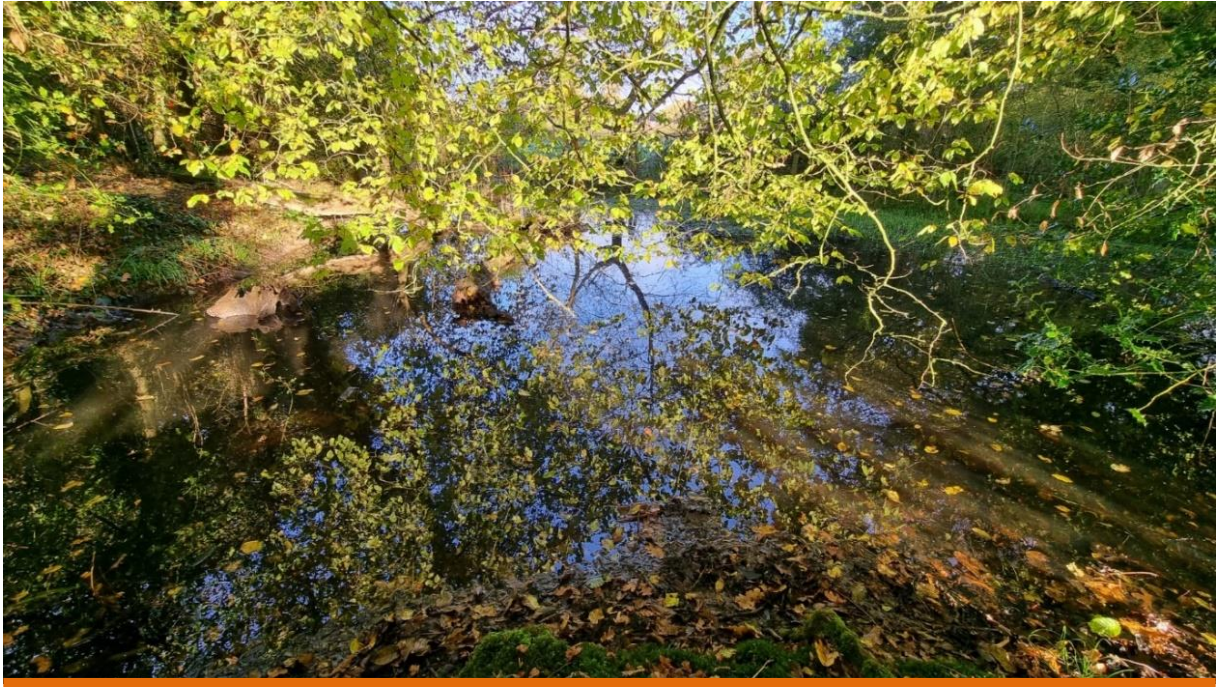




# Flood Risk Assessment

Blowers Wood, Maidstone Road, Hempstead

Gillingham ME7 3DT

## Client

**Redrow Homes South East**

Redrow House

6-12 Talbot Lane

Ebbsfleet Valley

Kent, DA10 1AZ

Ref: 11977

Date: August 2023

## Consulting Engineers

**GTA Civils & Transport Limited**

Maple House

192-198 London Road

Burgess Hill

West Sussex

RH15 9RD

Tel: 01444 871444

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| B | Environment Agency Flood & Groundwater Maps |
| C | Topographic Survey & Sewer Records          |
| D | BRE365 Soil Soakage Test Results            |
| E | Proposed Site Layout & Drainage Strategy    |
| F | Micro Drainage Calculation Sheets           |

Annex

Drainage Management & Maintenance Plan

| Issue                | Issue date        | Compiled | Checked |
|----------------------|-------------------|----------|---------|
| Preliminary Issue    | 09 November 2022  | JP       | MR      |
| First Issue          | 19 January 2023   | JP       | MR      |
| Second Issue         | 01 August 2023    | FVV      | MR      |
| Revised Second Issue | 29 September 2023 | FVV / JP | MR      |
|                      |                   |          |         |
|                      |                   |          |         |

## 1 Introduction

- 1.1 This FRA report has been prepared for Redrow Homes South East in relation to the proposed development at Blowers Wood, Maidstone Road, Hempstead, Gillingham ME7 3DT. No responsibility is accepted to any third party for all or part of this study in connection with this or any other development.
- 1.2 GTA Civils & Transport Ltd was appointed by the client to provide a Flood Risk Assessment (FRA) as required by the Environment Agency and Medway Council in order to achieve Planning Approval at said site.
- 1.3 This report will take the form of a formal Flood Risk Assessment in accordance with the 2021 National Planning Policy Framework (NPPF) and the current Planning Practice Guidance (PPG).

## 2 Existing Site & Flood Risk Profile

- 2.1 The application site is in Hempstead, a village approximately 5km SSE of Gillingham and administered by Medway Council (MC). The site comprises a vacant greenfield site bordered by Maidstone Road to the south and Hoath Way to the east. The existing access to the field is from Maidstone Road to the south. A site location map and aerial view are shown in Appendix A.
- 2.2 Hydrology: the River Medway passes the site approximately 8km to the west before emptying into the Thames Estuary near Sheerness. Unnamed watercourses run parallel to the site's west boundary and along the site's south boundary before flowing away to the south. A drain edges the carpark to the south of Maidstone Road.
- 2.3 Topography: a topographic survey is shown in Appendix C. The site slopes from east to west, with external levels ranging between 128.80m AOD and 123.32m AOD.
- 2.4 Geology: according to the BGS online mapping, the site's solid geology is Seaford Chalk Formation with Clay-with-flints Formation (clay, silt, sand and gravel) superficial deposits overlying.
- 2.5 Soil Infiltration testing was undertaken in April 2022 – refer to the results pages in Appendix D. Although 2 tests of the 6 test locations were deemed as 'fails' (at TP3 and TP7), there was reasonably good soakage recorded at TP2 and TP6. It should be noted that there was insufficient time for a third test cycle to be carried out at any of the test locations. Only one test was undertaken at TP5 and TP10.
- 2.6 Existing Sewers: Southern Water's sewer records (see appendix C) show a 225mmØ foul sewer entering the site close to the most southerly point. This flows northwards and changes to a combined sewer at the site's centre. It exits the site close to the NW corner (at Lambsfrith Grove). This will be diverted to the west as much as possible around the proposed development.
- 2.7 Fluvial flooding: the EA's fluvial flood map in Appendix B indicates that the site is in Flood Zone 1 (FZ1), 'Low Risk' of fluvial flooding. Sites situated in fluvial FZ1 are liable to flood with an annual expectation of <0.1% (less than once every 1000 years on average).
- 2.8 Surface water flooding: this occurs when excess rainwater does not infiltrate into the ground or is not intercepted by drainage. The EA's Online 'Surface Water Depth - Low Risk Scenario' (1 in 1000 years) Flood Map (in Appendix B) shows the site is largely clear from the risk of flooding from this source. The overland flow route near to the NW corner clearly originates within this site. The small area next to the south boundary is well removed from the proposed development. Neither area is of any consequence – so this risk can be put to one side.

- 2.9 Artificial sources: flooding from reservoirs, canals and docks. The EA's Reservoirs Flood Map in Appendix B shows the site is clear from the risk of flooding from reservoirs. There are no canals or docks in this area.
- 2.10 Historical Flooding: according to DEFRA's Historic Flood Map in Appendix B, the site is removed from areas of recorded flood incidents.
- 2.11 Groundwater Flooding: the EA's Groundwater Vulnerability Zone Map (in Appendix B) shows the northern half of the site overlies a "Medium" Aquifer, while the southern half overlies a 'Medium-High' Aquifer. According to the EA's Groundwater Source Protection Zones Map the site is located within "Zone III – Total Catchment" of the Groundwater Source Protection Zone.
- 2.12 The Groundwater Vulnerability map shows this vicinity has a localised risk of solution features. The Site Investigation identified no evidence of any such features in excavations, in-situ testing or visible as localised surface depressions.
- 2.13 In conclusion, the flood risk profile of this site is Low.

### 3 Proposed Development & The Sequential Test

- 3.1 The proposed development is for a development of 88 dwellings including 22 affordable units with access to the site from the south via Maidstone Road. The 'as proposed' site layout is shown in Appendix E.
- 3.2 As summarised in section 2.13 above, the flood risk profile of the building is 'Low'. No mitigation is needed or proposed.
- 3.3 Vulnerability and the Sequential Test: the vulnerability classification of any new development should be considered. According to Table 2 of the NPPF, dwelling units are rated as 'More Vulnerable'.
- 3.4 Table 3 of the NPPF states that More Vulnerable uses, such as dwellings, are appropriate development in FZ1 – so there is no need to pass the Sequential Test. Figure 1 below shows this table:

**Table 3: Flood risk vulnerability and flood zone 'compatibility'**

| Flood zone (see table 1) | Flood risk vulnerability classification (see table 2) | Essential infrastructure | Water compatible | Highly vulnerable       | More vulnerable         | Less vulnerable |
|--------------------------|-------------------------------------------------------|--------------------------|------------------|-------------------------|-------------------------|-----------------|
|                          | Zone 1                                                | ✓                        | ✓                | ✓                       | ✓                       | ✓               |
|                          | Zone 2                                                | ✓                        | ✓                | Exception Test required | ✓                       | ✓               |
|                          | Zone 3a                                               | Exception Test required  | ✓                | ×                       | Exception Test required | ✓               |
|                          | Zone 3b functional floodplain                         | Exception Test required  | ✓                | ×                       | ×                       | ×               |

**Key:**      ✓ Development is appropriate.  
                  × Development should not be permitted.

**Notes to table 3:**

This table does not show:

- the application of the Sequential Test which guides development to Flood Zone 1 first, then Zone 2, and then Zone 3;
- flood risk assessment requirements; or
- the policy aims for each flood zone.

Figure 1: Table 3 of the NPPF

- 3.5 The only issue to address is the development's drainage strategy, ie its effect on the downstream properties and environment. No flood mitigation measures are needed or proposed.

## 4 Sustainable Surface Water Drainage Design

- 4.1 Any development of 10 or more dwelling units would be considered as a Major Development. A drainage strategy layout is needed in such a case.
- 4.2 The SuDS hierarchy has been applied, this being:-
- Infiltration to ground, namely features such as soakaways, infiltration trenches and the like;
  - Discharging to a watercourse;
  - Discharging to a public sewer.
- 4.3 As set out in section 2.5 and Appendix D, the soil's soakage rate varied across this site. An infiltration basin is proposed close to the NW corner – very close to TP2, where 2 successful test cycles were undertaken. The lower test rate was  $1.31 \times 10^{-4}$ m/s (equivalent to 0.4716m/hr), this being the first of the 2 test cycles. The development's surface water will flow under gravity to this basin. The drainage strategy layout is shown in Appendix E.
- 4.4 The infiltration basin will have a 0.8m deep infiltration blanket underneath. Both structures have been sized to hold the volume in the critical 1 in 100 years + 40% climate change event. 40% allowance for climate change is included – following the EA's revised guidance on Climate Change Allowances in May 22 – based on the 1% 2070s Upper End Allowance for the North Kent Management Catchment peak rainfall allowances table. The MicroDrainage Network calculation sheets are shown in Appendix F.
- 4.5 The volume of the pond/blanket combination is 617m<sup>3</sup> (see Appendix F). Note that there is a freeboard of 0.442m between the design water level of 123.558m AOD and pond's crest level of 124.00m AOD.
- 4.6 The calculations in Appendix F shows the half drain time for this network is less than 24 hours and so complies with Building Regulations.
- 4.7 Exceedance flows: The volume of the pond is greater than the design volume of 617m<sup>3</sup> – because of the large freeboard. In the 1 in 1000 years storm event, the pond will fill up and any overtopping volume will flow westwards off site away from buildings.
- 4.8 The infiltration basin will provide the necessary treatment according to CIRIA guidelines table 26.2 Pollution hazard indices. This table shows that for a residential estate road the TSS, Metals and hydrocarbon indices are 0.5, 0.4 and 0.4 respectively - overleaf:

**TABLE 26.2** Pollution hazard indices for different land use classifications

| Land use                                                                                                                                                                                                                                 | Pollution hazard level | Total suspended solids (TSS) | Metals                                                                     | Hydrocarbons |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------------|----------------------------------------------------------------------------|--------------|
| Residential roofs                                                                                                                                                                                                                        | Very low               | 0.2                          | 0.2                                                                        | 0.05         |
| Other roofs (typically commercial/ industrial roofs)                                                                                                                                                                                     | Low                    | 0.3                          | 0.2 (up to 0.8 where there is potential for metals to leach from the roof) | 0.05         |
| Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day | Low                    | 0.5                          | 0.4                                                                        | 0.4          |

CIRIA SUDS manual table 26.2

- 4.9 Table 26.3 – mitigation index shows that an infiltration basin will provide the necessary mitigation for the 3 parameters:

**TABLE 26.3** Indicative SuDS mitigation indices for discharges to surface waters

| Type of SuDS component                       | Mitigation indices <sup>1</sup>                                                                                                                                                                                                                    |        |              |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------|
|                                              | TSS                                                                                                                                                                                                                                                | Metals | Hydrocarbons |
| Filter strip                                 | 0.4                                                                                                                                                                                                                                                | 0.4    | 0.5          |
| Filter drain                                 | 0.4 <sup>2</sup>                                                                                                                                                                                                                                   | 0.4    | 0.4          |
| Swale                                        | 0.5                                                                                                                                                                                                                                                | 0.6    | 0.6          |
| Bioretention system                          | 0.8                                                                                                                                                                                                                                                | 0.8    | 0.8          |
| Permeable pavement                           | 0.7                                                                                                                                                                                                                                                | 0.6    | 0.7          |
| Detention basin                              | 0.5                                                                                                                                                                                                                                                | 0.5    | 0.6          |
| Pond <sup>4</sup>                            | 0.7 <sup>3</sup>                                                                                                                                                                                                                                   | 0.7    | 0.5          |
| Wetland                                      | 0.8 <sup>3</sup>                                                                                                                                                                                                                                   | 0.8    | 0.8          |
| Proprietary treatment systems <sup>5,6</sup> | These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area. |        |              |

- 4.10 Ownership and maintenance responsibilities for the proposed drainage systems will remain with the applicant. Ownership and maintenance responsibilities for the whole system are set out in the SuDS Management and Maintenance Plan – refer to the Annex set out at the back of this report.
- 4.11 Foul water drainage: the foul effluent is to be routed to the public foul sewerage network mostly via gravity. The southern section of the site will drain to an adoptable pumping station, provided on site, before being pumped back up to the main gravity system. This is required due to the site levels. An application to discharge into the sewer shall be made to Southern Water in due course.

## 5 Summary & Conclusion

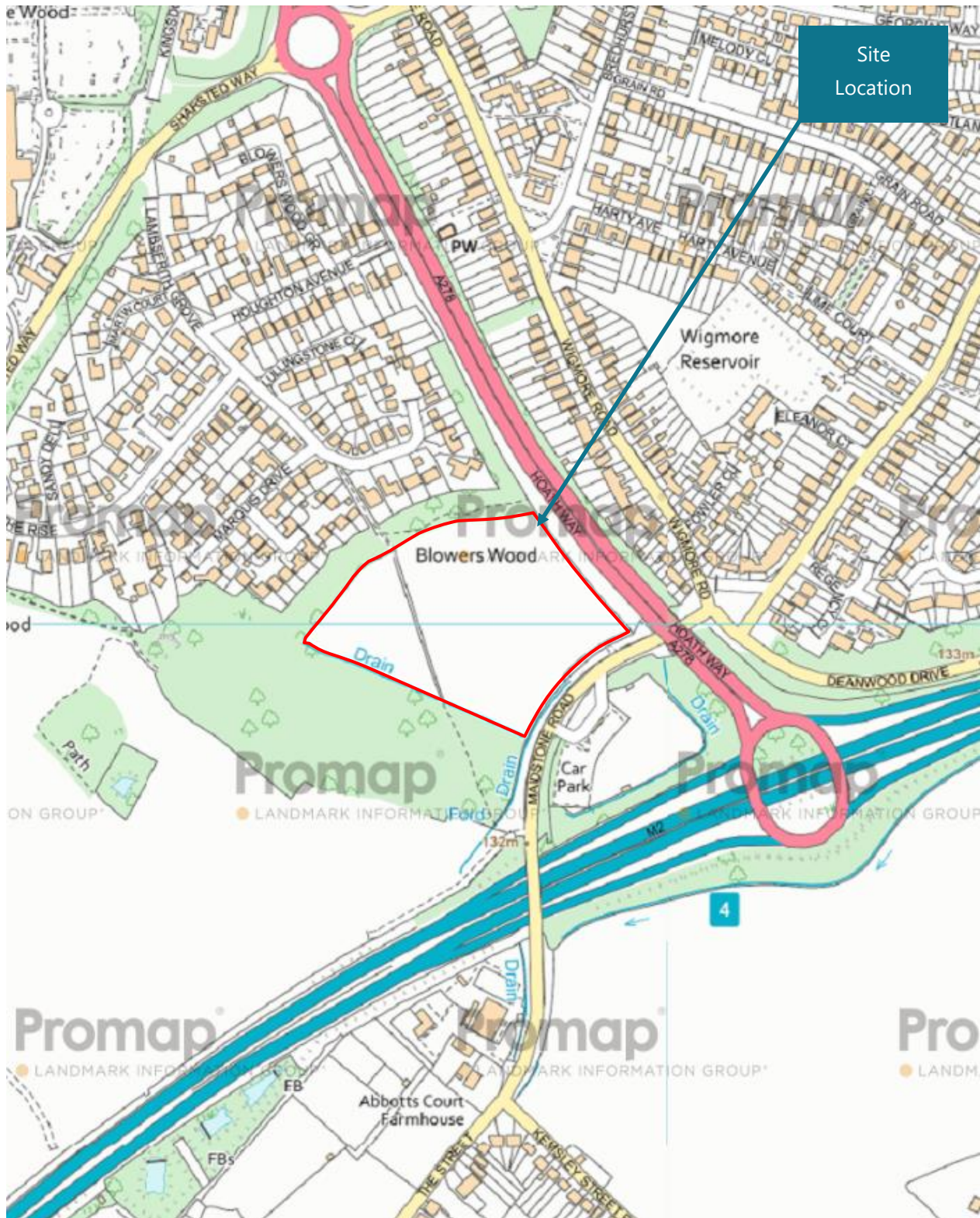
- 5.1 This site has no flood risk issues, effectively being clear of all the sources of flood risk. The FR profile is Low.
- 5.2 SuDS Strategy: the development's surface water will be routed via gravity to an infiltration basin located near to the northwest corner. The soil's soakage rate is high at this location, having been determined by 2 tests to BRE Digest 365 (at this exact place).
- 5.3 The Infiltration basin provides the treatment necessary to mitigate the 3 pollution indices encountered in residential estates. The infiltration blanket layer underneath provides additional treatment.
- 5.4 A MicroDrainage network calculation shows that a storage volume of 617m<sup>3</sup> is needed. The design volume of the basin is higher than this, meaning that there is additional capacity in extreme storm events.

Conclusion: This development will not increase the flood risk, either on this site or to neighbouring properties, and so complies fully with the 2021 NPPF and 2022 PPG.

- End of Report -

## Appendix A

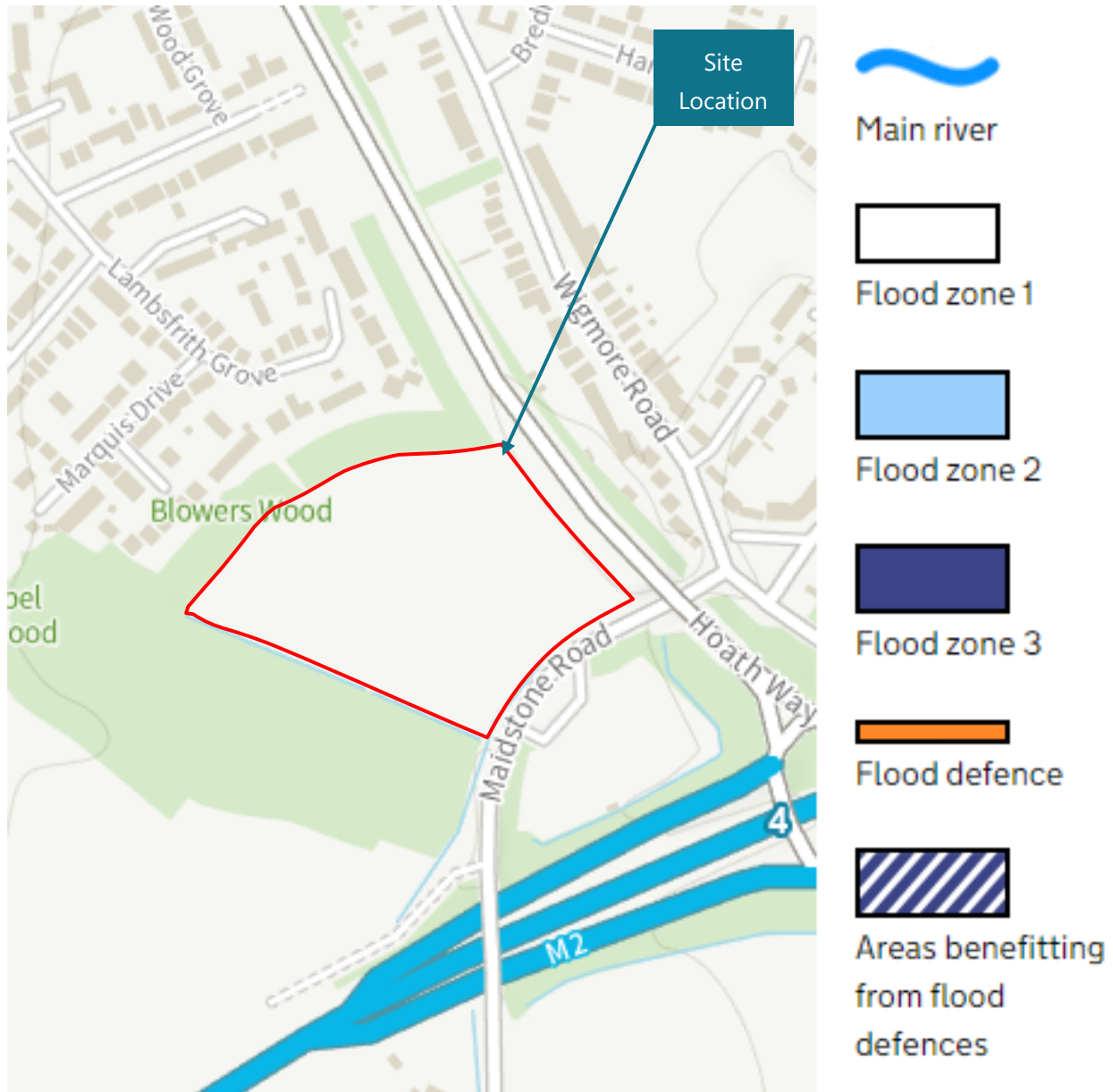
### Site Location Map & Aerial Photo





## Appendix B

### Environment Agency Flood & Groundwater Maps

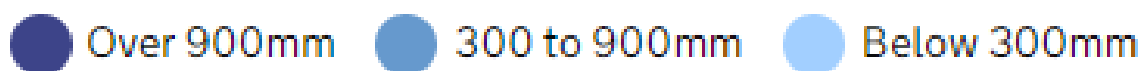


EA's Online Flood Map for Planning (Rivers and Seas)

The site is located in Flood Zone 1 (FZ1)

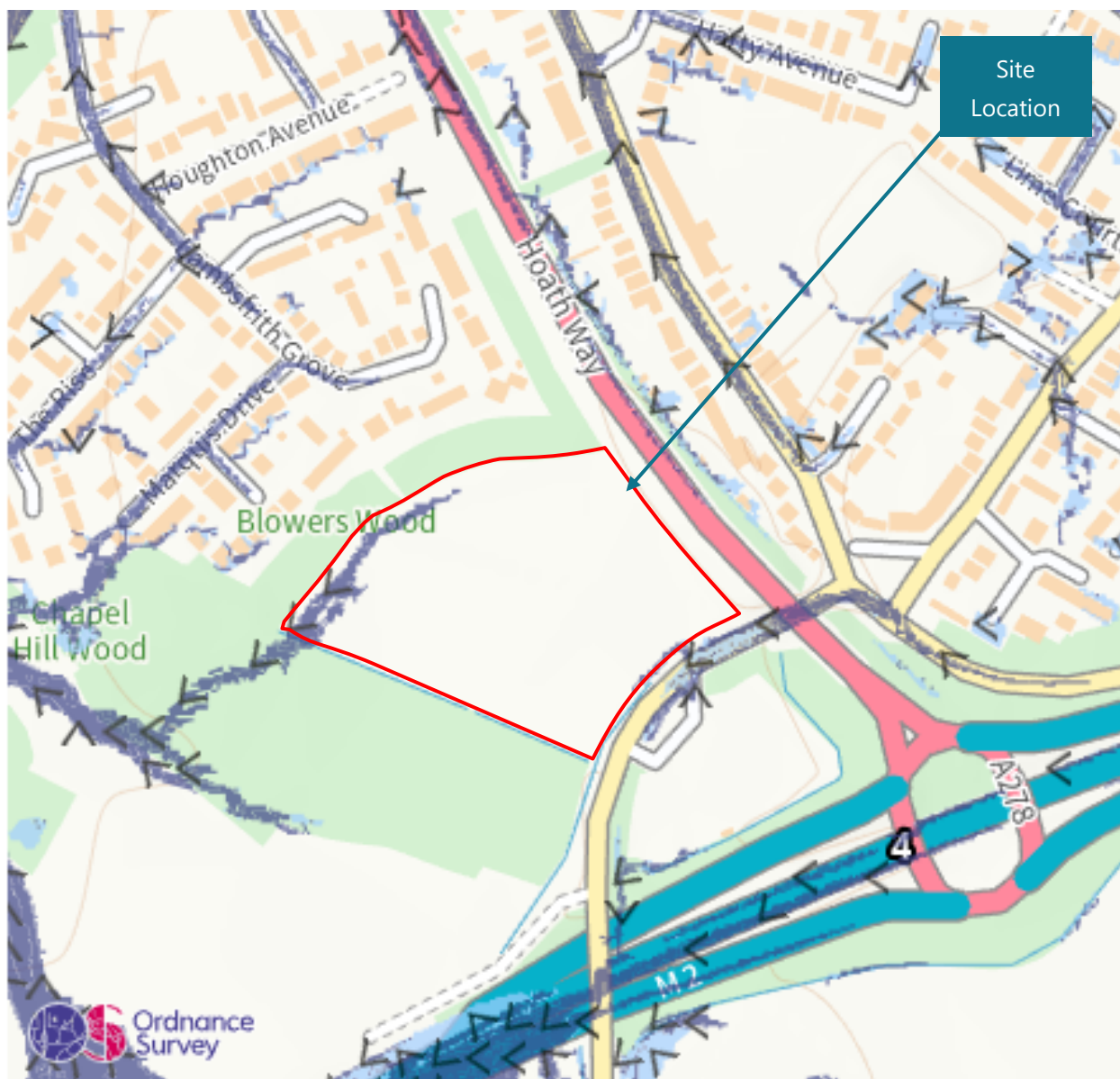


## Surface water flood risk: water depth in a low risk scenario Flood depth (millimetres)



EA's Online Surface Water Flood Depth Map in a 'Low Risk Scenario'  
(1 in 1000 years storm event)

The site is largely clear from the risk of flooding from this source – except for a flow route that originates within the application area



## Surface water flood risk: water velocity in a low risk scenario Flood velocity (metres/second)

● Over 0.25 m/s ● Less than 0.25 m/s ↖ Direction of water flow

EA's Online Surface Water Flood Velocity Map in a 'Low Risk Scenario'  
(1 in 1000 years storm event)

The flow along the northern boundary is clearly originating within this site



Maximum extent of flooding from reservoirs:

● when river levels are normal    ● when there is also flooding from rivers

EA's Online Flood Risk of 'Flooding from Reservoirs' Map

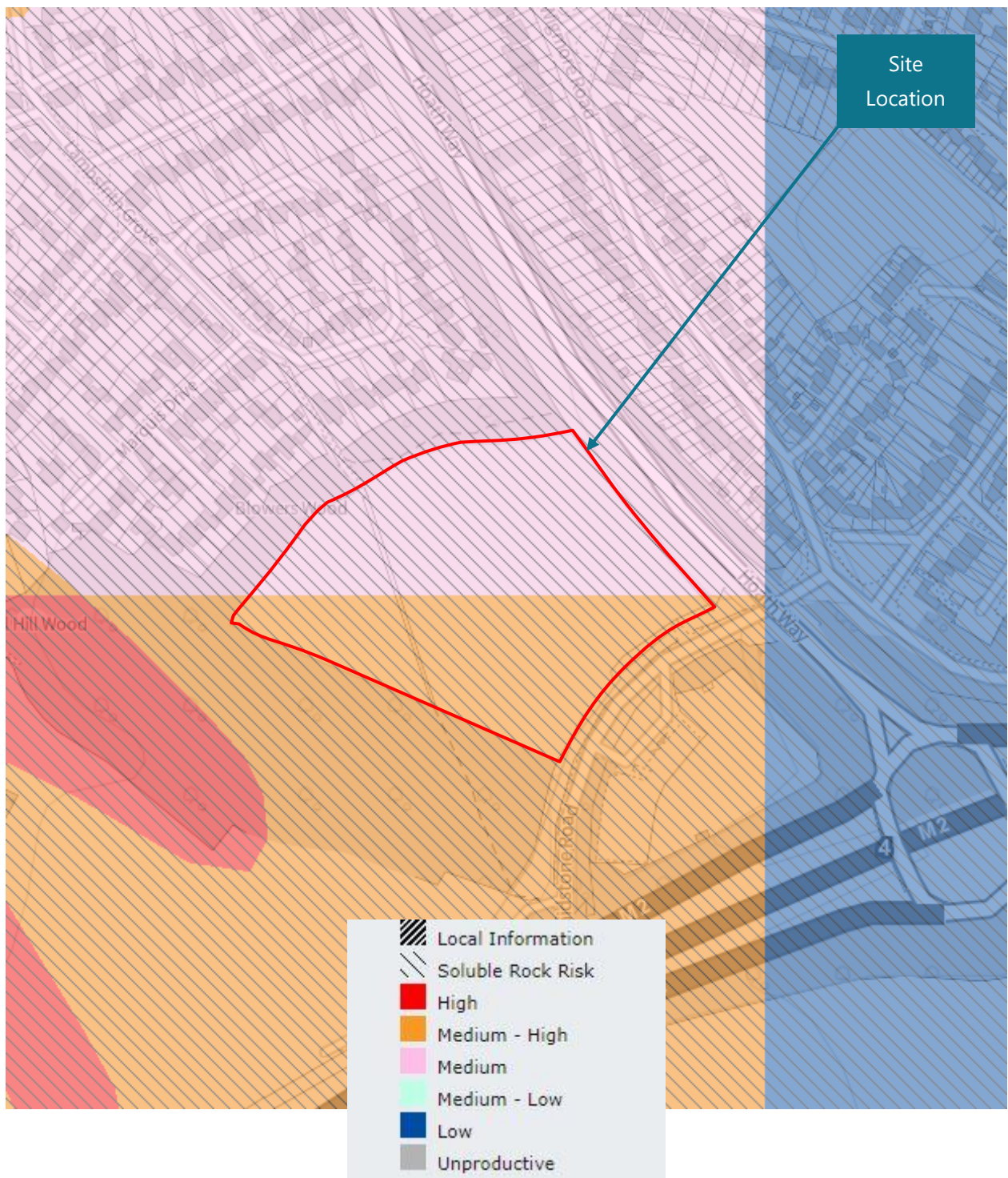
The site is clear of risk of flooding from this source



 Historical Flooding

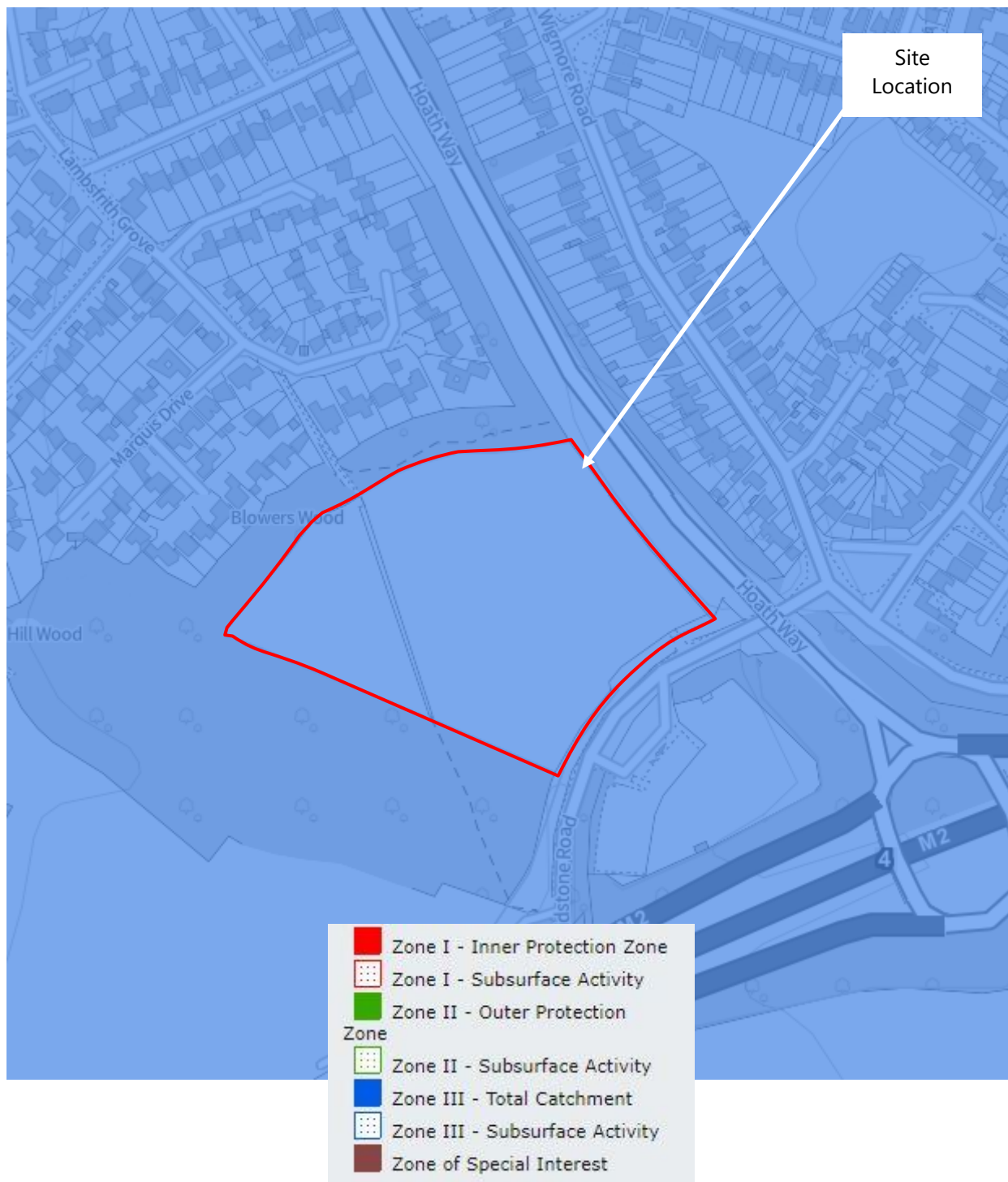
[DEFRA's Online 'Historical Flooding' Map](#)

The site is removed from the nearest affected area



**Environment Agency's Online Groundwater Vulnerability Zones Map**

The northern half of the site overlies a "Medium" Aquifer, while the southern half overlies a 'Medium - High' Aquifer

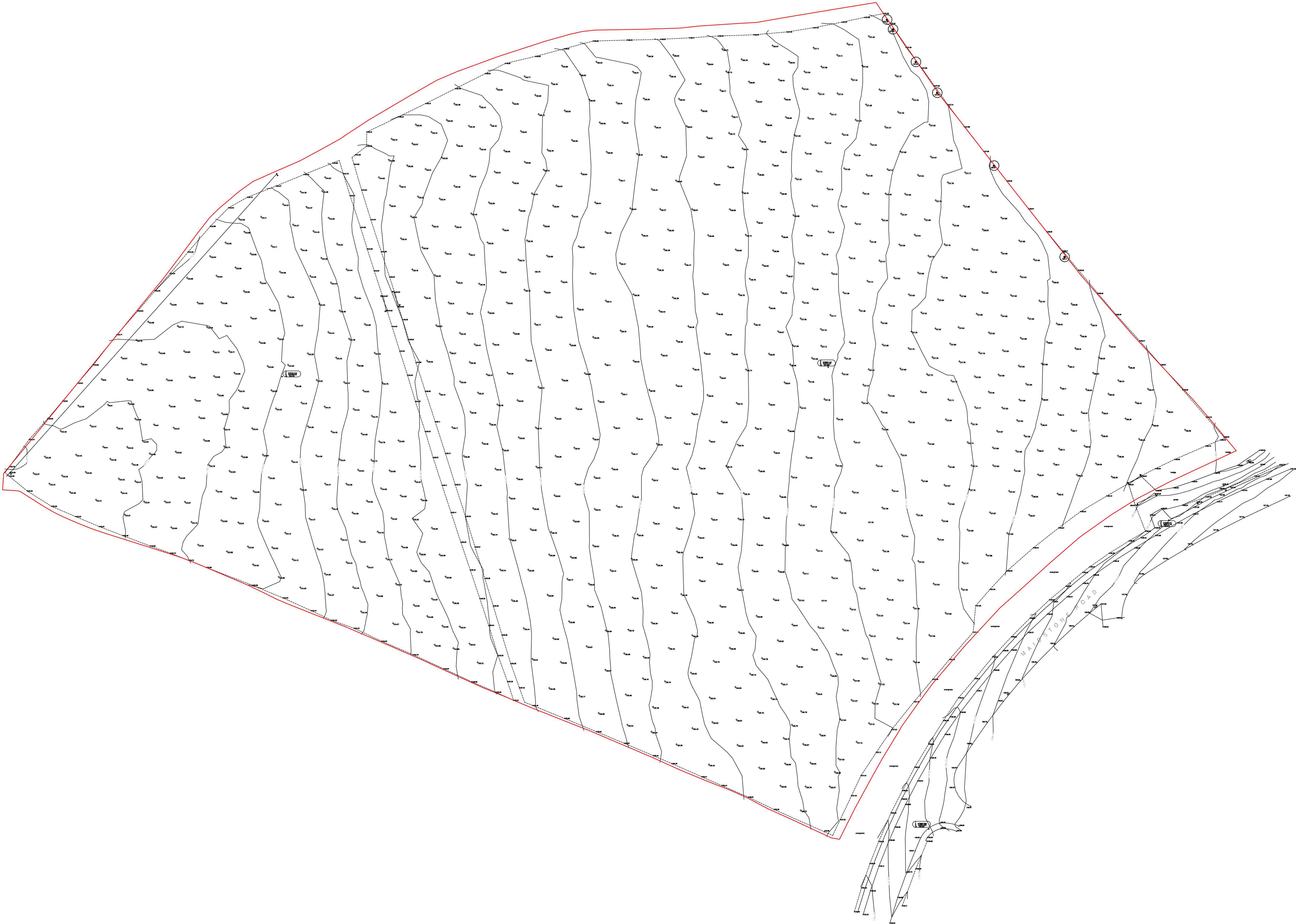


**Environment Agency's Online Groundwater Source Protection Zones Map**

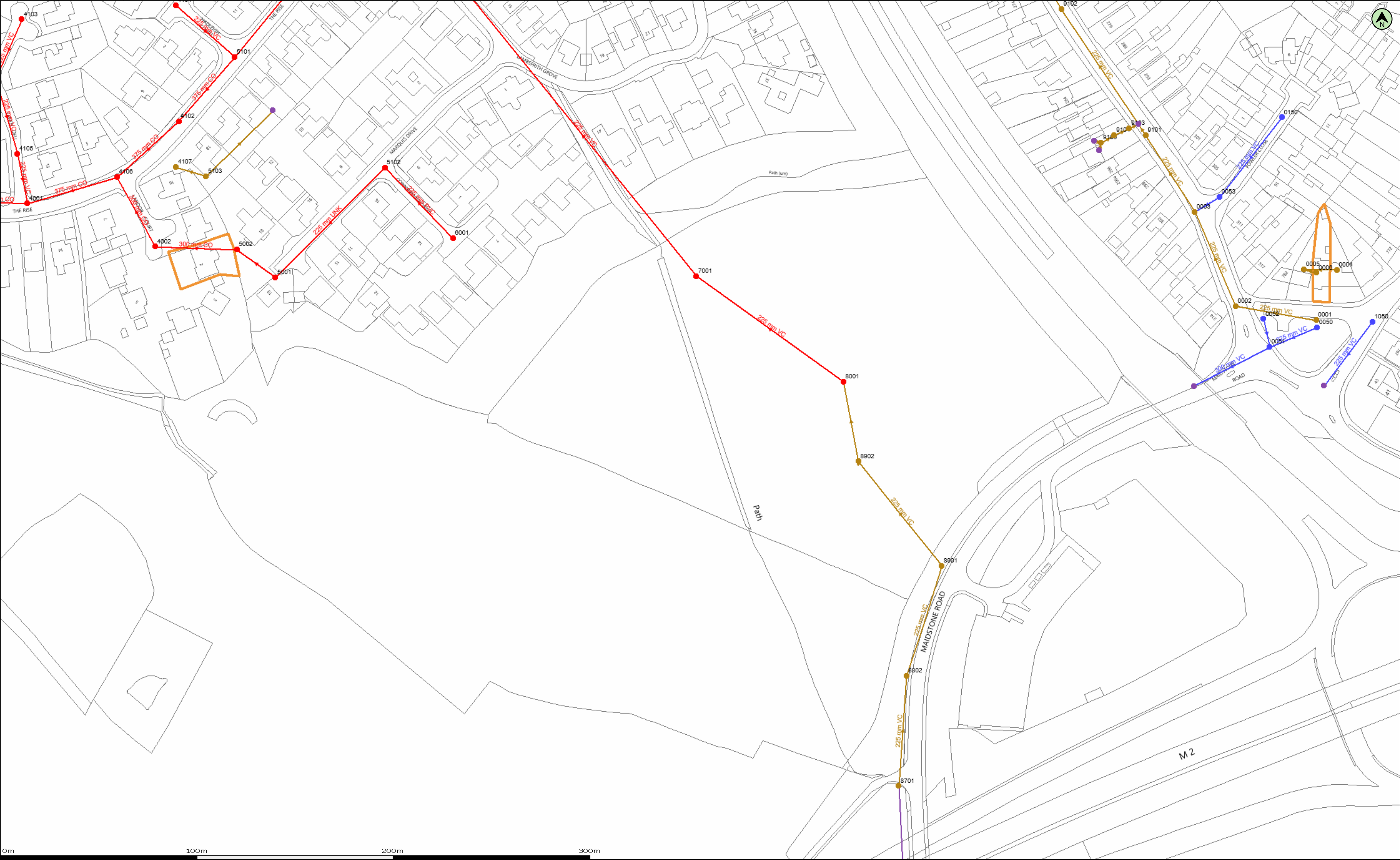
The site is located within "Zone III – Total Catchment" Groundwater Source Protection Zone

## Appendix C

### Topographic Survey & Sewer Records



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |            |    |      |  |     |      |  |    |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------|----|------|--|-----|------|--|----|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Job. No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      | P4266J2508 |    | Rev. |  |     |      |  |    |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <div>Legend</div> <div><div><div>AH apex height</div><div>BS bus stop</div><div>CB control box</div><div>CL cover level</div><div>D drain</div><div>EIC electric IC</div><div>EP electricity pole</div><div>ER earth rod</div><div>EH eave height</div><div>FB foot bridge</div><div>FH fire hydrant</div><div>FT flood light</div><div>G gully</div><div>GP gate post</div><div>GV gas valve</div><div>IC inspection cover</div><div>IL invert level</div><div>KD kerb outlet</div><div>Lt light post</div><div>LP lamp post</div></div><div><div>MH manhole</div><div>DSBM benchmark</div><div>P post</div><div>PB pillar box</div><div>RE rodding eye</div><div>RH roof height</div><div>RP reflector post</div><div>RS road sign</div><div>SAP sapling</div><div>SC security camera</div><div>SK sky light</div><div>SL soffit level</div><div>SP sign post</div><div>SV stop valve</div><div>TIC telephone IC</div><div>TP telegraph pole</div><div>TM ticket machine</div><div>WM water meter</div><div>UTL unable to lift</div><div>VP vent pipe</div></div></div> |      |            |    |      |  |     |      |  |    |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <div>Notes.</div> <div><div>Copyright of this plan is held by Jomas Associates Ltd.</div><div>No responsibility is taken for amendments by others.</div><div>Do not scale from copies or PDF's.</div><div>Key dimensions to be checked by engineer before major structural works commence on site.</div><div><div>1. This survey has been computed and drawn about O. S. National Grid.</div><div>2. All levels are in metres and relate to O. S. National Datum by GPS instruments.</div><div>3. This survey was measured for a scale of 1:200, any subsequent enlargements should be verified on site.</div></div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |            |    |      |  |     |      |  |    |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <div>Amendments</div> <table><tr><td>Rev</td><td>Date</td><td></td><td>By</td><td>Chkd</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |            |    |      |  | Rev | Date |  | By | Chkd |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Rev                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Date |            | By | Chkd |  |     |      |  |    |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |            |    |      |  |     |      |  |    |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |            |    |      |  |     |      |  |    |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |            |    |      |  |     |      |  |    |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |            |    |      |  |     |      |  |    |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

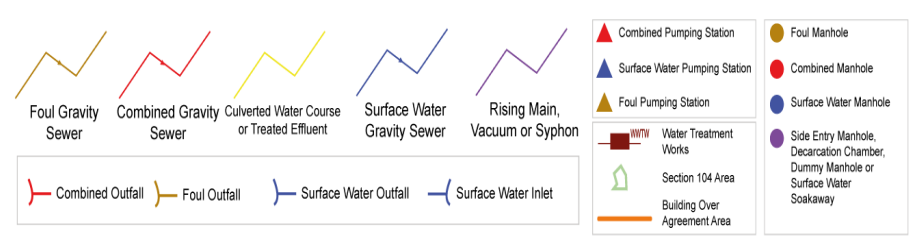


(c) Crown copyright and database rights 2022 Ordnance Survey 100031673 Date: 28/03/22 Scale: 1:1250 Map Centre: 579759,162977 Data updated: 21/03/22 Our Ref: 817618 - 1 Wastewater Plan A2

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2022 Ordnance Survey 100031673. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.



|                        |
|------------------------|
| cfagan@gtacivils.co.uk |
| 11977 Blowers Wood     |
|                        |





## Appendix D

## BRE365 Soil Soakage Test Results

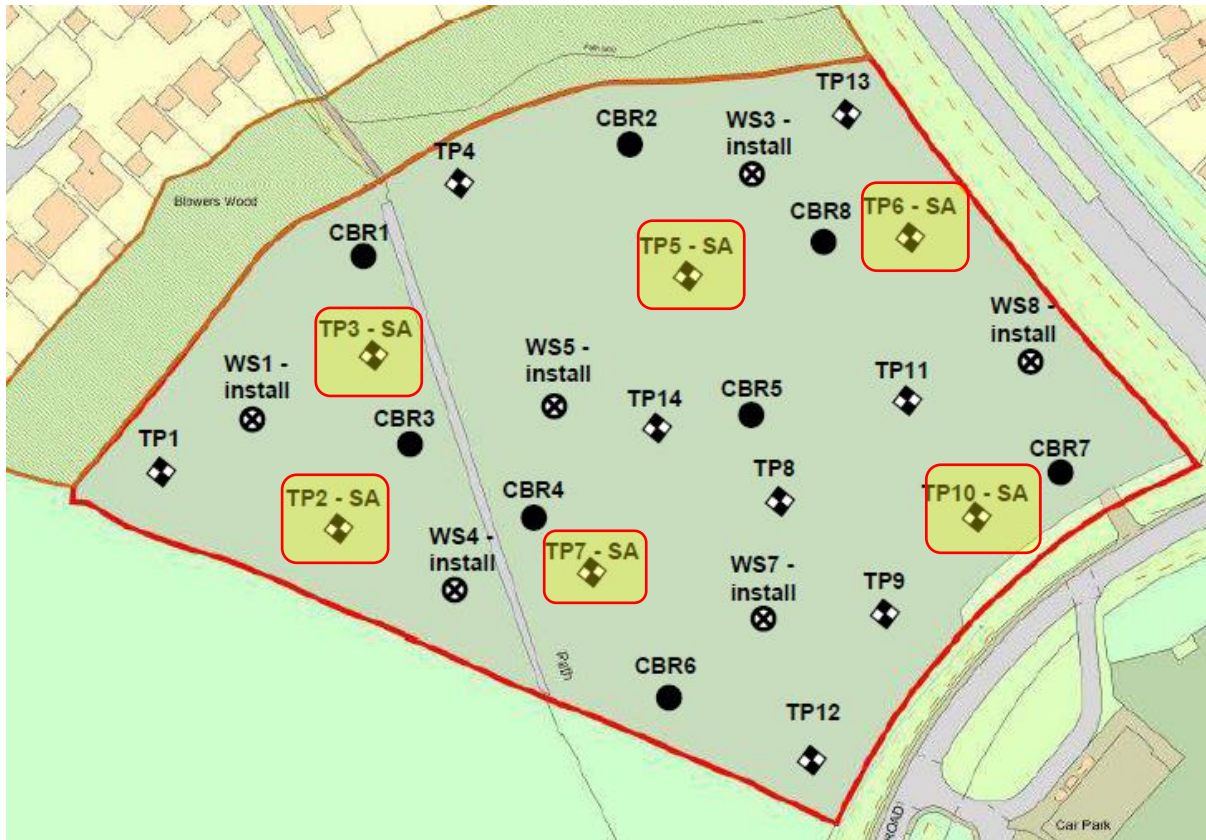


Table 9.4 – Summary of BRE 365 Soakage Test Results

| Position | Geology                                            | Calculated Infiltration Rates (m/s) |                       |                       |
|----------|----------------------------------------------------|-------------------------------------|-----------------------|-----------------------|
|          |                                                    | 1 <sup>st</sup> cycle               | 2 <sup>nd</sup> Cycle | 3 <sup>rd</sup> Cycle |
| TP2      | Seaford Chalk Formation                            | $1.31 \times 10^{-4}$               | $1.77 \times 10^{-4}$ | -                     |
| TP3      | Clay-With-Flints Formation                         | N/D                                 | -                     | -                     |
| TP5      | Seaford Chalk Formation                            | $7.81 \times 10^{-6}$               | -                     | -                     |
| TP6*     | Clay-With-Flints Formation/Seaford Chalk Formation | $7.02 \times 10^{-6}$               | $2.84 \times 10^{-5}$ | -                     |
| TP7      | Clay-With-Flints Formation                         | N/D                                 | -                     | -                     |
| TP10     | Seaford Chalk Formation                            | $8.84 \times 10^{-6}$               | -                     | -                     |

N/D: Not determined due to insufficient fall in head over two-day period

\* Pit depth had reduced by 0.4m due to spalling overnight between 1<sup>st</sup> and 2<sup>nd</sup> test cycles.

## BRE 365 INFILTRATION TESTS

**JOMAS JOB NAME:** Blowers Wood Site, Maidstone Road

**CALCULATING ENGINEER:** JRO

**DATE:** 21 April 2022

Notes:

APPROVED BY: SC

**DATE:** 11 May 2022

Dw = depth to water

$D_g$  = head of water in the pit

JOMAS JOB NO.: P4266J2508

TEST LOCATION: TP2

**DATE OF TEST:** 20 April 2022

### Pit Details

Length 2.0 m

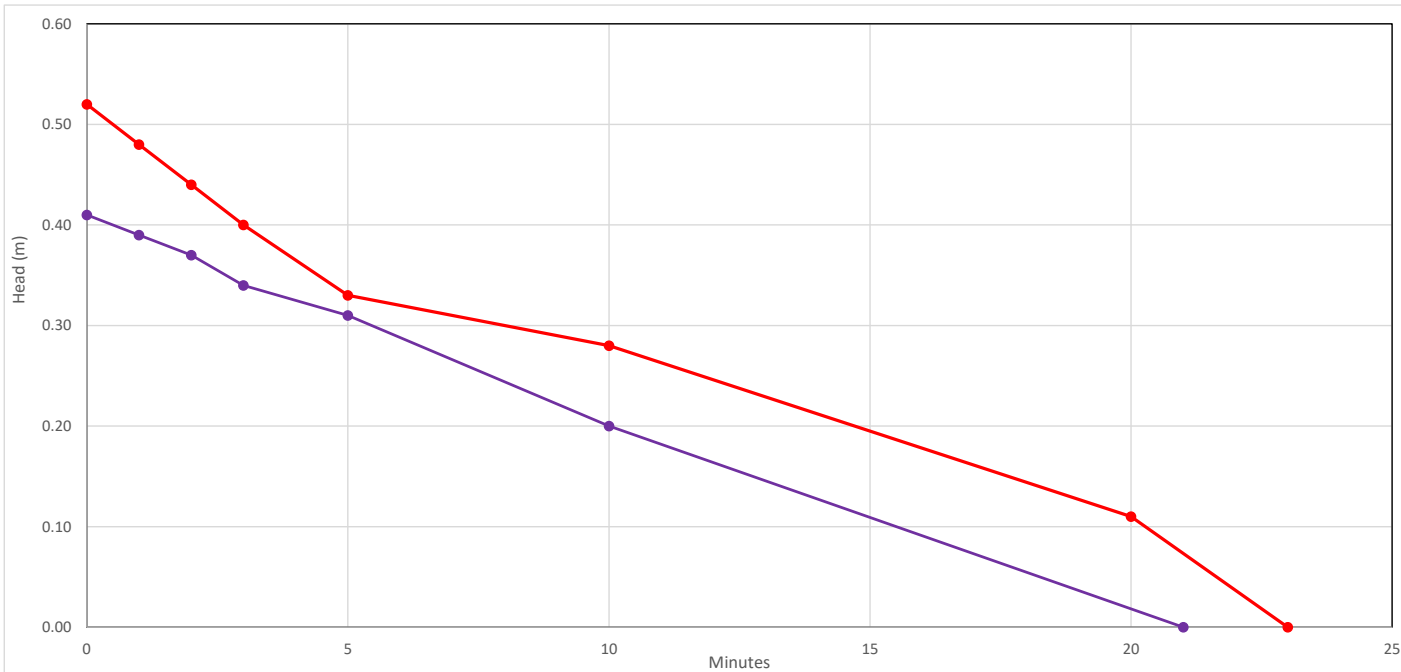
Breadth 0.6 m

Depth 3.5 m

Groundwater? N

Filled With Gravel? N

|                                 | TP2 - Test 1 | TP2 - Test 2 | TP2 - Test 3 |
|---------------------------------|--------------|--------------|--------------|
| Dg 75% (m)                      | 0.39         | 0.31         |              |
| Tp 75%                          | 3.29         | 5.11         |              |
| Dg 25%                          | 0.13         | 0.10         |              |
| Tp 25%                          | 18.82        | 15.36        |              |
| Vp75% - Vp25% (m <sup>3</sup> ) | 0.31         | 0.25         |              |
| ap50% (m <sup>2</sup> )         | 2.55         | 2.27         |              |
| Tp75-Tp25 (min)                 | 15.54        | 10.25        |              |
| Soil infiltration rate (m/sec)  | 1.31E-04     | 1.77E-04     |              |
| Permeability Description        | Medium       | Medium       |              |
| Drainage Conditions             | Good         | Good         |              |

[illegible]

## BRE 365 INFILTRATION TESTS

**JOMAS JOB NAME:** Blowers Wood Site, Maidstone Road

**CALCULATING ENGINEER:** JRO

**DATE:** 21 April 2022

Notes:

APPROVED BY: SC

**DATE:** 11 May 2022

Dw = depth to water

$D_g$  = head of water in the pit

JOMAS JOB NO.: P4266J2508

TEST LOCATION: TP3

**DATE OF TEST:** 20 April 2022

### Pit Details

Length 2.3 m

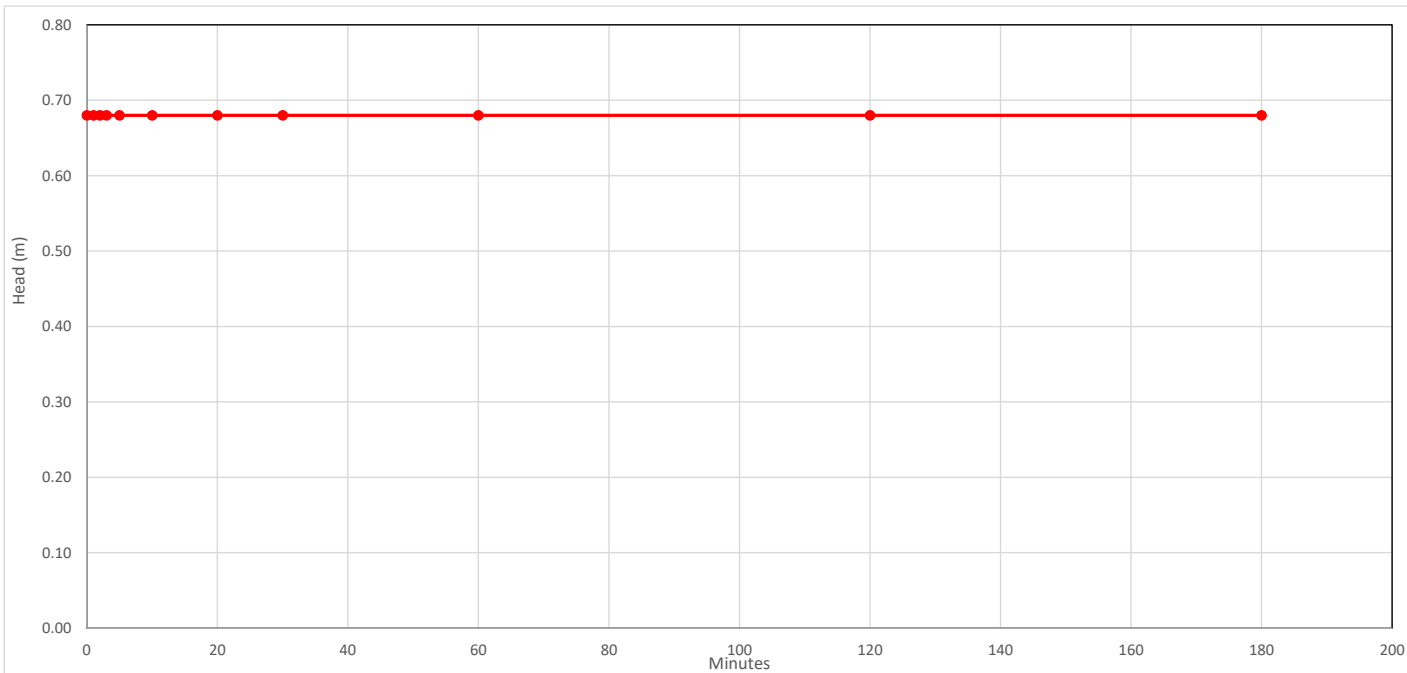
Breadth 0.6 m

Depth 2.8 m

Groundwater? N

Filled With Gravel? N

|                                 | TP3 - Test 1  | TP3 - Test 2 | TP3 - Test 3 |
|---------------------------------|---------------|--------------|--------------|
| Dg 75% (m)                      | 0.51          |              |              |
| Tp 75%                          |               |              |              |
| Dg 25%                          | 0.17          |              |              |
| Tp 25%                          |               |              |              |
| Vp75% - Vp25% (m <sup>3</sup> ) | 0.47          |              |              |
| ap50% (m <sup>2</sup> )         | 3.35          |              |              |
| Tp75-Tp25 (min)                 |               |              |              |
| Soil infiltration rate (m/sec)  | Insuff. Drain |              |              |
| Permeability Description        |               |              |              |
| Drainage Conditions             |               |              |              |

[illegible]

## BRE 365 INFILTRATION TESTS

**JOMAS JOB NAME:** Blowers Wood Site, Maidstone Road

**CALCULATING ENGINEER:** JRO

**DATE:** 21 April 2022

Notes:

APPROVED BY: SC

**DATE:** 11 May 2022

Dw = depth to water

$D_g$  = head of water in the pit

JOMAS JOB NO.: P4266J2508

TEST LOCATION: TP5

**DATE OF TEST:** 20 April 2022

### Pit Details

Length 2.2 m

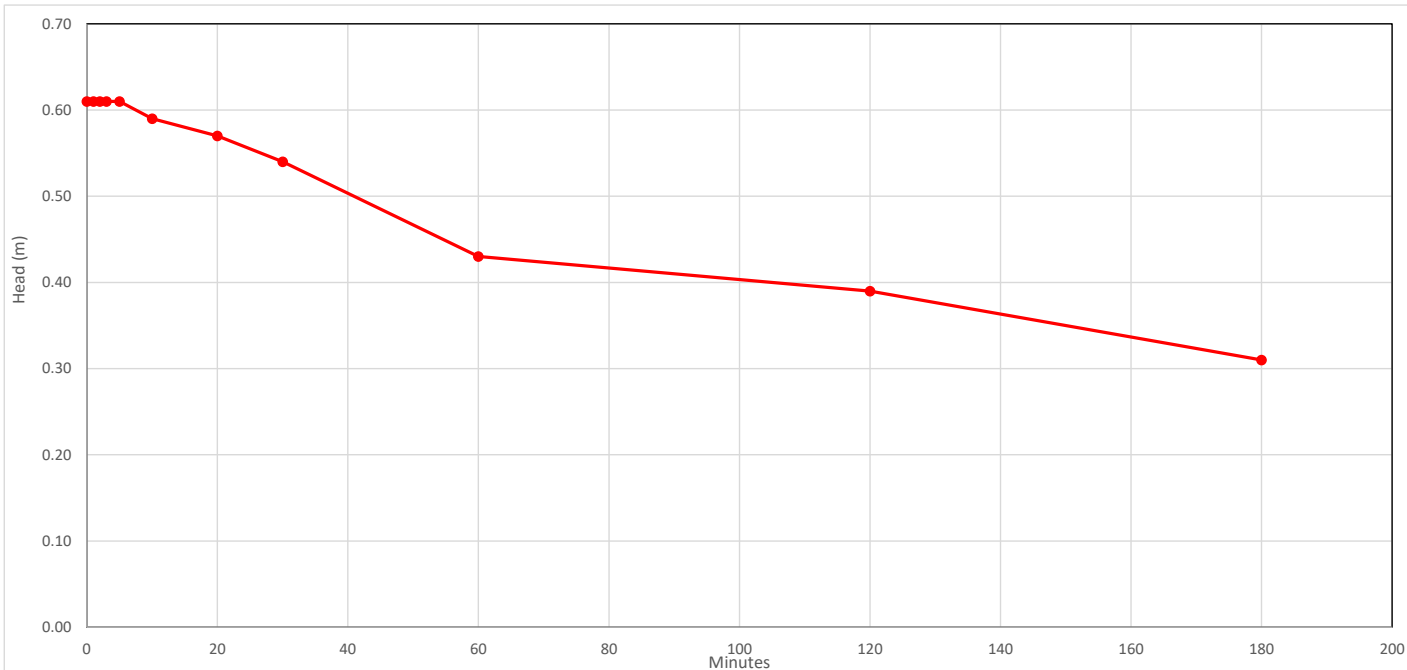
Breadth 0.6 m

Depth 3.5 m

Groundwater? N

Filled With Gravel? N

|                                 | TP5 - Test 1 | TP5 - Test 2 | TP5 - Test 3 |
|---------------------------------|--------------|--------------|--------------|
| Dg 75% (m)                      | 0.46         |              |              |
| Tp 75%                          | 52.50        |              |              |
| Dg 25%                          | 0.15         |              |              |
| Tp 25%                          | 336.16       |              |              |
| Vp75% - Vp25% (m <sup>3</sup> ) | 0.40         |              |              |
| ap50% (m <sup>2</sup> )         | 3.03         |              |              |
| Tp75-Tp25 (min)                 | 283.66       |              |              |
| Soil infiltration rate (m/sec)  | 7.81E-06     |              |              |
| Permeability Description        | Low          |              |              |
| Drainage Conditions             | Poor         |              |              |

[illegible]

## BRE 365 INFILTRATION TESTS

**JOMAS JOB NAME:** Blowers Wood Site, Maidstone Road

**CALCULATING ENGINEER: JRO**

**DATE:** 21 April 2022

APPROVED BY: SC

**DATE:** 11 May 2022

Notes:

Dw = depth to water

$D_g$  = head of water in the pit

Test 1 undertaken 19/04/22

Test 2 undertaken 20/04/22, by which point pit depth had collapsed to 3.1m bgl

**JOMAS JOB NO.:** P4266J2508

**TEST LOCATION:** TP6

**DATE OF TEST:** 20 April 2022

### Pit Details

Length 2.3 m

Breadth 0.6 m

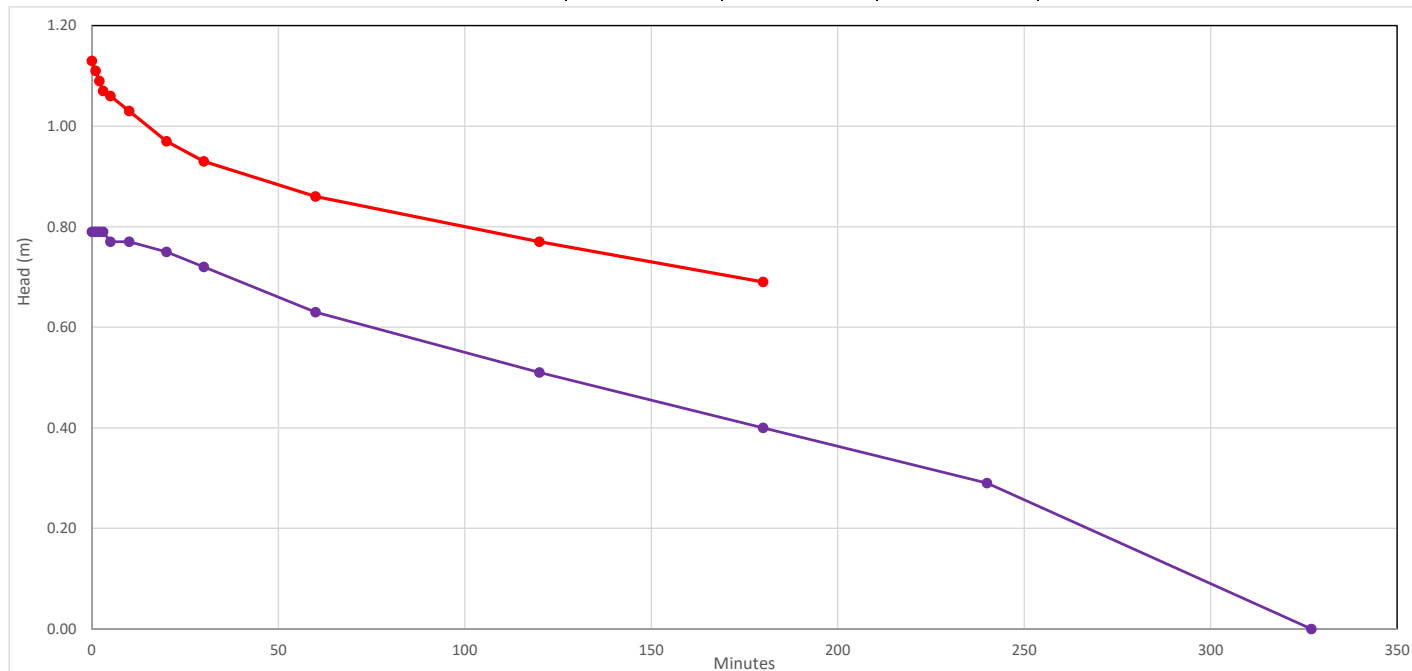
Depth (Test 1) 3.5 m

Depth (Test 2) 3.1 m

Groundwater? N

|                     |   |
|---------------------|---|
| Filled With Gravel? | N |
|---------------------|---|

|                                 | TP6 - Test 1 | TP6 - Test 2 | TP6 - Test 3 |
|---------------------------------|--------------|--------------|--------------|
| Dg 75% (m)                      | 0.85         | 0.59         |              |
| Tp 75%                          | 68.33        | 240.00       |              |
| Dg 25%                          | 0.28         | 0.20         |              |
| Tp 25%                          | 466.07       | 327.00       |              |
| Vp75% - Vp25% (m <sup>3</sup> ) | 0.78         | 0.55         |              |
| ap50% (m <sup>2</sup> )         | 4.66         | 3.67         |              |
| Tp75-Tp25 (min)                 | 397.74       | 87.00        |              |
| Soil infiltration rate (m/sec)  | 7.02E-06     | 2.84E-05     |              |
| Permeability Description        | Low          | Medium       |              |
| Drainage Conditions             | Poor         | Good         |              |

[illegible]

## BRE 365 INFILTRATION TESTS

**JOMAS JOB NAME:** Blowers Wood Site, Maidstone Road

**CALCULATING ENGINEER: JRO**

**DATE:** 21 April 2022

Notes:

APPROVED BY: SC

**DATE:** 11 May 2022

JOMAS JOB NO.: P4266J2508

TEST LOCATION: TP7

**DATE OF TEST:** 20 April 2022

### Pit Details

Length 2.2 m

Breadth 0.6 m

Depth 3.5 m

Groundwater? N

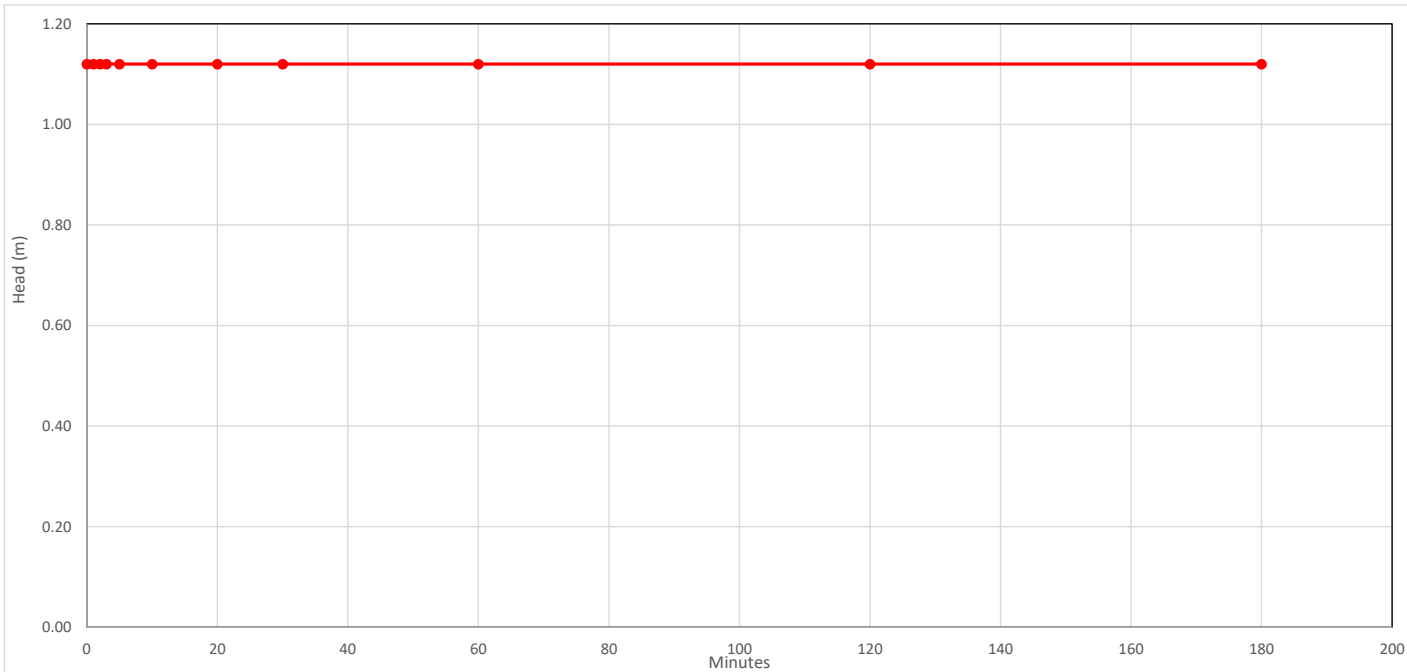
Filled With Gravel? N

|                                 | TP7 - Test 1  | TP7 - Test 2 | TP7 - Test 3 |
|---------------------------------|---------------|--------------|--------------|
| Dg 75% (m)                      | 0.84          |              |              |
| Tp 75%                          |               |              |              |
| Dg 25%                          | 0.28          |              |              |
| Tp 25%                          |               |              |              |
| Vp75% - Vp25% (m <sup>3</sup> ) | 0.74          |              |              |
| ap50% (m <sup>2</sup> )         | 4.46          |              |              |
| Tp75-Tp25 (min)                 |               |              |              |
| Soil infiltration rate (m/sec)  | Insuff. Drain |              |              |
| Permeability Description        |               |              |              |
| Drainage Condtions              |               |              |              |

Dw = depth to water

$D_g$  = head of water in the pit

Depth to water was measured as 2.42m the morning after first test (approx. 18 hours later)

[illegible]

## BRE 365 INFILTRATION TESTS

**JOMAS JOB NAME:** Blowers Wood Site, Maidstone Road

**CALCULATING ENGINEER:** JRO

**DATE:** 21 April 2022

Notes:

APPROVED BY: SC

SC

**DATE:** 11 May 2022

JOMAS JOB NO.: P4266J2508

TEST LOCATION: TP10

**DATE OF TEST:** 20 April 2022

### Pit Details

Length 2.0 m

Breadth 0.6 m

Depth 3.5 m

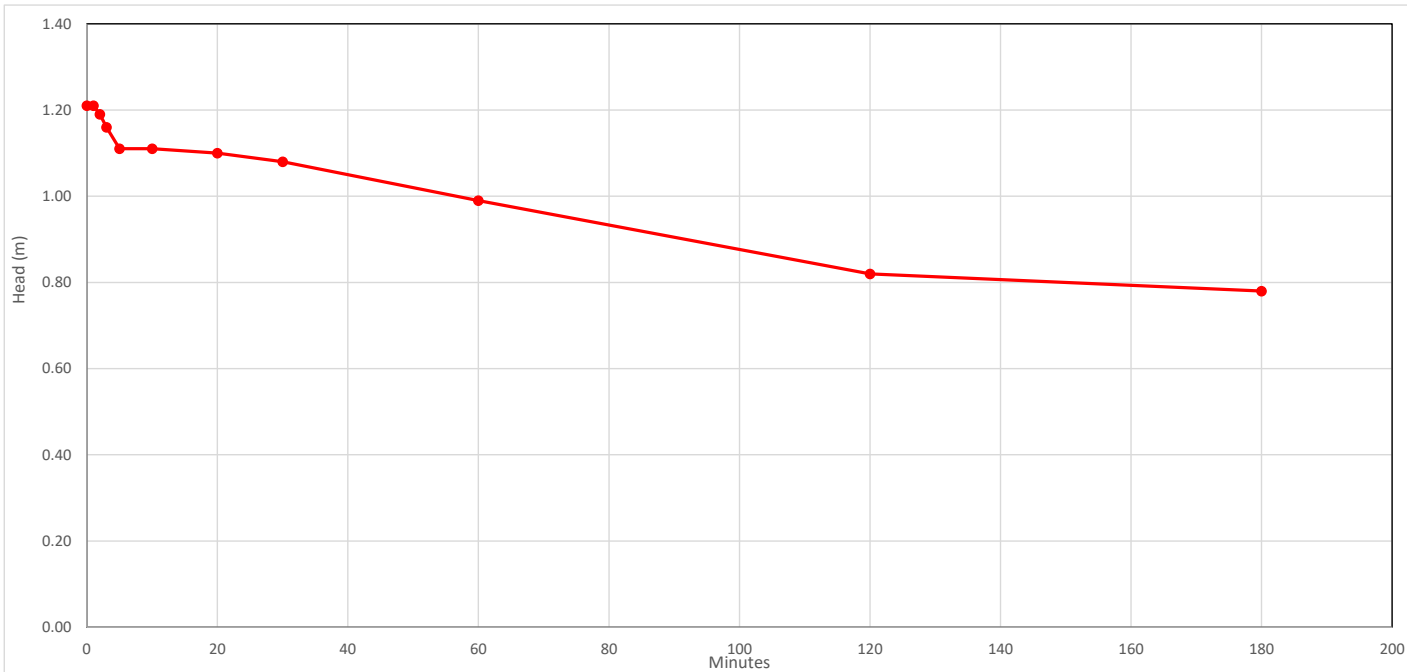
Groundwater? N

Filled With Gravel? N

|                                 | TP10 - Test 1 | TP10 - Test 2 | TP10 - Test 3 |
|---------------------------------|---------------|---------------|---------------|
| Dg 75% (m)                      | 0.91          |               |               |
| TP 75%                          | 89.12         |               |               |
| Dg 25%                          | 0.30          |               |               |
| TP 25%                          | 404.18        |               |               |
| Vp75% - Vp25% (m <sup>3</sup> ) | 0.73          |               |               |
| ap50% (m <sup>2</sup> )         | 4.35          |               |               |
| TP75-TP25 (min)                 | 315.06        |               |               |
| Soil infiltration rate (m/sec)  | 8.84E-06      |               |               |
| Permeability Description        | Low           |               |               |
| Drainage Conditions             | Poor          |               |               |

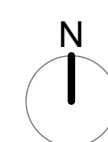
Dw = depth to water

$D_g$  = head of water in the pit

[illegible]

## Appendix E

### Proposed Site Layout & Drainage Strategy



|                                                                                       |                                                                                      |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|    | Application Site Boundary                                                            |
|    | Potential Vehicular Access                                                           |
|    | 15m Offset to Ancient Woodland                                                       |
|    | Affordable Rented Dwelling                                                           |
|    | First Homes Dwelling                                                                 |
|    | Market Dwelling                                                                      |
|    | Proposed Attenuation Feature                                                         |
|    | Existing Public Right of Way (PRoW)                                                  |
|    | Official route of PRoW GB40                                                          |
|    | New Diverted PRoW route                                                              |
|    | Connection from diverted PRoW to official PRoW route                                 |
|    | Approximate size and location of proposed foul water pumping station with 15m offset |
|  | Approximate size and location of proposed sub-station                                |
|  | Grasscrete turning heads                                                             |

| P29 | 08/09/2023 | Minor amendments.          | HJL | KMN |
|-----|------------|----------------------------|-----|-----|
| P28 | 21/08/2023 | Official PRoW route added. | HJL | KMN |
| P27 | 08/08/2023 | Attenuation basin revised. | HJL | KMN |
| rev | date       | description                | dm  | chk |



client  
**Redrow Homes**

project  
Land at Blowers Wood,  
Maidstone Road, Hempstead

drawing title  
**Site Layout**

```
scale          drn      chk      date created
1:500 @ A1    HJL    KMN    09 March 2022
```

|                |        |       |
|----------------|--------|-------|
| project number | status | issue |
| 10745          | S1     | P29   |

document number  
10745-FPCR-ZZ-XX-DR-A-0001

File: \\FPCR-FS-01\Projects2\11900\11952\ARCH\Drawings\10745-FPCR-ZZ-XX-DR-A-0001-P29 Site Layout.v

| <b>House Name</b> | <b>Beds</b>   | <b>Area (sqft)</b>          | <b>No.</b> | <b>Total Area (sqft)</b> |
|-------------------|---------------|-----------------------------|------------|--------------------------|
| Maisonette GF     | 1 Bed         | 552                         | 3          | 1,656                    |
| Maisonette 1F     | 1 Bed         | 637                         | 3          | 1,911                    |
| Buxton            | 2 Bed         | 762                         | 2          | 1,524                    |
| Letchworth        | 2 Bed + Study | 983                         | 2          | 1,966                    |
| Stratford         | 3 Bed + Study | 1211                        | 4          | 4,844                    |
| Oxford LS         | 3 Bed         | 1316                        | 8          | 10,528                   |
| Cambridge         | 3 Bed + Study | 1372                        | 8          | 10,976                   |
| Overton           | 4 Bed         | 1392                        | 2          | 2,784                    |
| Leamington LS     | 3 Bed         | 1394                        | 8          | 11,152                   |
| Shaftesbury       | 4 Bed         | 1427                        | 1          | 1,427                    |
| Harrogate         | 4 Bed         | 1555                        | 1          | 1,555                    |
| Henley            | 4 Bed         | 1769                        | 11         | 19,459                   |
| Hampstead         | 5 Bed         | 1850                        | 13         | 24,050                   |
|                   |               | <b>Total Private Market</b> | <b>66</b>  | <b>93,832</b>            |

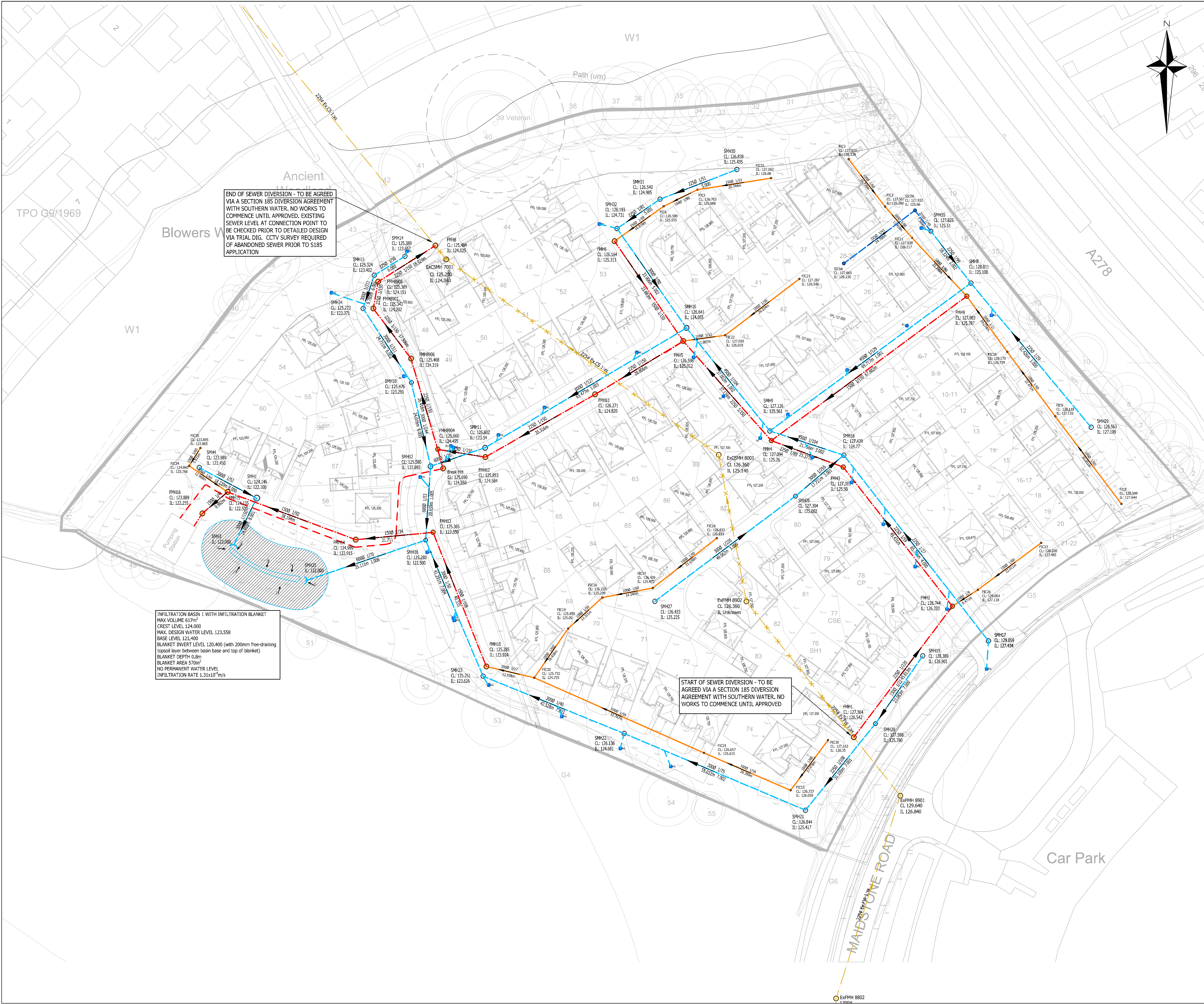
|                |       |                         |           |               |
|----------------|-------|-------------------------|-----------|---------------|
| Maisonnette GF | 1 Bed | 552                     | 2         | 1,104         |
| Maisonnette 1F | 1 Bed | 637                     | 2         | 1,274         |
| S-1A           | 1 Bed | 754                     | 3         | 2,262         |
| S-2A           | 2 Bed | 757                     | 3         | 2,271         |
| S-2B           | 2 Bed | 763                     | 3         | 2,289         |
| Dart           | 3 Bed | 938                     | 3         | 2,814         |
|                |       | <b>Total Affordable</b> | <b>16</b> | <b>12,014</b> |

|        |       |                          |          |              |
|--------|-------|--------------------------|----------|--------------|
| Buxton | 2 Bed | 762                      | 6        | 4,572        |
|        |       | <b>Total First Homes</b> | <b>6</b> | <b>4,572</b> |

|              |           |                |
|--------------|-----------|----------------|
| <b>Total</b> | <b>88</b> | <b>110,418</b> |
|--------------|-----------|----------------|

|            | Bed No. | Policy Mix | Provided |
|------------|---------|------------|----------|
| Market     | 1 Bed   | 10-15%     | 9%       |
|            | 2 Bed   | 25-30%     | 6%       |
|            | 3 Bed   | 35-40%     | 45%      |
|            | 4+ Bed  | 20-25%     | 40%      |
| Affordable | 1 Bed   | 30-35%     | 32%      |
|            | 2 Bed   | 30-35%     | 55%      |
|            | 3 Bed   | 25-30%     | 13%      |
|            | 4+ Bed  | 5-10%      | 0%       |

|           |          |             | Required |       |          |     |
|-----------|----------|-------------|----------|-------|----------|-----|
| Type      | Bedrooms | House Count | Per Unit | Total | Provided |     |
| Apartment | 1        | 13          | 1        | 13    |          | 13  |
| Apartment | 2        | 6           | 1        | 6     |          | 6   |
| House     | 2        | 10          | 1.5      | 15    |          | 17  |
| House     | 3        | 32          | 2        | 64    |          | 66  |
| House     | 4        | 14          | 2        | 28    |          | 28  |
| House     | 5        | 13          | 2        | 26    |          | 26  |
|           |          |             | Total    | 152   |          | 156 |
| Visitor   |          |             | 0.25     | 22    |          | 22  |
| Total     |          |             |          | 174   |          | 178 |



- GENERAL NOTES**
1. The location, size, depth and identification of existing services that may be shown or referred to on this drawing have been assessed from non intrusive observations , record drawings or the like. The contractor shall safely carry out intrusive investigations, trial holes or soundings prior to commencing work to satisfy himself that it is safe to proceed and that the assessments are accurate. any discrepancies shall be notified to gta prior to works commencing.
  2. Tender or billing drawings shall not be used for construction or the ordering of materials.
  3. Do not scale. All dimensions and levels to be site confirmed.
  4. This drawing shall be read in conjunction with all relevant architects, consultants drawings and specifications, together with H25 plan requirements
  5. Copyright : This drawing must not be copied, amended nor reproduced without the prior written agreement of gta.
  6. All drawings specifications and recommendations made by gta are subject to Local Authority and other relevant Statutory Authorities approval. Any works or services made abortive due to the client proceeding prior to these approvals is considered wholly at the Clients risk. gta hold no responsibility for resulting abortive works or costs.

- KEY**
- Main Surface Water Sewer
  - Surface Water Manhole
  - ▨ Infiltration blanket
  - Main Foul Water Sewer
  - Foul Manhole
  - Foul Rising Main
  - Private Foul Drain
  - Private Inspection Chamber
  - Existing Foul Sewer
  - Existing Foul Sewer - Abandoned

- DESIGN NOTES**
1. STORAGE DESIGN BASED ON 1 IN 100 YR STORM + 40% INFILTRATION RATE BASES ON BRE365 TESTING CONDUCTED ON SITE BY JOMAS IN APRIL 2022.
  2. DRAIN POINTS AND LOCATIONS TO BE CONFIRMED BY ARCHITECT.
  3. CONTRACTOR TO ESTABLISH LOCATIONS OF ALL EXISTING SERVICES PRIOR TO COMMENCING.
  4. EXISTING TREES TO BE PROTECTED WHERE EXCAVATIONS RUN CLOSE.

|     |                                             |          |     |     |
|-----|---------------------------------------------|----------|-----|-----|
| P11 | UPDATED TO LATEST LAYOUT                    | 31.07.23 | CM  | FVW |
| P10 | UPDATED TO LATEST LAYOUT                    | 16.01.23 | CM  | MR  |
| P9  | UPDATED TO COMMENTS                         | 16.12.22 | CM  | MR  |
| P8  | 200mm topsoil added to basin                | 12.12.22 | FVW | MR  |
| P7  | Foul routing revised                        | 09.12.22 | FVW | MR  |
| P6  | Tree protection shown, Foul routing revised | 18.11.22 | KW  | MR  |
| P5  | FOUL DRAINAGE ADDED                         | 15.11.22 | CM  | MR  |
| P4  | UPDATED POND FOOTPRINT AND LAYOUT           | 03.11.22 | FVW | MR  |
| P3  | UPDATED POND FOOTPRINT                      | 19.10.22 | FVW | MR  |
| P2  | UPDATED LAYOUT                              | 11.10.22 | CM  | FVW |
| P1  | FIRST ISSUE                                 | 16.05.22 | MR  | MR  |
| Rev | Amendments                                  | Date     | Dis | Chk |

|                                                                                                                                                                                                                 |  |              |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------|--|
| Status                                                                                                                                                                                                          |  | PRELIMINARY  |  |
| Client                                                                                                                                                                                                          |  |              |  |
|                                                                                                                            |  |              |  |
| Architect                                                                                                                                                                                                       |  |              |  |
| Project                                                                                                                                                                                                         |  |              |  |
| BLOWERS WOOD<br>HEMPSTEAD, GILLINGHAM                                                                                                                                                                           |  |              |  |
| Title                                                                                                                                                                                                           |  |              |  |
| DRAINAGE STRATEGY                                                                                                                                                                                               |  |              |  |
| Date                                                                                                                                                                                                            |  | Scale @ A1   |  |
| MAY 2022                                                                                                                                                                                                        |  | 1:500        |  |
| Clients Ref.                                                                                                                                                                                                    |  | Project Ref. |  |
|                                                                                                                                                                                                                 |  | 11977        |  |
| <br>Gloucester House, 66a Church Walk,<br>Burgess Hill, West Sussex, RH15 9AS<br>Tel 01444 871444 Web: www.gtacivils.co.uk |  |              |  |
| Drawing Number                                                                                                                                                                                                  |  | Rev.         |  |
| 11977/1101                                                                                                                                                                                                      |  | P11          |  |

## Appendix F

### Micro Drainage Calculation Sheets

|                    |
|--------------------|
| 11977 BLOWERS WOOD |
| STORM NETWORK      |

|                |
|----------------|
| Designed by CM |
| Checked by FVV |

Network 2020.1.3



Network Design Table for Surface Network 1

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section      | Type | Auto<br>Design                                                                      |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|------|-------------------------------------------------------------------------------------|
| 1.000 | 52.426        | 1.784       | 29.4           | 0.149          | 5.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |      |  |
| 2.000 | 24.788        | 0.570       | 43.5           | 0.070          | 5.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |      |  |
| 2.001 | 7.300         | 0.150       | 48.7           | 0.018          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |      |  |
| 2.002 | 18.324        | 0.185       | 99.0           | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |      |  |
| 1.001 | 69.717        | 0.539       | 129.3          | 0.110          | 0.00           | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |      |  |
| 3.000 | 49.062        | 0.223       | 220.0          | 0.161          | 5.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |      |  |
| 3.001 | 17.721        | 0.082       | 216.1          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |      |  |
| 4.000 | 65.766        | 2.439       | 27.0           | 0.148          | 5.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |      |  |

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.000 | 11.19           | 5.36           | 127.109      | 0.149            | 0.0                  | 0.0           | 0.0               | 2.42         | 96.3         | 4.5           |
| 2.000 | 11.52           | 5.21           | 126.230      | 0.070            | 0.0                  | 0.0           | 0.0               | 1.99         | 79.1         | 2.2           |
| 2.001 | 11.38           | 5.27           | 125.660      | 0.088            | 0.0                  | 0.0           | 0.0               | 1.88         | 74.7         | 2.7           |
| 2.002 | 10.90           | 5.50           | 125.510      | 0.088            | 0.0                  | 0.0           | 0.0               | 1.31         | 52.2         | 2.7           |
| 1.001 | 9.75            | 6.16           | 125.100      | 0.347            | 0.0                  | 0.0           | 0.0               | 1.79         | 284.1        | 9.2           |
| 3.000 | 10.39           | 5.77           | 125.225      | 0.161            | 0.0                  | 0.0           | 0.0               | 1.06         | 74.6         | 4.5           |
| 3.001 | 9.91            | 6.05           | 125.002      | 0.161            | 0.0                  | 0.0           | 0.0               | 1.07         | 75.3         | 4.5           |
| 4.000 | 11.04           | 5.43           | 127.434      | 0.148            | 0.0                  | 0.0           | 0.0               | 2.53         | 100.6        | 4.4           |

|       |         |         |
|-------|---------|---------|
| 11977 | BLOWERS | WOOD    |
|       | STORM   | NETWORK |

|                |
|----------------|
| Designed by CM |
| Checked by FVV |

Network 2020.1.3



Network Design Table for Surface Network 1

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section Type | Auto<br>Design                                                                      |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|-------------------------------------------------------------------------------------|
| 3.002 | 21.756        | 0.209       | 104.0          | 0.028          | 0.00           | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |  |
| 1.002 | 37.002        | 0.356       | 104.0          | 0.089          | 0.00           | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |  |
| 5.000 | 23.014        | 0.450       | 51.1           | 0.064          | 5.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |  |
| 5.001 | 14.539        | 0.179       | 81.1           | 0.014          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |  |
| 5.002 | 33.906        | 0.376       | 90.2           | 0.068          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 1.003 | 65.477        | 0.515       | 127.1          | 0.205          | 0.00           | 0.0                | 0.600     | o           | 600         | Pipe/Conduit |  |
| 1.004 | 16.100        | 0.647       | 24.9           | 0.028          | 0.00           | 0.0                | 0.600     | o           | 600         | Pipe/Conduit |  |
| 6.000 | 10.060        | 0.179       | 56.1           | 0.049          | 5.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |  |
| 6.001 | 9.780         | 0.031       | 310.9          | 0.035          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 3.002 | 9.63            | 6.23           | 124.770      | 0.336            | 0.0                  | 0.0           | 0.0               | 1.99         | 317.0        | 8.8           |
| 1.002 | 9.17            | 6.54           | 124.561      | 0.771            | 0.0                  | 0.0           | 0.0               | 1.99         | 317.0        | 19.2          |
| 5.000 | 11.52           | 5.21           | 125.435      | 0.064            | 0.0                  | 0.0           | 0.0               | 1.83         | 72.9         | 2.0           |
| 5.001 | 11.16           | 5.38           | 124.985      | 0.078            | 0.0                  | 0.0           | 0.0               | 1.45         | 57.8         | 2.4           |
| 5.002 | 10.49           | 5.72           | 124.731      | 0.145            | 0.0                  | 0.0           | 0.0               | 1.66         | 117.1        | 4.1           |
| 1.003 | 8.51            | 7.05           | 124.055      | 1.121            | 0.0                  | 0.0           | 0.0               | 2.16         | 610.3        | 25.9          |
| 1.004 | 8.45            | 7.10           | 123.540      | 1.149            | 0.0                  | 0.0           | 0.0               | 4.90         | 1384.3       | 26.3          |
| 6.000 | 11.77           | 5.10           | 123.657      | 0.049            | 0.0                  | 0.0           | 0.0               | 1.75         | 69.6         | 1.6           |
| 6.001 | 11.36           | 5.28           | 123.402      | 0.084            | 0.0                  | 0.0           | 0.0               | 0.89         | 62.6         | 2.6           |

|       |         |         |
|-------|---------|---------|
| 11977 | BLOWERS | WOOD    |
|       | STORM   | NETWORK |

|                |
|----------------|
| Designed by CM |
| Checked by FVV |

Network 2020.1.3



Network Design Table for Surface Network 1

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section Type | Auto<br>Design                                                                      |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|-------------------------------------------------------------------------------------|
| 6.002 | 24.711        | 0.079       | 310.9          | 0.031          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 6.003 | 24.016        | 0.099       | 243.6          | 0.045          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 1.005 | 20.659        | 0.393       | 52.6           | 0.015          | 0.00           | 0.0                | 0.600     | o           | 600         | Pipe/Conduit |  |
| 7.000 | 23.083        | 1.046       | 22.1           | 0.082          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| 7.001 | 31.100        | 0.287       | 108.3          | 0.031          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |  |
| 7.002 | 55.032        | 0.736       | 74.7           | 0.053          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 7.003 | 42.528        | 1.055       | 40.3           | 0.059          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 7.004 | 41.291        | 0.826       | 50.0           | 0.067          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 1.006 | 32.161        | 0.500       | 64.3           | 0.049          | 0.00           | 0.0                | 0.600     | o           | 600         | Pipe/Conduit |  |
| 1.007 | 17.198        | 0.600       | 28.7           | 0.000          | 0.00           | 0.0                | 0.600     | o           | 675         | Pipe/Conduit |  |

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 6.002 | 10.44           | 5.74           | 123.371      | 0.114            | 0.0                  | 0.0           | 0.0               | 0.89         | 62.6         | 3.2           |
| 6.003 | 9.77            | 6.14           | 123.291      | 0.159            | 0.0                  | 0.0           | 0.0               | 1.00         | 70.9         | 4.2           |
| 1.005 | 8.33            | 7.21           | 122.893      | 1.323            | 0.0                  | 0.0           | 0.0               | 3.36         | 951.1        | 29.8          |
| 7.000 | 11.59           | 5.18           | 126.901      | 0.082            | 0.0                  | 0.0           | 0.0               | 2.15         | 38.1         | 2.6           |
| 7.001 | 10.73           | 5.59           | 125.780      | 0.113            | 0.0                  | 0.0           | 0.0               | 1.26         | 49.9         | 3.3           |
| 7.002 | 9.84            | 6.10           | 125.417      | 0.167            | 0.0                  | 0.0           | 0.0               | 1.82         | 128.7        | 4.4           |
| 7.003 | 9.40            | 6.38           | 124.681      | 0.225            | 0.0                  | 0.0           | 0.0               | 2.48         | 175.6        | 5.7           |
| 7.004 | 8.97            | 6.69           | 123.626      | 0.292            | 0.0                  | 0.0           | 0.0               | 2.23         | 157.6        | 7.1           |
| 1.006 | 8.13            | 7.38           | 122.500      | 1.664            | 0.0                  | 0.0           | 0.0               | 3.04         | 859.5        | 36.6          |
| 1.007 | 8.06            | 7.44           | 122.000      | 1.664            | 0.0                  | 0.0           | 0.0               | 4.91         | 1756.0       | 36.6          |

|                                                                    |                                     |                                                                                     |
|--------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------------------------|
| GTA Civils Ltd                                                     |                                     | Page 3                                                                              |
| Gloucester House<br>66a Church Walk<br>Burgess Hill RH15 9AS       | 11977 BLOWERS WOOD<br>STORM NETWORK |  |
| Date 31/07/2023 12:18<br>File 11977_Blowers_Storm - 30-07-2023.mdx | Designed by CM<br>Checked by FVV    |                                                                                     |
| Micro Drainage                                                     | Network 2020.1.3                    |                                                                                     |

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 1

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section Type | Auto<br>Design                                                                      |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|-------------------------------------------------------------------------------------|
| 8.000 | 18.220        | 0.350       | 52.1           | 0.020          | 5.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 8.001 | 14.951        | 0.100       | 149.5          | 0.071          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 8.002 | 9.445         | 0.600       | 15.7           | 0.000          | 0.00           | 0.0                | 0.600     | o           | 600         | Pipe/Conduit |  |
| 1.008 | 3.819         | 0.300       | 12.7           | 0.000          | 0.00           | 0.0                | 0.600     | o           | 600         | Pipe/Conduit |  |

Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 8.000 | 11.68           | 5.14           | 122.450      | 0.020            | 0.0                  | 0.0           | 0.0               | 2.18         | 154.4        | 0.6           |
| 8.001 | 11.25           | 5.33           | 122.100      | 0.091            | 0.0                  | 0.0           | 0.0               | 1.28         | 90.7         | 2.8           |
| 8.002 | 11.20           | 5.36           | 122.000      | 0.091            | 0.0                  | 0.0           | 0.0               | 6.16         | 1741.1       | 2.8           |
| 1.008 | 8.05            | 7.45           | 121.400      | 1.755            | 0.0                  | 0.0           | 0.0               | 6.85         | 1936.6       | 38.3          |

|                                                                    |                                     |                                                                                     |
|--------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------------------------|
| GTA Civils Ltd                                                     |                                     | Page 4                                                                              |
| Gloucester House<br>66a Church Walk<br>Burgess Hill RH15 9AS       | 11977 BLOWERS WOOD<br>STORM NETWORK |  |
| Date 31/07/2023 12:18<br>File 11977_Blowers_Storm - 30-07-2023.mdx | Designed by CM<br>Checked by FVV    |                                                                                     |
| Micro Drainage                                                     | Network 2020.1.3                    |                                                                                     |

Online Controls for Surface Network 1

Pump Manhole: SMH5, DS/PN: 1.008, Volume (m³): 12.5

Invert Level (m) 121.400

|                                                                    |                                     |                                                                                     |
|--------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------------------------|
| GTA Civils Ltd                                                     |                                     | Page 5                                                                              |
| Gloucester House<br>66a Church Walk<br>Burgess Hill RH15 9AS       | 11977 BLOWERS WOOD<br>STORM NETWORK |  |
| Date 31/07/2023 12:18<br>File 11977_Blowers_Storm - 30-07-2023.mdx | Designed by CM<br>Checked by FVV    |                                                                                     |
| Micro Drainage                                                     | Network 2020.1.3                    |                                                                                     |

Storage Structures for Surface Network 1

Complex Manhole: SMH5, DS/PN: 1.008

Infiltration Blanket

Infiltration Coefficient Base (m/hr) 0.47160    Invert Level (m) 120.400    Cap Volume Depth (m) 0.800  
Safety Factor 2.0    Diameter/Width (m) 15.0  
Porosity 0.30    Length (m) 38.0

Infiltration Basin

Invert Level (m) 121.400    Infiltration Coefficient Side (m/hr) 0.47160    Porosity 1.00  
Infiltration Coefficient Base (m/hr) 0.00000    Safety Factor 2.0

| Depth (m) | Area (m²) | Depth (m) | Area (m²) | Depth (m) | Area (m²) | Depth (m) | Area (m²) | Depth (m) | Area (m²) | Depth (m) | Area (m²) | Depth (m) | Area (m²) |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 0.000     | 25.8      | 0.400     | 84.7      | 0.800     | 152.6     | 1.200     | 229.7     | 1.600     | 315.8     | 2.000     | 411.0     | 2.400     | 515.2     |
| 0.100     | 39.7      | 0.500     | 100.8     | 0.900     | 171.1     | 1.300     | 250.4     | 1.700     | 338.7     | 2.100     | 436.2     | 2.500     | 542.7     |
| 0.200     | 54.1      | 0.600     | 117.5     | 1.000     | 190.0     | 1.400     | 271.6     | 1.800     | 362.2     | 2.200     | 462.0     | 2.600     | 570.7     |
| 0.300     | 69.1      | 0.700     | 134.8     | 1.100     | 209.6     | 1.500     | 293.4     | 1.900     | 386.3     | 2.300     | 488.3     |           |           |

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

### Simulation Criteria

|                        |       |                                   |       |                                     |       |
|------------------------|-------|-----------------------------------|-------|-------------------------------------|-------|
| Areal Reduction Factor | 1.000 | Manhole Headloss Coeff (Global)   | 0.500 | MADD Factor * 10m³/ha Storage       | 2.000 |
| Hot Start (mins)       | 0     | Foul Sewage per hectare (l/s)     | 0.000 | Inlet Coeffiecient                  | 0.800 |
| Hot Start Level (mm)   | 0     | Additional Flow - % of Total Flow | 0.000 | Flow per Person per Day (l/per/day) | 0.000 |

|                             |   |                              |   |                              |   |
|-----------------------------|---|------------------------------|---|------------------------------|---|
| Number of Input Hydrographs | 0 | Number of Offline Controls   | 0 | Number of Time/Area Diagrams | 0 |
| Number of Online Controls   | 1 | Number of Storage Structures | 1 | Number of Real Time Controls | 0 |

## Synthetic Rainfall Details

|                      |      |               |    |        |        |    |       |       |       |          |          |       |
|----------------------|------|---------------|----|--------|--------|----|-------|-------|-------|----------|----------|-------|
| Rainfall Model       | FEH  | Site Location | GB | 579822 | 162987 | TQ | 79822 | 62987 | Cv    | (Summer) | 0.750    |       |
| FEH Rainfall Version | 2013 | Data Type     |    |        |        |    |       |       | Point | Cv       | (Winter) | 0.840 |

```

Margin for Flood Risk Warning (mm)                300.0      DVD Status  ON
      Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
      DTS Status                                ON

```

|                          |                                                                      |
|--------------------------|----------------------------------------------------------------------|
| Profile(s)               | Summer and Winter                                                    |
| Duration(s) (mins)       | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880 |
| Return Period(s) (years) | 2, 30, 100                                                           |
| Climate Change (%)       | 0, 0, 40                                                             |

|       |       |           |        |        |      |         |         |        |       | Water    | Surcharged | Flooded   | Half Drain |       | Pipe   |
|-------|-------|-----------|--------|--------|------|---------|---------|--------|-------|----------|------------|-----------|------------|-------|--------|
| US/MH |       |           |        |        |      |         | US/CL   | Level  | Depth | Volume   | Maximum    | Discharge | Time       | Flow  |        |
| PN    | Name  | Event     |        |        |      | (m)     | (m)     | (m)    | (m³)  | Vol (m³) | Vol (m³)   | Vol (m³)  | (mins)     | (l/s) | Status |
| 1.000 | SMH29 | 15 minute | 2 year | Winter | I+0% | 128.555 | 127.187 | -0.147 | 0.000 | 0.104    | 11.099     |           |            | 23.4  | OK     |
| 2.000 | SIC6A | 15 minute | 2 year | Winter | I+0% | 127.706 | 126.289 | -0.166 | 0.000 | 0.077    | 5.192      |           |            | 11.1  | OK     |
| 2.001 | SIC7A | 15 minute | 2 year | Winter | I+0% | 127.935 | 125.736 | -0.149 | 0.000 | 0.102    | 6.549      |           |            | 13.4  | OK     |
| 2.002 | SMH35 | 15 minute | 2 year | Winter | I+0% | 127.825 | 125.593 | -0.142 | 0.000 | 0.111    | 6.549      |           |            | 13.5  | OK     |
| 1.001 | SMH8  | 15 minute | 2 year | Winter | I+0% | 128.011 | 125.236 | -0.314 | 0.000 | 0.187    | 25.836     |           |            | 51.0  | OK     |
| 3.000 | SMH27 | 15 minute | 2 year | Winter | I+0% | 126.433 | 125.351 | -0.174 | 0.000 | 0.173    | 11.968     |           |            | 24.8  | OK     |
| 3.001 | SMH26 | 15 minute | 2 year | Winter | I+0% | 127.306 | 125.130 | -0.172 | 0.000 | 0.497    | 11.969     |           |            | 24.5  | OK     |
| 4.000 | SMH17 | 15 minute | 2 year | Winter | I+0% | 129.056 | 127.509 | -0.150 | 0.000 | 0.101    | 11.020     |           |            | 23.2  | OK     |
| 3.002 | SMH18 | 15 minute | 2 year | Winter | I+0% | 127.439 | 124.905 | -0.315 | 0.000 | 0.195    | 25.040     |           |            | 50.7  | OK     |
| 1.002 | SMH9  | 15 minute | 2 year | Winter | I+0% | 127.126 | 124.760 | -0.251 | 0.000 | 1.505    | 57.479     |           |            | 112.3 | OK     |

|                                                                    |                                     |                                                                                     |
|--------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------------------------|
| GTA Civils Ltd                                                     |                                     | Page 7                                                                              |
| Gloucester House<br>66a Church Walk<br>Burgess Hill RH15 9AS       | 11977 BLOWERS WOOD<br>STORM NETWORK |  |
| Date 31/07/2023 12:18<br>File 11977_Blowers_Storm - 30-07-2023.mdx | Designed by CM<br>Checked by FVV    |                                                                                     |
| Micro Drainage                                                     | Network 2020.1.3                    |                                                                                     |

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

| PN    | US/MH |           | Event  |        |      | US/CL<br>(m) | Water<br>Level<br>(m) | Surcharged<br>Depth<br>(m) | Flooded<br>Volume<br>(m³) | Maximum<br>Vol (m³) | Discharge<br>Vol (m³) | Half Drain<br>Time<br>(mins) | Pipe<br>Flow<br>(l/s) | Status |
|-------|-------|-----------|--------|--------|------|--------------|-----------------------|----------------------------|---------------------------|---------------------|-----------------------|------------------------------|-----------------------|--------|
|       | Name  |           |        |        |      |              |                       |                            |                           |                     |                       |                              |                       |        |
| 5.000 | SMH30 | 15 minute | 2 year | Winter | I+0% | 126.838      | 125.494               | -0.166                     | 0.000                     | 0.077               | 4.791                 |                              | 10.2                  | OK     |
| 5.001 | SMH31 | 15 minute | 2 year | Winter | I+0% | 126.540      | 125.060               | -0.150                     | 0.000                     | 0.124               | 5.797                 |                              | 11.9                  | OK     |
| 5.002 | SMH32 | 15 minute | 2 year | Winter | I+0% | 126.189      | 124.822               | -0.209                     | 0.000                     | 0.124               | 10.830                |                              | 21.2                  | OK     |
| 1.003 | SMH10 | 15 minute | 2 year | Winter | I+0% | 126.641      | 124.276               | -0.379                     | 0.000                     | 0.444               | 83.573                |                              | 157.6                 | OK     |
| 1.004 | SMH11 | 15 minute | 2 year | Winter | I+0% | 125.802      | 123.721               | -0.419                     | 0.000                     | 0.994               | 85.633                |                              | 160.6                 | OK     |
| 6.000 | SMH14 | 15 minute | 2 year | Winter | I+0% | 125.389      | 123.711               | -0.170                     | 0.000                     | 0.071               | 3.637                 |                              | 7.8                   | OK     |
| 6.001 | SMH15 | 15 minute | 2 year | Winter | I+0% | 125.326      | 123.511               | -0.192                     | 0.000                     | 0.151               | 6.223                 |                              | 12.3                  | OK     |
| 6.002 | SMH34 | 15 minute | 2 year | Winter | I+0% | 125.279      | 123.482               | -0.188                     | 0.000                     | 0.276               | 8.499                 |                              | 16.4                  | OK     |
| 6.003 | SMH16 | 15 minute | 2 year | Winter | I+0% | 125.477      | 123.414               | -0.177                     | 0.000                     | 0.498               | 11.863                |                              | 22.1                  | OK     |
| 1.005 | SMH12 | 15 minute | 2 year | Winter | I+0% | 125.580      | 123.114               | -0.379                     | 0.000                     | 0.576               | 98.597                |                              | 183.8                 | OK     |
| 7.000 | SMH19 | 15 minute | 2 year | Winter | I+0% | 128.386      | 126.964               | -0.087                     | 0.000                     | 0.083               | 6.134                 |                              | 13.1                  | OK     |
| 7.001 | SMH20 | 15 minute | 2 year | Winter | I+0% | 127.589      | 125.875               | -0.130                     | 0.000                     | 0.102               | 8.432                 |                              | 17.3                  | OK     |
| 7.002 | SMH21 | 15 minute | 2 year | Winter | I+0% | 126.846      | 125.509               | -0.209                     | 0.000                     | 0.126               | 12.415                |                              | 24.2                  | OK     |
| 7.003 | SMH22 | 15 minute | 2 year | Winter | I+0% | 126.140      | 124.771               | -0.210                     | 0.000                     | 0.174               | 16.777                |                              | 31.7                  | OK     |
| 7.004 | SMH23 | 15 minute | 2 year | Winter | I+0% | 125.251      | 123.734               | -0.193                     | 0.000                     | 0.183               | 21.743                |                              | 40.0                  | OK     |
| 1.006 | SMH36 | 15 minute | 2 year | Winter | I+0% | 125.280      | 122.734               | -0.366                     | 0.000                     | 0.901               | 124.021               |                              | 228.5                 | OK     |
| 1.007 | SMH25 | 15 minute | 2 year | Winter | I+0% | 124.000      | 122.221               | -0.454                     | 0.000                     | 0.909               | 124.021               |                              | 228.4                 | OK     |
| 8.000 | SMH4  | 15 minute | 2 year | Winter | I+0% | 123.989      | 122.481               | -0.269                     | 0.000                     | 0.037               | 1.454                 |                              | 3.1                   | OK     |
| 8.001 | SMH1  | 15 minute | 2 year | Winter | I+0% | 124.156      | 122.183               | -0.217                     | 0.000                     | 0.229               | 6.766                 |                              | 12.7                  | OK     |
| 8.002 | SMH3  | 15 minute | 2 year | Winter | I+0% | 124.000      | 122.047               | -0.553                     | 0.000                     | 0.123               | 6.765                 |                              | 12.8                  | OK     |
| 1.008 | SMH5  | 30 minute | 2 year | Winter | I+0% | 124.000      | 121.029               | -0.971                     | 0.000                     | 108.641             | 0.000                 | 29                           | 0.0                   | OK     |

11977 BLOWERS WOOD  
STORM NETWORK

|                |
|----------------|
| Designed by CM |
| Checked by FVV |

Network 2020.1.3



| Simulation Criteria    |       |                                            |       |
|------------------------|-------|--------------------------------------------|-------|
| Areal Reduction Factor | 1.000 | Manhole Headloss Coeff (Global)            | 0.500 |
|                        |       | MADD Factor * 10m <sup>3</sup> /ha Storage | 2.000 |
| Hot Start (mins)       | 0     | Foul Sewage per hectare (l/s)              | 0.000 |
|                        |       | Inlet Coeffiecient                         | 0.800 |
| Hot Start Level (mm)   | 0     | Additional Flow - % of Total Flow          | 0.000 |
|                        |       | Flow per Person per Day (l/per/day)        | 0.000 |

| Synthetic Rainfall Details |      |               |                                 |                   |       |  |  |  |  |
|----------------------------|------|---------------|---------------------------------|-------------------|-------|--|--|--|--|
| Rainfall Model             | FEH  | Site Location | GB 579822 162987 TQ 79822 62987 | Cv (Summer)       | 0.750 |  |  |  |  |
| FEH Rainfall Version       | 2013 | Data Type     |                                 | Point Cv (Winter) | 0.840 |  |  |  |  |

|                          |                                                                      |
|--------------------------|----------------------------------------------------------------------|
| Profile(s)               | Summer and Winter                                                    |
| Duration(s) (mins)       | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880 |
| Return Period(s) (years) | 2, 30, 100                                                           |
| Climate Change (%)       | 0, 0, 40                                                             |

WARNING: Half Drain Time has not been calculated as the structure is too full.

| PN    | US/MH |           | Event   | US/CL<br>(m) | Water<br>Level<br>(m) | Surcharged<br>Depth<br>(m) | Flooded<br>Volume<br>(m³) | Maximum<br>Vol (m³) | Discharge<br>Vol (m³) | Half Drain<br>Time<br>(mins) | Pipe<br>Flow<br>(l/s) | Status |    |
|-------|-------|-----------|---------|--------------|-----------------------|----------------------------|---------------------------|---------------------|-----------------------|------------------------------|-----------------------|--------|----|
|       | Name  |           |         |              |                       |                            |                           |                     |                       |                              |                       |        |    |
| 1.000 | SMH29 | 15 minute | 30 year | Winter       | I+0%                  | 128.555                    | 127.233                   | -0.101              | 0.000                 | 0.170                        | 24.952                | 52.6   | OK |
| 2.000 | SIC6A | 15 minute | 30 year | Winter       | I+0%                  | 127.706                    | 126.322                   | -0.134              | 0.000                 | 0.123                        | 11.675                | 24.9   | OK |
| 2.001 | SIC7A | 15 minute | 30 year | Winter       | I+0%                  | 127.935                    | 125.785                   | -0.100              | 0.000                 | 0.188                        | 14.726                | 31.6   | OK |
| 2.002 | SMH35 | 15 minute | 30 year | Winter       | I+0%                  | 127.825                    | 125.648                   | -0.087              | 0.000                 | 0.215                        | 14.726                | 31.5   | OK |
| 1.001 | SMH8  | 15 minute | 30 year | Winter       | I+0%                  | 128.011                    | 125.321                   | -0.229              | 0.000                 | 0.316                        | 58.087                | 122.6  | OK |
| 3.000 | SMH27 | 15 minute | 30 year | Winter       | I+0%                  | 126.433                    | 125.434                   | -0.091              | 0.000                 | 0.292                        | 26.905                | 55.8   | OK |
| 3.001 | SMH26 | 15 minute | 30 year | Winter       | I+0%                  | 127.306                    | 125.216                   | -0.086              | 0.000                 | 1.283                        | 26.905                | 54.8   | OK |

|                                                                    |                                     |                                                                                     |
|--------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------------------------|
| GTA Civils Ltd                                                     |                                     | Page 9                                                                              |
| Gloucester House<br>66a Church Walk<br>Burgess Hill RH15 9AS       | 11977 BLOWERS WOOD<br>STORM NETWORK |  |
| Date 31/07/2023 12:18<br>File 11977_Blowers_Storm - 30-07-2023.mdx | Designed by CM<br>Checked by FVV    |                                                                                     |
| Micro Drainage                                                     | Network 2020.1.3                    |                                                                                     |

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

| PN    | US/MH |           | Event               | US/CL<br>(m) | Water Level<br>(m) |  | Surcharged Depth<br>(m) |       | Flooded Volume<br>(m³) |         | Maximum Discharge<br>Vol (m³) |  | Half Drain Time<br>(mins) |  | Pipe Flow<br>(l/s) |            | Status |
|-------|-------|-----------|---------------------|--------------|--------------------|--|-------------------------|-------|------------------------|---------|-------------------------------|--|---------------------------|--|--------------------|------------|--------|
|       | Name  |           |                     |              |                    |  |                         |       |                        |         |                               |  |                           |  |                    |            |        |
| 4.000 | SMH17 | 15 minute | 30 year Winter I+0% | 129.056      | 127.553            |  | -0.106                  | 0.000 | 0.164                  | 24.776  |                               |  |                           |  | 52.2               |            | OK     |
| 3.002 | SMH18 | 15 minute | 30 year Winter I+0% | 127.439      | 124.981            |  | -0.239                  | 0.000 | 0.349                  | 56.294  |                               |  |                           |  | 114.6              |            | OK     |
| 1.002 | SMH9  | 15 minute | 30 year Winter I+0% | 127.126      | 124.907            |  | -0.104                  | 0.000 | 4.774                  | 129.222 |                               |  |                           |  | 260.1              |            | OK     |
| 5.000 | SMH30 | 15 minute | 30 year Winter I+0% | 126.838      | 125.527            |  | -0.133                  | 0.000 | 0.124                  | 10.772  |                               |  |                           |  | 23.0               |            | OK     |
| 5.001 | SMH31 | 15 minute | 30 year Winter I+0% | 126.540      | 125.106            |  | -0.104                  | 0.000 | 0.223                  | 13.035  |                               |  |                           |  | 27.9               |            | OK     |
| 5.002 | SMH32 | 15 minute | 30 year Winter I+0% | 126.189      | 124.882            |  | -0.149                  | 0.000 | 0.252                  | 24.352  |                               |  |                           |  | 53.0               |            | OK     |
| 1.003 | SMH10 | 15 minute | 30 year Winter I+0% | 126.641      | 124.423            |  | -0.232                  | 0.000 | 1.411                  | 187.886 |                               |  |                           |  | 368.9              |            | OK     |
| 1.004 | SMH11 | 15 minute | 30 year Winter I+0% | 125.802      | 123.832            |  | -0.308                  | 0.000 | 2.559                  | 192.517 |                               |  |                           |  | 379.9              |            | OK     |
| 6.000 | SMH14 | 15 minute | 30 year Winter I+0% | 125.389      | 123.741            |  | -0.140                  | 0.000 | 0.114                  | 8.178   |                               |  |                           |  | 17.5               |            | OK     |
| 6.001 | SMH15 | 15 minute | 30 year Winter I+0% | 125.326      | 123.597            |  | -0.106                  | 0.000 | 0.324                  | 13.992  |                               |  |                           |  | 30.3               |            | OK     |
| 6.002 | SMH34 | 15 minute | 30 year Winter I+0% | 125.279      | 123.573            |  | -0.098                  | 0.000 | 0.622                  | 19.109  |                               |  |                           |  | 40.7               |            | OK     |
| 6.003 | SMH16 | 15 minute | 30 year Winter I+0% | 125.477      | 123.515            |  | -0.076                  | 0.000 | 1.262                  | 26.671  |                               |  |                           |  | 56.3               |            | OK     |
| 1.005 | SMH12 | 15 minute | 30 year Winter I+0% | 125.580      | 123.266            |  | -0.227                  | 0.000 | 1.453                  | 221.665 |                               |  |                           |  | 439.8              |            | OK     |
| 7.000 | SMH19 | 15 minute | 30 year Winter I+0% | 128.386      | 127.006            |  | -0.045                  | 0.000 | 0.143                  | 13.793  |                               |  |                           |  | 29.4               |            | OK     |
| 7.001 | SMH20 | 15 minute | 30 year Winter I+0% | 127.589      | 125.945            |  | -0.059                  | 0.000 | 0.193                  | 18.959  |                               |  |                           |  | 40.2               |            | OK     |
| 7.002 | SMH21 | 15 minute | 30 year Winter I+0% | 126.846      | 125.569            |  | -0.149                  | 0.000 | 0.269                  | 27.912  |                               |  |                           |  | 59.3               |            | OK     |
| 7.003 | SMH22 | 15 minute | 30 year Winter I+0% | 126.140      | 124.831            |  | -0.150                  | 0.000 | 0.387                  | 37.718  |                               |  |                           |  | 79.8               |            | OK     |
| 7.004 | SMH23 | 15 minute | 30 year Winter I+0% | 125.251      | 123.816            |  | -0.110                  | 0.000 | 0.415                  | 48.884  |                               |  |                           |  | 103.1              |            | OK     |
| 1.006 | SMH36 | 60 minute | 30 year Winter I+0% | 125.280      | 123.019            |  | -0.081                  | 0.000 | 4.052                  | 448.971 |                               |  |                           |  | 302.0              |            | OK     |
| 1.007 | SMH25 | 60 minute | 30 year Winter I+0% | 124.000      | 122.885            |  | 0.210                   | 0.000 | 9.666                  | 448.885 |                               |  |                           |  | 301.9              | SURCHARGED |        |
| 8.000 | SMH4  | 60 minute | 30 year Winter I+0% | 123.989      | 122.673            |  | -0.077                  | 0.000 | 0.312                  | 5.268   |                               |  |                           |  | 3.6                |            | OK     |
| 8.001 | SMH1  | 60 minute | 30 year Winter I+0% | 124.156      | 122.673            |  | 0.273                   | 0.000 | 2.583                  | 24.510  |                               |  |                           |  | 16.8               | SURCHARGED |        |
| 8.002 | SMH3  | 60 minute | 30 year Winter I+0% | 124.000      | 122.672            |  | 0.072                   | 0.000 | 2.118                  | 24.504  |                               |  |                           |  | 16.8               | SURCHARGED |        |
| 1.008 | SMH5  | 60 minute | 30 year Winter I+0% | 124.000      | 122.672            |  | 0.672                   | 0.000 | 310.692                | 0.000   |                               |  |                           |  | 0.0                | SURCHARGED |        |

| GTA Civils Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                 |         |         |        |            |                                     |           |        | Page 10    |            |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
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| Gloucester House<br>66a Church Walk<br>Burgess Hill RH15 9AS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                 |         |         |        |            | 11977 BLOWERS WOOD<br>STORM NETWORK |           |        |            |            |  |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| Date 31/07/2023 12:18<br>File 11977_Blowers_Storm - 30-07-2023.mdx                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                 |         |         |        |            | Designed by CM<br>Checked by FVV    |           |        |            |            |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| Micro Drainage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                 |         |         |        |            | Network 2020.1.3                    |           |        |            |            |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| <u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                 |         |         |        |            |                                     |           |        |            |            |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| <u>Simulation Criteria</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                 |         |         |        |            |                                     |           |        |            |            |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| Areal Reduction Factor 1.000    Manhole Headloss Coeff (Global) 0.500    MADD Factor * 10m³/ha Storage 2.000<br>Hot Start (mins) 0    Foul Sewage per hectare (l/s) 0.000    Inlet Coeffiecient 0.800<br>Hot Start Level (mm) 0    Additional Flow - % of Total Flow 0.000    Flow per Person per Day (l/per/day) 0.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                 |         |         |        |            |                                     |           |        |            |            |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 0<br>Number of Online Controls 1    Number of Storage Structures 1    Number of Real Time Controls 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                 |         |         |        |            |                                     |           |        |            |            |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| <u>Synthetic Rainfall Details</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                 |         |         |        |            |                                     |           |        |            |            |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| Rainfall Model FEH    Site Location GB 579822 162987 TQ 79822 62987    Cv (Summer) 0.750<br>FEH Rainfall Version 2013    Data Type    Point Cv (Winter) 0.840                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                 |         |         |        |            |                                     |           |        |            |            |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| Margin for Flood Risk Warning (mm) 300.0    DVD Status ON<br>Analysis Timestep 2.5 Second Increment (Extended)    Inertia Status OFF<br>DTS Status ON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                 |         |         |        |            |                                     |           |        |            |            |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| <u>Profile(s)</u> Summer and Winter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                 |         |         |        |            |                                     |           |        |            |            |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880<br>Return Period(s) (years) 2, 30, 100<br>Climate Change (%) 0, 0, 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                 |         |         |        |            |                                     |           |        |            |            |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| <table><tr><th colspan="2">US/MH</th><th colspan="2"></th><th colspan="2">Water</th><th colspan="2">Surcharged</th><th colspan="2">Flooded</th><th colspan="2">Half Drain</th><th>Pipe</th><th></th></tr><tr><th>PN</th><th>Name</th><th>Event</th><th>US/CL</th><th>Level</th><th>Depth</th><th>Volume</th><th>Maximum</th><th>Discharge</th><th>Time</th><th>Flow</th><th>Status</th><th></th><th></th></tr><tr><th></th><th></th><th></th><th>(m)</th><th>(m)</th><th>(m)</th><th>(m³)</th><th>Vol (m³)</th><th>Vol (m³)</th><th>(mins)</th><th>(l/s)</th><th></th><th></th><th></th></tr><tr><td>1.000</td><td>SMH29</td><td>15 minute 100 year Winter I+40%</td><td>128.555</td><td>127.394</td><td>0.060</td><td>0.000</td><td>0.401</td><td>45.052</td><td></td><td>91.9</td><td>SURCHARGED</td><td></td><td></td></tr><tr><td>2.000</td><td>SIC6A</td><td>15 minute 100 year Winter I+40%</td><td>127.706</td><td>126.360</td><td>-0.096</td><td>0.000</td><td>0.178</td><td>21.081</td><td></td><td>45.1</td><td>OK</td><td></td><td></td></tr><tr><td>2.001</td><td>SIC7A</td><td>15 minute 100 year Winter I+40%</td><td>127.935</td><td>126.054</td><td>0.169</td><td>0.000</td><td>0.894</td><td>26.590</td><td></td><td>53.9</td><td>SURCHARGED</td><td></td><td></td></tr><tr><td>2.002</td><td>SMH35</td><td>15 minute 100 year Winter I+40%</td><td>127.825</td><td>125.945</td><td>0.210</td><td>0.000</td><td>0.728</td><td>26.590</td><td></td><td>51.5</td><td>SURCHARGED</td><td></td><td></td></tr><tr><td>1.001</td><td>SMH8</td><td>15 minute 100 year Winter I+40%</td><td>128.011</td><td>125.776</td><td>0.226</td><td>0.000</td><td>2.016</td><td>104.870</td><td></td><td>198.7</td><td>SURCHARGED</td><td></td><td></td></tr><tr><td>3.000</td><td>SMH27</td><td>15 minute 100 year Winter I+40%</td><td>126.433</td><td>126.095</td><td>0.570</td><td>0.000</td><td>1.238</td><td>48.586</td><td></td><td>86.3</td><td>SURCHARGED</td><td></td><td></td></tr><tr><td>3.001</td><td>SMH26</td><td>15 minute 100 year Winter I+40%</td><td>127.306</td><td>125.772</td><td>0.470</td><td>0.000</td><td>4.243</td><td>48.603</td><td></td><td>85.3</td><td>SURCHARGED</td><td></td><td></td></tr><tr><td>4.000</td><td>SMH17</td><td>15 minute 100 year Winter I+40%</td><td>129.056</td><td>127.670</td><td>0.011</td><td>0.000</td><td>0.330</td><td>44.731</td><td></td><td>92.1</td><td>SURCHARGED</td><td></td><td></td></tr><tr><td>3.002</td><td>SMH18</td><td>15 minute 100 year Winter I+40%</td><td>127.439</td><td>125.642</td><td>0.422</td><td>0.000</td><td>2.961</td><td>101.663</td><td></td><td>182.6</td><td>SURCHARGED</td><td></td><td></td></tr><tr><td>1.002</td><td>SMH9</td><td>15 minute 100 year Winter I+40%</td><td>127.126</td><td>125.498</td><td>0.487</td><td>0.000</td><td>15.382</td><td>233.336</td><td></td><td>412.9</td><td>SURCHARGED</td><td></td><td></td></tr></table> |       |                                 |         |         |        |            |                                     |           |        |            |            |                                                                                     |  | US/MH |  |  |  | Water |  | Surcharged |  | Flooded |  | Half Drain |  | Pipe |  | PN | Name | Event | US/CL | Level | Depth | Volume | Maximum | Discharge | Time | Flow | Status |  |  |  |  |  | (m) | (m) | (m) | (m³) | Vol (m³) | Vol (m³) | (mins) | (l/s) |  |  |  | 1.000 | SMH29 | 15 minute 100 year Winter I+40% | 128.555 | 127.394 | 0.060 | 0.000 | 0.401 | 45.052 |  | 91.9 | SURCHARGED |  |  | 2.000 | SIC6A | 15 minute 100 year Winter I+40% | 127.706 | 126.360 | -0.096 | 0.000 | 0.178 | 21.081 |  | 45.1 | OK |  |  | 2.001 | SIC7A | 15 minute 100 year Winter I+40% | 127.935 | 126.054 | 0.169 | 0.000 | 0.894 | 26.590 |  | 53.9 | SURCHARGED |  |  | 2.002 | SMH35 | 15 minute 100 year Winter I+40% | 127.825 | 125.945 | 0.210 | 0.000 | 0.728 | 26.590 |  | 51.5 | SURCHARGED |  |  | 1.001 | SMH8 | 15 minute 100 year Winter I+40% | 128.011 | 125.776 | 0.226 | 0.000 | 2.016 | 104.870 |  | 198.7 | SURCHARGED |  |  | 3.000 | SMH27 | 15 minute 100 year Winter I+40% | 126.433 | 126.095 | 0.570 | 0.000 | 1.238 | 48.586 |  | 86.3 | SURCHARGED |  |  | 3.001 | SMH26 | 15 minute 100 year Winter I+40% | 127.306 | 125.772 | 0.470 | 0.000 | 4.243 | 48.603 |  | 85.3 | SURCHARGED |  |  | 4.000 | SMH17 | 15 minute 100 year Winter I+40% | 129.056 | 127.670 | 0.011 | 0.000 | 0.330 | 44.731 |  | 92.1 | SURCHARGED |  |  | 3.002 | SMH18 | 15 minute 100 year Winter I+40% | 127.439 | 125.642 | 0.422 | 0.000 | 2.961 | 101.663 |  | 182.6 | SURCHARGED |  |  | 1.002 | SMH9 | 15 minute 100 year Winter I+40% | 127.126 | 125.498 | 0.487 | 0.000 | 15.382 | 233.336 |  | 412.9 | SURCHARGED |  |  |
| US/MH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                 |         | Water   |        | Surcharged |                                     | Flooded   |        | Half Drain |            | Pipe                                                                                |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| PN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Name  | Event                           | US/CL   | Level   | Depth  | Volume     | Maximum                             | Discharge | Time   | Flow       | Status     |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                 | (m)     | (m)     | (m)    | (m³)       | Vol (m³)                            | Vol (m³)  | (mins) | (l/s)      |            |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| 1.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SMH29 | 15 minute 100 year Winter I+40% | 128.555 | 127.394 | 0.060  | 0.000      | 0.401                               | 45.052    |        | 91.9       | SURCHARGED |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| 2.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SIC6A | 15 minute 100 year Winter I+40% | 127.706 | 126.360 | -0.096 | 0.000      | 0.178                               | 21.081    |        | 45.1       | OK         |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| 2.001                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SIC7A | 15 minute 100 year Winter I+40% | 127.935 | 126.054 | 0.169  | 0.000      | 0.894                               | 26.590    |        | 53.9       | SURCHARGED |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| 2.002                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SMH35 | 15 minute 100 year Winter I+40% | 127.825 | 125.945 | 0.210  | 0.000      | 0.728                               | 26.590    |        | 51.5       | SURCHARGED |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| 1.001                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SMH8  | 15 minute 100 year Winter I+40% | 128.011 | 125.776 | 0.226  | 0.000      | 2.016                               | 104.870   |        | 198.7      | SURCHARGED |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| 3.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SMH27 | 15 minute 100 year Winter I+40% | 126.433 | 126.095 | 0.570  | 0.000      | 1.238                               | 48.586    |        | 86.3       | SURCHARGED |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| 3.001                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SMH26 | 15 minute 100 year Winter I+40% | 127.306 | 125.772 | 0.470  | 0.000      | 4.243                               | 48.603    |        | 85.3       | SURCHARGED |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| 4.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SMH17 | 15 minute 100 year Winter I+40% | 129.056 | 127.670 | 0.011  | 0.000      | 0.330                               | 44.731    |        | 92.1       | SURCHARGED |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| 3.002                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SMH18 | 15 minute 100 year Winter I+40% | 127.439 | 125.642 | 0.422  | 0.000      | 2.961                               | 101.663   |        | 182.6      | SURCHARGED |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| 1.002                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SMH9  | 15 minute 100 year Winter I+40% | 127.126 | 125.498 | 0.487  | 0.000      | 15.382                              | 233.336   |        | 412.9      | SURCHARGED |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |
| ©1982-2020 Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                 |         |         |        |            |                                     |           |        |            |            |                                                                                     |  |       |  |  |  |       |  |            |  |         |  |            |  |      |  |    |      |       |       |       |       |        |         |           |      |      |        |  |  |  |  |  |     |     |     |      |          |          |        |       |  |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |        |       |       |        |  |      |    |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |      |                                 |         |         |       |       |       |         |  |       |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |        |  |      |            |  |  |       |       |                                 |         |         |       |       |       |         |  |       |            |  |  |       |      |                                 |         |         |       |       |        |         |  |       |            |  |  |

|                                                                    |                                     |                                                                                     |
|--------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------------------------|
| GTA Civils Ltd                                                     |                                     | Page 11                                                                             |
| Gloucester House<br>66a Church Walk<br>Burgess Hill RH15 9AS       | 11977 BLOWERS WOOD<br>STORM NETWORK |  |
| Date 31/07/2023 12:18<br>File 11977_Blowers_Storm - 30-07-2023.mdx | Designed by CM<br>Checked by FVV    |                                                                                     |
| Micro Drainage                                                     | Network 2020.1.3                    |                                                                                     |

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

| PN    | US/MH |            | Event                 | US/CL<br>(m) | Water<br>Level<br>(m) | Surcharged<br>Depth<br>(m) | Flooded<br>Volume<br>(m³) | Maximum<br>Vol (m³) | Discharge<br>Vol (m³) | Half Drain<br>Time<br>(mins) | Pipe<br>Flow<br>(l/s) | Status     |
|-------|-------|------------|-----------------------|--------------|-----------------------|----------------------------|---------------------------|---------------------|-----------------------|------------------------------|-----------------------|------------|
|       | Name  |            |                       |              |                       |                            |                           |                     |                       |                              |                       |            |
| 5.000 | SMH30 | 15 minute  | 100 year Winter I+40% | 126.838      | 125.565               | -0.095                     | 0.000                     | 0.179               | 19.451                |                              | 41.6                  | OK         |
| 5.001 | SMH31 | 15 minute  | 100 year Winter I+40% | 126.540      | 125.178               | -0.032                     | 0.000                     | 0.421               | 23.536                |                              | 50.0                  | OK         |
| 5.002 | SMH32 | 15 minute  | 100 year Winter I+40% | 126.189      | 124.954               | -0.077                     | 0.000                     | 0.443               | 43.969                |                              | 95.3                  | OK         |
| 1.003 | SMH10 | 15 minute  | 100 year Winter I+40% | 126.641      | 124.706               | 0.051                      | 0.000                     | 6.346               | 339.259               |                              | 580.1                 | SURCHARGED |
| 1.004 | SMH11 | 120 minute | 100 year Winter I+40% | 125.802      | 124.470               | 0.330                      | 0.000                     | 18.909              | 675.384               |                              | 234.0                 | SURCHARGED |
| 6.000 | SMH14 | 120 minute | 100 year Winter I+40% | 125.389      | 124.272               | 0.390                      | 0.000                     | 0.874               | 28.690                |                              | 10.0                  | SURCHARGED |
| 6.001 | SMH15 | 120 minute | 100 year Winter I+40% | 125.326      | 124.270               | 0.567                      | 0.000                     | 1.581               | 49.088                |                              | 17.1                  | SURCHARGED |
| 6.002 | SMH34 | 120 minute | 100 year Winter I+40% | 125.279      | 124.268               | 0.597                      | 0.000                     | 1.872               | 67.036                |                              | 23.3                  | SURCHARGED |
| 6.003 | SMH16 | 120 minute | 100 year Winter I+40% | 125.477      | 124.263               | 0.672                      | 0.000                     | 2.750               | 93.573                |                              | 32.5                  | SURCHARGED |
| 1.005 | SMH12 | 120 minute | 100 year Winter I+40% | 125.580      | 124.256               | 0.764                      | 0.000                     | 8.130               | 777.587               |                              | 260.4                 | SURCHARGED |
| 7.000 | SMH19 | 15 minute  | 100 year Winter I+40% | 128.386      | 127.842               | 0.791                      | 0.000                     | 1.339               | 24.905                |                              | 45.0                  | SURCHARGED |
| 7.001 | SMH20 | 15 minute  | 100 year Winter I+40% | 127.589      | 126.213               | 0.209                      | 0.000                     | 0.587               | 34.230                |                              | 61.3                  | SURCHARGED |
| 7.002 | SMH21 | 15 minute  | 100 year Winter I+40% | 126.846      | 125.621               | -0.097                     | 0.000                     | 0.408               | 50.399                |                              | 94.2                  | OK         |
| 7.003 | SMH22 | 15 minute  | 100 year Winter I+40% | 126.140      | 124.892               | -0.089                     | 0.000                     | 0.643               | 68.101                |                              | 130.4                 | OK         |
| 7.004 | SMH23 | 15 minute  | 100 year Winter I+40% | 125.251      | 124.272               | 0.346                      | 0.000                     | 2.273               | 88.257                |                              | 162.5                 | SURCHARGED |
| 1.006 | SMH36 | 120 minute | 100 year Winter I+40% | 125.280      | 124.045               | 0.945                      | 0.000                     | 10.956              | 978.072               |                              | 314.0                 | SURCHARGED |
| 1.007 | SMH25 | 120 minute | 100 year Winter I+40% | 124.000      | 123.807               | 1.132                      | 0.000                     | 11.853              | 974.565               |                              | 313.4                 | FLOOD RISK |
| 8.000 | SMH4  | 120 minute | 100 year Winter I+40% | 123.989      | 123.561               | 0.811                      | 0.000                     | 1.583               | 11.466                |                              | 3.7                   | SURCHARGED |
| 8.001 | SMH1  | 120 minute | 100 year Winter I+40% | 124.156      | 123.561               | 1.161                      | 0.000                     | 4.881               | 51.576                |                              | 15.1                  | SURCHARGED |
| 8.002 | SMH3  | 120 minute | 100 year Winter I+40% | 124.000      | 123.558               | 0.958                      | 0.000                     | 3.685               | 49.844                |                              | 14.3                  | SURCHARGED |
| 1.008 | SMH5  | 120 minute | 100 year Winter I+40% | 124.000      | 123.558               | 1.558                      | 0.000                     | 617.226             | 0.000                 | 106                          | 0.0                   | SURCHARGED |

## Annex

### Drainage Management & Maintenance Plan

#### 1. Introduction

This Drainage Maintenance & Management Plan (DMMP) has been prepared by GTA Civils & Transport Ltd for Redrow Homes Limited in relation to the proposed development at Blowers Wood, Maidstone Road, Hempstead, Gillingham ME7 3DT. No responsibility is accepted to any third party for all or part of this study in connection with this or any other development.

This Plan sets out the framework for the management of the proposed sustainable drainage systems (SuDS) and foul drainage network. The document will be updated with further information through the next stage of detailed design and coordination. At this early stage, the level of detail proposed herein is sufficient to demonstrate the viability of the proposed SuDS and foul drainage maintenance regime.

#### 2. Ownership & Maintenance Responsibilities

Responsibility for the maintenance of the drainage system will be apportioned generally as follows.

The drainage features will be cared for by the Estate Management Company which will be set up by the developer to administer the site-wide infrastructure. This includes:

- infiltration pond
- all associated piped networks / chambers

The following sections show schedules detailing the maintenance requirements for each of the main drainage items used within the scheme. The Estate Management Company will undertake the inspections and maintenance activities in accordance with these schedules.

Additional reference has been made to currently established best practice and guidance documents such as The SuDS Manual (CIRIA C753, 2015) and other resources available at the susdrain website ([www.susdrain.org](http://www.susdrain.org)).

This DMMP shall be a live document. The frequency of maintenance intervals may need to be increased or decreased based on the observed performance of the drainage systems over time. Changes to this Plan must be agreed with the drainage authority (LFA) and recorded and dated in the DMMP.

### 3. Health and Safety

All those responsible for and involved in the maintenance of the site drainage systems should be safety-conscious and comply with the relevant health and safety legislation. This includes:

- The Health and Safety at Work etc Act 1974
- The Management of Health and Safety at Work Regulations 1999
- The Workplace (Health, Safety and Welfare) Regulations 1992

The Estate Management Company is responsible for suitable risk assessment and management to ensure safe working conditions and practices. Measures to protect potential visitors also need to be considered.

Specialist contractors used should work to industry guidelines and be able to demonstrate safe working practices.

Employers have a duty to employees to inform them about the risks of their work environment and to decrease the risk as far as reasonably practicable. Appropriate personal protective equipment (PPE) should be provided and practices/policies implemented based on risk assessments.

Operatives should be trained for working near water. Risks of contaminated water should be considered. Checking for open cuts and using nitrile gloves, waterproof plasters etc. is advised.

Entry of pipes, chambers and culverts should be avoided. Work should be carried out from the surface using appropriate equipment. In the event that entry cannot be avoided to perform a critical task, the required safety training, protection measures and precautions must be implemented prior to entry. Lone working should never be attempted.

For further information refer to Section 36 of The SuDS Manual (CIRIA C753).

### 4. Schedule A – Sewers, Manholes, Inspection Chambers, Gullies, Channel Drains

Regular inspection and maintenance are required to ensure the effective long-term operation of private drains, manholes, gullies & channel drains.

Post Completion: a CCTV survey to be carried out on all new and retained existing drainage systems and any downstream receiving systems, prior to connection with adopted sewers.

The survey report will be used to prove the integrity of the as-built drainage system prior to issue of practical completion certificate and will be handed over to the Client & Management Company for future reference.

Ongoing maintenance responsibility for all sewers is by Thames Water and for adoptable highway drainage is by Medway Council . All other private gullies and drainage are private and to be maintained by the Estate Management Company in shared areas and by each homeowner within conveyed land. Operation and maintenance requirements for all sewers, manholes, gullies and channel drains are described in the following table:

| <b>Schedule</b>     | <b>Action</b>                                                                                                                                  | <b>Frequency</b>                                                                          |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Regular Maintenance | Inspect and identify any areas that are not operating correctly. If required, take remedial action.                                            | 6 Monthly intervals.                                                                      |
|                     | Hard standing areas to be swept clear of debris, to prevent possibility of blockages to the receiving drainage systems.                        | Monthly.                                                                                  |
|                     | Debris removal from gullies & channel drains (where may cause risks to performance).                                                           | Monthly intervals, after autumn leaf fall, or as required based on specific observations. |
|                     | Lift and inspect receiving manholes to check for any blockages.                                                                                | Monthly                                                                                   |
| Remedial Actions    | Repair any damaged gully or channel drain gratings.                                                                                            | As required.                                                                              |
|                     | Replace / fix any loose channel drain covers                                                                                                   | As required.                                                                              |
| Monitoring          | Carry out full CCTV survey to confirm ongoing integrity of all drains. Inspect all gullies and silt pits & drainage channels during the survey | 10-yearly intervals.                                                                      |

Where appropriate refer also to specialist drainage manufacturer's information and maintenance

requirements. In all instances, inspection and cleaning should be carried out only by a specialist contractor and in accordance with the guidelines given in 'Safe Working in Sewers and at Sewage Works' published by National Joint Health and Safety Committee for the Water Services.

Further information on safety is set out in Section 3.

## 5. Schedule B – Infiltration Pond

Inspection Frequency and Maintenance Requirements: as per table below:

| Schedule               | Action                                                                                            | Frequency                                                                           |
|------------------------|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Regular Maintenance    | Remove litter and debris                                                                          | Monthly, or as required                                                             |
|                        | Cut grass.                                                                                        | Monthly (during growing season), or as required                                     |
|                        | Manage other vegetation and remove nuisance plants.                                               | Monthly at start, then as required.                                                 |
|                        | Inspect inlets, outlets & overflows for blockages and clear if required                           | Monthly                                                                             |
|                        | Inspect vegetation coverage                                                                       | Monthly for 6 months, quarterly for 2 years, then half yearly                       |
| Occasional Maintenance | Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required. | As required or if bare soil is exposed over 10% or more of the swale treatment area |
| Remedial Actions       | Repair erosion or other damage by re-turfing or reseeded.                                         | As required.                                                                        |
|                        | Relevel uneven surfaces and reinstate design levels.                                              | As required.                                                                        |
|                        | Remove and dispose of oils or petrol residues using safe standard practices                       | As required.                                                                        |

Further information on safety is set out in Section 3.

## 6. Contamination or Dilution of Spillage

In the event of a spillage, it is the responsibility of the landowner to clear up any spillage before it enters the drainage system. The primary method of dealing with any spillage of hydrocarbons should be using sand to soak up the leak and prevent any hydrocarbons entering the drainage system. Once sand has been contaminated it should not be washed into the drainage system but disposed of by a Licensed Contractor.

Environment Agency – Emergency Contact Number: In the event of a spillage the Environment Agency should be contacted to notify the event and seek advice. The Environment Agency Incident Hotline is 0800 80 70 60 (Freephone 24hrs).



## Civil Engineering - Transport Planning - Flood Risk

GTA Civils & Transport, Maple House, 192-198 London Road, Burgess Hill, West Sussex, RH15 9RD

T: 01444 871444 E: [enquiries@gtacivils.co.uk](mailto:enquiries@gtacivils.co.uk) www: [gtacivils.co.uk](http://gtacivils.co.uk)

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