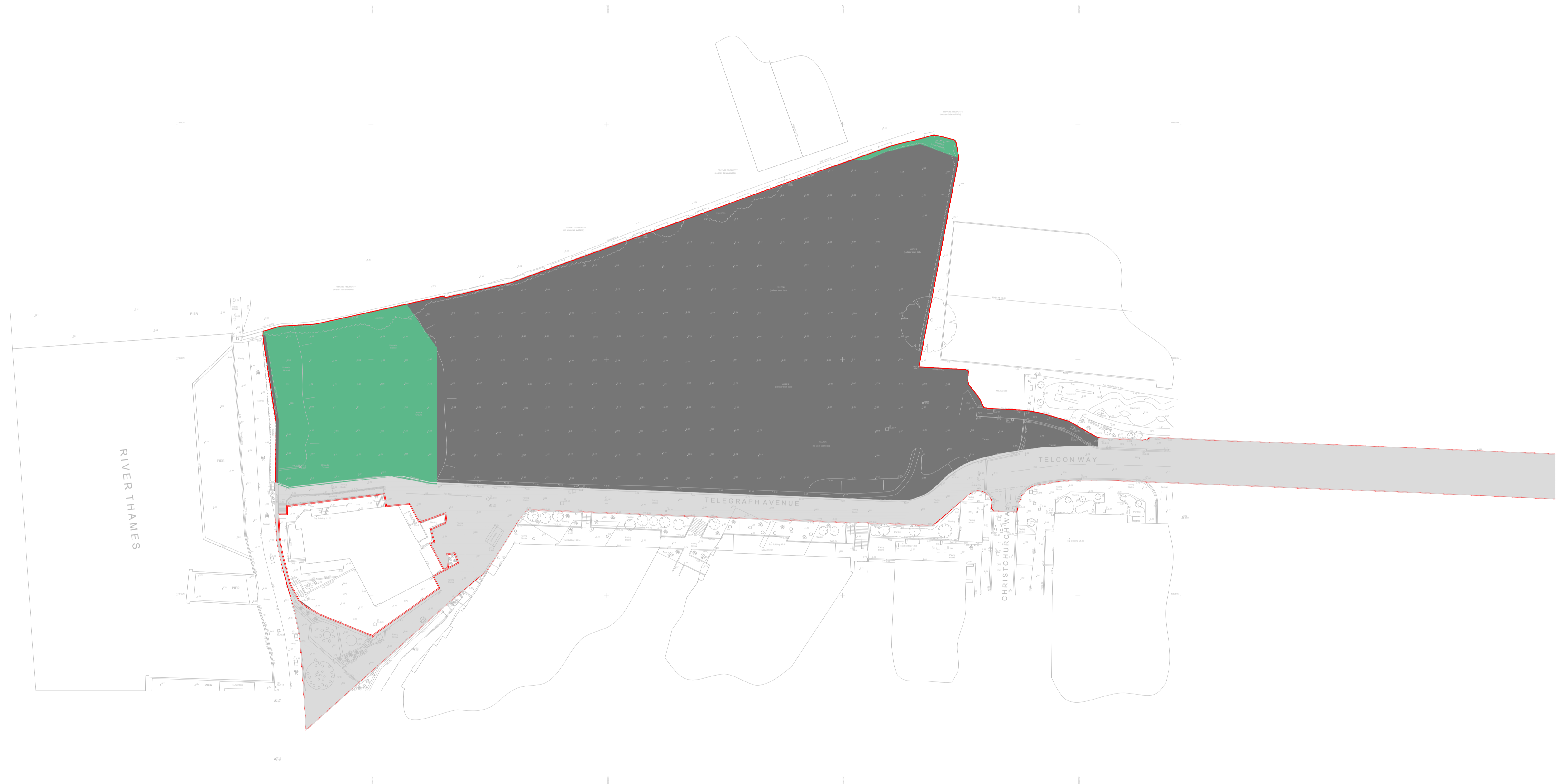
Direct e-mail [kslplanning@environment-agency.gov.uk](mailto:kslplanning@environment-agency.gov.uk)

**APPENDIX D**  
**Impermeable Areas**



KEY:

- LANDSCAPE/PERMEABLE AREAS
- HARDSTANDING AREAS
- EXISTING PUBLIC HIGHWAY



NOTES:

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2. DIMENSIONS MUST NOT BE SCALED FROM THE ENGINEERS DRAWINGS.
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4. THIS DRAWING IS FOR PLANNING PURPOSES ONLY AND SHALL NOT BE USED FOR CONSTRUCTION
5. SURFACE FLOOD ZONES ARE BASED ON ENVIRONMENT AGENCY ONLINE LONG TERM MAPS

SCALE: 1:500

P2	29.11.23	PLANNING LAYOUT
P1	12.10.22	ISSUED FOR PLANNING

client

MARITIME VIEW LTD

architect

BUCKLEY GRAY YEOMAN

project

ENDERBY PLACE  
GREENWICH

title

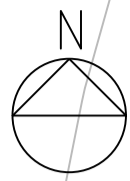
EXISTING IMPERMEABLE AREAS

drawing number

0711-001-P2



MAB Consultancy Ltd Wymondham Norfolk  
 Tel: +44 (0)7881 527107 +44 (0)1953 602524  
 Email: [office@mabconsultingltd.com](mailto:office@mabconsultingltd.com)  
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**KEY:**

- ROOF AREAS
- LANDSCAPE/PERMEABLE AREAS
- HARDSTANDING AREAS
- EXISTING HIGHWAY

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4. THIS DRAWING IS FOR PLANNING PURPOSES ONLY AND SHALL NOT BE USED FOR CONSTRUCTION
5. SURFACE FLOOD ZONES ARE BASED ON ENVIRONMENT AGENCY ONLINE LONG TERM MAPS



SCALE: 1:250

P4	29.11.23	FINAL LAYOUT

client  
**MARITIME VIEW LTD**

architect  
**BUCKLEY GRAY YEOMAN**

project  
**ENDERBY PLACE GREENWICH**

title  
**EXISTING IMPERMEABLE AREAS**

drawing number  
**0711-002-P4**



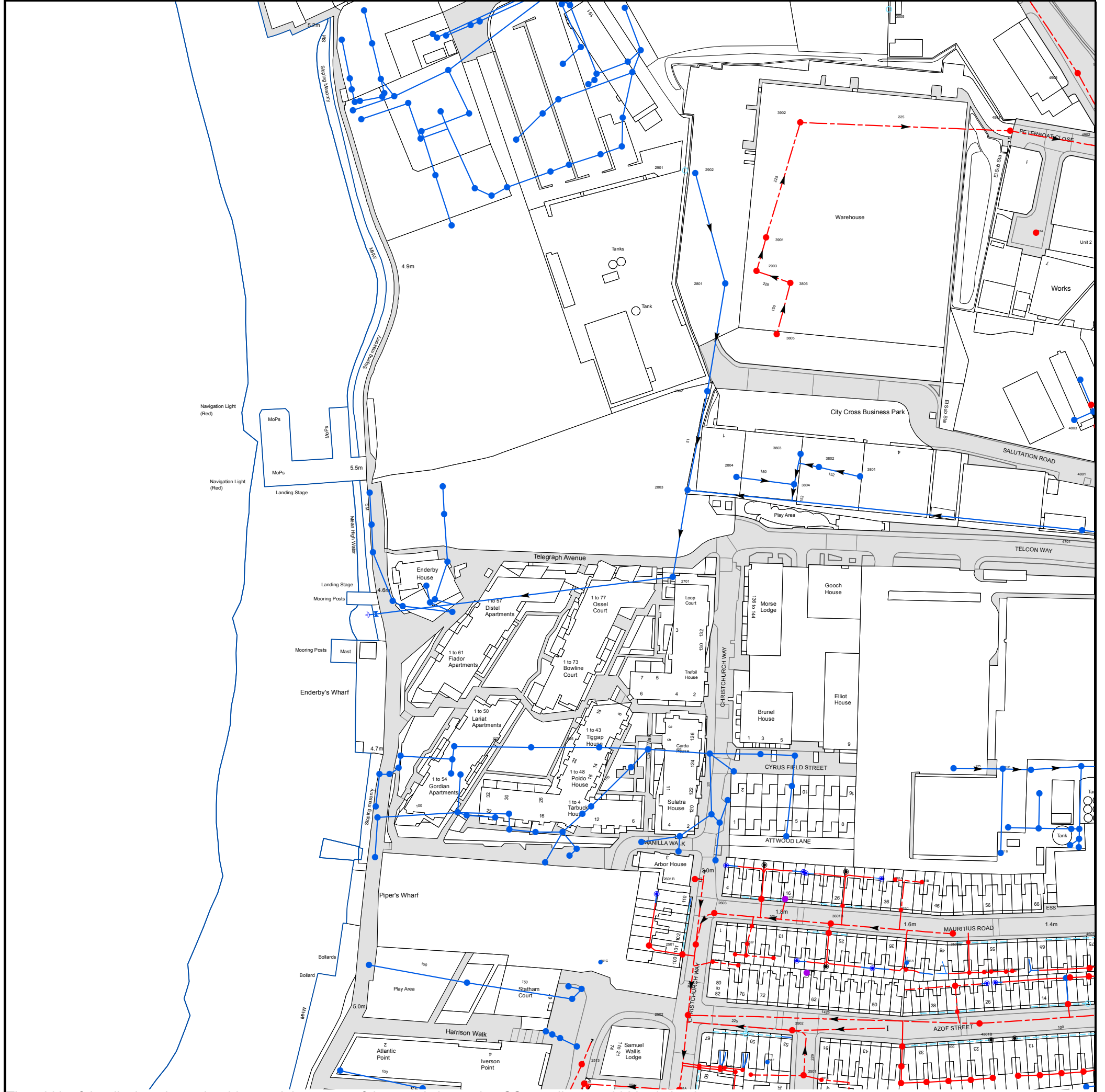
MAB Consultancy Ltd Wymondham Norfolk  
Tel: +44 (0)7881 527107 +44 (0)1953 602524  
Email: [office@mabconsultingltd.com](mailto:office@mabconsultingltd.com)  
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**APPENDIX E**

**Thames Water Asset Maps & Pre-Application Response**

**Asset Location Search Sewer Map - ALS/ALS Standard/2022\_4718198**



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 539205,178776

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

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

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
45VR	n/a	n/a
45VQ	n/a	n/a
45TU	n/a	n/a
35WQ	n/a	n/a
35WR	n/a	n/a
35UV	n/a	n/a
451F	n/a	n/a
451E	n/a	n/a
45UT	n/a	n/a
451D	n/a	n/a
451C	n/a	n/a
45VT	n/a	n/a
45VS	n/a	n/a
29YQ	n/a	n/a
29YW	n/a	n/a
29ZR	n/a	n/a
29ZV	n/a	n/a
29ZU	n/a	n/a
20YT	n/a	n/a
29YS	n/a	n/a
29YU	n/a	n/a
29YT	n/a	n/a
2901	3.01	-.05
2902	4.67	-.08
2802	4.44	-.78
2801	n/a	n/a
2903	n/a	n/a
3901	4.35	2.21
3805	4.76	2.86
3806	4.34	2.57
3902	4.15	1.93
3803	4.6	1.99
3005	n/a	n/a
4901	3.03	1.24
491A	n/a	n/a
48ZQ	n/a	n/a
4903	2.36	-1.05
48ZS	n/a	n/a
4802	3.7	2.98
48ZR	n/a	n/a
4803	3.67	2.51
48YZ	n/a	n/a
46ZS	n/a	n/a
46YV	n/a	n/a
46ZT	n/a	n/a
46ZV	n/a	n/a
461C	n/a	n/a
36WU	n/a	n/a
46ZU	n/a	n/a
36WW	n/a	n/a
4701	1.89	-.53
3804	4.19	1.3
3801	4.07	3.26
3802	4.21	2.75
4501B	1.55	-2.17
35VR	n/a	n/a
45SU	n/a	n/a
35UX	n/a	n/a
45TQ	n/a	n/a
45RX	n/a	n/a
351B	n/a	n/a
351A	n/a	n/a
3503B	1.5	-.24
361B	n/a	n/a
461B	n/a	n/a
46YY	n/a	n/a
46YZ	n/a	n/a
46YW	n/a	n/a
46ZR	n/a	n/a
46ZQ	n/a	n/a
45ST	n/a	n/a
45SZ	n/a	n/a
45XX	n/a	n/a
45XU	n/a	n/a
251G	n/a	n/a
251E	n/a	n/a
2603	1.92	-.39
25YZ	n/a	n/a
251D	n/a	n/a
25YT	n/a	n/a
251F	n/a	n/a
2514	n/a	n/a
26YS	n/a	n/a
351F	n/a	n/a
35ZR	n/a	n/a
3502	1.82	-.33
3501	1.9	.2
351C	n/a	n/a
351E	n/a	n/a
35XT	n/a	n/a
3601B	1.66	-.39

Manhole Reference	Manhole Cover Level	Manhole Invert Level
36XY	n/a	n/a
361A	n/a	n/a
361C	n/a	n/a
35UR	n/a	n/a
35UQ	n/a	n/a
251A	1.62	-2.416
35US	n/a	n/a
35UT	n/a	n/a
35UU	n/a	n/a
25WZ	n/a	n/a
25UZ	n/a	n/a
25WY	n/a	n/a
26WY	n/a	n/a
26WU	n/a	n/a
25ZU	n/a	n/a
26WS	n/a	n/a
26WT	n/a	n/a
25ZT	n/a	n/a
2502	1.71	-2.32
2601B	1.95	.61
2501	1.92	-.39
25WX	n/a	n/a
25VT	n/a	n/a
26XV	n/a	n/a
26XX	n/a	n/a
26XW	n/a	n/a
25VU	n/a	n/a
251C	n/a	n/a
26XR	n/a	n/a
25UV	n/a	n/a
36ZT	n/a	n/a
361D	n/a	n/a
36WY	n/a	n/a
36WX	n/a	n/a
15ZX	n/a	n/a
16YY	n/a	n/a
16ZW	n/a	n/a
16YX	n/a	n/a
16ZV	n/a	n/a
16ZU	n/a	n/a
16YW	n/a	n/a
16YT	n/a	n/a
16YR	n/a	n/a
15ZW	n/a	n/a
16YS	n/a	n/a
16YV	n/a	n/a
16ZX	n/a	n/a
16ZY	n/a	n/a
26XZ	n/a	n/a
25UT	n/a	n/a
25UQ	n/a	n/a
25US	n/a	n/a
26XQ	n/a	n/a
25TX	n/a	n/a
26WW	n/a	n/a
25TW	n/a	n/a
26WV	n/a	n/a
25UR	n/a	n/a
25TY	n/a	n/a
2513	n/a	n/a
26WZ	n/a	n/a
15ZU	n/a	n/a
251B	2.205	-2.46
15ZV	n/a	n/a
16YU	n/a	n/a
26WR	n/a	n/a
16ZT	n/a	n/a
26WX	n/a	n/a
16ZR	n/a	n/a
16ZS	n/a	n/a
36WV	n/a	n/a
26XS	n/a	n/a
26XT	n/a	n/a
16YZ	n/a	n/a
26XU	n/a	n/a
16ZQ	n/a	n/a
17YY	n/a	n/a
17YZ	n/a	n/a
17YW	n/a	n/a
17ZS	n/a	n/a
17ZV	n/a	n/a
17YX	n/a	n/a
2701	n/a	n/a
17ZW	n/a	n/a
17ZT	n/a	n/a
17ZQ	n/a	n/a
17ZX	n/a	n/a
17ZR	n/a	n/a
2803	n/a	n/a
18ZY	n/a	n/a
2804	4.21	3.33
19ZS	n/a	n/a
19ZW	n/a	n/a
















Manhole Reference	Manhole Cover Level	Manhole Invert Level
19ZY	n/a	n/a
19ZX	n/a	n/a
19XY	n/a	n/a
29ZQ	n/a	n/a
29ZS	n/a	n/a
19YX	n/a	n/a
19ZT	n/a	n/a
19ZR	n/a	n/a
19YV	n/a	n/a
19ZQ	n/a	n/a
29YY	n/a	n/a
19ZV	n/a	n/a
19YT	n/a	n/a
19YW	n/a	n/a
19YS	n/a	n/a
19YR	n/a	n/a
29YZ	n/a	n/a
19XU	n/a	n/a
19YY	n/a	n/a
19YQ	n/a	n/a
19XV	n/a	n/a
29YR	n/a	n/a
19YU	n/a	n/a
19XW	n/a	n/a
19YZ	n/a	n/a
29YX	n/a	n/a
29ZT	n/a	n/a
19XZ	n/a	n/a
19XX	n/a	n/a
10ZS	n/a	n/a
10ZW	n/a	n/a
10ZT	n/a	n/a
10ZV	n/a	n/a
10ZU	n/a	n/a
10WZ	n/a	n/a
20ZQ	n/a	n/a
20ZY	n/a	n/a

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









# Asset Location Search - Sewer Key

## Public Sewer Types (Operated and maintained by Thames Water)

-  **Foul Sewer:** A sewer designed to convey waste water from domestic and industrial sources to a treatment works.
-  **Surface Water Sewer:** A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.
-  **Combined Sewer:** A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.
-  Storm Sewer
-  Sludge Sewer
-  Foul Trunk Sewer
-  Surface Trunk Sewer
-  Combined Trunk Sewer
-  Foul Rising Main
-  Surface Water Rising Main
-  Combined Rising Main
-  Vacuum
-  Thames Water Proposed
-  Vent Pipe
-  Gallery

## Other Sewer Types (Not operated and maintained by Thames Water)

-  Sewer
-  Culverted Watercourse
-  Proposed
-  Decommissioned Sewer
-  Content of this drainage network is currently unknown
-  Ownership of this drainage network is currently unknown

### Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plan are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate the direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.

## Sewer Fittings

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

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

## Operational Controls

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

-  Ancillary
-  Drop Pipe
-  Control Valve
-  Weir

## End Items

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

-  Inlet
-  Outfall
-  Undefined End




## Other Symbols

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





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

## Areas

Lines denoting areas of underground surveys, etc.

-  Agreement
-  Chamber
-  Operational Site

## Ducts or Crossings

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

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

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

# Sewer Flooding

History Enquiry



Property Searches

MAB Consultancy

24 Petunia Court

**Search address supplied** Enderby House  
23  
Telegraph Avenue  
London  
SE10 0TH

**Your reference** 0711

**Our reference** SFH/SFH Standard/2022\_4718202

**Received date** 14 September 2022

**Search date** 14 September 2022



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



[searches@thameswater.co.uk](mailto:searches@thameswater.co.uk)  
[www.thameswater-propertysearches.co.uk](http://www.thameswater-propertysearches.co.uk)



0800 009 4540

# Sewer Flooding

History Enquiry



Property Searches

**Search address supplied:** Enderby House,23,Telegraph Avenue,London,SE10  
0TH

**This search is recommended to check for any sewer flooding in a specific address or area**

TWUL, trading as Property Searches, are responsible in respect of the following:-

- (i) any negligent or incorrect entry in the records searched;
- (ii) any negligent or incorrect interpretation of the records searched;
- (iii) and any negligent or incorrect recording of that interpretation in the search report
- (iv) compensation payments



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



[searches@thameswater.co.uk](mailto:searches@thameswater.co.uk)  
[www.thameswater-propertysearches.co.uk](http://www.thameswater-propertysearches.co.uk)



0800 009 4540



### History of Sewer Flooding

#### **Is the requested address or area at risk of flooding due to overloaded public sewers?**

The flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers.

For your guidance:

- A sewer is “overloaded” when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.
- “Internal flooding” from public sewers is defined as flooding, which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.
- “At Risk” properties are those that the water company is required to include in the Regulatory Register that is presented annually to the Director General of Water Services. These are defined as properties that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Company’s reporting procedure.
- Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included on the At Risk Register.
- Properties may be at risk of flooding but not included on the Register where flooding incidents have not been reported to the Company.
- Public Sewers are defined as those for which the Company holds statutory responsibility under the Water Industry Act 1991.
- It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Company. This report excludes flooding from private sewers and drains and the Company makes no comment upon this matter.
- For further information please contact Thames Water on Tel: 0800 316 9800 or website [www.thameswater.co.uk](http://www.thameswater.co.uk)



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



[searches@thameswater.co.uk](mailto:searches@thameswater.co.uk)  
[www.thameswater-propertysearches.co.uk](http://www.thameswater-propertysearches.co.uk)



0800 009 4540



Mr Mark Bullen  
**MAB Consultancy Ltd**  
24 Petnuia Court  
Wymondgam  
Norfolk  
NR18 0FR



25 October 2023

## Pre-planning enquiry: Capacity concerns

**Site: Enderby Place, Telegraph Road, Royal Borough of Greenwich, SE10 0TH**

Dear Mr Bullen,

Thank you for Pre-planning application for the construction of 594 residential flats & 151sqm of commercial premises.

We have completed the assessment of the foul water flows and surface water run-off based on the information submitted in your application with the purpose of assessing sewerage capacity within the existing Thames Water sewer network.

We've assessed your foul and surface water proposals and concluded that our sewerage network **will not** have enough capacity for full development at this time.

### Combined discharge

*Proposed foul & surface water (combined) to discharge via gravity into an existing private drain, final outfall of the private drain is into an existing 225mm diameter foul water located within Christchurch Way upstream from manhole chamber TQ3978 2501.*

*Surface water restricted to a maximum of **3.2 litres/sec.** for all storm events up to and including 1:100yr+40%CC.*

In order to ensure we make the appropriate upgrades – or 'off-site reinforcement' – to serve the remainder of your development, we'll need to carry out modelling work, design a solution and build the necessary improvements. This work is done at our cost.

Once we've begun modelling, we may need to contact you to discuss changing the connection point for capacity reasons. Please note that we'll pay the cost of covering any extra distance if the connection needs to be made at a point further away than the nearest practicable point of at least the same diameter.

### How long could modelling and reinforcement take?

Typical timescales for a development of your size are:

**Modelling:** 8 months

**Design:** 6 months

**Construction:** 6 months

**Total:** 20 months



If the time you're likely to take from planning and construction through to first occupancy is longer than this, we'll be able to carry out the necessary upgrades in time for your development. If it's shorter, please contact me on the number below to discuss the timing of our activities.

### Surface Water Hierarchy

In accordance with the Building Act 2000 Clause H3.3, positive connection of surface water to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable. Before we can consider your surface water needs, you'll need written approval from the lead local flood authority that you have followed the sequential approach to the disposal of surface water and considered all practical means.

The disposal hierarchy being:

1. store rainwater for later use.
2. use infiltration techniques where possible.
3. attenuate rainwater in ponds or open water features for gradual release.
4. attenuate rainwater by storing in tanks or sealed water features for gradual release.
5. discharge rainwater direct to a watercourse.
6. discharge rainwater to a surface water sewer/drain.
7. discharge rainwater to the combined sewer.
8. discharge rainwater to the foul sewer

Where connection to the public sewerage network is still required to manage surface water flows we will accept these flows at a discharge rate in line with CIRIA's best practice guide on SuDS or that stated within the sites planning approval.

Please see the attached 'Planning your wastewater' leaflet for additional information.

### What do I need to do next?

If you've satisfied the points above, then you should compare your own timeline with the typical timescales we've suggested for our activities. If the time you're likely to take from planning and construction through to first occupancy is **more** than the total time we're likely to take, we'll be able to carry out the necessary upgrades in time for your development.

If it's **less** than this, you might want to ask us to start modelling earlier – in which case we'll require you to underwrite the cost, as noted above.

### What do you need to tell us before we start modelling?

We will only carry out modelling once we're confident that your development will proceed. In order to have this confidence, we'll need to know that you **own the land and have either outline or full planning permission**. Please email this information to us as soon as you have it.

If the modelling shows we need to carry out reinforcement work, then before we start construction we'll need you to supply us with notification that you've confirmed your F10 – Notification of construction project - submission to the Health and Safety Executive.



If you've any further questions, please do not hesitate to contact me.

Yours sincerely,

**Colins Akemche**

Clean & Waste Pre-Planning Engineer  
Adoption Team - Service Delivery

Thames Water - Developer Services - Ground Floor West - Clearwater Court - Vastern Road  
Reading -Berkshire - RG1 8DB - Tel: 0800 009 3921

Email: [developer.services@thameswater.co.uk](mailto:developer.services@thameswater.co.uk) - Web: [www.developerservices.co.uk](http://www.developerservices.co.uk)

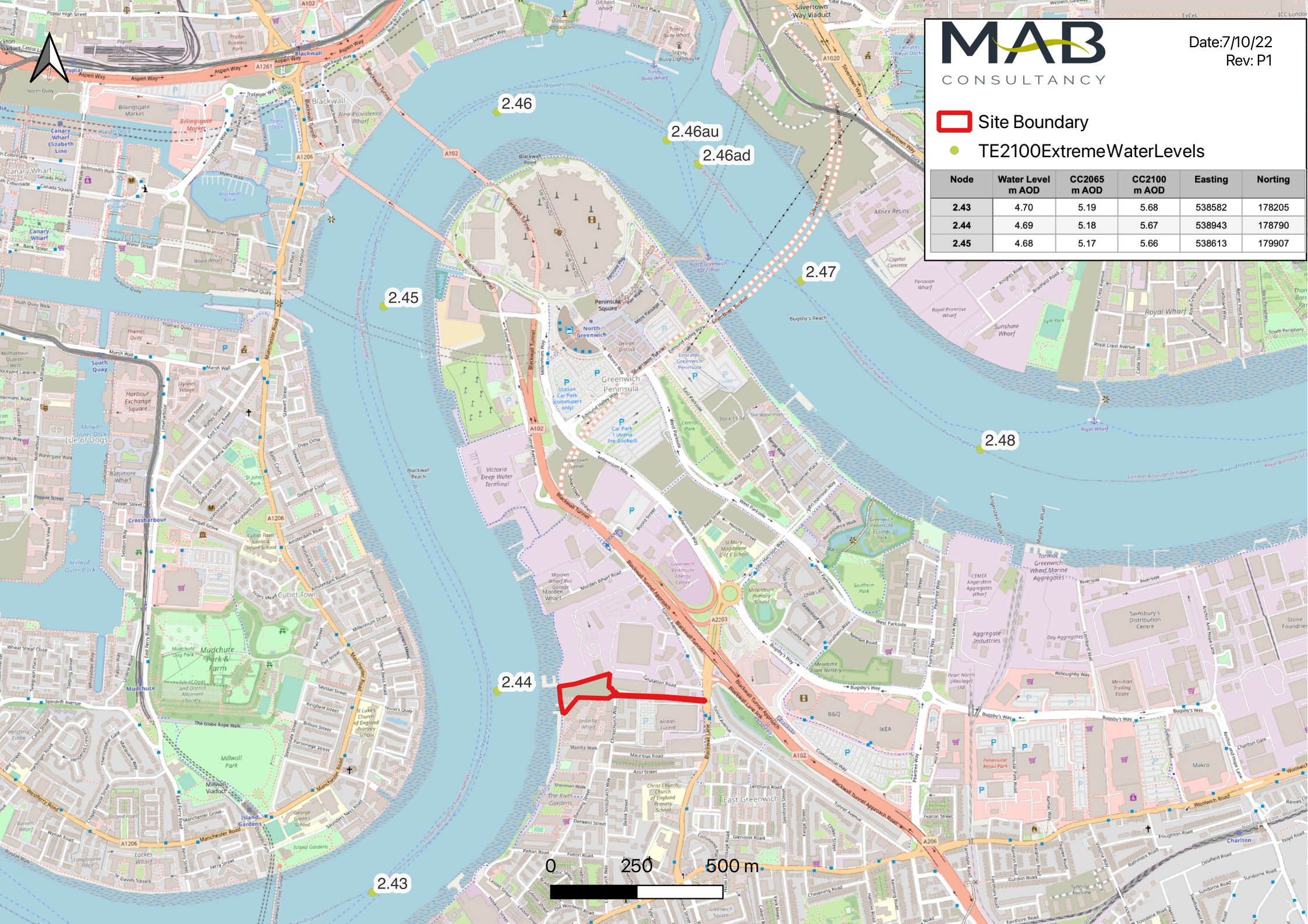
**APPENDIX F**

**EA Data**

 Site Boundary



 TE2100 Extreme Water Levels

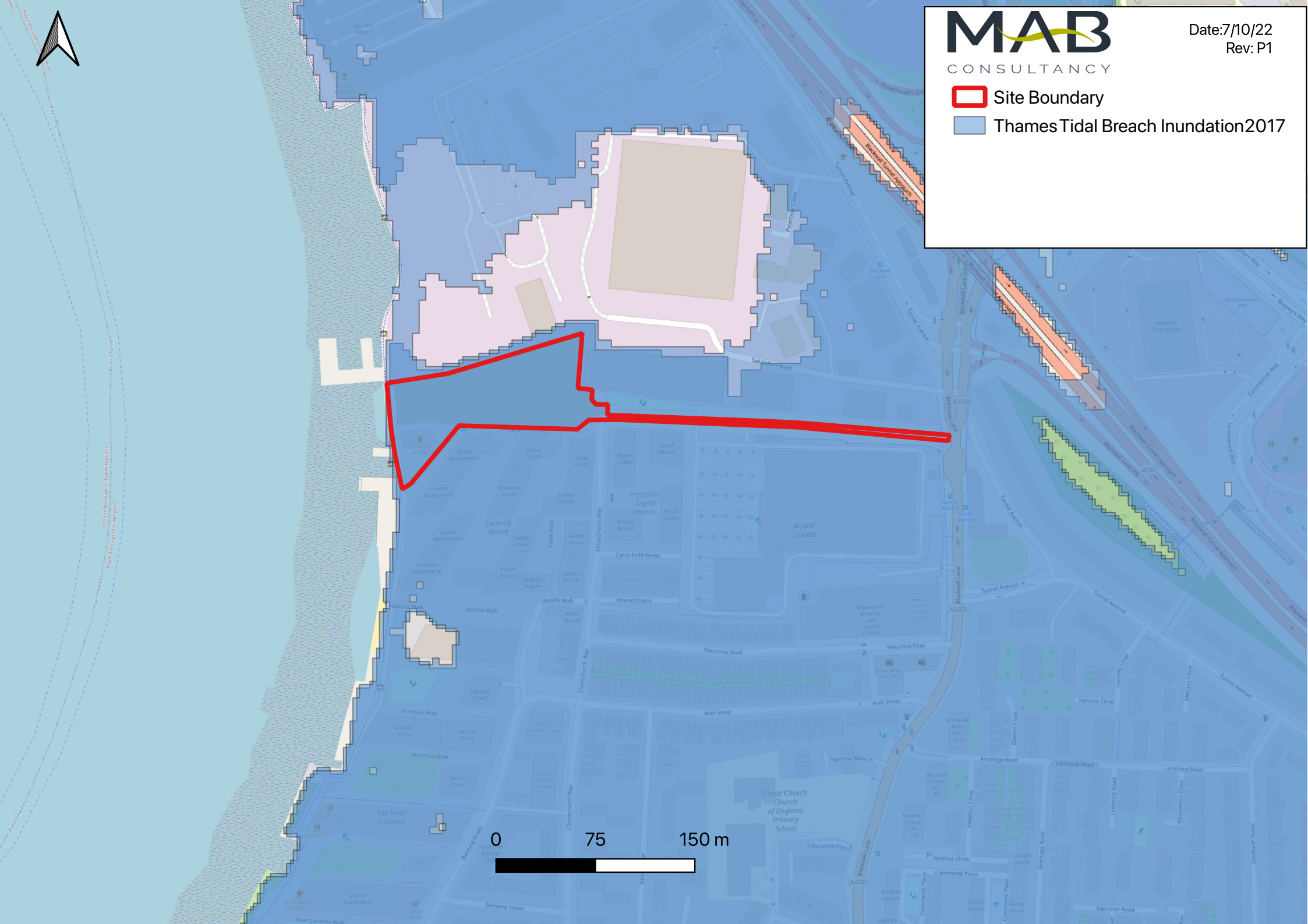
Node	Water Level m AOD	CC2065 m AOD	CC2100 m AOD	Easting	Northing
2.43	4.70	5.19	5.68	538582	178205
2.44	4.69	5.18	5.67	538943	178790
2.45	4.68	5.17	5.66	538613	179907



<b>Node</b>	<b>Water Level m AOD</b>	<b>CC2065 m AOD</b>	<b>CC2100 m AOD</b>	<b>Easting</b>	<b>Norting</b>
<b>2.43</b>	4.70	5.19	5.68	538582	178205
<b>2.44</b>	4.69	5.18	5.67	538943	178790
<b>2.45</b>	4.68	5.17	5.66	538613	179907





-  Site Boundary
-  Thames Tidal Breach Inundation 2017

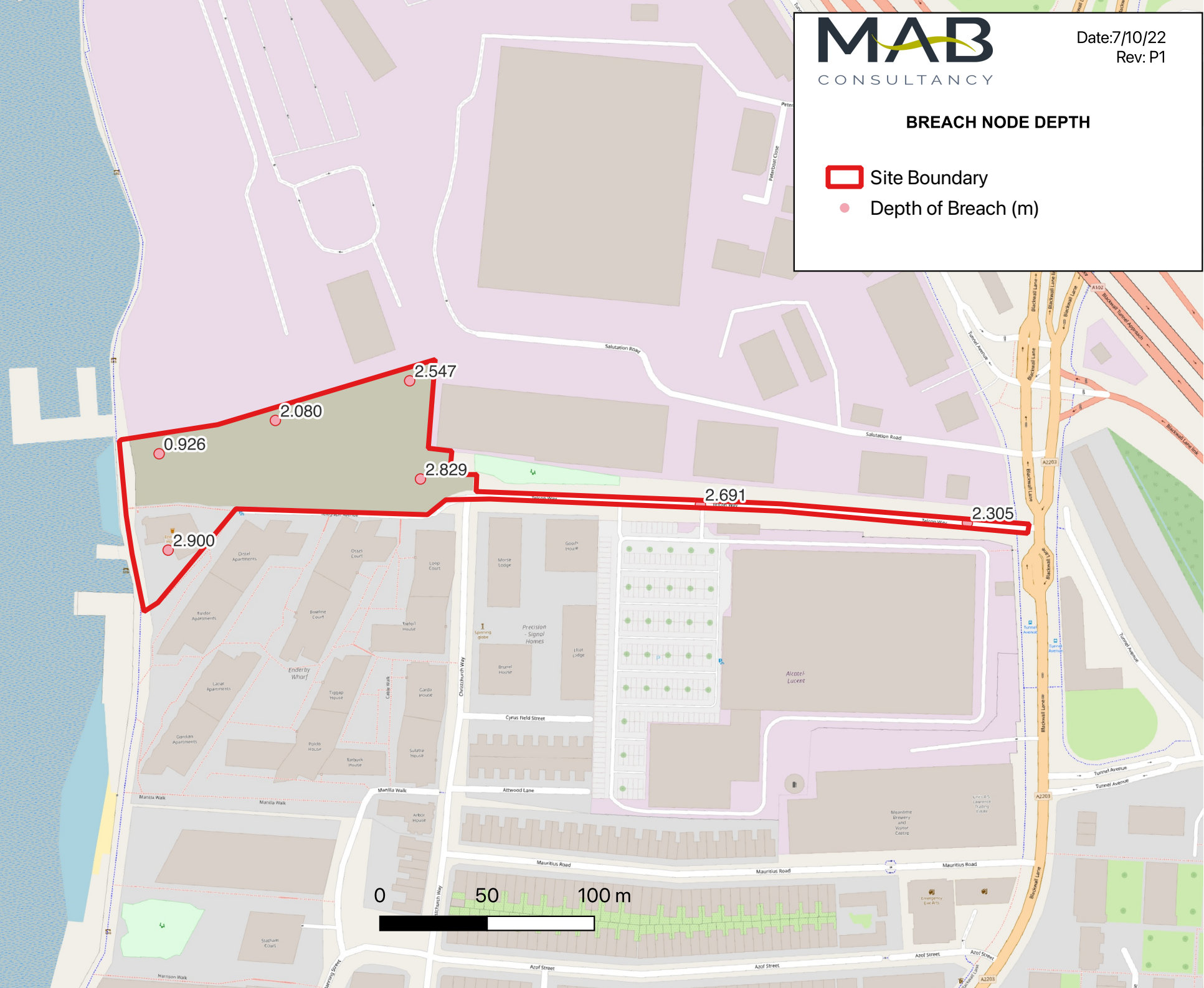






**BREACH NODE DEPTH**

-  Site Boundary
-  Depth of Breach (m)



**APPENDIX G**  
**Greenfield & Existing Run Off Rate**

Calculated by:	Mark Bullen
Site name:	Enderby Place
Site location:	0711

## Site Details

Latitude:	51.49094° N
Longitude:	0.00393° E
Reference:	1020321488
Date:	Oct 25 2023 10:5

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach IH124

## Site characteristics

Total site area (ha): 0.781

## Methodology

Q <sub>BAR</sub> estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

## Notes

(1) Is Q<sub>BAR</sub> < 2.0 l/s/ha?

When Q<sub>BAR</sub> is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

## Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

## Hydrological characteristics

	Default	Edited
SAAR (mm):	587	587
Hydrological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

## Greenfield runoff rates

	Default	Edited
Q <sub>BAR</sub> (l/s):	3.07	3.07
1 in 1 year (l/s):	2.61	2.61
1 in 30 years (l/s):	7.06	7.06
1 in 100 year (l/s):	9.79	9.79
1 in 200 years (l/s):	11.48	11.48

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at [www.uksuds.com](http://www.uksuds.com). The use of this tool is subject to the UK SuDS terms and conditions licence agreement, which can both be found at [www.uksuds.com/terms-and-conditions.htm](http://www.uksuds.com/terms-and-conditions.htm). The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Calculated by:	Mark Bullen
Site name:	Enderby Place-Area A
Site location:	0711

## Site Details

Latitude:	51.49099° N
Longitude:	0.00398° E
Reference:	85056544
Date:	Oct 04 2023 20:1

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

## Runoff estimation approach

IH124

## Site characteristics

Total site area (ha): 0.255

## Methodology

Q <sub>BAR</sub> estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

## Notes

(1) Is Q<sub>BAR</sub> < 2.0 l/s/ha?

When Q<sub>BAR</sub> is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

## Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

## Hydrological characteristics

	Default	Edited
SAAR (mm):	587	587
Hydrological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

## Greenfield runoff rates

	Default	Edited
Q <sub>BAR</sub> (l/s):	1	1
1 in 1 year (l/s):	0.85	0.85
1 in 30 years (l/s):	2.3	2.3
1 in 100 year (l/s):	3.2	3.2
1 in 200 years (l/s):	3.75	3.75

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MORE INFO

Calculated by:	Mark Bullen
Site name:	Enderby Place-Area B
Site location:	0711

Site Details

Latitude:	51.49099° N
Longitude:	0.00398° E
Reference:	410230153
Date:	Oct 04 2023 20:1

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach IH124

Site characteristics

Total site area (ha): 0.4935

Methodology

Q <sub>BAR</sub> estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Notes

(1) Is Q<sub>BAR</sub> < 2.0 l/s/ha?

When Q<sub>BAR</sub> is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

Hydrological characteristics

	Default	Edited
SAAR (mm):	587	587
Hydrological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q <sub>BAR</sub> (l/s):	1.94	1.94
1 in 1 year (l/s):	1.65	1.65
1 in 30 years (l/s):	4.46	4.46
1 in 100 year (l/s):	6.19	6.19
1 in 200 years (l/s):	7.25	7.25

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## **Enderby Place, Greenwich, London**

### **Existing Discharge Rates**


### **Surface Water Calculations**

**Job No. 0711**

**Revision 0**

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
1.000	10.000	0.100	100.0	0.599	4.00	0.0	0.600	o	450	Pipe/Conduit
1.001	10.000	0.100	100.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	$\Sigma$ I.Area (ha)	$\Sigma$ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	4.08	3.975	0.599	0.0	0.0	0.0	2.03	323.4	0.0
1.001	0.00	4.16	3.875	0.599	0.0	0.0	0.0	2.03	323.4	0.0

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S 100	5.800	1.825	Open Manhole	1200	1.000	3.975	450				
S 101	5.800	1.925	Open Manhole	1200	1.001	3.875	450	1.000	3.875	450	
EXSW 3	5.800	2.025	Open Manhole	1500		OUTFALL		1.001	3.775	450	

No coordinates have been specified, layout information cannot be produced.



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PIPELINE SCHEDULES for Storm

Upstream Manhole


PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	450	S 100	5.800	3.975	1.375	Open Manhole	1200
1.001	o	450	S 101	5.800	3.875	1.475	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	10.000	100.0	S 101	5.800	3.875	1.475	Open Manhole	1200
1.001	10.000	100.0	EXSW 3	5.800	3.775	1.575	Open Manhole	1500

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.001	EXSW 3	5.800	3.775	3.400	1500	0

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 0  
Number of Online Controls 0    Number of Storage Structures 0

Synthetic Rainfall Details


Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	2	Winter Storms	No
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 535000 183900 TQ 35000 83900	Cv (Winter)	0.840
Data Type		Catchment Storm Duration (mins)	15

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Summary of Results for 15 minute 2 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap.	Time (mins)	Flow (l/s)		
1.000	S 100	4.207	-0.218	0.000	0.52		93.5	OK	
1.001	S 101	4.108	-0.217	0.000	0.53		93.8	OK	


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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 0			
Number of Online Controls 0    Number of Storage Structures 0			

Synthetic Rainfall Details


Rainfall Model	FEH	Summer Storms	No
Return Period (years)	2	Winter Storms	Yes
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 535000 183900 TQ 35000 83900	Cv (Winter)	0.840
Data Type		Catchment Storm Duration (mins)	15

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Summary of Results for 15 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap.	Time (mins)	Flow (l/s)		
1.000	S 100	4.207	-0.218	0.000	0.52		93.5	OK	
1.001	S 101	4.108	-0.217	0.000	0.53		93.8	OK	

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 0  
Number of Online Controls 0    Number of Storage Structures 0

Synthetic Rainfall Details


Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	30	Winter Storms	No
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 535000 183900 TQ 35000 83900	Cv (Winter)	0.840
Data Type		Catchment Storm Duration (mins)	15

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Summary of Results for 15 minute 30 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	
1.000	S 100	4.557	0.132	0.000	1.33	236.4	SURCHARGED
1.001	S 101	4.380	0.055	0.000	1.33	236.4	SURCHARGED

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Causeway	Network 2020.1.3	

Simulation Criteria for Storm


Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 0  
Number of Online Controls 0    Number of Storage Structures 0

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	No
Return Period (years)	30	Winter Storms	Yes
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 535000 183900 TQ 35000 83900	Cv (Winter)	0.840
Data Type		Catchment Storm Duration (mins)	15




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Causeway	Network 2020.1.3	

Summary of Results for 15 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	
1.000	S 100	4.556	0.131	0.000	1.33	236.4	SURCHARGED
1.001	S 101	4.380	0.055	0.000	1.33	236.4	SURCHARGED

BLI Consulting		Page 12
Norwich Norfolk .	ENDERBY PLACE GREENWICH LONDON	
Date 24/10/2023 File NETWORK DESIGN_EXISTING_REV00.MDX	Designed by RSM Checked by MAB	
Causeway	Network 2020.1.3	


Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 0  
Number of Online Controls 0    Number of Storage Structures 0

Synthetic Rainfall Details


Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	100	Winter Storms	No
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 535000 183900 TQ 35000 83900	Cv (Winter)	0.840
Data Type		Catchment Storm Duration (mins)	15

BLI Consulting		Page 13
Norwich Norfolk .	ENDERBY PLACE GREENWICH LONDON	
Date 24/10/2023 File NETWORK DESIGN_EXISTING_REV00.MDX	Designed by RSM Checked by MAB	
Causeway	Network 2020.1.3	

Summary of Results for 15 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	
1.000	S 100	4.806	0.381	0.000	1.73	308.7	SURCHARGED
1.001	S 101	4.505	0.180	0.000	1.73	308.7	SURCHARGED

BLI Consulting		Page 14
Norwich Norfolk .	ENDERBY PLACE GREENWICH LONDON	
Date 24/10/2023 File NETWORK DESIGN_EXISTING_REV00.MDX	Designed by RSM Checked by MAB	
Causeway	Network 2020.1.3	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
Number of Input Hydrographs 0			
Number of Offline Controls 0			
Number of Time/Area Diagrams 0			
Number of Online Controls 0			
Number of Storage Structures 0			

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	No
Return Period (years)	100	Winter Storms	Yes
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 535000 183900 TQ 35000 83900	Cv (Winter)	0.840
Data Type		Catchment Storm Duration (mins)	15

Norwich  
Norfolk  
.

ENDERBY PLACE  
GREENWICH  
LONDON



Date 24/10/2023

Designed by RSM

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Checked by MAB

Causeway

Network 2020.1.3

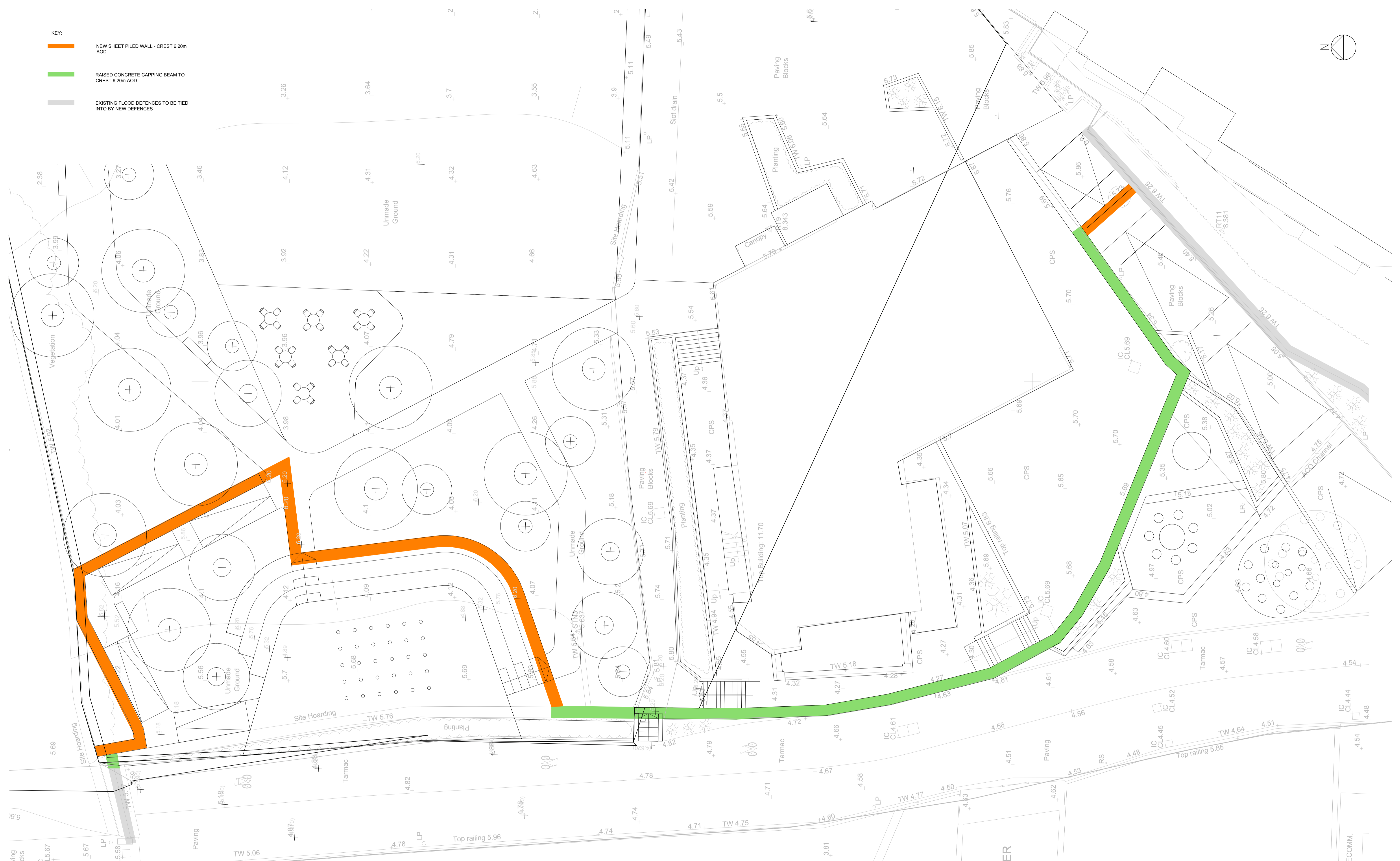
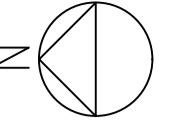
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 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	
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**APPENDIX H**  
**Proposed Flood Defences**

- KEY:**
- NEW SHEET PILED WALL - CREST 6.20m AOD
  - RAISED CONCRETE CAPPING BEAM TO CREST 6.20m AOD
  - EXISTING FLOOD DEFENCES TO BE TIED INTO BY NEW DEFENCES



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  5. LOCATION OF ALL EXISTING MANHOLES AND PIPES TO BE CONFIRMED ON SITE PRIOR TO CONSTRUCTION

SCALE: 1:100

P3	07.11.23	ISSUED FOR PLANNING
P2	28.10.23	ISSUED FOR PLANNING
P1	12.10.22	ISSUED FOR PLANNING

client  
**MARITIME VIEW LTD**

architect  
**BUCKLEY GRAY YEOMAN**

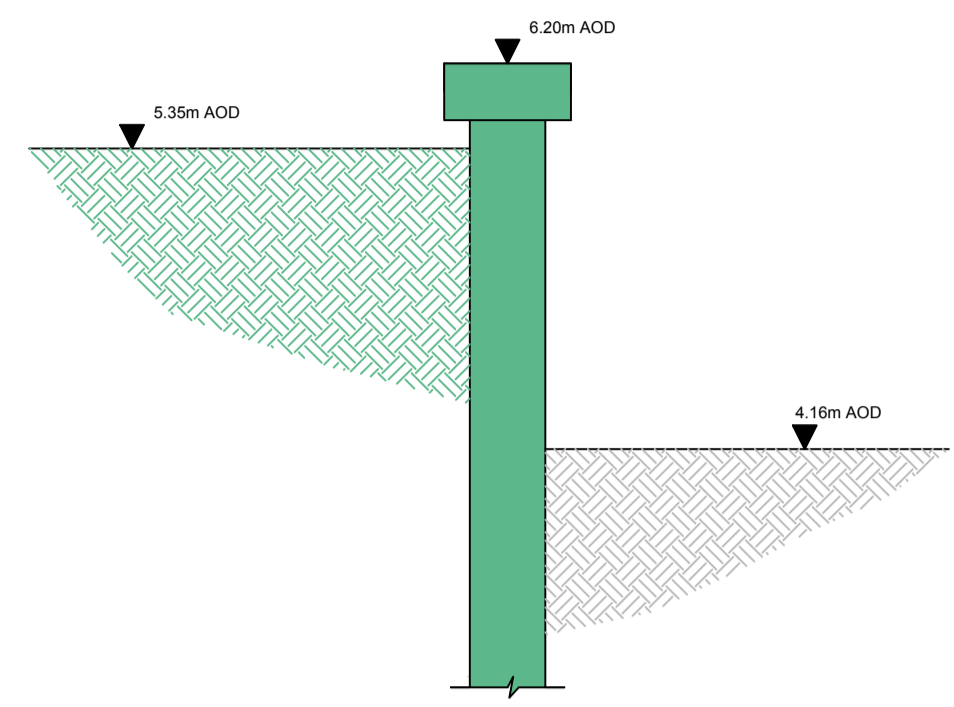
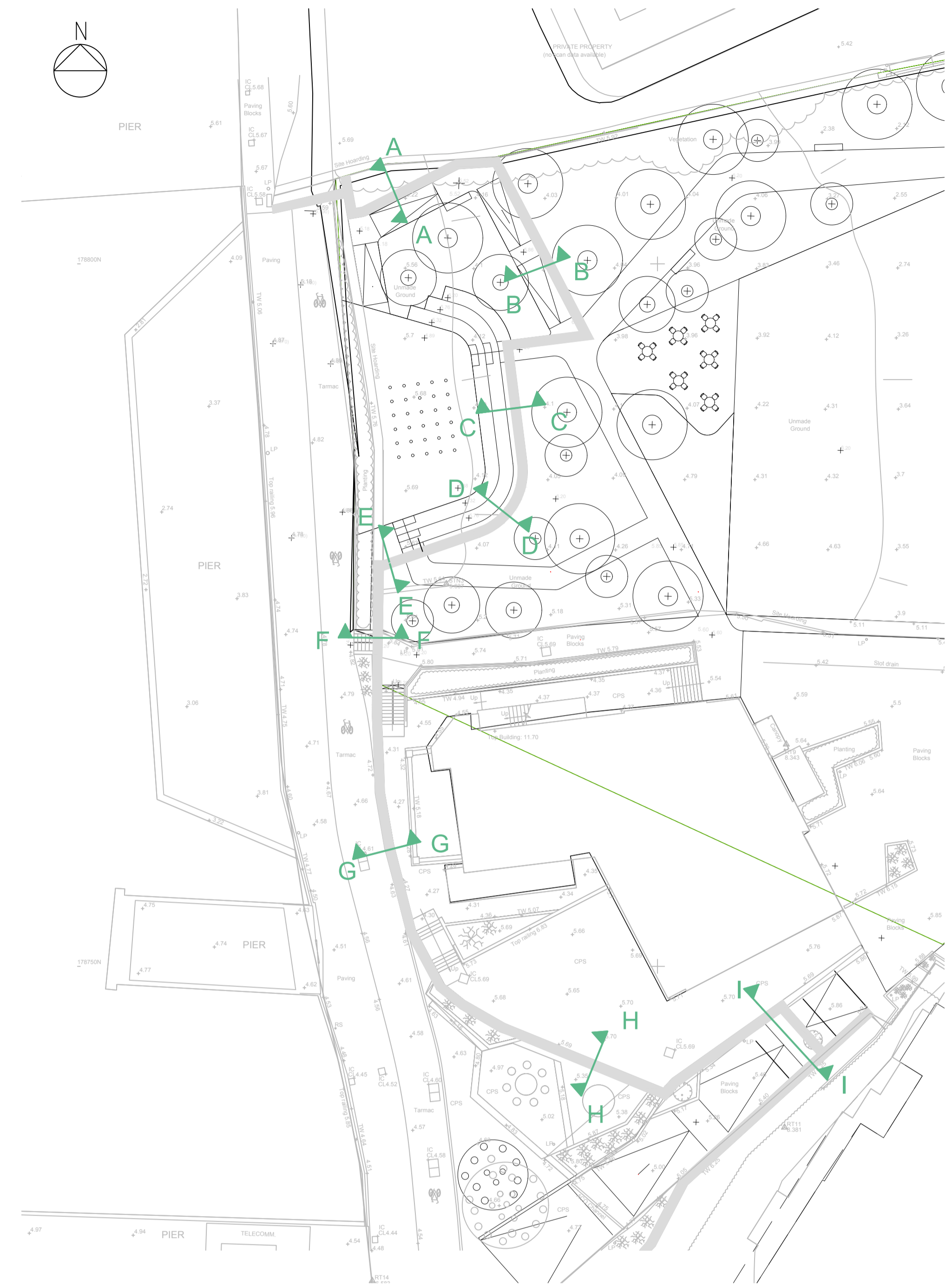
project  
**ENDERBY PLACE GREENWICH**

title  
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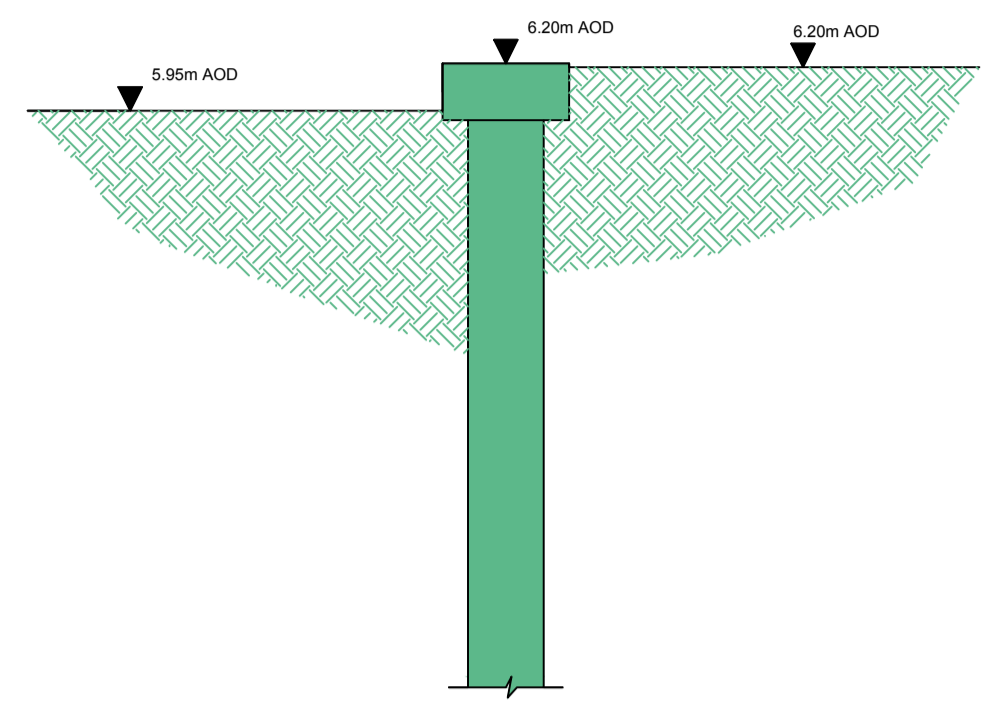
drawing number  
**0711-005-P3**



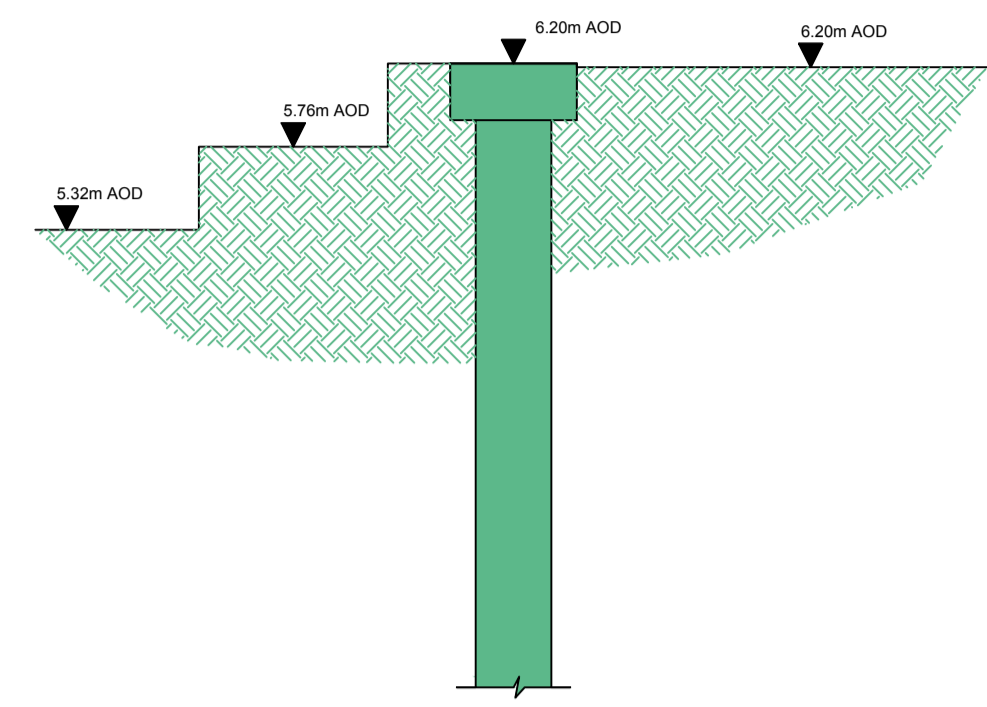
MAB Consultancy Ltd Wymondham Norfolk  
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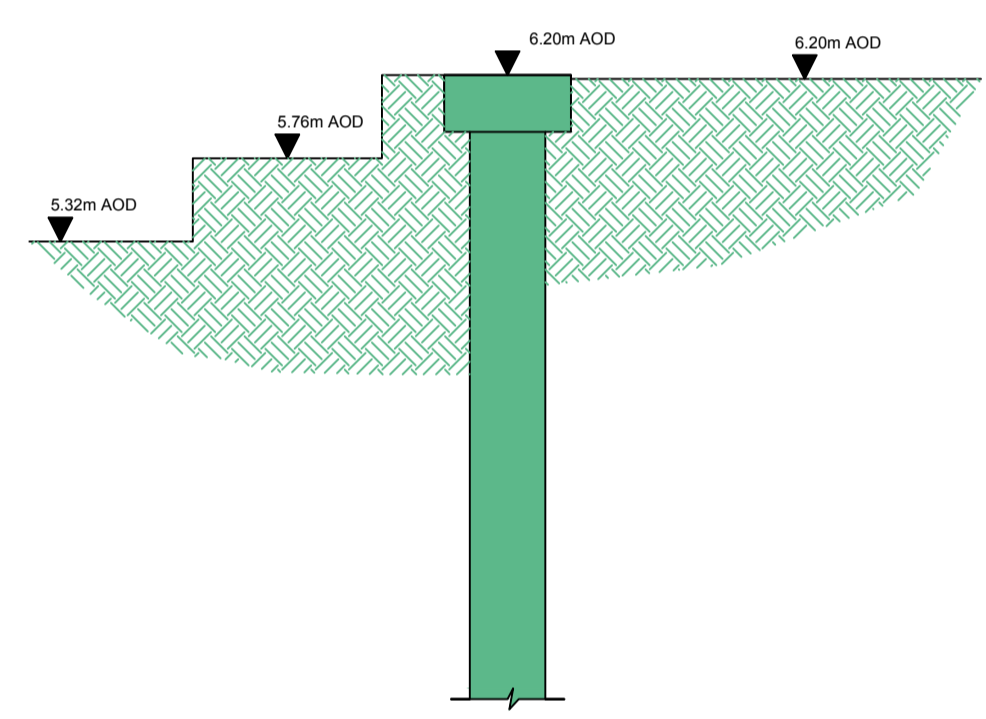
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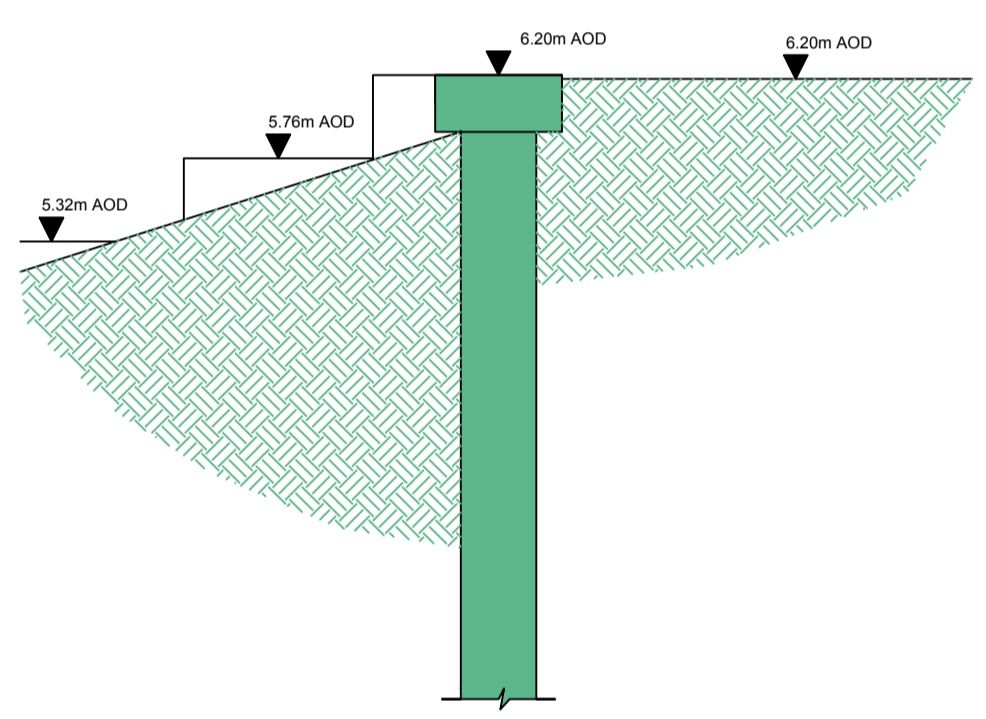
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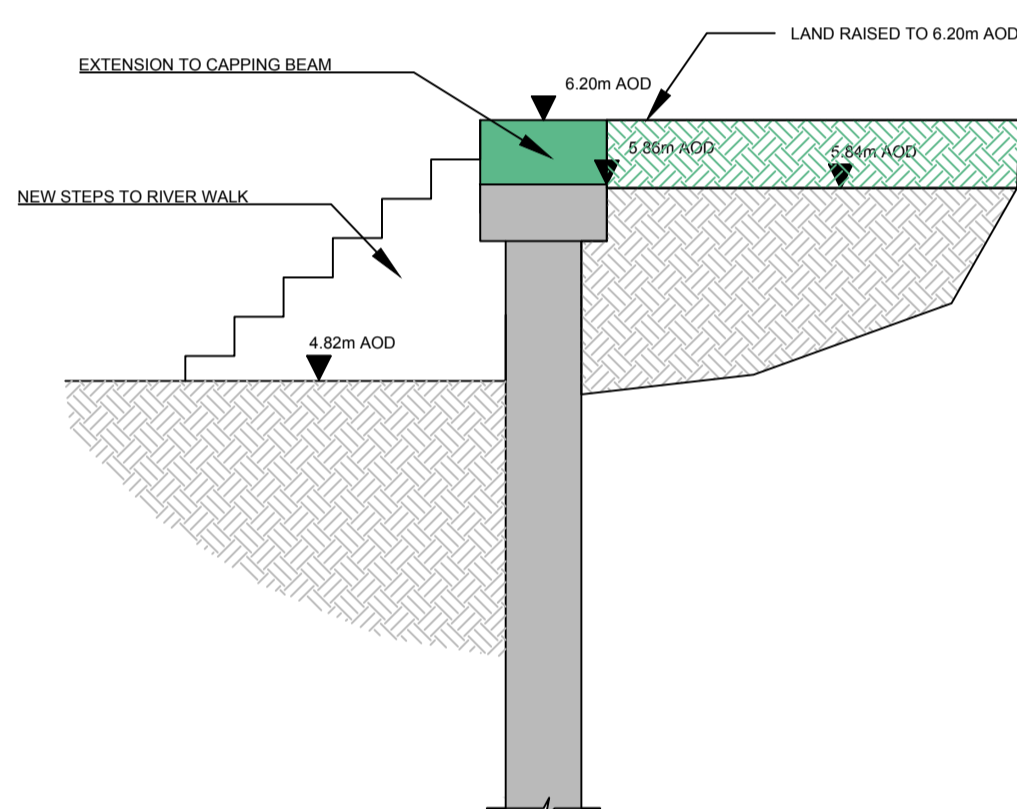
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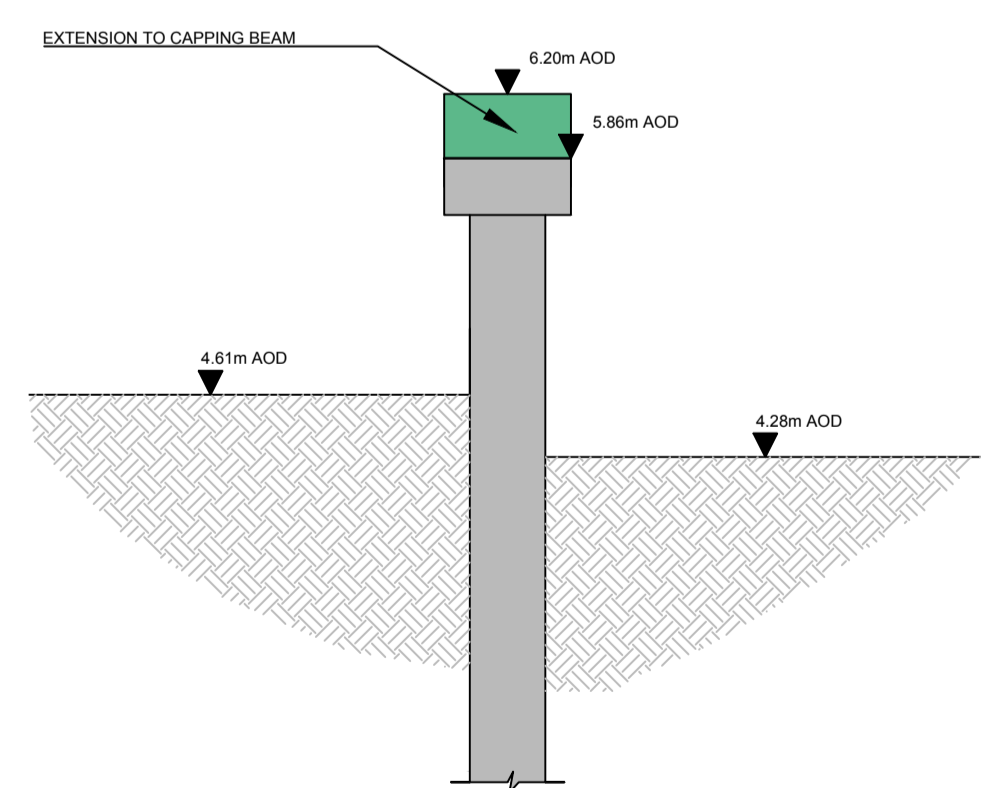
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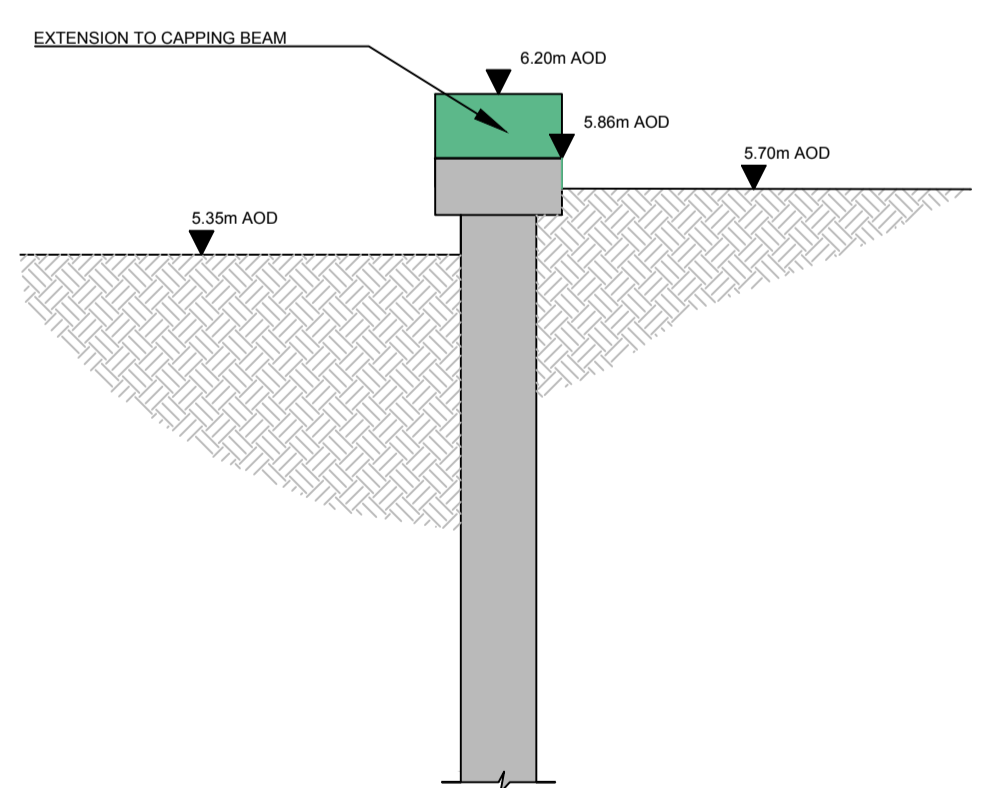
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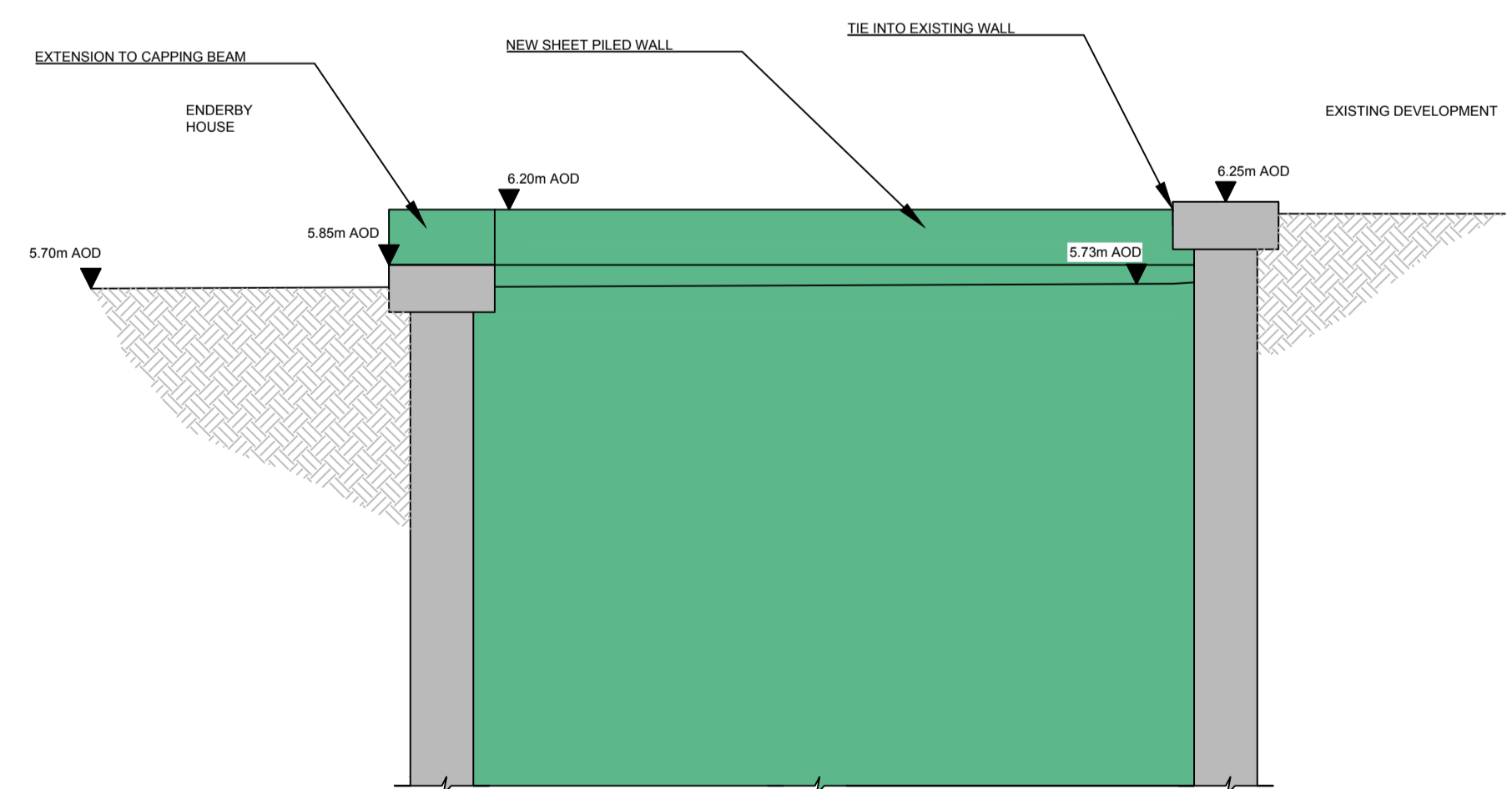
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SECTION G-G  
Scale: 1:25

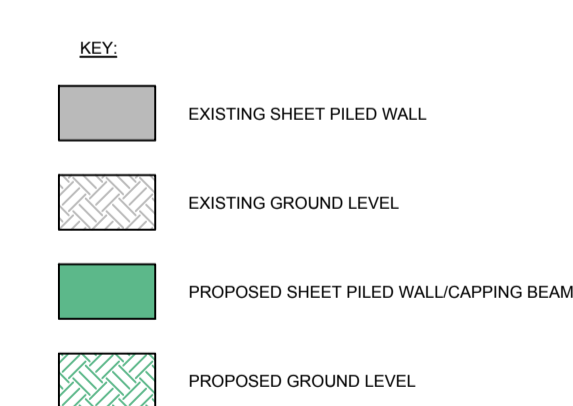


SECTION H-H  
Scale: 1:25



SECTION I-I  
Scale: 1:25

SECTION LOCATIONS  
Scale: 1:250



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SCALE: AS SHOWN

P2	07.11.23	ISSUED FOR PLANNING
P1	12.10.22	ISSUED FOR PLANNING

client  
MARITIME VIEW LTD

architect  
BUCKLEY GRAY YEOMAN

project  
ENDERBY PLACE GREENWICH

title  
PROPOSED DEFENCE SECTIONS

drawing number  
0711-006-P2



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**APPENDIX I**  
**Flood Management Plan**

# Flood Warning and Evacuation Plan

for

## Enderby Place Greenwich

Version number: P1

Date of plan version: 28.10.2023

Normal review period: 3 years  
*(or following a flood event or as flood warnings or circumstances change)*

Date for revision: 28.10.2026

# Contents

The plan is page numbered for quick reference:

1. Distribution list .....	2
2. Document history .....	2
3. Purpose and scope of the plan .....	3
4. Location .....	4
5. Flood Threat .....	6
6. Environment Agency Floodline Warnings Direct (FWD) .....	6
7. Flood Alert Notice .....	9
8. Procedures .....	9
9. On-site refuge .....	11
10. Grab Bag .....	12
11. Re-occupation of premises after a flood .....	12
12. List of key contacts .....	14
13. Location of Services .....	14

## 1. Distribution list

The following should receive a copy of the plan:

Name	Contact details
Occupier	
Owner / landlord	
Letting Agent	
Insurer (It is suggested you send a copy of this document to your insurance company)	
Other	

## 2. Document history

Version	Revision date	Revisions
P1	21.10.2021	Preliminary Issue

### NOTE:

Keeping this plan up-to-date and keeping a record of changes may be important as it could affect your property insurance. As the owner (or occupier) of the property, you are responsible for ensuring the report is reviewed and updated as required. If you require help in maintaining this plan, see contacts page for details of organisations that can provide assistance.

### **3. Purpose and scope of the plan**

This plan is to ensure there are appropriate measures in place to protect life and property in the event of a flood.

The scope of the plan covers the property situated at Enderby Place, Telcon Way, Greenwich the occupants and owner.

## Location

The property mentioned above is located in a flood zone recognised by the UK Government. See the link below to see this information (the site address will need to be entered).

<https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>



Figure 1: Flood Map

The site does benefit from flood defences, but is vulnerable to a breach event which could be a sudden and severe. The Environment Agency have predicted that the flood event could be as per Figure 2.

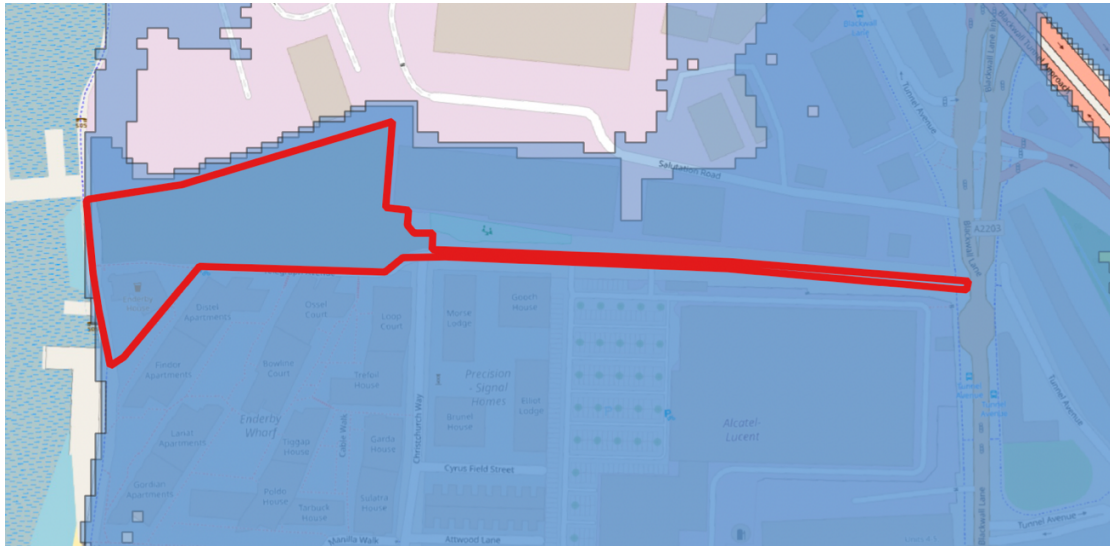


Figure 2: Breach Extent

On receiving a flood warning, the recommended evacuation route (prior to any flooding) is east via Telcon Way and then south on the A102 to higher ground near Westcombe Park Station.

Occupants of the site are advised to evacuate the site in the event of a flood warning being issued. Evacuation should only be made should there be enough time to safely evacuate before flooding occurs. The route above takes approximately 5-minutes to drive or 25 minute walk, however, consideration should be given to the likelihood that traffic would be slower moving during flood events as people evacuate. The route above directs evacuees through the lowest flood risk areas.

Each property is considered a 'Safe Refuge', where residents can wait for direction from emergency services. **HOWEVER**, this is to be a last resort for scenarios where a flood warning is not received or, when a warning is received at short notice, not providing enough to evacuate so staying onsite is the safest option.

## 4. Flood Threat

The main risk of flooding comes from a breach to the coastal defences. In a flood event, flood water will most likely have high water flows making the site dangerous to enter and exit. It is noted that all flood water is dangerous, not just fast flowing water. Flood water can hide foot entrapments and missing manhole covers. Flood water can also be contaminated with sewage and other substances.

## 5. Environment Agency Floodline Warnings Direct (FWD)

**Floodline: 0345 988 1188** (24-hour service)

The owner of the property will need to sign up to the Floodline service, which is a free service.

The following procedure will be followed to ensure all occupants of the premises receive warnings directly or are made aware of any Flood Warnings issued: As an occupier of the property it is your responsibility to register with the gov.uk Flood Warning system.

When a flood warning is issued, the FWD service will phone or text you, depending on the preference you have set up. This will go to the support staff.

The flood warning area this property is located in the **TIDAL THAMES IN THE BOROUGH OF BEXLEY AND GREENWICH** area.

For an explanation and description of the flood codes see:

<https://flood-warning-information.service.gov.uk/>

The flood warning service has three types of warnings that will help you prepare for flooding and take action. You would not normally need to take action on the issue of a “Flood Alert” unless you are in a particularly vulnerable low-lying area or have livestock on a river or near the coast. Therefore, you will not receive a



“Flood Alert” unless you require an early warning or request a “Flood Alert”. You should take action if you receive a “Flood Warning” or “Severe Flood Warning”.

## **Flood alert**

### **What it means**

Flooding is possible. Be prepared.



### **When it's used**

Two hours to two days in advance of flooding.

### **What to do**

- Be prepared to act on your flood plan
- Prepare a flood kit of essential items
- Monitor local water levels and the flood forecast on the EA website
- Check insurance policy details and have contact details available for if you need to activate the policy.
- Contact family and friends

## **Flood warning**

### **What it means**

Flooding is expected. Immediate action required.



### **When it's used**

Half an hour to one day in advance of flooding.

### **What to do**

- Move family, pets and valuables to a safe place.
- Turn off gas, electricity and water supplies if safe to do so.
- Put flood protection equipment in place.
- Check insurance policy details and have contact details available for if you need to activate the policy.
- Contact family and friends

## **Severe flood warning**

### **What it means**

Severe flooding. Danger to life.

### **When it's used**

When flooding poses a significant threat to life.

### **What to do**

- Stay in a safe place with a means of escape.
- Be ready should you need to evacuate from your home.
- Co-operate with the emergency services.
- Call 999 if you are in immediate danger.
- Check insurance policy details and have contact details available for if you need to activate the policy.
- Contact family and friends



## **Warnings no longer in force**

### **What it means**

No further flooding is currently expected in your area.

### **When it's used**

When river or sea conditions begin to return to normal.

### **What to do**

- Be careful. Flood water may still be around for several days.
- If you've been flooded, ring your insurance company as soon as possible.
- Wait for confirmation from the emergency services before re-entering your property.

## 6. Flood Alert Notice

A Flood Alert Notice will be permanently displayed in a prominent, clearly visible place, as shown below.

**Flood Notice**

This building is located in a low-lying area at risk of tidal flooding. Flooding may occur when a combination of weather conditions and / or high tides coincide. This is more likely during the winter months but could occur at any time of the year.

Up-to-date flood warning information and advice can be obtained from:

**Floodline on 0345 988 1188 (24 hours a day, called charged at local rate)**

Or visit their website: <https://flood-warning-information.service.gov.uk>

## 7. Procedures

The procedures listed below will be followed:

- The owner and occupants will sign up to Floodline Warnings Direct. Include both landline and mobile phone numbers.
- The owner and occupant shall follow the advice below.

Note that for tidal flooding the EA undertakes to issue a Flood Warning several hours before the predicted event. The technology is available to predict a tidal surge well in advance of the event. Therefore, in most cases, there is no reason to take hasty measures and a “Flood Warning and Evacuation Plan” allows individuals to take appropriate precautions in a measured and unhurried way.

Actions to take ahead of evacuating the property can include:

- Shut off your gas/electric/water supplies – indicate in Section 13 how to shut off these supplies for easy reference
- Store valuable equipment and belongings above flood level
- Place important documentation in waterproof bag
- Ensure any hazardous materials are safe and secure and that they do not create any additional risks by coming in contact with flood waters
- Where possible relocate equipment and furniture that could potentially float and cause an additional hazard
- Any large or loose items in the garden should be tied down or moved
- Notify family and friends that it is not safe to visit, and you will be evacuating
- Roll up and relocate carpets/rugs
- Move vehicles to higher ground if not going to be used to evacuate
- Lift and hang curtains over poles
- Monitor local TV or radio stations for further information

In relation to items to move to safety, do not wait for a flood but consider what can be moved permanently to a safer higher level. Then consider an inventory / checklist of remaining items that will need to be moved to safety immediately prior to a flood. e.g. vehicles, IT and electrical equipment, documents, potentially hazardous materials.

If there is time, fit flood protection products you might have available such as:

- Flood boards
- Airbrick covers
- Toilet bungs (only for ground floor toilets)

Sandbags can be obtained from local builder's merchants. A guide to the effective use of sandbags can be downloaded from the website via the below link:

<https://www.gov.uk/government/publications/sandbags-how-to-use-them-to-prepare-for-a-flood>

## 8. On-site refuge

If the worst happens and people remain on the site when flooding occurs, then on-site refuge above the expected flood level is provided. The first floor of the property and above are above the expected extreme flood levels and are considered a safe refuge that can be used as a **last resort** if evacuation is not possible or unsafe.

## **9. Grab Bag**

A Grab bag of essential items will be kept at the on-site safe refuge as an easily accessible “grab bag”. The grab bag might include the following:

- Copies of insurance documents
- A torch with spare batteries or a torch powered by winding
- A wind-up or battery radio (to receive latest updates on the situation)
- Spare batteries
- Warm, waterproof clothing and blankets
- List of prescription medication
- First Aid kit
- Toiletries
- Bottled water and high energy food snacks
- Flood Warning and Evacuation Plan including list of important contact numbers.
- Insurance Details
- Notepad and pen / pencil
- Equipment / carriers for any pets that will need to be removed and taken with you.
- Mobile phone charger
- Spare keys for house / car.

## **10. Re-occupation of premises after a flood**

Owing to potential residual hazards following major flooding, re-occupation of the premises should only be carried out following consultation with the emergency services and appropriate authorities. Utility companies will advise on the state of drinking water, sewerage, gas and electricity supplies. Do not switch the electricity or gas supply back on until deemed safe to do so.

Photos / videos can gather evidence to support insurance claims. Before disposing of anything, take photos / videos of the damage, create a list of items and get permission from the insurance company to dispose of items.

Key elements to the process of starting to recover are outlined below:

- Do not start to clean up until the threat of further flooding has passed
- Don't throw anything away until you have permission from your insurer
- Check with your insurance company that it is okay to do so before starting to clean the property
- Confirm what services the insurance company will cover
- Use a permanent marker to mark water height in each room
- All areas covered by flood water will be contaminated, use masks, gloves and protective clothing.
- As soon as possible get confirmation from your insurer when a loss adjuster will visit
- Find out if your insurers will cover flood resilient methods for future flooding
- Keep records of date, time, name of person you spoke to and what was agreed
- Keep receipts
- Take photos and a list of the damaged property

## 11. List of key contacts

Owner / landlord telephone numbers (landline and mobile)	
Floodline	0345 988 1188
Electricity Provider	
Electricity (UK Power 24hr Fault Line)	0800 783 8838
Thames Water	0800 316 9800
Gas (National Grid Gas Emergency Service)	0800 111 999
Telephone Provider	
Telephone Network, BT	0800 0850 654
NHS - urgent medical help needed but not an emergency	111
Insurance company	

## 12. Location of Services

<b>Utility Supply</b>	<b>Location and How to shut off supply</b>
Water	
Gas	
Electricity	
Other	



## Dangers of flood water

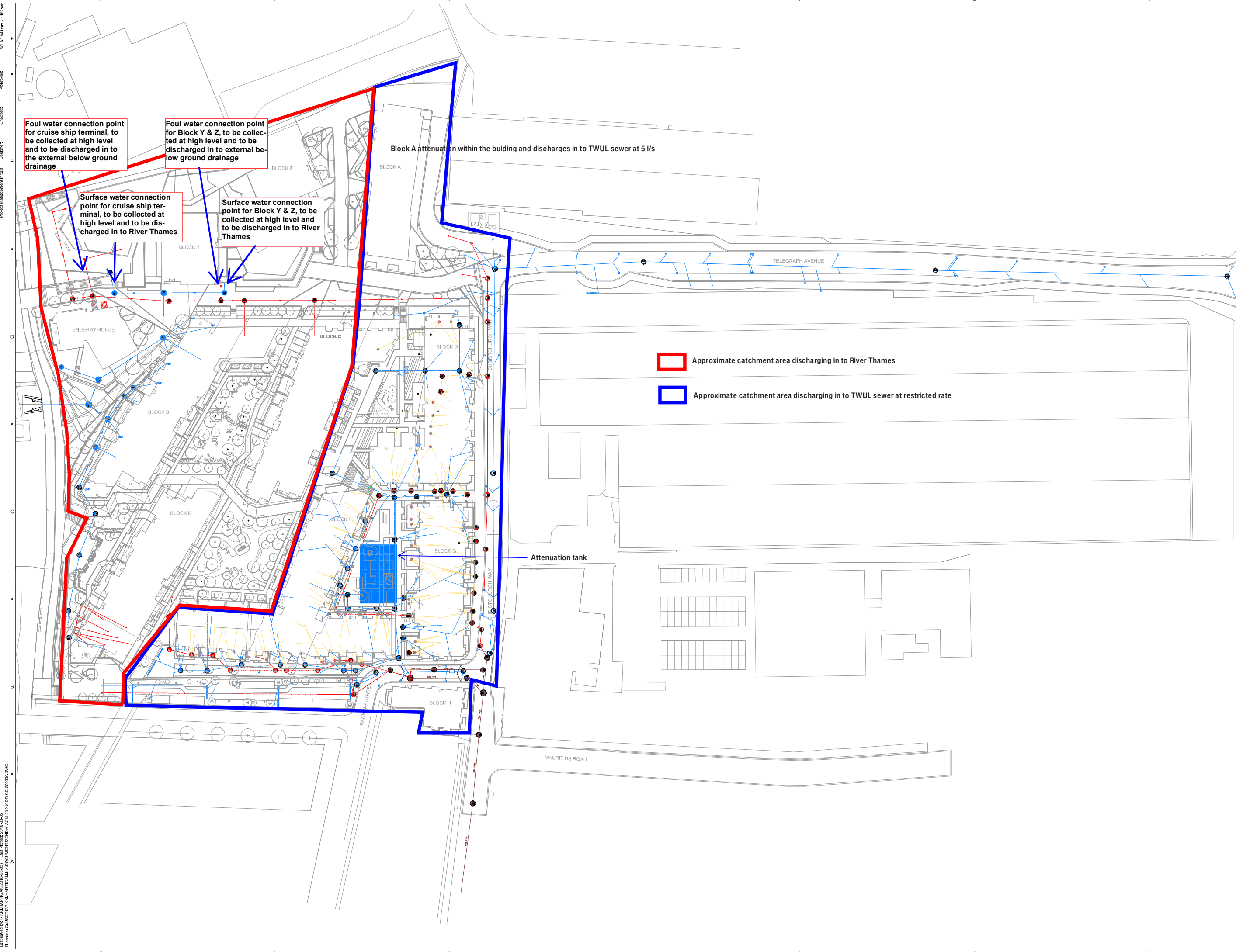
### **REMEMBER!**

- Don't walk through flowing water – Currents can be deceptive, and shallow, fast moving water can knock you off your feet as well as obscuring hazards below water!
- Don't swim through fast flowing water – You may get swept away or struck by an object in the water!
- If you have to walk in standing water, use a pole or stick to ensure that you do not step into deep water, open manholes or ditches!
- Don't drive through a flooded area – You may not be able to see abrupt drop-offs and only half a metre of flood water can carry a car away!
- Avoid contact with flood water – It may be contaminated with sewage, oil, chemicals or other substances!

See also the following web page:

<https://www.gov.uk/check-flood-risk>

**APPENDIX J**  
**Surface Water Masterplan**



Approximate catchment area discharging in to River Thames

Approximate catchment area discharging in to TWUL sewer at restricted rate

**ISSUE/REVISION**

IR	DATE	DESCRIPTION
A	07/03/2018	FOR INFORMATION

**FOR INFORMATION**

**PROJECT NUMBER**  
47068268

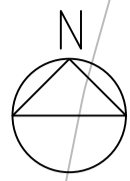
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ENDERBY WHARF SITEWIDE DRAINAGE STRATEGY

**SHEET NUMBER**  
47068268 - SK1011

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# Masterplan Area Split Line



HISTORIC REMEDIATION  
CONFERRED AS PART OF  
DISPOSAL TO HAVE BEEN  
CAPTURED AND REMEDIATED

- KEY:**
- ROOF AREAS
  - LANDSCAPE/PERMEABLE AREAS
  - HARDSTANDING AREAS
  - EXISTING PUBLIC HIGHWAY
  - AREA B
  - AREA A

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AREA B

AREA A

CONNECTION POINT TO DISCHARGE TO RIVER THAMES

CONNECTION POINT TO PRIVATE SEWER

SCALE: 1:250

P3	29.11.23	RED LINE UPDATE
P2	07.11.23	ISSUED FOR PLANNING
P1	12.10.22	ISSUED FOR PLANNING

client  
**MARITIME VIEW LTD**

architect  
**BUCKLEY GRAY YEOMAN**

project  
**ENDERBY PLACE GREENWICH**

title  
**MASTERPLAN DRAINAGE AREAS**

drawing number  
**0711-060-P3**



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**APPENDIX K**  
**Indicative Surface Water Drainage Layout and Calculations**

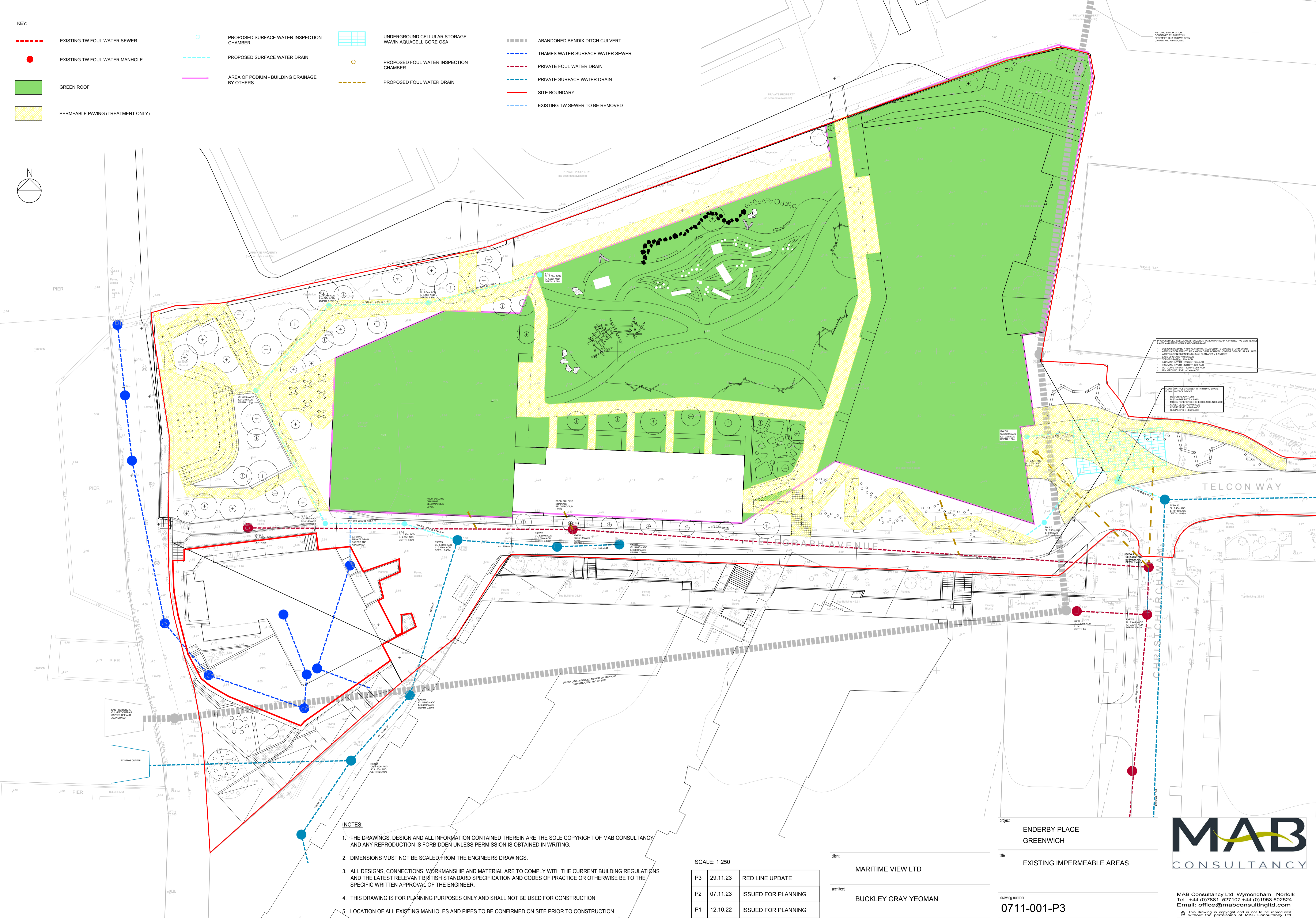
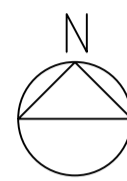
KEY:

- - - - EXISTING TW FOUL WATER SEWER
- EXISTING TW FOUL WATER MANHOLE
- GREEN ROOF
- PERMEABLE PAVING (TREATMENT ONLY)

- PROPOSED SURFACE WATER INSPECTION CHAMBER
- - - - PROPOSED SURFACE WATER DRAIN
- AREA OF PODIUM - BUILDING DRAINAGE BY OTHERS

- UNDERGROUND CELLULAR STORAGE WOVEN AQUACELL CORE OSA
- PROPOSED FOUL WATER INSPECTION CHAMBER
- - - - PROPOSED FOUL WATER DRAIN

- ABANDONED BENDIX DITCH CULVERT
- - - - THAMES WATER SURFACE WATER SEWER
- - - - PRIVATE FOUL WATER DRAIN
- - - - PRIVATE SURFACE WATER DRAIN
- - - - SITE BOUNDARY
- - - - EXISTING TW SEWER TO BE REMOVED



PROPOSED GEO-CELLULAR ATTENUATION TANK WRAPPED IN A PROTECTIVE GEO-TEXTILE LINER AND SURROUNDED BY GEOSUBSTRATE

DESIGN STANDARD = 100 YEAR +100 YEAR CLIMATE CHANGE STORAGE EVENT

ATTENUATION STORAGE = 100% OVERFLOW CORE AT GEO-CELLULAR UNITS

BASE OF TANK = 1.20M AOD

TOP OF TANK = 1.20M AOD

INCOMING WASTEWATER = 1.00M AOD

OUTGOING WASTEWATER = 1.00M AOD

MIN. GROUND LEVEL = 1.20M AOD

FLOW CONTROL CHAMBER WITH HYDRO-RAMME FLOW CONTROL DEVICE

DESIGN HEAD = 1.20M

DISCHARGE HEAD = 1.00M

MODEL REFERENCE = SHE 0105 0000 000000

FLOW LEVEL = 1.00M AOD

SLUMP LEVEL = 0.95M AOD

- NOTES:
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  5. LOCATION OF ALL EXISTING MANHOLES AND PIPES TO BE CONFIRMED ON SITE PRIOR TO CONSTRUCTION

SCALE: 1:250

P3	29.11.23	RED LINE UPDATE
P2	07.11.23	ISSUED FOR PLANNING
P1	12.10.22	ISSUED FOR PLANNING

client  
**MARITIME VIEW LTD**

architect  
**BUCKLEY GRAY YEOMAN**

project  
**ENDERBY PLACE GREENWICH**

title  
**EXISTING IMPERMEABLE AREAS**

drawing number  
**0711-001-P3**



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## **Enderby Place, Greenwich, London**

### **Catchment Area A**


## **Surface Water Calculations**

**Job No. 0711**

**Revision 0**

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Page 2	Manhole Schedule
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Page 4	Online Control (Hydro-Brake Specification)
Page 5	Storage Structure
Page 6	Time Area Diagram
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Pages 15 – 22	Simulation Criteria and Results for the 2-Year (+45%) Storm Event (Winter)
Pages 23 – 30	Simulation Criteria and Results for the 30-Year (+45%) Storm Event (Summer)
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STORM SEWER DESIGN by the Modified Rational Method


Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
1.000	9.287	0.900	10.3	0.000	4.00	0.0	0.600	o	150	Pipe/Conduit
2.000	7.338	0.200	36.7	0.000	4.00	0.0	0.600	o	225	Pipe/Conduit
1.001	7.861	0.098	80.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	4.05	2.000	0.000	0.0	0.0	0.0	3.15	55.8	0.0
2.000	0.00	4.06	1.220	0.000	0.0	0.0	0.0	2.17	86.2	0.0
1.001	0.00	4.17	0.050	0.000	0.0	0.0	0.0	1.12	19.9	0.0



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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW 1.0	2.900	0.900	Open Manhole	500	1.000	2.000	150				
SW 2.0	2.300	1.080	Open Manhole	600	2.000	1.220	225				
FLOW CONTROL	2.500	2.450	Open Manhole	1200	1.001	0.050	150	1.000	1.100	150	1050
								2.000	1.020	225	1045
EXSW 13	2.400	2.448	Open Manhole	1500		OUTFALL		1.001	-0.048	150	

No coordinates have been specified, layout information cannot be produced.

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PIPELINE SCHEDULES for StormUpstream Manhole


PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	150	SW 1.0	2.900	2.000	0.750	Open Manhole	500
2.000	o	225	SW 2.0	2.300	1.220	0.855	Open Manhole	600
1.001	o	150	FLOW CONTROL	2.500	0.050	2.300	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	9.287	10.3	FLOW CONTROL	2.500	1.100	1.250	Open Manhole	1200
2.000	7.338	36.7	FLOW CONTROL	2.500	1.020	1.255	Open Manhole	1200
1.001	7.861	80.2	EXSW 13	2.400	-0.048	2.298	Open Manhole	1500

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
1.001	EXSW 13	2.400	-0.048	-198.000	1500	0

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Online Controls for Storm


Hydro-Brake® Optimum Manhole: FLOW CONTROL, DS/PN: 1.001, Volume (m³): 3.2

Unit Reference	MD-SHE-0103-5000-1200-5000
Design Head (m)	1.200
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	103
Invert Level (m)	0.050
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	5.0	Kick-Flo®	0.745	4.0
Flush-Flo™	0.354	5.0	Mean Flow over Head Range	-	4.4

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.4	0.800	4.1	2.000	6.3	4.000	8.8	7.000	11.5
0.200	4.7	1.000	4.6	2.200	6.6	4.500	9.3	7.500	11.8
0.300	5.0	1.200	5.0	2.400	6.9	5.000	9.8	8.000	12.2
0.400	5.0	1.400	5.4	2.600	7.2	5.500	10.2	8.500	12.6
0.500	4.9	1.600	5.7	3.000	7.7	6.000	10.7	9.000	12.9
0.600	4.7	1.800	6.0	3.500	8.3	6.500	11.1	9.500	13.3

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Storage Structures for Storm

Tank or Pond Manhole: FLOW CONTROL, DS/PN: 1.001

Invert Level (m) 0.050

Depth (m)	Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )
0.000	89.3	1.200	89.3

Time Area Diagram at Pipe Number 1.000 for Storm

Total Area (ha) 0.019

<b>Time (mins) Area</b>		
<b>From:</b>	<b>To:</b>	<b>(ha)</b>
0	4	0.019

Time Area Diagram for Green Roof at Pipe Number 2.000 (Storm)

Area (m³) 1530 Evaporation (mm/day) 3  
Depression Storage (mm) 5 Decay Coefficient 0.050

Time (mins)		Area	Time (mins)		Area	Time (mins)		Area	Time (mins)		Area
From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)
0	4	0.027803	32	36	0.005613	64	68	0.001133	96	100	0.000229
4	8	0.022763	36	40	0.004596	68	72	0.000928	100	104	0.000187
8	12	0.018637	40	44	0.003763	72	76	0.000760	104	108	0.000153
12	16	0.015259	44	48	0.003081	76	80	0.000622	108	112	0.000126
16	20	0.012493	48	52	0.002522	80	84	0.000509	112	116	0.000103
20	24	0.010228	52	56	0.002065	84	88	0.000417	116	120	0.000084
24	28	0.008374	56	60	0.001691	88	92	0.000341			
28	32	0.006856	60	64	0.001384	92	96	0.000279			

Time Area Diagram for Green Roof at Pipe Number 2.000 (Storm)


Area (m³) 430 Evaporation (mm/day) 3  
Depression Storage (mm) 50 Decay Coefficient 0.050

Time (mins)		Area	Time (mins)		Area	Time (mins)		Area	Time (mins)		Area
From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)
0	4	0.007814	32	36	0.001578	64	68	0.000319	96	100	0.000064
4	8	0.006398	36	40	0.001292	68	72	0.000261	100	104	0.000053
8	12	0.005238	40	44	0.001058	72	76	0.000214	104	108	0.000043
12	16	0.004288	44	48	0.000866	76	80	0.000175	108	112	0.000035
16	20	0.003511	48	52	0.000709	80	84	0.000143	112	116	0.000029
20	24	0.002875	52	56	0.000580	84	88	0.000117	116	120	0.000024
24	28	0.002354	56	60	0.000475	88	92	0.000096			
28	32	0.001927	60	64	0.000389	92	96	0.000079			

Time Area Diagram at Pipe Number 1.001 for Storm

Total Area (ha) 0.029

<b>Time (mins) Area</b>		
<b>From:</b>	<b>To:</b>	<b>(ha)</b>
0	4	0.029

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 4  
Number of Online Controls 1    Number of Storage Structures 1

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	2	Winter Storms	No
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 535000 183900 TQ 35000 83900	Cv (Winter)	0.840
Data Type	Catchment	Storm Duration (mins)	15

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Summary of Results for 15 minute 2 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap.	(l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.029	-0.121	0.000	0.08		4.2		OK
2.000	SW 2.0	1.244	-0.201	0.000	0.03		1.7		OK
1.001	FLOW CONTROL	0.091	-0.109	0.000	0.05		0.9		OK

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Summary of Results for 30 minute 2 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap. (l/s)	Time (mins)	Flow (l/s)		
1.000	SW 1.0	2.027	-0.123	0.000	0.07		3.6	OK	
2.000	SW 2.0	1.261	-0.184	0.000	0.08		5.2	OK	
1.001	FLOW CONTROL	0.115	-0.085	0.000	0.11		1.9	OK	



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Summary of Results for 60 minute 2 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.022	-0.128	0.000	0.05			2.5	OK
2.000	SW 2.0	1.268	-0.177	0.000	0.11			6.8	OK
1.001	FLOW CONTROL	0.142	-0.058	0.000	0.18			3.1	OK

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Summary of Results for 120 minute 2 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap.	(l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.019	-0.131	0.000	0.04			1.9	OK
2.000	SW 2.0	1.276	-0.169	0.000	0.14			8.8	OK
1.001	FLOW CONTROL	0.197	-0.003	0.000	0.26			4.4	OK

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Summary of Results for 180 minute 2 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap.	(l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.018	-0.132	0.000	0.03			1.6	OK
2.000	SW 2.0	1.274	-0.171	0.000	0.13			8.4	OK
1.001	FLOW CONTROL	0.225	0.025	0.000	0.27			4.6	SURCHARGED

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Summary of Results for 240 minute 2 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water		Surcharged		Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)		
1.000	SW 1.0	2.016	-0.134	0.000	0.03			1.3		OK
2.000	SW 2.0	1.272	-0.173	0.000	0.12			7.7		OK
1.001	FLOW CONTROL	0.236	0.036	0.000	0.27			4.7		SURCHARGED

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Summary of Results for 360 minute 2 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap.	(l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.014	-0.136	0.000	0.02		1.0		OK
2.000	SW 2.0	1.268	-0.177	0.000	0.10		6.5		OK
1.001	FLOW CONTROL	0.236	0.036	0.000	0.27		4.7		SURCHARGED

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 4  
Number of Online Controls 1    Number of Storage Structures 1

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	No
Return Period (years)	2	Winter Storms	Yes
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 535000 183900 TQ 35000 83900	Cv (Winter)	0.840
Data Type	Catchment	Storm Duration (mins)	15

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Summary of Results for 15 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap. (l/s)	Time (mins)	Flow (l/s)		
1.000	SW 1.0	2.029	-0.121	0.000	0.08		4.2	OK	
2.000	SW 2.0	1.251	-0.194	0.000	0.05		3.0	OK	
1.001	FLOW CONTROL	0.098	-0.102	0.000	0.07		1.1	OK	

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Summary of Results for 30 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap. (l/s)	Time (mins)	Flow (l/s)		
1.000	SW 1.0	2.024	-0.126	0.000	0.06		3.1	OK	
2.000	SW 2.0	1.271	-0.174	0.000	0.10		6.4	OK	
1.001	FLOW CONTROL	0.129	-0.071	0.000	0.15		2.6	OK	



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Summary of Results for 60 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap. (l/s)	Time (mins)	Flow (l/s)		
1.000	SW 1.0	2.019	-0.131	0.000	0.04		2.0	OK	
2.000	SW 2.0	1.276	-0.169	0.000	0.13		7.9	OK	
1.001	FLOW CONTROL	0.161	-0.039	0.000	0.22		3.8	OK	

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Summary of Results for 120 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap.	(l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.017	-0.133	0.000	0.03			1.5	OK
2.000	SW 2.0	1.276	-0.169	0.000	0.14			8.7	OK
1.001	FLOW CONTROL	0.230	0.030	0.000	0.27			4.6	SURCHARGED

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Summary of Results for 180 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	
1.000	SW 1.0	2.016	-0.134	0.000	0.02	1.2	OK
2.000	SW 2.0	1.272	-0.173	0.000	0.12	7.8	OK
1.001	FLOW CONTROL	0.256	0.056	0.000	0.28	4.8	SURCHARGED

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Summary of Results for 240 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap.	(l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.014	-0.136	0.000	0.02			1.0	OK
2.000	SW 2.0	1.269	-0.176	0.000	0.11			6.9	OK
1.001	FLOW CONTROL	0.260	0.060	0.000	0.28			4.8	SURCHARGED

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Summary of Results for 360 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	
1.000	SW 1.0	2.011	-0.139	0.000	0.02	0.7	OK
2.000	SW 2.0	1.264	-0.181	0.000	0.09	5.5	OK
1.001	FLOW CONTROL	0.242	0.042	0.000	0.27	4.7	SURCHARGED

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 4  
Number of Online Controls 1    Number of Storage Structures 1

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	30	Winter Storms	No
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 535000 183900 TQ 35000 83900	Cv (Winter)	0.840
Data Type	Catchment	Storm Duration (mins)	15

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Summary of Results for 15 minute 30 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap.	(l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.047	-0.103	0.000	0.21		10.5		OK
2.000	SW 2.0	1.303	-0.142	0.000	0.28		17.3		OK
1.001	FLOW CONTROL	0.252	0.052	0.000	0.28		4.7		SURCHARGED

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Summary of Results for 30 minute 30 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap.	(l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.044	-0.106	0.000	0.18		9.1		OK
2.000	SW 2.0	1.311	-0.134	0.000	0.35		21.8		OK
1.001	FLOW CONTROL	0.369	0.169	0.000	0.29		5.0		SURCHARGED



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Summary of Results for 60 minute 30 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water		Surcharged		Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)		
1.000	SW 1.0	2.036	-0.114	0.000	0.13			6.5		OK
2.000	SW 2.0	1.315	-0.130	0.000	0.35			21.9		OK
1.001	FLOW CONTROL	0.490	0.290	0.000	0.29			5.0		SURCHARGED

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Summary of Results for 120 minute 30 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap.	(l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.030	-0.120	0.000	0.09			4.3	OK
2.000	SW 2.0	1.308	-0.137	0.000	0.32			20.4	OK
1.001	FLOW CONTROL	0.654	0.454	0.000	0.29			5.0	SURCHARGED

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Summary of Results for 180 minute 30 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	
1.000	SW 1.0	2.026	-0.124	0.000	0.07	3.4	OK
2.000	SW 2.0	1.302	-0.143	0.000	0.29	18.2	OK
1.001	FLOW CONTROL	0.702	0.502	0.000	0.29	5.0	SURCHARGED

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Summary of Results for 240 minute 30 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	
1.000	SW 1.0	2.023	-0.127	0.000	0.06	2.8	OK
2.000	SW 2.0	1.297	-0.148	0.000	0.26	16.2	OK
1.001	FLOW CONTROL	0.707	0.507	0.000	0.29	5.0	SURCHARGED

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Summary of Results for 360 minute 30 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap.	(l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.020	-0.130	0.000	0.04		2.0		OK
2.000	SW 2.0	1.290	-0.155	0.000	0.21		13.2		OK
1.001	FLOW CONTROL	0.674	0.474	0.000	0.29		5.0		SURCHARGED

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 4  
Number of Online Controls 1    Number of Storage Structures 1

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	No
Return Period (years)	30	Winter Storms	Yes
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 535000 183900 TQ 35000 83900	Cv (Winter)	0.840
Data Type	Catchment	Storm Duration (mins)	15

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Summary of Results for 15 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap.	(l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.047	-0.103	0.000	0.21		10.5		OK
2.000	SW 2.0	1.309	-0.136	0.000	0.33		20.6		OK
1.001	FLOW CONTROL	0.296	0.096	0.000	0.28		4.9		SURCHARGED

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Summary of Results for 30 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap.	(l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.040	-0.110	0.000	0.16		7.9		OK
2.000	SW 2.0	1.320	-0.125	0.000	0.39		24.4		OK
1.001	FLOW CONTROL	0.433	0.233	0.000	0.29		5.0		SURCHARGED



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Summary of Results for 60 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	
1.000	SW 1.0	2.032	-0.118	0.000	0.10	5.1	OK
2.000	SW 2.0	1.313	-0.132	0.000	0.36	22.8	OK
1.001	FLOW CONTROL	0.572	0.372	0.000	0.29	5.0	SURCHARGED

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Summary of Results for 120 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap.	(l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.025	-0.125	0.000	0.07			3.4	OK
2.000	SW 2.0	1.306	-0.139	0.000	0.32			19.9	OK
1.001	FLOW CONTROL	0.763	0.563	0.000	0.29			5.0	SURCHARGED

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Summary of Results for 180 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap.	(l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.022	-0.128	0.000	0.05			2.6	OK
2.000	SW 2.0	1.299	-0.146	0.000	0.27			16.8	OK
1.001	FLOW CONTROL	0.828	0.628	0.000	0.29			5.0	SURCHARGED

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Summary of Results for 240 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	
1.000	SW 1.0	2.020	-0.130	0.000	0.04	2.1	OK
2.000	SW 2.0	1.293	-0.152	0.000	0.23	14.5	OK
1.001	FLOW CONTROL	0.828	0.628	0.000	0.29	5.0	SURCHARGED

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Summary of Results for 360 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water		Surcharged		Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)		
1.000	SW 1.0	2.017	-0.133	0.000	0.03			1.5		OK
2.000	SW 2.0	1.284	-0.161	0.000	0.18			11.2		OK
1.001	FLOW CONTROL	0.765	0.565	0.000	0.29			5.0		SURCHARGED

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 4  
Number of Online Controls 1    Number of Storage Structures 1

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	100	Winter Storms	No
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 535000 183900 TQ 35000 83900	Cv (Winter)	0.840
Data Type	Catchment	Storm Duration (mins)	15

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Summary of Results for 15 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	
1.000	SW 1.0	2.054	-0.096	0.000	0.28	13.7	OK
2.000	SW 2.0	1.319	-0.126	0.000	0.40	25.1	OK
1.001	FLOW CONTROL	0.368	0.168	0.000	0.29	5.0	SURCHARGED

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Summary of Results for 30 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap.	(l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.050	-0.100	0.000	0.24		12.0		OK
2.000	SW 2.0	1.328	-0.117	0.000	0.47		29.4		OK
1.001	FLOW CONTROL	0.542	0.342	0.000	0.29		5.0		SURCHARGED



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Summary of Results for 60 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap.	(l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.042	-0.108	0.000	0.17			8.6	OK
2.000	SW 2.0	1.327	-0.118	0.000	0.46			28.9	OK
1.001	FLOW CONTROL	0.723	0.523	0.000	0.29			5.0	SURCHARGED

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Summary of Results for 120 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	
1.000	SW 1.0	2.033	-0.117	0.000	0.11	5.6	OK
2.000	SW 2.0	1.322	-0.123	0.000	0.42	26.7	OK
1.001	FLOW CONTROL	0.954	0.754	0.000	0.29	5.0	SURCHARGED

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Summary of Results for 180 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	
1.000	SW 1.0	2.031	-0.119	0.000	0.09	4.5	OK
2.000	SW 2.0	1.316	-0.129	0.000	0.38	24.0	OK
1.001	FLOW CONTROL	1.039	0.839	0.000	0.29	5.0	SURCHARGED

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Summary of Results for 240 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	
1.000	SW 1.0	2.027	-0.123	0.000	0.08	3.7	OK
2.000	SW 2.0	1.311	-0.134	0.000	0.34	21.5	OK
1.001	FLOW CONTROL	1.056	0.856	0.000	0.29	5.0	SURCHARGED

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Summary of Results for 360 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap.	(l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.023	-0.127	0.000	0.06			2.7	OK
2.000	SW 2.0	1.301	-0.144	0.000	0.28			17.8	OK
1.001	FLOW CONTROL	1.053	0.853	0.000	0.29			5.0	SURCHARGED

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 4  
Number of Online Controls 1    Number of Storage Structures 1

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	No
Return Period (years)	100	Winter Storms	Yes
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 535000 183900 TQ 35000 83900	Cv (Winter)	0.840
Data Type	Catchment	Storm Duration (mins)	15

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Summary of Results for 15 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water		Surcharged		Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)		
1.000	SW 1.0	2.054	-0.096	0.000	0.28			13.7		OK
2.000	SW 2.0	1.326	-0.119	0.000	0.46			28.7		OK
1.001	FLOW CONTROL	0.432	0.232	0.000	0.29			5.0		SURCHARGED

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Summary of Results for 30 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	
1.000	SW 1.0	2.047	-0.103	0.000	0.21	10.4	OK
2.000	SW 2.0	1.342	-0.103	0.000	0.51	32.0	OK
1.001	FLOW CONTROL	0.633	0.433	0.000	0.29	5.0	SURCHARGED



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Summary of Results for 60 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Cap.	(l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.037	-0.113	0.000	0.14			6.8	OK
2.000	SW 2.0	1.329	-0.116	0.000	0.48			30.1	OK
1.001	FLOW CONTROL	0.841	0.641	0.000	0.29			5.0	SURCHARGED

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Summary of Results for 120 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water		Surcharged		Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)		
1.000	SW 1.0	2.030	-0.120	0.000	0.09			4.4		OK
2.000	SW 2.0	1.321	-0.124	0.000	0.41			26.1		OK
1.001	FLOW CONTROL	1.087	0.887	0.000	0.29			5.0		SURCHARGED

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Summary of Results for 180 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	
1.000	SW 1.0	2.026	-0.124	0.000	0.07			3.4	OK
2.000	SW 2.0	1.312	-0.133	0.000	0.35			22.2	OK
1.001	FLOW CONTROL	1.199	0.999	0.000	0.29			5.0	SURCHARGED

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Summary of Results for 240 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	
1.000	SW 1.0	2.023	-0.127	0.000	0.06	2.8	OK
2.000	SW 2.0	1.305	-0.140	0.000	0.31	19.2	OK
1.001	FLOW CONTROL	1.254	1.054	0.000	0.29	5.0	SURCHARGED

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Summary of Results for 360 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	
1.000	SW 1.0	2.019	-0.131	0.000	0.04	2.0	OK
2.000	SW 2.0	1.294	-0.151	0.000	0.24	15.1	OK
1.001	FLOW CONTROL	1.242	1.042	0.000	0.29	5.0	SURCHARGED



## **Enderby Place, Greenwich, London**

### **Catchment Area B**


## **Surface Water Calculations**

**Job No. 0711**

**Revision 0**

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
1.000	17.966	0.110	163.3	0.000	4.00	0.0	0.600	o	225	Pipe/Conduit
1.001	15.627	0.100	156.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
1.002	17.474	0.110	158.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
1.003	23.499	0.140	167.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
1.004	12.429	0.080	155.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
1.005	8.677	0.060	144.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	4.29	4.600	0.000	0.0	0.0	0.0	1.02	40.6	0.0
1.001	0.00	4.54	4.490	0.000	0.0	0.0	0.0	1.04	41.5	0.0
1.002	0.00	4.82	4.390	0.000	0.0	0.0	0.0	1.03	41.1	0.0
1.003	0.00	5.21	4.280	0.000	0.0	0.0	0.0	1.01	40.0	0.0
1.004	0.00	5.41	4.140	0.000	0.0	0.0	0.0	1.05	41.6	0.0
1.005	0.00	5.54	4.060	0.000	0.0	0.0	0.0	1.09	43.1	0.0

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out		Pipes In		Backdrop (mm)	
					PN	Invert Level (m)	Diameter (mm)	PN		Invert Level (m)
S 1.0	6.370	1.770	Open Manhole	600	1.000	4.600	225			
S 1.1	6.340	1.850	Open Manhole	600	1.001	4.490	225	1.000	4.490	225
S 1.2	6.200	1.810	Open Manhole	600	1.002	4.390	225	1.001	4.390	225
S 1.3	6.200	1.920	Open Manhole	600	1.003	4.280	225	1.002	4.280	225
S 1.4	5.600	1.460	Open Manhole	600	1.004	4.140	225	1.003	4.140	225
S 1.5	5.450	1.390	Open Manhole	600	1.005	4.060	225	1.004	4.060	225
EXSW 3	5.800	1.800	Open Manhole	1500		OUTFALL		1.005	4.000	225

No coordinates have been specified, layout information cannot be produced.



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PIPELINE SCHEDULES for StormUpstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	S 1.0	6.370	4.600	1.545	Open Manhole	600
1.001	o	225	S 1.1	6.340	4.490	1.625	Open Manhole	600
1.002	o	225	S 1.2	6.200	4.390	1.585	Open Manhole	600
1.003	o	225	S 1.3	6.200	4.280	1.695	Open Manhole	600
1.004	o	225	S 1.4	5.600	4.140	1.235	Open Manhole	600
1.005	o	225	S 1.5	5.450	4.060	1.165	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	17.966	163.3	S 1.1	6.340	4.490	1.625	Open Manhole	600
1.001	15.627	156.3	S 1.2	6.200	4.390	1.585	Open Manhole	600
1.002	17.474	158.9	S 1.3	6.200	4.280	1.695	Open Manhole	600
1.003	23.499	167.9	S 1.4	5.600	4.140	1.235	Open Manhole	600
1.004	12.429	155.4	S 1.5	5.450	4.060	1.165	Open Manhole	600
1.005	8.677	144.6	EXSW 3	5.800	4.000	1.575	Open Manhole	1500

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
1.005	EXSW 3	5.800	4.000	3.400	1500	0

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Time Area Diagram for Green Roof at Pipe Number 1.000 (Storm)

Area (m³) 860 Evaporation (mm/day) 3  
Depression Storage (mm) 5 Decay Coefficient 0.050

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)	From: To:	(ha)	From: To:	(ha)
0 4	0.015628	32 36	0.003155	64 68	0.000637	96 100	0.000129
4 8	0.012795	36 40	0.002583	68 72	0.000522	100 104	0.000105
8 12	0.010476	40 44	0.002115	72 76	0.000427	104 108	0.000086
12 16	0.008577	44 48	0.001732	76 80	0.000350	108 112	0.000071
16 20	0.007022	48 52	0.001418	80 84	0.000286	112 116	0.000058
20 24	0.005749	52 56	0.001161	84 88	0.000234	116 120	0.000047
24 28	0.004707	56 60	0.000950	88 92	0.000192		
28 32	0.003854	60 64	0.000778	92 96	0.000157		

Time Area Diagram for Green Roof at Pipe Number 1.000 (Storm)


Area (m³) 2100 Evaporation (mm/day) 3  
Depression Storage (mm) 50 Decay Coefficient 0.050

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)	From: To:	(ha)	From: To:	(ha)
0 4	0.038161	32 36	0.007705	64 68	0.001556	96 100	0.000314
4 8	0.031244	36 40	0.006308	68 72	0.001274	100 104	0.000257
8 12	0.025580	40 44	0.005165	72 76	0.001043	104 108	0.000211
12 16	0.020943	44 48	0.004228	76 80	0.000854	108 112	0.000172
16 20	0.017147	48 52	0.003462	80 84	0.000699	112 116	0.000141
20 24	0.014039	52 56	0.002834	84 88	0.000572	116 120	0.000116
24 28	0.011494	56 60	0.002321	88 92	0.000469		
28 32	0.009410	60 64	0.001900	92 96	0.000384		

Time Area Diagram at Pipe Number 1.000 for Storm

Total Area (ha) 0.096

Time (mins)	Area
From: To:	(ha)
0 4	0.096

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 3  
Number of Online Controls 0    Number of Storage Structures 0

Synthetic Rainfall Details


Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	2	Winter Storms	No
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 535000 183900 TQ 35000 83900	Cv (Winter)	0.840
Data Type	Catchment	Storm Duration (mins)	15

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Summary of Results for 15 minute 2 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	Flow (l/s)		
1.000	S 1.0	4.723	-0.102	0.000	0.58		20.9	OK	
1.001	S 1.1	4.612	-0.103	0.000	0.56		20.5	OK	
1.002	S 1.2	4.511	-0.104	0.000	0.56		20.7	OK	
1.003	S 1.3	4.400	-0.105	0.000	0.55		20.1	OK	
1.004	S 1.4	4.262	-0.103	0.000	0.57		20.3	OK	
1.005	S 1.5	4.184	-0.101	0.000	0.59		20.3	OK	

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Summary of Results for 30 minute 2 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded			Half Drain Pipe	
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Time (mins)	Pipe Flow (l/s)	Status
1.000	S 1.0	4.713	-0.112	0.000	0.49		17.8	OK	
1.001	S 1.1	4.602	-0.113	0.000	0.49		17.9	OK	
1.002	S 1.2	4.500	-0.115	0.000	0.48		17.8	OK	
1.003	S 1.3	4.391	-0.114	0.000	0.48		17.7	OK	
1.004	S 1.4	4.252	-0.113	0.000	0.49		17.6	OK	
1.005	S 1.5	4.175	-0.110	0.000	0.51		17.5	OK	

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Summary of Results for 60 minute 2 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	Flow (l/s)		
1.000	S 1.0	4.692	-0.133	0.000	0.35		12.6	OK	
1.001	S 1.1	4.582	-0.133	0.000	0.33		12.3	OK	
1.002	S 1.2	4.482	-0.133	0.000	0.33		12.3	OK	
1.003	S 1.3	4.371	-0.134	0.000	0.34		12.5	OK	
1.004	S 1.4	4.231	-0.134	0.000	0.35		12.6	OK	
1.005	S 1.5	4.152	-0.133	0.000	0.36		12.6	OK	

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Summary of Results for 120 minute 2 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded			Half Drain Pipe	
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Time (mins)	Pipe Flow (l/s)	Status
1.000	S 1.0	4.689	-0.136	0.000	0.28		10.3	OK	
1.001	S 1.1	4.579	-0.136	0.000	0.29		10.5	OK	
1.002	S 1.2	4.479	-0.136	0.000	0.29		10.7	OK	
1.003	S 1.3	4.365	-0.140	0.000	0.30		10.9	OK	
1.004	S 1.4	4.221	-0.144	0.000	0.30		10.8	OK	
1.005	S 1.5	4.143	-0.142	0.000	0.31		10.6	OK	


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Summary of Results for 180 minute 2 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Time (mins)	Pipe Flow (l/s)	Status
1.000	S 1.0	4.690	-0.135	0.000	0.33			11.9	OK
1.001	S 1.1	4.580	-0.135	0.000	0.33			12.0	OK
1.002	S 1.2	4.480	-0.135	0.000	0.33			12.1	OK
1.003	S 1.3	4.369	-0.136	0.000	0.33			12.1	OK
1.004	S 1.4	4.229	-0.136	0.000	0.33			11.9	OK
1.005	S 1.5	4.151	-0.134	0.000	0.34			11.7	OK



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Summary of Results for 240 minute 2 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Time (mins)	Pipe Flow (l/s)	Status
1.000	S 1.0	4.683	-0.142	0.000	0.30		10.7		OK
1.001	S 1.1	4.573	-0.142	0.000	0.29		10.7		OK
1.002	S 1.2	4.473	-0.142	0.000	0.29		10.7		OK
1.003	S 1.3	4.363	-0.142	0.000	0.29		10.6		OK
1.004	S 1.4	4.224	-0.141	0.000	0.30		10.6		OK
1.005	S 1.5	4.146	-0.139	0.000	0.31		10.5		OK

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Summary of Results for 360 minute 2 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)	Time (mins)	Flow (l/s)		
1.000	S 1.0	4.674	-0.151	0.000	0.24	8.6	8.6	OK	
1.001	S 1.1	4.564	-0.151	0.000	0.23	8.6	8.6	OK	
1.002	S 1.2	4.463	-0.152	0.000	0.23	8.5	8.5	OK	
1.003	S 1.3	4.353	-0.152	0.000	0.23	8.5	8.5	OK	
1.004	S 1.4	4.214	-0.151	0.000	0.24	8.5	8.5	OK	
1.005	S 1.5	4.136	-0.149	0.000	0.25	8.5	8.5	OK	

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 3  
Number of Online Controls 0    Number of Storage Structures 0

Synthetic Rainfall Details


Rainfall Model	FEH	Summer Storms	No
Return Period (years)	2	Winter Storms	Yes
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 535000 183900 TQ 35000 83900	Cv (Winter)	0.840
Data Type	Catchment	Storm Duration (mins)	15

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Summary of Results for 15 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF


PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap.	Time (mins)	Flow (l/s)		
1.000	S 1.0	4.723	-0.102	0.000	0.58		21.0	OK	
1.001	S 1.1	4.612	-0.103	0.000	0.56		20.6	OK	
1.002	S 1.2	4.511	-0.104	0.000	0.56		20.7	OK	
1.003	S 1.3	4.400	-0.105	0.000	0.55		20.2	OK	
1.004	S 1.4	4.263	-0.102	0.000	0.57		20.4	OK	
1.005	S 1.5	4.184	-0.101	0.000	0.59		20.4	OK	

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Summary of Results for 30 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	
1.000	S 1.0	4.703	-0.122	0.000	0.43		15.6	OK	
1.001	S 1.1	4.593	-0.122	0.000	0.43		15.6	OK	
1.002	S 1.2	4.492	-0.123	0.000	0.42		15.6	OK	
1.003	S 1.3	4.382	-0.123	0.000	0.42		15.6	OK	
1.004	S 1.4	4.243	-0.122	0.000	0.43		15.5	OK	
1.005	S 1.5	4.166	-0.119	0.000	0.45		15.5	OK	

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Summary of Results for 60 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	Pipe Flow (l/s)	Status	
1.000	S 1.0	4.681	-0.144	0.000	0.28	10.1		OK	
1.001	S 1.1	4.570	-0.145	0.000	0.27	10.0		OK	
1.002	S 1.2	4.470	-0.145	0.000	0.27	10.0		OK	
1.003	S 1.3	4.360	-0.145	0.000	0.27	10.1		OK	
1.004	S 1.4	4.221	-0.144	0.000	0.28	10.1		OK	
1.005	S 1.5	4.142	-0.143	0.000	0.29	10.1		OK	

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Summary of Results for 120 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap.	Time (mins)	Pipe Flow (l/s)	Status	
1.000	S 1.0	4.690	-0.135	0.000	0.32		11.7	OK	
1.001	S 1.1	4.577	-0.138	0.000	0.32		11.6	OK	
1.002	S 1.2	4.477	-0.138	0.000	0.31		11.3	OK	
1.003	S 1.3	4.367	-0.138	0.000	0.31		11.2	OK	
1.004	S 1.4	4.228	-0.137	0.000	0.31		11.3	OK	
1.005	S 1.5	4.150	-0.135	0.000	0.33		11.3	OK	


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Summary of Results for 180 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Time (mins)	Pipe Flow (l/s)	Status
1.000	S 1.0	4.680	-0.145	0.000	0.28		10.1		OK
1.001	S 1.1	4.570	-0.145	0.000	0.27		10.1		OK
1.002	S 1.2	4.470	-0.145	0.000	0.27		10.0		OK
1.003	S 1.3	4.360	-0.145	0.000	0.27		10.0		OK
1.004	S 1.4	4.221	-0.144	0.000	0.28		10.0		OK
1.005	S 1.5	4.143	-0.142	0.000	0.29		10.0		OK



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Summary of Results for 240 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap.	Time (mins)	Flow (l/s)		
1.000	S 1.0	4.674	-0.151	0.000	0.24		8.6	OK	
1.001	S 1.1	4.564	-0.151	0.000	0.24		8.6	OK	
1.002	S 1.2	4.464	-0.151	0.000	0.23		8.6	OK	
1.003	S 1.3	4.354	-0.151	0.000	0.24		8.6	OK	
1.004	S 1.4	4.215	-0.150	0.000	0.24		8.6	OK	
1.005	S 1.5	4.136	-0.149	0.000	0.25		8.6	OK	

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Summary of Results for 360 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap.	Time (mins)	Pipe Flow (l/s)	Status	
1.000	S 1.0	4.665	-0.160	0.000	0.19	6.8	OK		
1.001	S 1.1	4.555	-0.160	0.000	0.18	6.8	OK		
1.002	S 1.2	4.455	-0.160	0.000	0.18	6.8	OK		
1.003	S 1.3	4.345	-0.160	0.000	0.18	6.7	OK		
1.004	S 1.4	4.206	-0.159	0.000	0.19	6.7	OK		
1.005	S 1.5	4.127	-0.158	0.000	0.20	6.7	OK		

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 3  
Number of Online Controls 0    Number of Storage Structures 0

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	30	Winter Storms	No
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 535000 183900 TQ 35000 83900	Cv (Winter)	0.840
Data Type	Catchment	Storm Duration (mins)	15

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Summary of Results for 15 minute 30 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water		Surcharged		Flooded		Half Drain Time (mins)	Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)					
1.000	S 1.0	5.141	0.316	0.000	1.38			50.1	SURCHARGED	
1.001	S 1.1	4.947	0.232	0.000	1.32			48.2	SURCHARGED	
1.002	S 1.2	4.802	0.187	0.000	1.30			47.8	SURCHARGED	
1.003	S 1.3	4.638	0.133	0.000	1.23			45.0	SURCHARGED	
1.004	S 1.4	4.436	0.071	0.000	1.22			43.8	SURCHARGED	
1.005	S 1.5	4.314	0.029	0.000	1.26			43.5	SURCHARGED	

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Summary of Results for 30 minute 30 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water		Surcharged		Flooded		Half Drain Time (mins)	Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)					
1.000	S 1.0	4.954	0.129	0.000	1.21			44.1	SURCHARGED	
1.001	S 1.1	4.801	0.086	0.000	1.17			42.9	SURCHARGED	
1.002	S 1.2	4.673	0.058	0.000	1.12			41.3	SURCHARGED	
1.003	S 1.3	4.550	0.045	0.000	1.09			40.0	SURCHARGED	
1.004	S 1.4	4.388	0.023	0.000	1.10			39.3	SURCHARGED	
1.005	S 1.5	4.292	0.007	0.000	1.13			39.0	SURCHARGED	

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Summary of Results for 60 minute 30 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Time (mins)	Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)				
1.000	S 1.0	4.864	0.039	0.000	1.09	39.7	SURCHARGED		
1.001	S 1.1	4.729	0.014	0.000	1.01	37.2	SURCHARGED		
1.002	S 1.2	4.611	-0.004	0.000	1.02	37.6	OK		
1.003	S 1.3	4.493	-0.012	0.000	1.00	36.6	OK		
1.004	S 1.4	4.358	-0.007	0.000	0.99	35.3	OK		
1.005	S 1.5	4.285	0.000	0.000	1.02	35.3	OK		

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Summary of Results for 120 minute 30 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	Flow (l/s)		
1.000	S 1.0	4.765	-0.060	0.000	0.89	32.2		OK	
1.001	S 1.1	4.654	-0.061	0.000	0.87	31.9		OK	
1.002	S 1.2	4.554	-0.061	0.000	0.86	31.7		OK	
1.003	S 1.3	4.444	-0.061	0.000	0.86	31.4		OK	
1.004	S 1.4	4.307	-0.058	0.000	0.87	31.2		OK	
1.005	S 1.5	4.231	-0.054	0.000	0.90	31.1		OK	

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Summary of Results for 180 minute 30 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded			Half Drain Pipe	
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)	Time (mins)	Pipe Flow (l/s)	Status	
1.000	S 1.0	4.744	-0.081	0.000	0.73		26.6	OK	
1.001	S 1.1	4.633	-0.082	0.000	0.72		26.3	OK	
1.002	S 1.2	4.533	-0.082	0.000	0.71		26.2	OK	
1.003	S 1.3	4.423	-0.082	0.000	0.72		26.4	OK	
1.004	S 1.4	4.285	-0.080	0.000	0.74		26.5	OK	
1.005	S 1.5	4.208	-0.077	0.000	0.77		26.6	OK	



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Summary of Results for 240 minute 30 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)	Time (mins)	Pipe Flow (l/s)	Status	
1.000	S 1.0	4.729	-0.096	0.000	0.62	22.6		OK	
1.001	S 1.1	4.618	-0.097	0.000	0.62	22.6		OK	
1.002	S 1.2	4.518	-0.097	0.000	0.61	22.5		OK	
1.003	S 1.3	4.408	-0.097	0.000	0.61	22.3		OK	
1.004	S 1.4	4.270	-0.095	0.000	0.62	22.2		OK	
1.005	S 1.5	4.193	-0.092	0.000	0.65	22.3		OK	

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Summary of Results for 360 minute 30 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)	Time (mins)	Flow (l/s)		
1.000	S 1.0	4.710	-0.115	0.000	0.48	17.5	OK		
1.001	S 1.1	4.599	-0.116	0.000	0.48	17.5	OK		
1.002	S 1.2	4.499	-0.116	0.000	0.47	17.4	OK		
1.003	S 1.3	4.389	-0.116	0.000	0.47	17.3	OK		
1.004	S 1.4	4.251	-0.114	0.000	0.48	17.3	OK		
1.005	S 1.5	4.174	-0.111	0.000	0.50	17.2	OK		

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 3  
Number of Online Controls 0    Number of Storage Structures 0

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	No
Return Period (years)	30	Winter Storms	Yes
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 535000 183900 TQ 35000 83900	Cv (Winter)	0.840
Data Type	Catchment	Storm Duration (mins)	15

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Summary of Results for 15 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water		Surcharged		Flooded		Half Drain Time (mins)	Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)					
1.000	S 1.0	5.157	0.332	0.000	1.37			50.0	SURCHARGED	
1.001	S 1.1	4.977	0.262	0.000	1.33			48.6	SURCHARGED	
1.002	S 1.2	4.825	0.210	0.000	1.31			48.0	SURCHARGED	
1.003	S 1.3	4.655	0.150	0.000	1.25			45.9	SURCHARGED	
1.004	S 1.4	4.445	0.080	0.000	1.25			44.9	SURCHARGED	
1.005	S 1.5	4.319	0.034	0.000	1.29			44.7	SURCHARGED	

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Summary of Results for 30 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )				
1.000	S 1.0	4.868	0.043	0.000	1.10	39.9	SURCHARGED	
1.001	S 1.1	4.736	0.021	0.000	1.06	38.9	SURCHARGED	
1.002	S 1.2	4.627	0.012	0.000	1.03	37.8	SURCHARGED	
1.003	S 1.3	4.518	0.013	0.000	1.01	37.2	SURCHARGED	
1.004	S 1.4	4.372	0.007	0.000	1.04	37.3	SURCHARGED	
1.005	S 1.5	4.285	0.000	0.000	1.08	37.3	OK	

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Summary of Results for 60 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)	Time (mins)	Flow (l/s)		
1.000	S 1.0	4.825	0.000	0.000	1.01		36.6	OK	
1.001	S 1.1	4.672	-0.043	0.000	0.99		36.4	OK	
1.002	S 1.2	4.578	-0.037	0.000	0.98		36.1	OK	
1.003	S 1.3	4.478	-0.027	0.000	0.97		35.7	OK	
1.004	S 1.4	4.355	-0.010	0.000	0.98		35.0	OK	
1.005	S 1.5	4.282	-0.003	0.000	1.00		34.5	OK	

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Summary of Results for 120 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)	Time (mins)	Pipe Flow (l/s)	Status	
1.000	S 1.0	4.746	-0.079	0.000	0.75	27.1		OK	
1.001	S 1.1	4.635	-0.080	0.000	0.74	27.1		OK	
1.002	S 1.2	4.535	-0.080	0.000	0.73	26.9		OK	
1.003	S 1.3	4.425	-0.080	0.000	0.73	26.9		OK	
1.004	S 1.4	4.288	-0.077	0.000	0.75	27.0		OK	
1.005	S 1.5	4.211	-0.074	0.000	0.78	27.1		OK	

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Summary of Results for 180 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	Pipe Flow (l/s)	Status	
1.000	S 1.0	4.726	-0.099	0.000	0.60	21.8		OK	
1.001	S 1.1	4.615	-0.100	0.000	0.59	21.8		OK	
1.002	S 1.2	4.515	-0.100	0.000	0.59	21.8		OK	
1.003	S 1.3	4.405	-0.100	0.000	0.59	21.7		OK	
1.004	S 1.4	4.267	-0.098	0.000	0.61	21.7		OK	
1.005	S 1.5	4.190	-0.095	0.000	0.63	21.8		OK	



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Summary of Results for 240 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)	Time (mins)	Flow (l/s)		
1.000	S 1.0	4.713	-0.112	0.000	0.50	18.2	OK		
1.001	S 1.1	4.602	-0.113	0.000	0.50	18.2	OK		
1.002	S 1.2	4.502	-0.113	0.000	0.50	18.2	OK		
1.003	S 1.3	4.392	-0.113	0.000	0.50	18.2	OK		
1.004	S 1.4	4.254	-0.111	0.000	0.51	18.2	OK		
1.005	S 1.5	4.176	-0.109	0.000	0.53	18.2	OK		

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Summary of Results for 360 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)	Time (mins)	Flow (l/s)		
1.000	S 1.0	4.696	-0.129	0.000	0.38		13.8	OK	
1.001	S 1.1	4.585	-0.130	0.000	0.38		13.8	OK	
1.002	S 1.2	4.485	-0.130	0.000	0.37		13.8	OK	
1.003	S 1.3	4.375	-0.130	0.000	0.37		13.8	OK	
1.004	S 1.4	4.237	-0.128	0.000	0.38		13.8	OK	
1.005	S 1.5	4.159	-0.126	0.000	0.40		13.8	OK	

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 3  
Number of Online Controls 0    Number of Storage Structures 0

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	100	Winter Storms	No
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 535000 183900 TQ 35000 83900	Cv (Winter)	0.840
Data Type	Catchment	Storm Duration (mins)	15

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Summary of Results for 15 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m³)				
1.000	S 1.0	5.738	0.913	0.000	1.69	61.6	SURCHARGED	
1.001	S 1.1	5.460	0.745	0.000	1.62	59.5	SURCHARGED	
1.002	S 1.2	5.218	0.603	0.000	1.60	58.9	SURCHARGED	
1.003	S 1.3	4.951	0.446	0.000	1.57	57.5	SURCHARGED	
1.004	S 1.4	4.601	0.236	0.000	1.62	57.9	SURCHARGED	
1.005	S 1.5	4.387	0.102	0.000	1.68	58.1	SURCHARGED	

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Summary of Results for 30 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Time (mins)	Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)				
1.000	S 1.0	5.600	0.775	0.000	1.51	54.8	SURCHARGED		
1.001	S 1.1	5.304	0.589	0.000	1.51	55.2	SURCHARGED		
1.002	S 1.2	5.089	0.474	0.000	1.49	54.7	SURCHARGED		
1.003	S 1.3	4.859	0.354	0.000	1.46	53.8	SURCHARGED		
1.004	S 1.4	4.551	0.186	0.000	1.52	54.2	SURCHARGED		
1.005	S 1.5	4.362	0.077	0.000	1.57	54.3	SURCHARGED		

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Summary of Results for 60 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water		Surcharged		Flooded		Half Drain Time (mins)	Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)					
1.000	S 1.0	5.455	0.630	0.000	1.44			52.4	SURCHARGED	
1.001	S 1.1	5.221	0.506	0.000	1.42			52.1	SURCHARGED	
1.002	S 1.2	5.014	0.399	0.000	1.40			51.7	SURCHARGED	
1.003	S 1.3	4.792	0.287	0.000	1.39			50.9	SURCHARGED	
1.004	S 1.4	4.512	0.147	0.000	1.43			51.2	SURCHARGED	
1.005	S 1.5	4.346	0.061	0.000	1.49			51.4	SURCHARGED	

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Summary of Results for 120 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water		Surcharged		Flooded		Half Drain Time (mins)	Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)					
1.000	S 1.0	4.990	0.165	0.000	1.14			41.6	SURCHARGED	
1.001	S 1.1	4.843	0.128	0.000	1.11			40.8	SURCHARGED	
1.002	S 1.2	4.712	0.097	0.000	1.09			39.9	SURCHARGED	
1.003	S 1.3	4.571	0.066	0.000	1.08			39.7	SURCHARGED	
1.004	S 1.4	4.396	0.031	0.000	1.12			40.0	SURCHARGED	
1.005	S 1.5	4.294	0.009	0.000	1.16			40.1	SURCHARGED	

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Summary of Results for 180 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap.	Time (mins)	Pipe Flow (l/s)	Status	
1.000	S 1.0	4.776	-0.049	0.000	0.96	35.0		OK	
1.001	S 1.1	4.665	-0.050	0.000	0.95	34.7		OK	
1.002	S 1.2	4.565	-0.050	0.000	0.94	34.6		OK	
1.003	S 1.3	4.455	-0.050	0.000	0.95	34.8		OK	
1.004	S 1.4	4.326	-0.039	0.000	0.97	34.7		OK	
1.005	S 1.5	4.252	-0.033	0.000	1.00	34.5		OK	




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Summary of Results for 240 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF


PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	
1.000	S 1.0	4.757	-0.068	0.000	0.83		30.0		OK
1.001	S 1.1	4.646	-0.069	0.000	0.82		29.9		OK
1.002	S 1.2	4.546	-0.069	0.000	0.81		29.7		OK
1.003	S 1.3	4.436	-0.069	0.000	0.80		29.5		OK
1.004	S 1.4	4.299	-0.066	0.000	0.82		29.4		OK
1.005	S 1.5	4.223	-0.062	0.000	0.86		29.7		OK

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Summary of Results for 360 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	
1.000	S 1.0	4.732	-0.093	0.000	0.65		23.5		OK
1.001	S 1.1	4.621	-0.094	0.000	0.64		23.5		OK
1.002	S 1.2	4.521	-0.094	0.000	0.64		23.4		OK
1.003	S 1.3	4.411	-0.094	0.000	0.63		23.2		OK
1.004	S 1.4	4.273	-0.092	0.000	0.65		23.2		OK
1.005	S 1.5	4.197	-0.088	0.000	0.67		23.1		OK

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Causeway	Network 2020.1.3	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 3  
Number of Online Controls 0    Number of Storage Structures 0

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	No
Return Period (years)	100	Winter Storms	Yes
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 535000 183900 TQ 35000 83900	Cv (Winter)	0.840
Data Type		Catchment Storm Duration (mins)	15

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Summary of Results for 15 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Time (mins)	Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)				
1.000	S 1.0	5.808	0.983	0.000	1.70	61.8	SURCHARGED		
1.001	S 1.1	5.517	0.802	0.000	1.64	60.0	SURCHARGED		
1.002	S 1.2	5.259	0.644	0.000	1.62	59.6	SURCHARGED		
1.003	S 1.3	4.977	0.472	0.000	1.60	58.9	SURCHARGED		
1.004	S 1.4	4.612	0.247	0.000	1.65	59.1	SURCHARGED		
1.005	S 1.5	4.391	0.106	0.000	1.71	59.1	SURCHARGED		

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Summary of Results for 30 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Time (mins)	Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)				
1.000	S 1.0	5.687	0.862	0.000	1.59	57.9	SURCHARGED		
1.001	S 1.1	5.414	0.699	0.000	1.57	57.5	SURCHARGED		
1.002	S 1.2	5.174	0.559	0.000	1.54	56.8	SURCHARGED		
1.003	S 1.3	4.911	0.406	0.000	1.54	56.7	SURCHARGED		
1.004	S 1.4	4.575	0.210	0.000	1.58	56.6	SURCHARGED		
1.005	S 1.5	4.375	0.090	0.000	1.63	56.4	SURCHARGED		

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Summary of Results for 60 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged Flooded			Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m³)				
1.000	S 1.0	5.228	0.403	0.000	1.30	47.2	SURCHARGED	
1.001	S 1.1	5.038	0.323	0.000	1.28	46.8	SURCHARGED	
1.002	S 1.2	4.870	0.255	0.000	1.28	46.9	SURCHARGED	
1.003	S 1.3	4.688	0.183	0.000	1.28	47.0	SURCHARGED	
1.004	S 1.4	4.460	0.095	0.000	1.31	46.9	SURCHARGED	
1.005	S 1.5	4.324	0.039	0.000	1.36	46.8	SURCHARGED	

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Summary of Results for 120 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)	Time (mins)	Flow (l/s)		
1.000	S 1.0	4.778	-0.047	0.000	0.98		35.6	OK	
1.001	S 1.1	4.666	-0.049	0.000	0.97		35.5	OK	
1.002	S 1.2	4.570	-0.045	0.000	0.96		35.3	OK	
1.003	S 1.3	4.472	-0.033	0.000	0.95		34.9	OK	
1.004	S 1.4	4.347	-0.018	0.000	0.97		34.7	OK	
1.005	S 1.5	4.273	-0.012	0.000	1.00		34.5	OK	

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Summary of Results for 180 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap.	Time (mins)	Flow (l/s)	Status	
1.000	S 1.0	4.751	-0.074	0.000	0.79	28.7	OK		
1.001	S 1.1	4.641	-0.074	0.000	0.78	28.7	OK		
1.002	S 1.2	4.540	-0.075	0.000	0.78	28.7	OK		
1.003	S 1.3	4.430	-0.075	0.000	0.78	28.7	OK		
1.004	S 1.4	4.293	-0.072	0.000	0.80	28.7	OK		
1.005	S 1.5	4.217	-0.068	0.000	0.83	28.7	OK		



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Summary of Results for 240 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Time (mins)	Pipe Flow (l/s)	Status
1.000	S 1.0	4.734	-0.091	0.000	0.66		24.2		OK
1.001	S 1.1	4.624	-0.091	0.000	0.66		24.2		OK
1.002	S 1.2	4.523	-0.092	0.000	0.66		24.2		OK
1.003	S 1.3	4.414	-0.091	0.000	0.66		24.2		OK
1.004	S 1.4	4.276	-0.089	0.000	0.68		24.2		OK
1.005	S 1.5	4.199	-0.086	0.000	0.70		24.2		OK

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Network 2020.1.3

Summary of Results for 360 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 0.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Surcharged			Flooded		Half Drain Pipe		
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	Pipe Flow (l/s)	Status	
1.000	S 1.0	4.732	-0.093	0.000	0.59	21.4	OK		
1.001	S 1.1	4.613	-0.102	0.000	0.59	21.6	OK		
1.002	S 1.2	4.513	-0.102	0.000	0.57	21.0	OK		
1.003	S 1.3	4.403	-0.102	0.000	0.54	20.0	OK		
1.004	S 1.4	4.265	-0.100	0.000	0.56	19.9	OK		
1.005	S 1.5	4.188	-0.097	0.000	0.58	20.1	OK		

**APPENDIX L**  
**SUDS Proforma**

1. Project & Site Details	Project / Site Name (including sub-catchment / stage / phase where appropriate)	Enderby Place - Area A			
	Address & post code	Telcon Way, Greenwich, SE10 0TH			
	OS Grid ref. (Easting, Northing)	E 539195 N 178797			
	LPA reference (if applicable)				
	Brief description of proposed work	circa 750 residential units across three tower blocks up to 32 storeys in height, together with commercial space. Amenity and public space provision			
	Total site Area	2,550 m <sup>2</sup>			
	Total existing impervious area	2550 m <sup>2</sup>			
	Total proposed impervious area	2267.5 m <sup>2</sup>			
	Is the site in a surface water flood risk catchment (ref. local Surface Water Management Plan)?	No			
	Existing drainage connection type and location	To TW Sewer via Private Drain in Telcon Way			
	Designer Name	Mark Bullen			
	Designer Position	Director			
	Designer Company	MAB Consulting			
	<b>3a. Discharge Rates &amp; Required Storage</b>				
	<i>Greenfield (GF)</i>	<i>Existing</i>	<i>Required</i>	<i>Proposed</i>	

2. Proposed Discharge Arrangements	<b>2a. Infiltration Feasibility</b>		
	Superficial geology classification	Alluvial Clay, Silt, Sand and Peat	
	Bedrock geology classification	Lambeth Group-Clay Silt and Sand	
	Site infiltration rate	NA	m/s
	Depth to groundwater level	3.7	m below ground level
	Is infiltration feasible?	No	
	<b>2b. Drainage Hierarchy</b>		
		<i>Feasible (Y/N)</i>	<i>Proposed (Y/N)</i>
	1 store rainwater for later use	y	
	2 use infiltration techniques, such as porous surfaces in non-clay areas	n	
	3 attenuate rainwater in ponds or open water features for gradual release	n	
	4 attenuate rainwater by storing in tanks or sealed water features for gradual release	y	
	5 discharge rainwater direct to a watercourse	n	
	6 discharge rainwater to a surface water sewer/drain	y	
	7 discharge rainwater to the combined sewer.	y	
	<b>2c. Proposed Discharge Details</b>		
	Proposed discharge location	Private Sewer within Telcon Way	
	Has the owner/regulator of the discharge location been consulted?	Yes	
	<b>4a. Discharge &amp; Drainage Strategy</b>		<i>Page/section of drainage report</i>
Infiltration feasibility (2a) – geotechnical			

3. Drainage Strategy		Greenfield (GF) runoff rate (l/s)	discharge rate (l/s)	storage for GF rate (m <sup>3</sup> )	discharge rate (l/s)	
	Q <sub>bar</sub>	1				
	1 in 1	0.85	33.77		5	
	1 in 30	2.3	85.1		5	
	1 in 100	3.2	111.13		5	
	1 in 100 + CC			107	5	
	Climate change allowance used		40%			
	3b. Principal Method of Flow Control	Vortex				
	<b>3c. Proposed SuDS Measures</b>					
		Catchment area (m <sup>2</sup> )	Plan area (m <sup>2</sup> )	Storage vol. (m <sup>3</sup> )		
	Rainwater harvesting	0		0		
	Infiltration systems	0		0		
	Green roofs	1918	1918	0		
	Blue roofs	0	0	0		
	Filter strips	0	0	0		
Filter drains	0	0	0			
Bioretention / tree pits	0	0	0			
Pervious pavements	250	250	0			
Swales	0	0	0			
Basins/ponds	0	0	0			
Attenuation tanks	382		107			
<b>Total</b>	<b>2550</b>	<b>2168</b>	<b>107</b>			

4. Supporting Information	Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	Section 4.5
	Drainage hierarchy (2b)	Section 5.6
	Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	Section 5.6, Appendix J & K
	Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	Section 5.6 Appendix K
	Proposed SuDS measures & specifications (3b)	Section 5.6
	<b>4b. Other Supporting Details</b>	<i>Page/section of drainage report</i>
	Detailed Development Layout	See Application Drawings
	Detailed drainage design drawings, including exceedance flow routes	Appendix K and N
	Detailed landscaping plans	See Application Drawings
	Maintenance strategy	Appendix M
	Demonstration of how the proposed SuDS measures improve:	Section 5.6
	a) water quality of the runoff?	
	b) biodiversity?	
	c) amenity?	

1. Project & Site Details	Project / Site Name (including sub-catchment / stage / phase where appropriate)	Enderby Place - Area B			
	Address & post code	Telcon Way, Greenwich, SE10 0TH			
	OS Grid ref. (Easting, Northing)	E 539195			
		N 178797			
	LPA reference (if applicable)				
	Brief description of proposed work	circa 750 residential units across three tower blocks up to 32 storeys in height, together with commercial space. Amenity and public space provision			
	Total site Area	4,935 m <sup>2</sup>			
	Total existing impervious area	4935 m <sup>2</sup>			
	Total proposed impervious area	3986 m <sup>2</sup>			
	Is the site in a surface water flood risk catchment (ref. local Surface Water Management Plan)?	No			
	Existing drainage connection type and location	To TW Sewer via Private Drain in Telcon Way			
	Designer Name	Mark Bullen			
	Designer Position	Director			
	Designer Company	MAB Consulting			
<b>3a. Discharge Rates &amp; Required Storage</b>					
	<i>Greenfield (GF)</i>	<i>Existing</i>	<i>Required</i>	<i>Proposed</i>	

2. Proposed Discharge Arrangements	<b>2a. Infiltration Feasibility</b>		
	Superficial geology classification	Alluvial Clay, Silt, Sand and Peat	
	Bedrock geology classification	Lambeth Group-Clay Silt and Sand	
	Site infiltration rate	NA	m/s
	Depth to groundwater level	3.7	m below ground level
	Is infiltration feasible?	No	
	<b>2b. Drainage Hierarchy</b>		
		<i>Feasible (Y/N)</i>	<i>Proposed (Y/N)</i>
	1 store rainwater for later use	y	
	2 use infiltration techniques, such as porous surfaces in non-clay areas	n	
	3 attenuate rainwater in ponds or open water features for gradual release	n	
	4 attenuate rainwater by storing in tanks or sealed water features for gradual release	y	
	5 discharge rainwater direct to a watercourse	n	
	6 discharge rainwater to a surface water sewer/drain	y	
	7 discharge rainwater to the combined sewer.	y	
	<b>2c. Proposed Discharge Details</b>		
	Proposed discharge location	River Thames	
	Has the owner/regulator of the discharge location been consulted?	Yes	
	<b>4a. Discharge &amp; Drainage Strategy</b>		<i>Page/section of drainage report</i>
Infiltration feasibility (2a) – geotechnical			

3. Drainage Strategy		Greenfield (GF) runoff rate (l/s)	discharge rate (l/s)	storage for GF rate (m <sup>3</sup> )	discharge rate (l/s)	
	Q <sub>bar</sub>	1.94				
	1 in 1	1.65	60.03		20.9	
	1 in 30	4.46	151.3		50.1	
	1 in 100	6.19	197.57		61.6	
	1 in 100 + CC			NA	61.6	
	Climate change allowance used		40%			
	3b. Principal Method of Flow Control	None				
	<b>3c. Proposed SuDS Measures</b>					
		Catchment area (m <sup>2</sup> )	Plan area (m <sup>2</sup> )	Storage vol. (m <sup>3</sup> )		
	Rainwater harvesting	0		0		
	Infiltration systems	0		0		
	Green roofs	3036	3036	0		
	Blue roofs	0	0	0		
	Filter strips	0	0	0		
Filter drains	0	0	0			
Bioretention / tree pits	0	0	0			
Pervious pavements	601	601	0			
Swales	0	0	0			
Basins/ponds	0	0	0			
Attenuation tanks	0		0			
<b>Total</b>	<b>3637</b>	<b>3637</b>	<b>0</b>			

4. Supporting Information	Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	Section 4.5
	Drainage hierarchy (2b)	Section 5.6
	Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	Section 5.6, Appendix J & K
	Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	Section 5.6 Appendix K
	Proposed SuDS measures & specifications (3b)	Section 5.6
	<b>4b. Other Supporting Details</b>	<i>Page/section of drainage report</i>
	Detailed Development Layout	See Application Drawings
	Detailed drainage design drawings, including exceedance flow routes	Appendix K and N
	Detailed landscaping plans	See Application Drawings
	Maintenance strategy	Appendix M
	Demonstration of how the proposed SuDS measures improve:	Section 5.6
	a) water quality of the runoff?	
	b) biodiversity?	
	c) amenity?	

**APPENDIX M**  
**Maintenance Plan**



# MAINTENANCE PLAN

Enderby Place, Greenwich

for

Maritime View Limited

## Enderby Place, Greenwich

### MAINTENANCE PLAN

REF: 0711

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Rev	Description	Date
P1	First Issue	20/10/23

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Tel: 07881 527107

## 1 GREEN ROOF MAINTENANCE

Maintenance Schedule	Required Action	Typical Frequency
Regular Inspections	Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable) membranes and roof structure for proper operation, integrity of waterproofing and structural stability.	Annually and after severe storms
	Inspect soil substrate for evidence of erosion channels and identify any sediment sources	Annually and after severe storms
	Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system	Annually and after severe storms
	Inspect underside of roof for evidence of leakage	Annually and after severe storms
Regular Maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth	Six months 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 as required (where >5% of coverage)	Annually (in Autumn)
	Remove fallen leaves and debris from deciduous plant foliage	Six monthly or as required
	Remove nuisance and invasive vegetation, including weeds	Six monthly or as required
	Mow grasses, prune shrubs and manage other planting (if appropriate) as required – clippings should be removed and not allowed to accumulate.	Six monthly or as required
Remedial Actions	If erosion channels are evident, 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.	As required

**2 PERMEABLE PAVING MAINTENANCE**

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Brushing and vacuuming	Once per year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations or clogging or manufacturer’s recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this is most likely to collect sediments.
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosphate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracking or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure and upper substructure by remedial sweeping	Every 10-15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial Inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial actions	Three monthly-48 hr after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

### 3 UNDERGROUND STORAGE MAINTENANCE

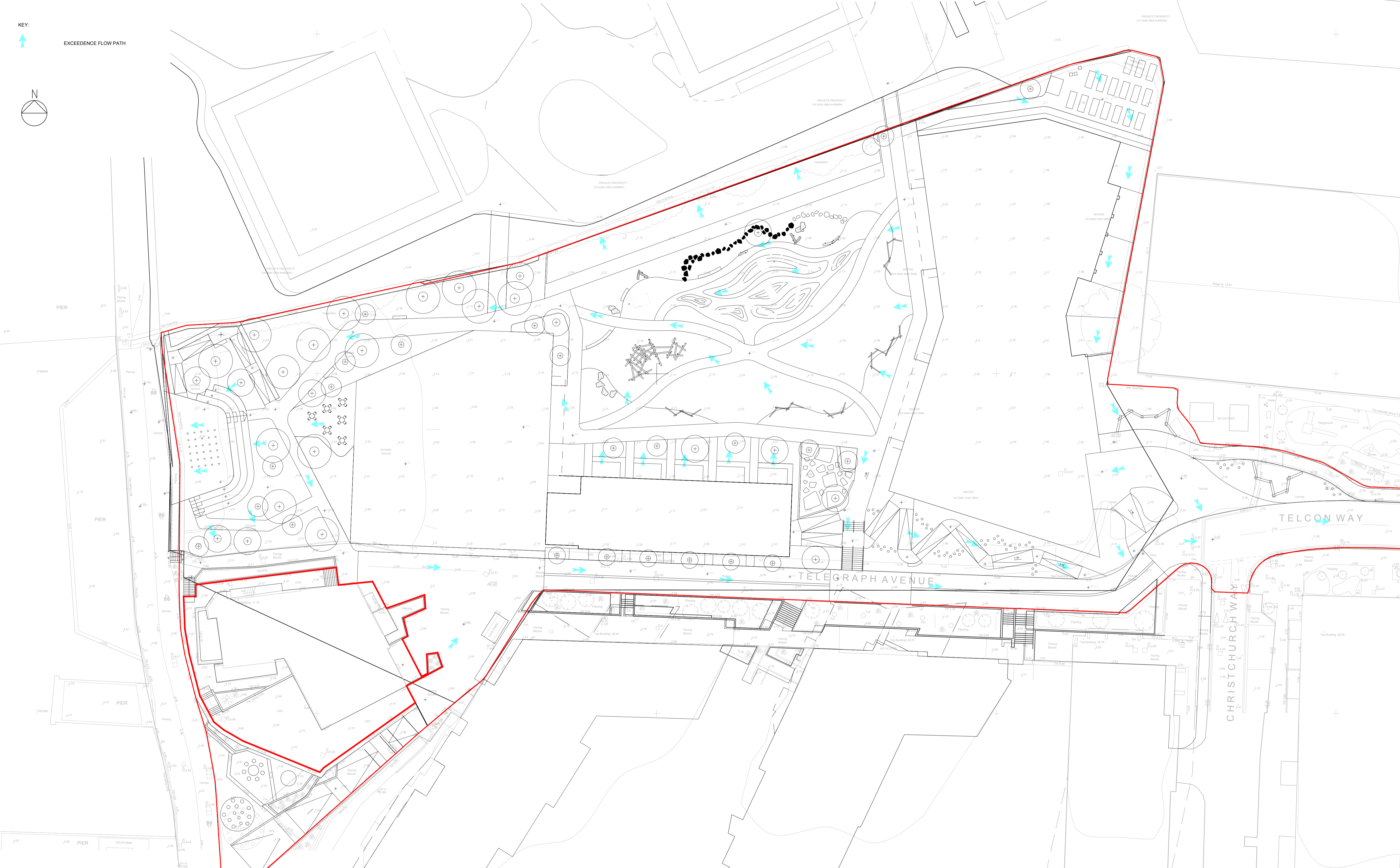
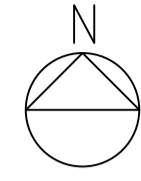
Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for three months, then annually.
	Remove debris from the catchment surface (where it may cause risks to performance).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

**APPENDIX N**  
**Exceedance Plan**

KEY:



EXCEEDENCE FLOW PATH



NOTES:

1. THE DRAWINGS, DESIGN AND ALL INFORMATION CONTAINED THEREIN ARE THE SOLE COPYRIGHT OF MAB CONSULTANCY AND ANY REPRODUCTION IS FORBIDDEN UNLESS PERMISSION IS OBTAINED IN WRITING.
2. DIMENSIONS MUST NOT BE SCALED FROM THE ENGINEERS DRAWINGS.
3. ALL DESIGNS, CONNECTIONS, WORKMANSHIP AND MATERIAL ARE TO COMPLY WITH THE CURRENT BUILDING REGULATIONS AND THE LATEST RELEVANT BRITISH STANDARD SPECIFICATION AND CODES OF PRACTICE OR OTHERWISE BE TO THE SPECIFIC WRITTEN APPROVAL OF THE ENGINEER.
4. THIS DRAWING IS FOR PLANNING PURPOSES ONLY AND SHALL NOT BE USED FOR CONSTRUCTION
5. LOCATION OF ALL EXISTING MANHOLES AND PIPES TO BE CONFIRMED ON SITE PRIOR TO CONSTRUCTION

SCALE: 1:250

P3	29.11.23	RED LINE UPDATE
P2	07.11.23	ISSUED FOR PLANNING
P1	20.10.23	ISSUED FOR PLANNING

client

MARITIME VIEW LTD

architect

BUCKLEY GRAY YEOMAN

project

ENDEBURY PLACE  
GREENWICH

title

EXCEEDENCE FLOOD EVENT

drawing number

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