



ENGINEERING GROUP

**PROPOSED RESIDENTIAL  
DWELLING, STONEY  
BROOK FARM,  
EASTERGATE LANE,  
WALBERTON,  
BN18 0BA**

Flood Risk Assessment & Drainage Strategy

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# Revisions and Additional Material

## Document History and Status

| Revision | Date     | Purpose/Status                    |
|----------|----------|-----------------------------------|
| -        | 17/07/26 | First Issue                       |
| A        | 20/07/26 | Final Issue                       |
| B        | 29/07/26 | Lidsey Drainage Impact Assessment |
|          |          |                                   |

## Document Details

|                  |                                                                                        |
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# 1 Introduction and Limitation

## 1.1 Introduction

- 1.1.1 MJ Engineering Group (MJEG) has been commissioned by Tom Reynolds and Sam Byrne to carry out a Flood Risk Assessment and drainage strategy for a new residential dwelling at Stoney Brook Farm in Walberton. The proposed layout can be found in [Appendix A](#).
- 1.1.2 It is proposed to submit the Flood Risk Assessment to the Planning Authority as part of a planning application. Specifically, this assessment intends to review the following:
- Flood Risk Zone,
  - Flood Risk from Overland Surface Water,
  - Flood Risk from Reservoir,
  - Assessment of the impact of the proposal,
  - Review the existing Drainage provision that serve the existing development.

## 1.2 Limitation

- 1.1.3 This Report has been prepared by MJ Engineering Group Ltd (MJEG) for the sole use of the “client” for the purpose of supporting a planning application.
- 1.2.2 The conclusions and recommendations contained in this Report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by MJEG has not been independently verified unless otherwise stated in this Report.
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## 2 Site Description

### 2.1 Site Location and Existing Condition

- 2.1.1 The application site is located in the village of Walberton to be south of the County of West Sussex, within the district of Arun, as shown in [Figure 1](#) below.



Figure 1: Wider Site Location

2.1.2 The site is situated to the west of the village along the lane known as Eastergate Lane. The site location in relation to the surrounding area is shown in [Figure 2](#).



Figure 2: Site Location

- 2.1.3 In the immediate vicinity there are farms, garden nurseries and small business outlets. There is a watercourse located to the south of the site which an outfall pipe of 100mm dia. discharges as the photograph below.



Photograph 1: Surface Water Outfall

- 2.1.4 The site is located at Ordnance Survey (OS) grid reference of SU960060 and covers a site area of circa. 0.38ha, including the any open drainage features.

## 2.2 Background

- 2.2.1 The neighbouring site, at Brookview Nursery, has been the subject of a recent planning appeal for the redevelopment to offices and workshops (APP/C3810/W/23/3316638) which was allowed.
- 2.2.2 The supporting Flood Risk Assessment and Drainage Strategy to the appeal documentation provides an indication of the surrounding ground conditions for the area. The approved development identified the best form of surface water drainage and assists in providing third party information.
- 2.2.3 The approved drainage strategy was based on a restricted outfall to the existing watercourse, with the allowance for possible infiltration, should it be achievable.
- 2.2.4 The site at Stoney Brook Farm has been subject of a recent planning approval (WA/108/24/PL) for the relocation of the existing workshop. In that application, approval was given for the restricting the existing outfall to the watercourse to 0.6l/s, with attenuation being provided with a storage basin.
- 2.2.5 Winter monitoring at the attenuation basin over the 2025/26 winter months recorded a groundwater height of 10.333m, which was within 347mm of the existing ground level. The groundwater record can be found in [Appendix B](#).

## 2.3 Existing Sewer Assets

- 2.3.1 The adoptable sewer records have been obtained from Southern Water. The plan shows adoptable foul water sewer located in Eastergate Lane as [Figure 3](#), with no surface water present. The records can be found in [Appendix C](#).

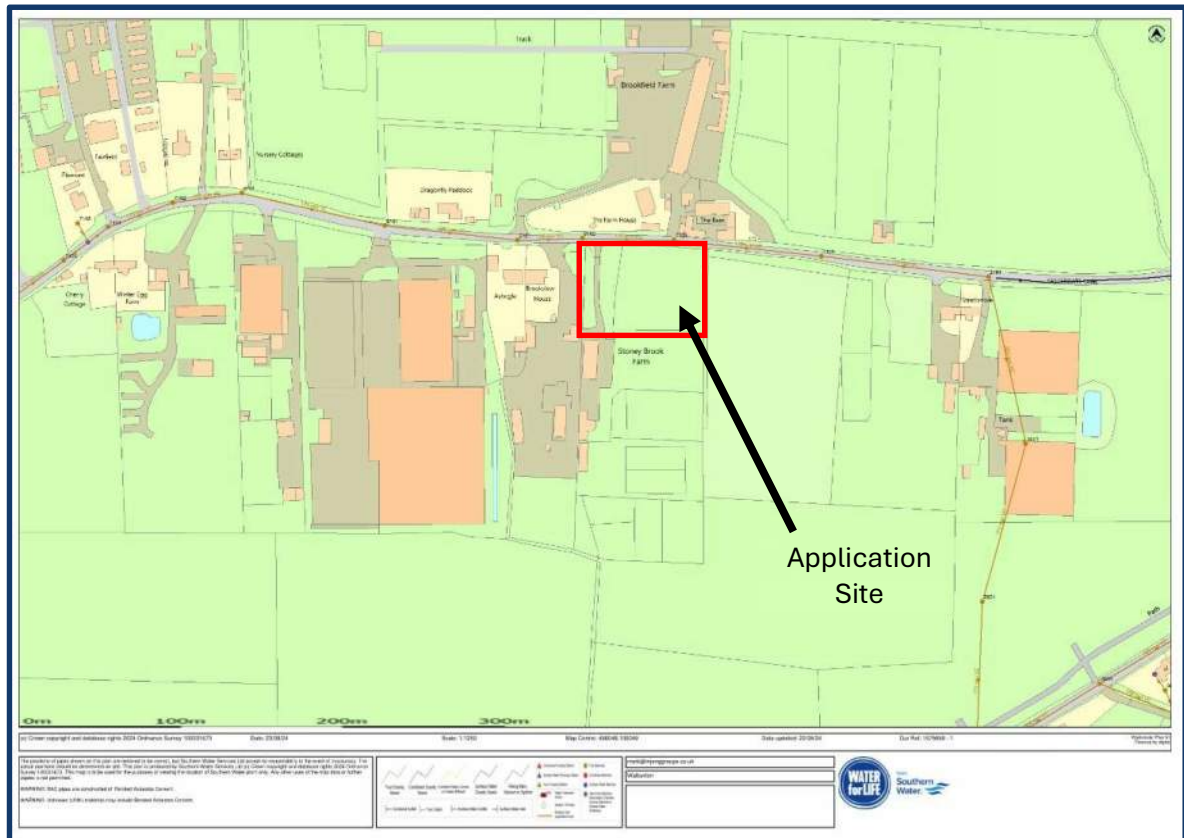


Figure 3: Extract from Southern Water records.

- 2.3.2 With no surface water sewer present, this would indicate either infiltration will be viable or that land is discharging to a watercourse.

## 2.4 Existing Drainage Regime

- 2.4.1 The existing site currently has a converted barn, and commercial workshop. The site benefits from a gravel access road with parking provision for the residential units and for the workshop.
- 2.4.2 The existing surface water from the residential barn outfalls via downpipes to a 100mm dia. pipe that falls south to the existing watercourse known as the 'Chalk Stream'. The workshop application will control the discharge to the watercourse to 0.6l/s and provide a detention basin to store surface water for the extreme storm events. The approved outline surface water drainage is shown existing surface water drainage is shown on drawing A001-013/101 which can be found in [Appendix D](#).
- 2.4.3 There is an aco channel set below the gravel across the access which collects some surface water from the access road, however the majority drains through infiltration.

- 2.4.6 The foul water from the site is privately pumped from a chamber outside the barn building to the main access, where a gravity connection is made to the Southern Wate main sewer in Easterbrook Lane.

## 2.5 Ground Condition

- 2.5.1 From the British Geological Society (BGS) website has been reviewed to establish the ground conditions in the area and consider in more detail the findings from the neighbouring development allowed on appeal.
- 2.5.2 The BGS mapping identifies a large area of Head deposits which consists of Gravel, Sand, Silt and Clay. An extract of the BGS mapping covering the site is shown in [Figure 4](#).

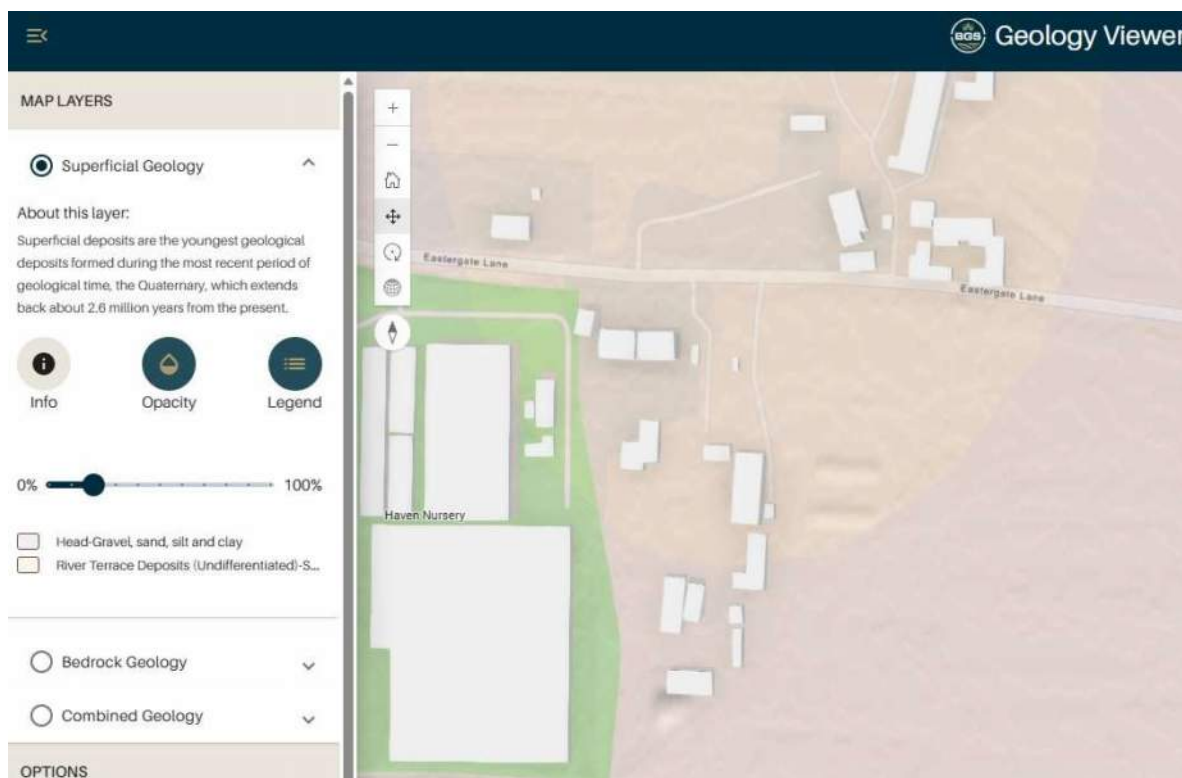


Figure 4: Extract from BGS Superficial Map.

- 2.5.3 At depth the surrounding area is shown to consist of London Clay formation. The Bedrock geology comprises of Clay, Silt and Sand.

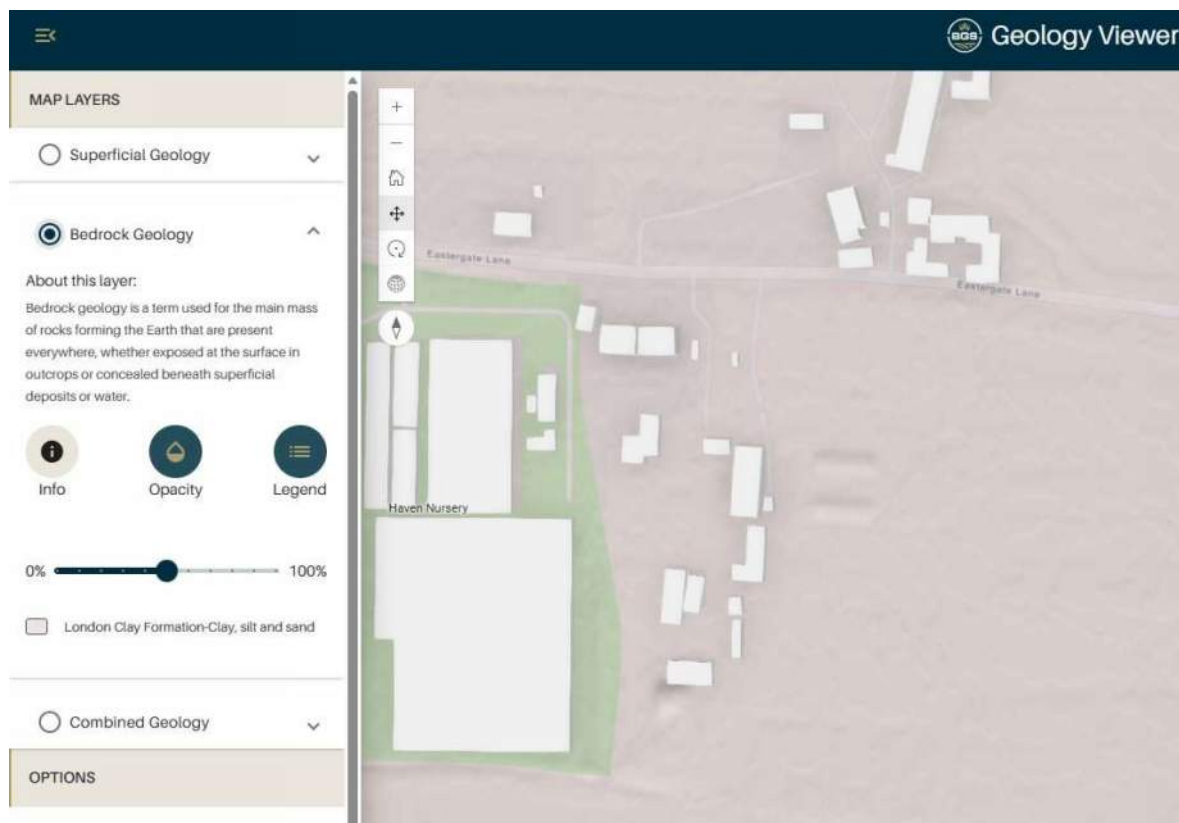


Figure 5: Extract from BGS Bedrock Map.

- 2.5.4 The neighbouring site identified 2no. borehole logs in relation the site at Stoneyfields Nursery some 600m to the southwest of the application site. The borehole logs recorded a geological composition consisting of 'Head Gravel' to a depth of 5.79mbgl (metres below ground level), followed by 'London Clay' up to a depth of 56.23mbgl.

## 2.6 Groundwater

- 2.6.1 It is a requirement by Arun District Council for monitoring of groundwater levels during the winter period. Winter monitoring at the attenuation basin over the 2025/26 winter months recorded a groundwater height of 10.333m, which was within 347mm of the existing ground level. The records can be found in [Appendix B](#).

### 3 Proposed Site Use

- 3.0.1 The application proposes a new single residential dwelling with garage and driveway at Stoney Brook Farm.
- 3.0.2 The proposal will consist of a 378m<sup>2</sup> roof area for the house, 136m<sup>2</sup> for the garage and 458m<sup>2</sup> for the driveway giving a site area approximately 975m<sup>2</sup>. as shown on the proposed layout plan found in [Appendix A](#).

## 4 Planning Policy Context

### 4.0 National Planning Policy

- 4.0.1 The National Planning Policy Framework (NPPF, 2024) includes government policy for developments and meeting the challenges of climate change and flood risk. The policy requires *“Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk”*.
- 4.0.2 New developments should avoid increased vulnerability from climate change, and where developments are brought forward in these area care should be taken to ensure that the risks are managed through suitable adaption measures.
- 4.0.3 The proposed development incorporates sustainable drainage systems, unless there are reasons that it is inappropriate. The development provides safe access and escape routes.
- 4.0.4 Development priorities are based on the specific flood risk zones outlined within Table 1 of the technical guidance, as [Figure 6](#) below.

| <i>Flood Zones</i>                   | <i>Definition</i>                                                                                                                                                                                                                                                                                                     |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Zone 1<br>Low Probability            | Land having a less than 1 in 1,000 annual probabilities of river or sea flooding (shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)                                                                                                                                                                 |
| Zone 2<br>Medium Probability         | Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding, or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.<br>(Land shown in Light Blue in Flood Map)                                                                                                   |
| Zone 3a<br>High Probability          | Land having a 1 in 100 or greater annual probability of river flooding, or land having a 1 in 200 or greater annual probability of sea flooding.<br>(Land shown in Dark Blue on the Flood Map)                                                                                                                        |
| Zone 3b<br>The Functional Floodplain | This zone comprises land where water must flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately designated from Zone 3a) |

Figure 6: Flood Zone definitions.

- 4.0.5 The Environment Agency (EA) website confirms all of the proposed application site to be within flood zone 1. The full Flood map for planning can be found in [Appendix E](#). The flood risk to the site is assessed and discussed further in [Section 5](#) of this report.
- 4.0.6 Further guidance in NPF classifies commercial development schemes to be a 'more vulnerable' land class use in terms of flood risk. A land-use in Flood Zone 1 is considered acceptable.

| <i>Flood Risk Vulnerability Class</i> | <i>Land-use</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Essential infrastructure              | <ul style="list-style-type: none"> <li>• Essential transport infrastructure which has to cross the area at risk,</li> <li>• Essential utility infrastructure,</li> <li>• Wind turbines,</li> <li>• Solar Farms.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Highly Vulnerable                     | <ul style="list-style-type: none"> <li>• Police and ambulance stations,</li> <li>• Emergency dispersal points,</li> <li>• Basement dwellings,</li> <li>• Caravans, mobile homes and park homes,</li> <li>• Installations requiring hazardous substances consent.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| More Vulnerable                       | <ul style="list-style-type: none"> <li>• Hospitals,</li> <li>• Residential institutions,</li> <li>• Buildings used for dwelling houses,</li> <li>• Non-residential uses,</li> <li>• Landfill and sites used for waste management,</li> <li>• Sites used for holiday or short let</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Less Vulnerable                       | <ul style="list-style-type: none"> <li>• Police, ambulance stations not required during flooding,</li> <li>• Buildings used for shops, financial, professional, restaurants, cafes and hot food take-away, offices and general industry, storage and distribution.</li> <li>• Land and building used for agriculture and forestry,</li> <li>• Waste treatment,</li> <li>• Minerals working and processing,</li> <li>• Water treatment works,</li> <li>• Sewerage treatment works,</li> <li>• Car parks.</li> </ul>                                                                                                                                                                                                                                                        |
| Water-compatible development          | <ul style="list-style-type: none"> <li>• Flood control infrastructure.</li> <li>• Water transmission infrastructure &amp; pump station</li> <li>• Sewerage transmission &amp; pump station</li> <li>• Sand &amp; gravel working.</li> <li>• Docks, marinas and wharves,</li> <li>• Navigation facilities,</li> <li>• Ministry of Defence installations,</li> <li>• Ship building, repairs, dismantling,</li> <li>• Water-based recreation,</li> <li>• Lifeguard and coastguard stations,</li> <li>• Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms,</li> <li>• Essential ancillary sleeping or residential accommodation for staff required by uses in this category.</li> </ul> |

Figure 7: Land-Use Vulnerability Classification

## 5 Flood Risk Assessment

### 5.1 Introduction

5.1.1 The main sources of flooding have been assessed as part of this report. In line with National Planning Policy Framework (para.181) and footnote 63. Flood Risk from the following sources have been assessed:

- Tidal and Fluvial;
- Pluvial;
- Reservoirs and other artificial sources.
- Groundwater

### 5.2 Tidal and Fluvial

5.2.1 Tidal flooding is a result of flooding from tidal waters to land along the coast, or inland usually caused by high tides or storm surge. Fluvial occurs when the water level in a river or stream rises and overflows onto land as a result of the capacity of rivers being exceeded by the river flow.

5.2.2 The Environment Agency (EA) flood map for planning shows the site being within Flood Zone 1, as shown in [Figure 8](#). The EA Flood Report can be found in [Appendix E](#).

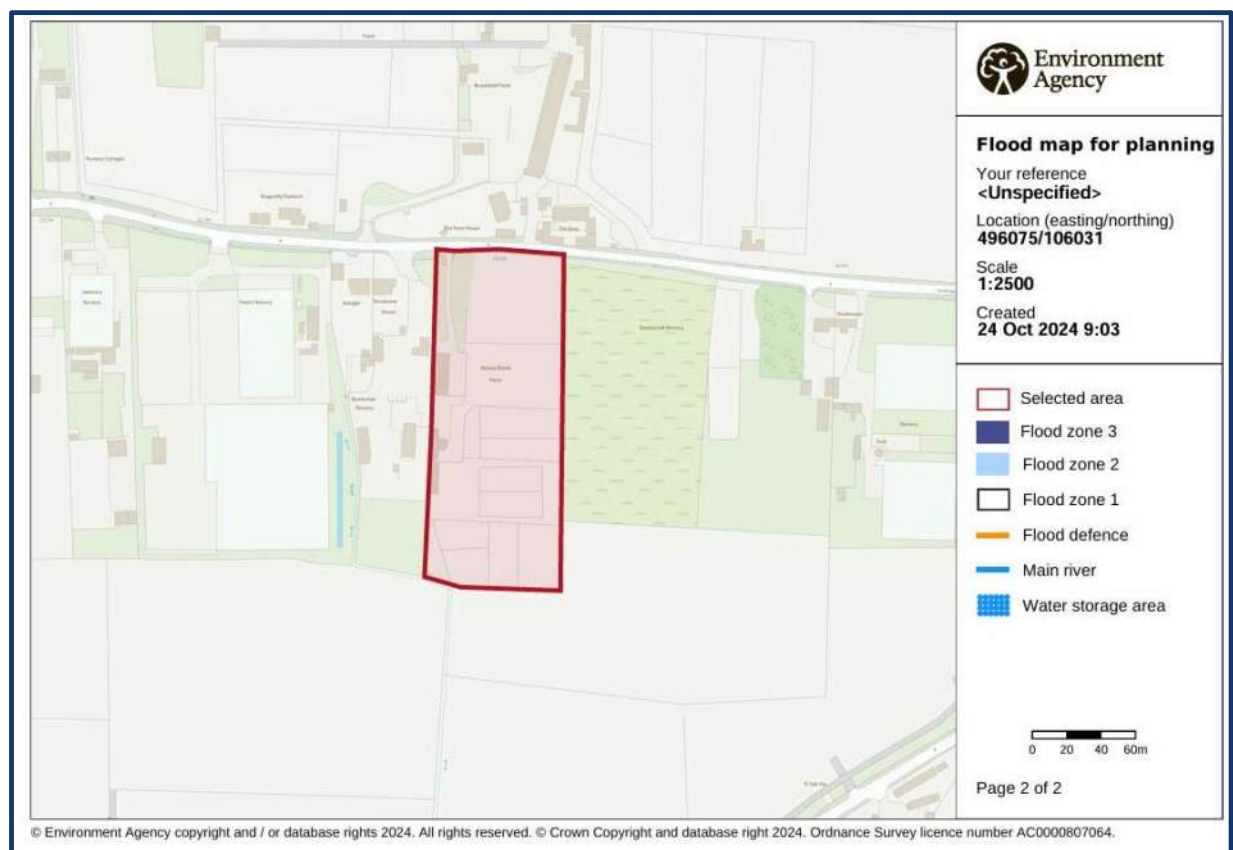


Figure 8: Extent Flood Risk from Rivers or Sea

### 5.3 Pluvial

- 5.3.1 Pluvial flooding occurs as a result of heavy rain creating flooding independent of a water body. Flooding occurs usually in low spots, and as a result of intense rainfall inundating the urban drainage system. The extent of flooding is shown on the Surface Water map from GOV.UK website in the figures below.

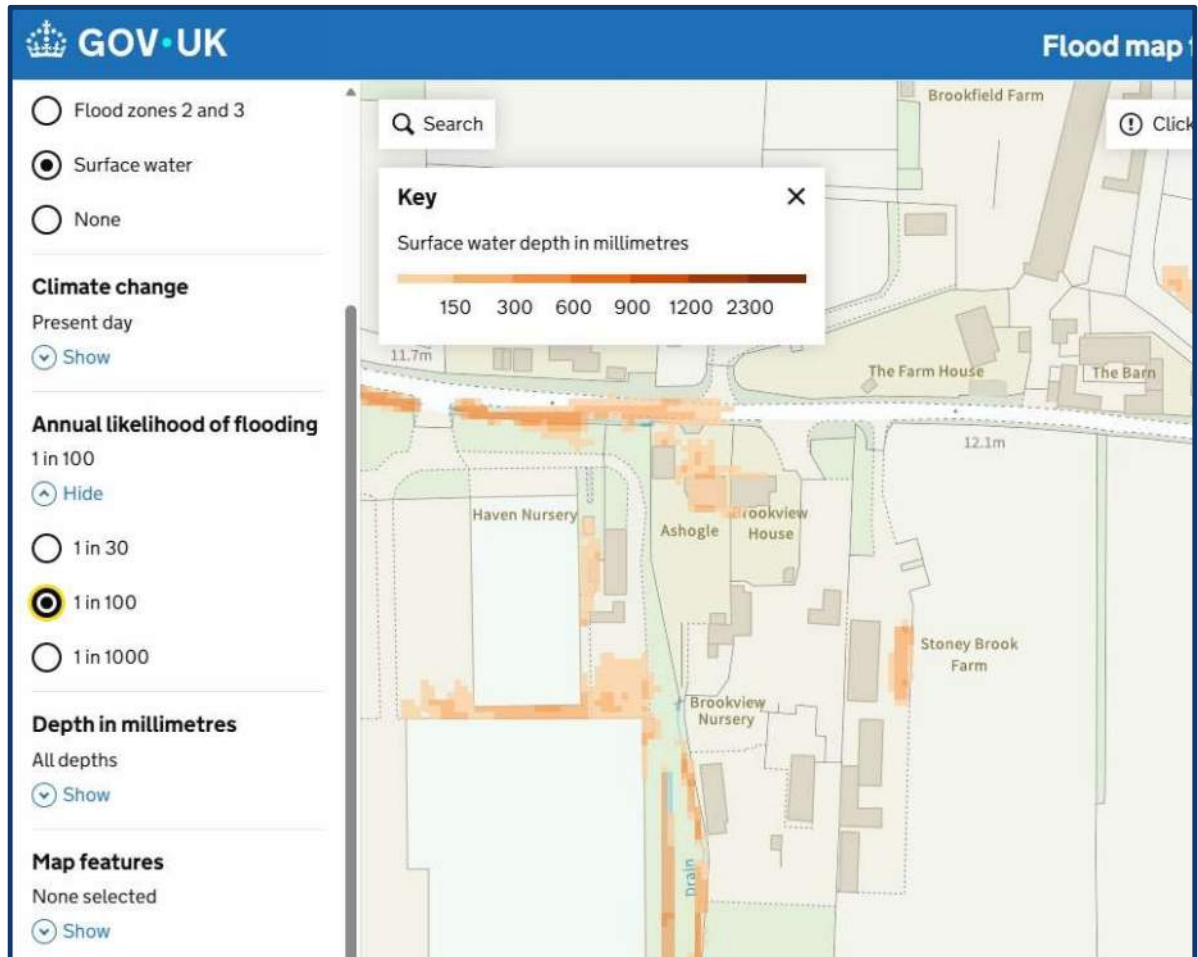


Figure 9: Extent of overland surface water flooding.

- 5.3.2 The extent of flooding shows no overland surface water flooding at the site, as Figure 9 above and the site proposal will not impact on the overland surface water flood area.

## 5.4 Reservoirs & Other Artificial Sources

5.4.1 The risk of flooding from the failure of a reservoir has been reviewed and shown in **Figure 10** below. It is shown that the site is not at risk from reservoir flooding.

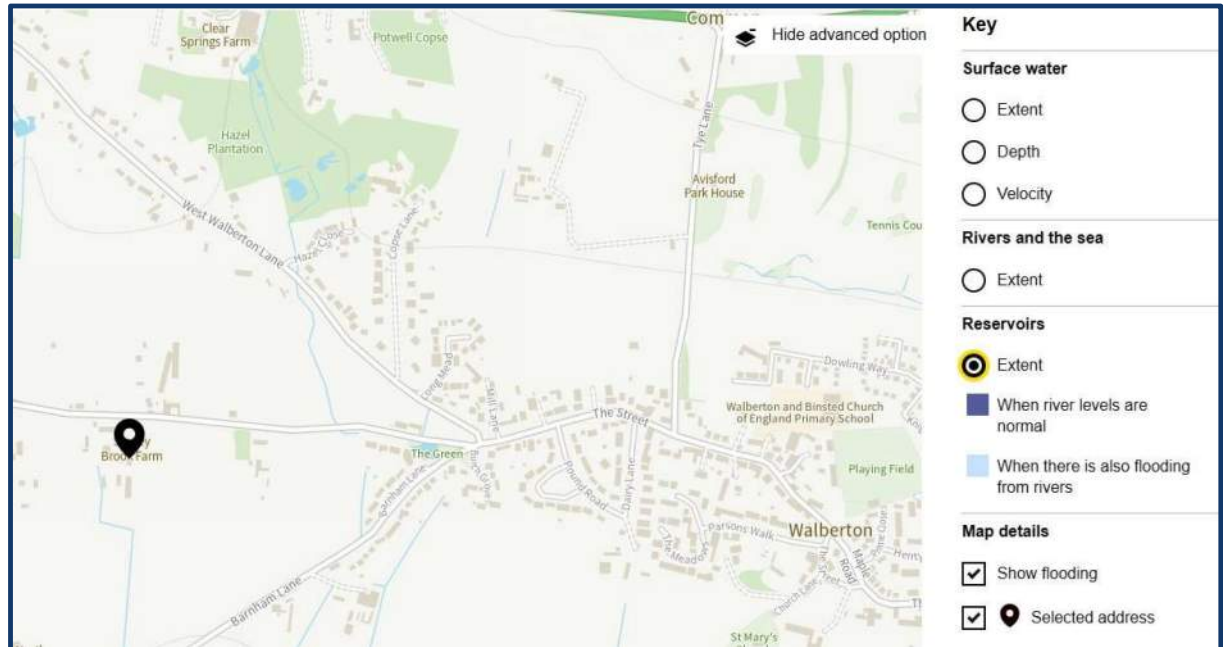


Figure 10: Extent of Reservoir Flooding

## 5.5 Groundwater

- 5.5.1 Groundwater flooding generally is a result of water levels below the ground rising above existing ground levels during the wet months. These flood levels fall again during the dry periods.
- 5.5.2 As stated in section 2.6, the EA reports flooding from groundwater is unlikely at the application site.
- 5.5.3 As part of the recent application for the workshop, groundwater monitoring was carried out during the winter months over 2025/26 recorded a groundwater height of 10.333m which was below 347mm of the existing ground level.

## 6 Drainage Strategy

6.0.1 The Surface Water drainage is required to be managed in a way that replicates the existing and natural drainage processes for the site. The proposals need to consider the NPPF hierarchy as tabled below.

- Discharge into the ground.
- To a surface water body e.g., watercourse.
- To a surface water, highway drain, or another drainage system.
- To a combined sewer.

6.0.2 SuDS are designed to replicate the natural course of drainage as closely as possible with a view to reducing the impact of flooding, removing pollutants at source and combining water management with green space.

### 6.1 SuDS Strategy

6.1.1 In considering the appropriate SuDS components, Table 7.1 of CIRIA document C753 'The SuDS Manual' indicates the benefits the SuDS components provide. The highlighted components tabled below are the be considered at the site.

| Component Type                | Description                                                                                    | Collection Mechanism | Design criteria  |                              |              |               |         |              |
|-------------------------------|------------------------------------------------------------------------------------------------|----------------------|------------------|------------------------------|--------------|---------------|---------|--------------|
|                               |                                                                                                |                      | Water quantity   |                              |              | Water quality | Amenity | Biodiversity |
|                               |                                                                                                |                      | Peak runoff rate | Runoff volumes               |              |               |         |              |
|                               |                                                                                                |                      |                  | Small events (interceptions) | Large events |               |         |              |
| Rainwater harvesting          | System that collects runoff from the roof of a building or other paved surface for use         | P                    |                  | 1                            | 1            |               | 1       |              |
| Green roofs                   | Planted soil layers on the roof of buildings that slow and store runoff                        | S                    | 2                | 1                            |              | 1             | 1       | 1            |
| Infiltration systems          | Systems that collect and store runoff, allowing it to infiltrate into the ground               | P                    | 2                | 1                            |              | 1             | 1       | 1            |
| Proprietary treatment systems | Subsurface structures designed to provide treatment of runoff                                  | P                    |                  |                              |              | 1             |         |              |
| Filter strips                 | Grass strips that promote sedimentation and filtration as runoff is conveyed over the surface. | L                    |                  | 1                            |              | 1             | 2       | 2            |

|                                                                                                                                                                                                    |                                                                                                                                                         |   |   |   |   |   |   |   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|
| Filter drains                                                                                                                                                                                      | Shallow stone-filled trenches that provide attenuation, conveyance and treatment of runoff.                                                             | L | 1 | 2 |   | 1 | 2 | 2 |
| Swales                                                                                                                                                                                             | Vegetated channels (sometimes planted) used to convey and treat runoff.                                                                                 | L | 1 | 1 | 1 | 1 | 1 | 1 |
| Bioretention systems                                                                                                                                                                               | Shallow landscaped depressions that allow runoff to pond temporarily on the surface, before filtering through vegetation and underlying soils.          | P | 2 | 1 | 2 | 1 | 1 | 1 |
| Trees                                                                                                                                                                                              | Trees within soil-filled tree pits, tree planters or structural soils used to collect, store and treat runoff.                                          | P | 1 | 1 |   | 1 | 1 | 1 |
| Pervious pavements                                                                                                                                                                                 | Structural paving through which runoff can soak and subsequently be stored in the sub-base beneath, and/or allowed to infiltrate into the ground below. | S | 1 | 1 | 1 | 1 | 2 | 2 |
| Attenuation storage tanks                                                                                                                                                                          | Large, below-ground voided spaces used to temporarily store runoff before infiltration, controlled release or use.                                      | P | 1 |   |   |   |   |   |
| Detention basins                                                                                                                                                                                   | Vegetated depressions that store and treat runoff.                                                                                                      | P | 1 | 1 | 1 | 1 | 1 | 1 |
| Ponds and wetlands                                                                                                                                                                                 | Permanent pools of water used to facilitate of runoff – runoff can also be stored in an attenuation zone above the pool.                                | P | 1 |   |   | 1 | 1 | 1 |
| Key<br>P-Point L-Lateral S-Surface<br>Likely valuable contribution to delivery of design criterion.<br>Some potential contribution to delivery of design criterion, if specifically in the design. |                                                                                                                                                         |   |   |   |   |   |   |   |

Table 1: SuDS feature options.

## 6.2 Surface Water Drainage Strategy

- 6.2.1 As previously stated in 6.1.1, the existing ground conditions may provide shallow infiltration however with the groundwater being located within 1m of the existing ground level infiltration could not be principle means of discharging the surface water.
- 6.2.2 The primary surface water outfall will be to utilise the existing outfall to the watercourse at the controlled greenfield runoff rate from the workshop application at 0.6l/s.
- 6.2.3 The SuDS features would be designed to allow for infiltration to reduce the demand on the outfall.
- 6.2.3 Based on the proposed roof, paved area and swale features the greenfield runoff rate is calculated at 0.4l/s for the 1 in 1 storm event. This increases with higher storm return periods

which are tabled below. The catchment area is as shown on drawing A001-013/600, in [Appendix F](#), with the Greenfield runoff report in [Appendix G](#).

| <i>Storm Return Period</i> | <i>Greenfield Rate</i> |
|----------------------------|------------------------|
| 1 in 1                     | 0.4                    |
| 1 in 30                    | 1.0                    |
| 1 in 100                   | 1.4                    |
| 1 in 200                   | 1.6                    |

**Table 2: Greenfield runoff rates**

- 6.2.4 It is proposed to maintain the restricted discharge rate of 0.6l/s from the workshop application and increase the storage volume on the site.
- 6.2.5 The proposed drainage layout considers the potential shallow groundwater across the site with the drainage model simulating a groundwater level at 10.333m, as recorded. The drainage network will be modelled for a surcharged water level of 10.333m.
- 6.2.6 The proposed drainage layout can be found in [Appendix H](#), with the hydraulic modelling reports for each scenario in [Appendix J](#).
- 6.2.7 The drainage network includes the workshop drainage network, with the proposed drainage for the dwelling noted by H on the nodes. The modelling includes for the groundwater being present at 10.333m and for a surcharged outfall of 10.41m.
- 6.2.8 The drainage design considers the inception of the first 5mm of rainfall. With a development area of 972m<sup>2</sup> the inception volume is 4.86m<sup>3</sup>. The house will have a water butt located to the rear of the dwelling for collecting and reusing in the garden.
- 6.2.9 The garage downpipes will outfall into small landscape areas where the outlet pipes from the landscape areas will be set higher to ensure surface water is retained within the landscape areas of approximately 4.4m<sup>3</sup>.
- 6.2.10 The swale will have 50mm bafflers located approximately 20m spacing to retain approximately 3m<sup>3</sup> of surface water for infiltrating.

## 6.3 Climate Change

- 6.3.1 The climate change provision for a commercial development should be based on a design life of 50 years. The design life will therefore be beyond 2060 which will require the 2070s Epoch on a central allowance.
- 6.3.2 Using the Government Department for Environment Food & Rural Affairs website the climate change allowance is shown to be 25%, as shown in [Figure 11](#).

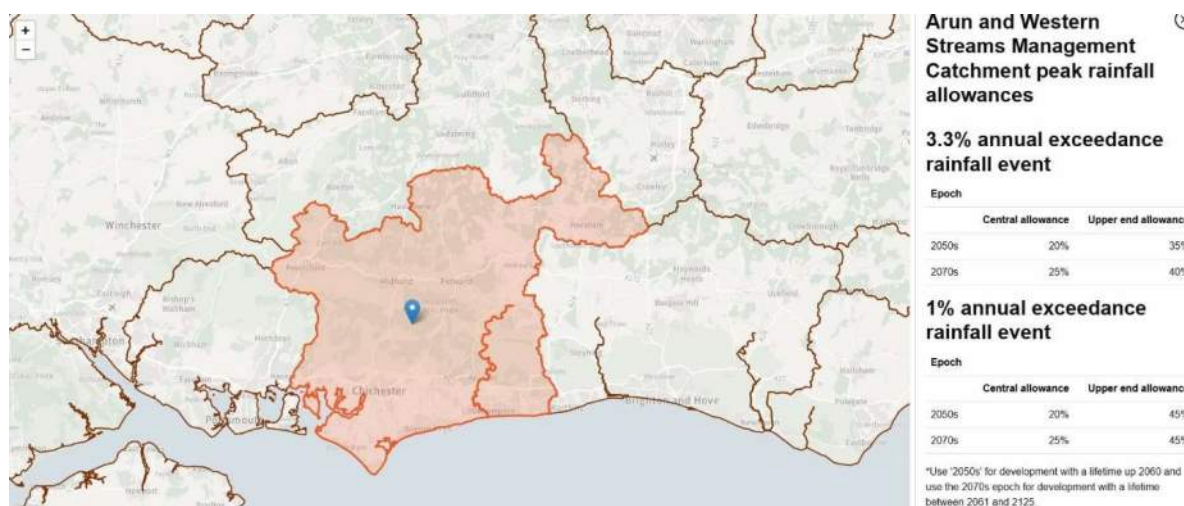


Figure 11: Extent of Climate Change value.

## 6.4 Urban Creep

- 6.4.1 To accord with National Policy an allowance for urban creep should be considered for the likely future extensions. For the building roof area, a 10% increase has been applied, making the roof areas 416m<sup>2</sup>.

## 6.5 Surface Water Pollution Mitigation

- 6.5.1 The proposal ensures that surface water is managed 'at source' retaining the existing outfall and utilising infiltration. Pollution indices for the proposed land use can be found in table 26.2 of C753. The highest level of pollution is therefore contributed by the access road and parking area.

| <i>Land Use</i>   | <i>Pollution Hazard Level</i> | <i>Total suspended solids pollution index</i> | <i>Metals</i> | <i>Hydrocarbons (HC)</i> |
|-------------------|-------------------------------|-----------------------------------------------|---------------|--------------------------|
| Residential roofs | Very Low                      | 0.2                                           | 0.2           | 0.05                     |
| Driveway          | Low                           | 0.5                                           | 0.4           | 0.4                      |

Table 3: Pollution indices by land use

6.5.2 It is recommended that permeable paving is utilised for the driveway. Once drained through the permeable paving, the surface water will be routed through a swale to route surface water south to the detention basin.

6.5.3 The relevant SuDS component mitigation indices are tabled below, (as per table 26.3 of C753). The SuDS mitigation index will be a combination of the SuDS components with a factor of 0.5 applied to secondary and tertiary components.

| <i>SuDS feature</i> | <i>Total suspended solids pollution index</i> | <i>Metals</i> | <i>Hydrocarbons (HC)</i> |
|---------------------|-----------------------------------------------|---------------|--------------------------|
| Permeable Paving    | 0.7                                           | 0.6           | 0.7                      |
| Swale               | 0.25 (0.5)                                    | 0.3 (0.6)     | 0.3 (0.6)                |
| Detention basin     | 0.25 (0.5)                                    | 0.25 (0.5)    | 0.3 (0.6)                |
| Combined            | 1.2                                           | 1.15          | 1.3                      |

Table 4: SuDS mitigation indices

6.5.4 The combined mitigation indices will provide the required treatment for the proposed uses.

## 6.6 Foul Water – Lidsey Drainage Impact Assessment

6.6.1 There is a public sewer in Eastergate Lane to which Stoney Brook Farm already has a direct connection that serves the existing barn conversions and workshop. The private system is drained to a private pump system which pumps to a private foul manhole at the front of the site before discharging to the adoptable sewer. An extract of the Southern Water sewer records is below.



Figure 12: Southern Water Sewer Records.

- 6.6.2 The current foul water is controlled by the pump rate to the adoptable sewer, which will continue with the proposed dwelling connected to the private pump station. It is considered the proposal will not likely have an impact on the catchment area.

## 7 Residual Risk and Mitigation

### 7.0 Residual Risk

- 7.1.1 The following residual risks have been identified in relation to the proposed development, which could cause flooding:

1. Build-up of debris in the watercourse;
2. Blockage of the outfall;
3. Blockage/failure of the proposed drainage system;
4. Extreme rainfall events that exceed the design criteria;
5. Surface Water flooding of proposed buildings.

### 7.1 Mitigation

- 7.2.1 To reduce the risks listed in 7.1.1, mitigation measures have been considered and are numbered below to correlate to the list above.

1. The watercourse is the responsibility of the landowner and maintenance works are restricted under Riparian ownership. The condition of the watercourse will be monitored and the appropriate authorities advised should a risk arise.
2. As above, should the outfall become blocked the landowner as the Riparian owner will be advised.

3. The drainage network will be maintained in accordance with the Surface Water Maintenance Plan which can be found in [Appendix K](#).
4. The drainage network has been modelled for the 1 in 100 storm events, plus 45% climate change. The sensitivity check has been carried out to consider a 1 in 200 storm event. The existing topography currently falls to the south and to the watercourse and away from the existing and proposed properties. These will remain unaltered and therefore the exceedance route will be to the watercourse.

## 8 Summary and Conclusion

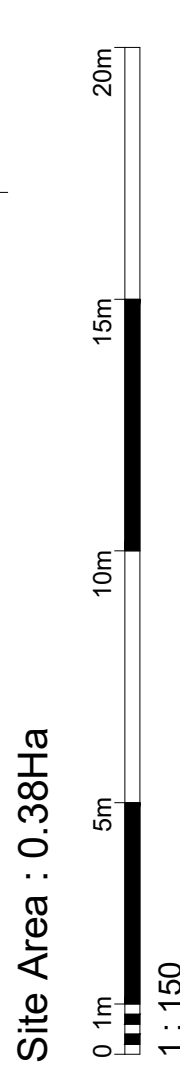
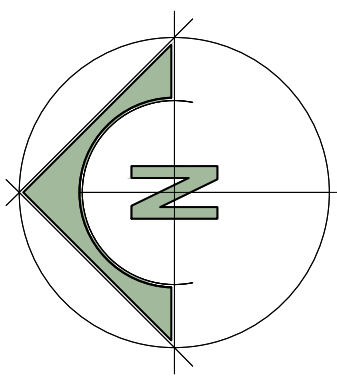
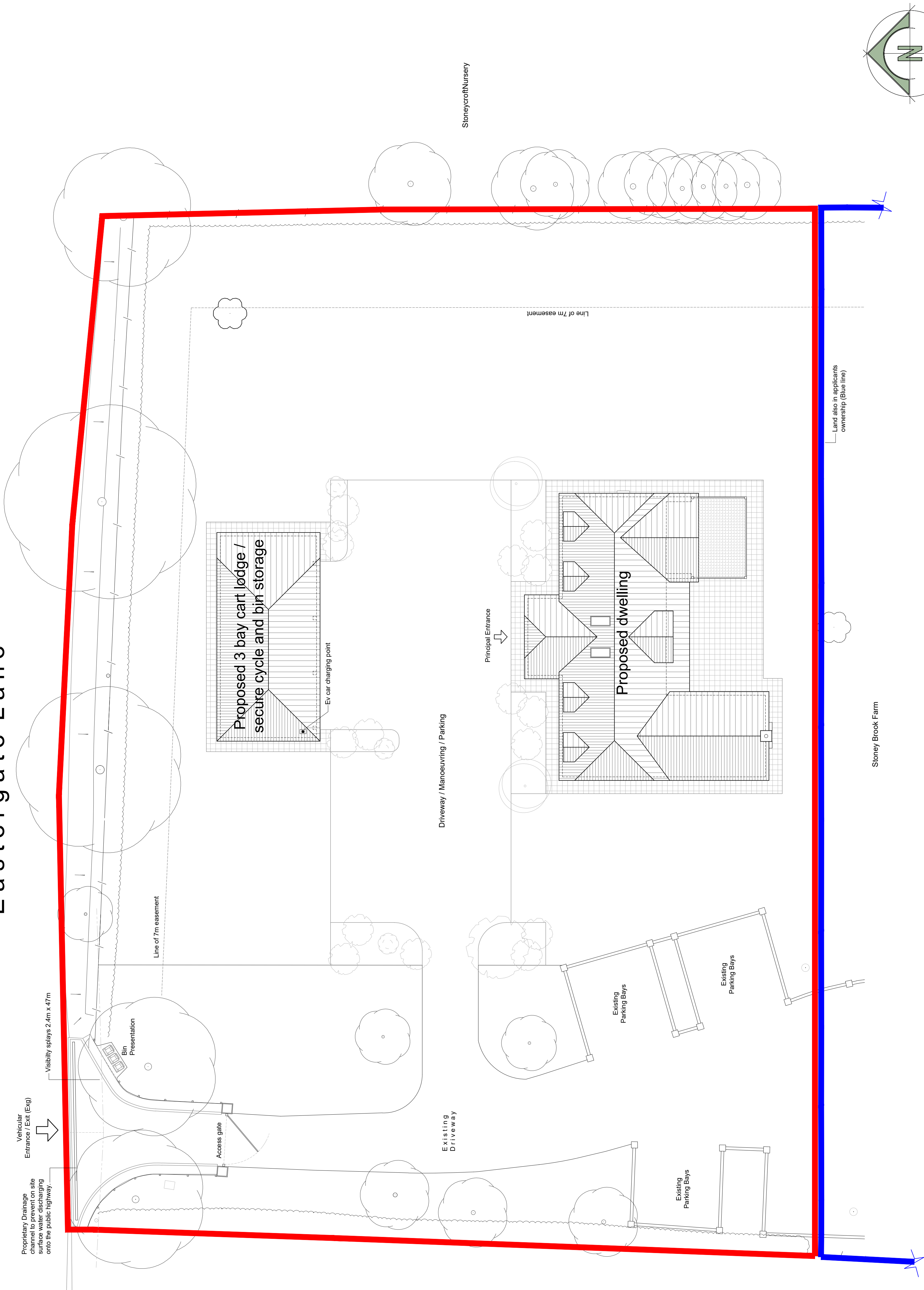
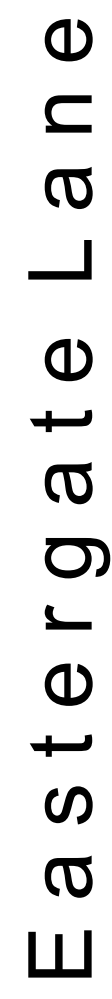
### 8.0 Summary

- 8.0.1 MJ Engineering Group (MJEG) has been commissioned by Tom Reynolds and Sam Byrne to carry out a Flood Risk Assessment and drainage strategy for a new residential dwelling at Stoney Brook Farm in Walberton. The application site is located to be south of the County of West Sussex, within the district of Arun. The site is situated to the west of the village along the lane known as Eastergate Lane.
- 8.0.2 In the immediate vicinity are farms, garden nurseries and small business outlets. There is a watercourse located to the south of the site known as a chalk stream, which the site outfalls to. The site located at Ordnance Survey (OS) grid reference of SU960060 and covers a site area of circa. 0.152ha.
- 8.0.3 The BGS mapping identifies a large area of Head deposits which consists of Gravel, Sand, Silt and Clay. At depth the surrounding area is shown to consist of London Clay formation. The Bedrock geology comprises of Clay, Silt and Sand. A recent neighbouring application identified geological composition consisting of 'Head Gravel' to a depth of 5.79mbgl (metres below ground level), followed by 'London Clay' up to a depth of 56.23mbgl.
- 8.0.4 Groundwater monitoring has been carried out in the area of the detention basin during the 2025/26 winter months. The groundwater was recorded at 10.333m.
- 8.0.5 The Environment Agency (EA) flood map for planning shows the site being within Flood Zone 1, with no overland surface water flooding impacting at the site. The risk of flooding from the failure of a reservoir also shows the site to be not at risk from reservoir flooding.
- 8.0.6 The Stoney Brook Farm currently outfalls to the Chalk Stream at a restricted 0.6l/s. Whilst the application site will generate 0.4l/s greenfield run off., it is proposed to increase the surface water storage and reduce the discharge to the watercourse from the site.
- 8.0.7 SuDS are designed to replicate the natural course of drainage as closely as possible with a view to reducing the impact of flooding, removing pollutants at source and combining water management with green space. The roof drainage will outfall through a tanked permeable paved access road and parking area.
- 8.0.8 A tanked permeable paved area will prevent groundwater from entering the pavement sub-base layer. Surface Water will flow through landscape area and swale which will convey the surface water to the detention basin.
- 8.0.9 The foul water drainage from the proposed dwelling and garage will be drained to the pump chamber, where it currently and will continue to pump to the site frontage and outfall to the Southern Water adoptable sewer at the current pump rates. This will not likely have an impact on the Lidsey Drainage Catchment Area.

## 8.1 *Conclusion*

- 8.1.1 It is concluded the new residential dwelling is compliant with policy being in Flood Zone 1, with a surface water drainage proposal that will reduce the discharge rate to the Chalk stream with storage being provided to accommodate surface water during the extreme storm event.

## **Appendix A –Proposed Indicative Layout**

[illegible]

PLANTING SPECIFICATION

GENERALLY

- **Ecological Requirement:** Peat and peat-based materials shall not be used in implementing the works, this includes the growing media used in container grown plant stock.
- **Timing:** Planting shall be implemented during the first planting season from mid-November to mid-March following substantial development completion or phases thereof.
- **Plant Stock:** Plant stock must be in strict accordance with the schedule of plants shown on the drawing. Plant stock shall be sourced from nurseries that comply with BS 3536: 2012
- **Planting Conditions:** No planting shall take place when the ground is frozen, wet or waterlogged or in excessively windy conditions, or in any other conditions that could adversely affect the successful establishment of plants.
- **Planting Media:** All plants shall be provided with a growing medium that complies with the relevant BS standards.
- **Planting Positions:** All plants shall be positioned in accordance with the drawings. If this is not possible due to site layout changes or unmarked service runs etc. then changes must be agreed and confirmed in writing by the Contract Administrator.
- **Watering Prior to Planting:** All container grown and root balled planting stock shall be thoroughly watered before planting on the same day as the planting operation.
- **PLANTING BEDS**
  - **Bed Widths:** Shrub beds shall be 1m minimum width, where space allows. Hedge beds shall be 700mm for single row hedges and 1m for double-row hedges.
  - **Herbicide Application:** Spray planting beds with translocated herbicide if there is any pernicious perennial weed growth. Allow weed growth to die off and repeat treatments if necessary to ensure that planted areas are free from perennial weed growth prior to further cultivation.
  - **Cultivation:** Cultivate all planting beds to 300mm depth to form an open textured free draining growing medium. Remove all stones and other debris larger than 100mm and remove all litter and vegetative matter. Areas of existing soil that have become compacted shall be broken up and loosened by hand forking or deep ripping to a depth of 600mm in accordance with the relevant British Standards.
  - **Finished Surface:** Rake all shrub and hedge beds to form an even surface. Remove all surface stones and other debris larger than 50mm. NB ensure that final soil levels within 300mm of edge of all beds are 70mm below adjacent surfaces, to stop much moving from bed. Water lightly if the soil is dry prior to planting.
  - **Planting:** Container grown shrubs shall be pit planted, small open ground stock may be notch planted. Following planting, lightly firm the soil around the base of the plant.
  - **Wood Chip Mulch:** Mulch shall be coarse wood chips with no fines. Spread wood chip mulch to an even depth of 50mm over entire planted area.
  - **Pruning:** Immediately after planting shrubs and hedging, carefully remove all damaged, dead or diseased branches and remove any weak, thin or malformed growth in a manner and at a point appropriate for the species.
  - **Watering:** Water in each plant position with 15 litres, or to field capacity upon planting, or at the end of the day during which the planting was carried out.

TREES

- **Excavation:** Excavate pits so that the diameter / depth of the pit allows a gap of approximately 150mm between the extent of the roots and the side of the pit. Remove all stones and other debris over 100mm diameter and all vegetative material. Remove any excavated material that is not suitable to form an open textured free draining growing medium and replace with topsoil.
- **Cultivation:** Loosen sides and bottom of pit to encourage drainage. Areas of existing soil that have become compacted shall be broken up and loosened by hand forking or deep ripping to a depth of 900mm to a minimum of a 1m radius from the proposed tree position, in accordance with the relevant British Standards.
- **Single Staking Standard and Feathered trees. NB: Only stake smaller stock size trees if entirely necessary to support to tree:** Stake trees with a single stake, 1.8m long x 100mm diameter, driven vertically into base of pit. Finished height of stake to be 800mm above finished ground level, cut stake if necessary to achieve this height.
- **Planting:** Position trees, and fix to stakes using biodegradable tree tie with spacing device. Ties to be nailed 25mm from top of stake. Backfill tree pit with clean topsoil and firm in after planting.
- **Mulching:** *Trees pits in shrub beds* - include mulch as per adjacent shrub planting. *Tree pits in grass areas* - Ensure finished soil level is 100mm below adjacent grass surface to a radius of 500mm from the base of the tree, thus forming a neat circle. Spread 80mm depth of coarse wood chip mulch over surface of pit.

MAINTENANCE

- **Maintenance period:** Carry out the following maintenance operations until planting is established. Ensure that maintenance operations are carried out as necessary to keep the works in a tidy condition throughout the maintenance period.
- **Weed control:** Remove all weed growth by hand or treat with spot herbicide applications, taking care to avoid spray drift. All erisings to be removed from site.
- **Litter removal:** Remove from site all litter and other debris during each maintenance visit.
- **Pruning:** Prune off dead, damaged, diseased or misshapen growth from shrubs and trees to promote good habit and shape.
- **Replacement:** Replace or make good immediately, any soft landscape item that fails, or does not develop full foliage during the maintenance period.
- **Watering:** Water soft landscape items as necessary throughout the maintenance period, to ensure establishment. Replace or make good immediately, any soft landscape item that fails due to lack of water.

PLANT SCHEDULE

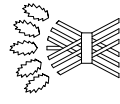
| TREES | QTY       | CODE              | PLANT NAME | STOCK | FORM      | GIRTH/HEIGHT |
|-------|-----------|-------------------|------------|-------|-----------|--------------|
| 3No.  | Mal pen F | Malus penicillata | C 15L      | FTH   | 150-180cm |              |
| 4No.  | Pru avl F | Prunus avium      | C 15L      | FTH   | 150-180cm |              |
| 1No.  | Sor tor F | Sorbus torminalis | C 15L      | FTH   | 150-180cm |              |

NOTES AND ABBREVIATIONS:

- C = Container (or pot) grown, followed by size of the container (or pot).
- FORM = Shape of tree as supplied by the nursery.
- FTH = Feather.
- FTH = Feathery.
- STOCK = Root condition/protection method eg Bare root.
- Refer to specification for further information.
- All plants to be completely hardened off.
- Substitutions to be agreed with Landscape Architect.
- Plant Schedule generated by "Qscape" software 13/07/2026



Revisions :



Land & Sculpture Design Partnership

LANDSCAPE ARCHITECTURE · SCULPTURE · ARBORICULTURE

SITE : Stoney Brook Farm, Eastergate Lane Arundel  
DRG : Landscape Proposal  
DRN BY : GH  
SCALE : 1:200 @ A1  
DATE : July 2026  
No : LSDP 2360.014

OCTAGON HOUSE · THE WATER RUN · HITCHAM · IPSWICH · IP7 7LN  
T : 01449 740272 · E : Giles@LSDP.uk

## **Appendix B – Groundwater Monitoring**

## Groundwater Monitoring

### Hole Size

L (m): 0.5

W (m): 0.5

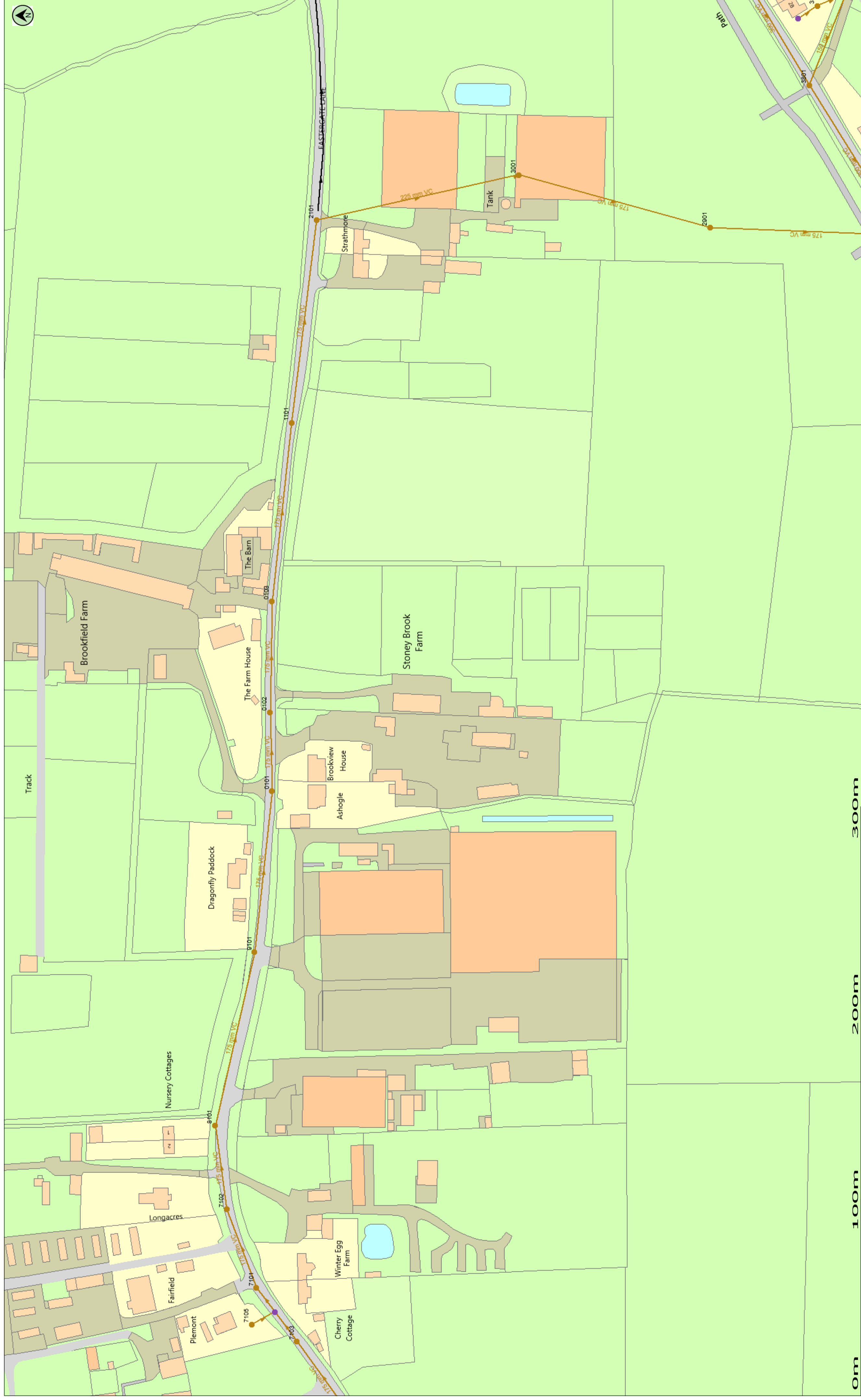
D (m): 1

Existing Ground Level – 10.68m

### Monitoring Record

| Date       | Depth to Water (mm) | Comments/Water level    |
|------------|---------------------|-------------------------|
| 17/11/2025 | 602                 | Date hole dug./ 10.078m |
| 24/11/2025 | 408                 | 10.272                  |
| 01/12/2025 | 448                 | 10.232                  |
| 08/12/2025 | 509                 | 10.171                  |
| 15/12/2025 | 415                 | 10.264                  |
| 22/12/2025 | 356                 | 10.324                  |
| 29/12/2025 | 363                 | 10.317                  |
| 05/01/2026 | 357                 | 10.323                  |
| 12/01/2026 | 423                 | 10.257                  |
| 19/01/2026 | 478                 | 10.202                  |
| 26/01/2026 | 447                 | 10.233                  |
| 02/02/2026 | 347                 | 10.333                  |
| 09/02/2026 | 416                 | 10.264                  |
| 16/02/2026 | 555                 | 10.125                  |
| 23/02/2026 | 598                 | 10.082                  |
| 02/03/2026 |                     |                         |
| 09/03/2026 |                     |                         |
| 16/03/2026 |                     |                         |
| 23/03/2026 |                     |                         |
| 30/03/2026 |                     |                         |
| 06/04/2026 |                     |                         |
| 13/04/2026 |                     |                         |
| 20/04/2026 |                     |                         |
| 27/04/2026 |                     |                         |

## **Appendix C - Southern Water Sewer Records**



(c) Crown copyright and database rights 2024 Ordnance Survey 100031673

Date: 23/09/24

Scale: 1:1250

Map Centre: 496048,106049

Data updated: 22/08/24

Our Ref: 1575659 - 1

**Wastewater Plan A2**  
**Powered by digdat**

The positions of places shown on this map 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 © Crown copyright and database rights 2024 Ordnance Survey 1000331673. 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.

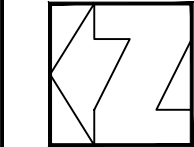
|                                                                                       |                                             |
|---------------------------------------------------------------------------------------|---------------------------------------------|
|  | Foul Manhole                                |
|  | Connected Manhole                           |
|  | Surface Water Manhole                       |
|  | Soakaway                                    |
|  | Sludge Entry Manhole                        |
|  | Manhole with Inlet, Outlet, or Sludge Entry |
|  | Surface Water Manhole or Gully              |
|  | Manhole with Sludge Entry                   |
|  | Controlled Pumping Station                  |
|  | Surface Water Pumping Station               |
|  | Water Treatment                             |
|  | Sludge Area                                 |
|  | Sludge 10 Area                              |
|  | Sludge 20 Area                              |
|  | Proposed Area                               |

|                        |
|------------------------|
| mark@mjenggroups.co.uk |
| Walberton              |
|                        |





## **Appendix D –Approved Drainage Layout**



Private Surface Water ditch

Private Surface Water perforated pipe

Private Surface Water pipe

Private 600mm Inspection Chamber (Surface Water)

Private Rodding Eye (Surface Water)

Sandbag Headwall

Gabion Cage

Proposed Paved Levels

Permeable Paving - Gravel Finished

Drainage Easement

KEY

- General Notes:
1. Do not scale this drawing. All dimensions are in metres unless otherwise noted. Any discrepancies are to be recorded and reported to the engineers immediately.

2. This drawing is to be read in conjunction with all other engineers and architects drawings, and the specification.

3. All works are to be carried out in accordance with the Specification for the Works. The specification for the works refers to "Volume 1 of the Manual for Contract Documents for Highway Works" for highway works and the "Civil Engineering Specification for the Water Industry" is applicable for the drainage works.

4. All workmanship and materials are to be to current British Standards.

5. The contractor is responsible for and must take all necessary precautions to ensure the stability of the works at all times during construction.

6. All services are to be located and protected as necessary by the contractor prior to the commencement of the works.

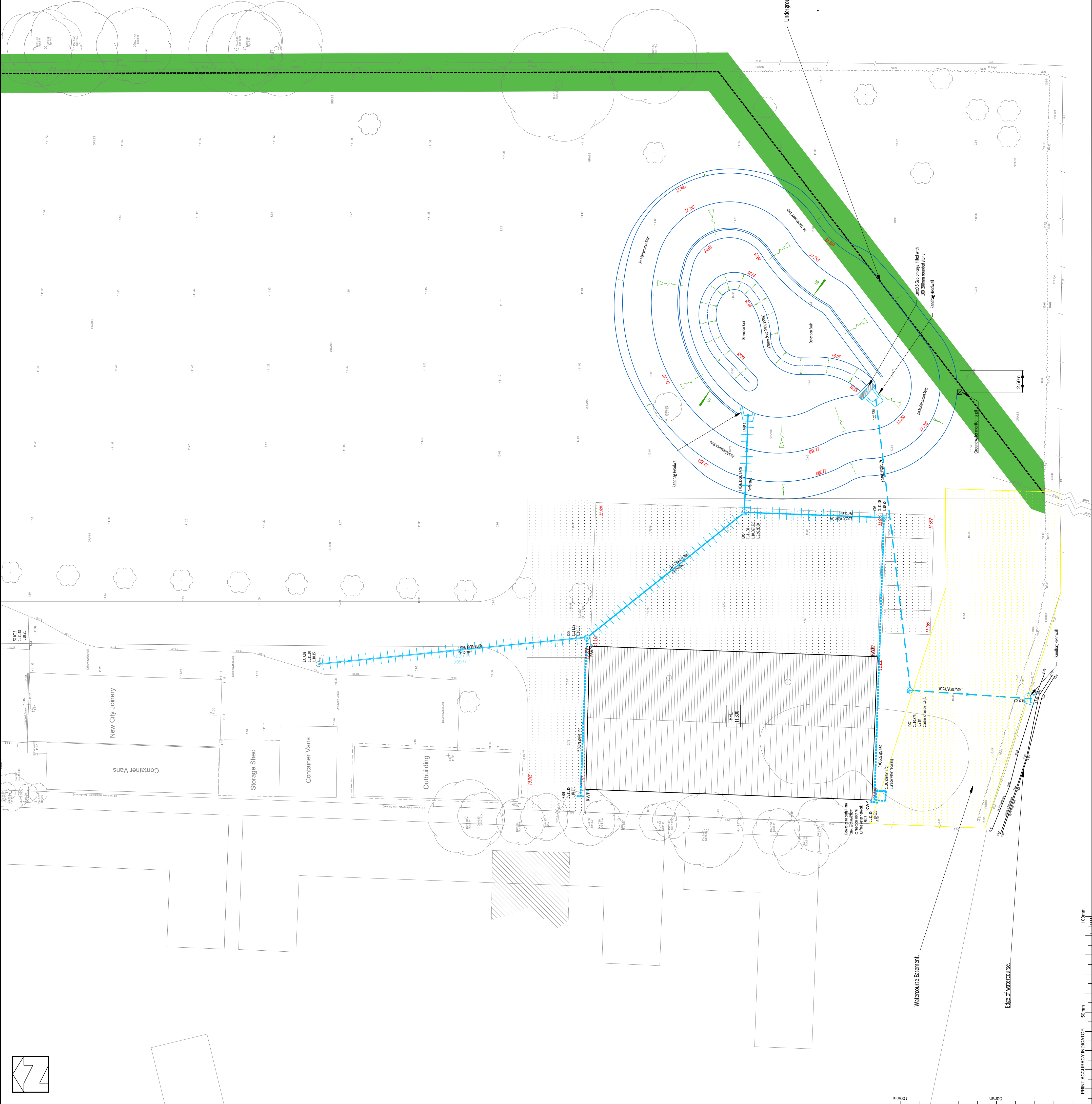
7. Any existing details which are shown on this drawing are for guidance only and are to be checked on site by the contractor. Any variations are to be recorded and reported to the engineer immediately.

8. During construction works on site, all roads and footpaths are to be swept and kept clear of obstructions, this is to include existing highways as appropriate to ensure safe passage of all road users.

9. Provision shall be made for the installation of all mains services including ducting prior to the laying of the road base-course.

10. All road markings and signs are to be in accordance with 'the traffic signs regulations and directions' 2016.

11. All private connections to adoptable sewers should be a minimum of 100mm diameter (hoof) and 150mm diameter (surface) made in vitrified clay connecting soffit to soffit.



|       |          |                                                |             |       |         |
|-------|----------|------------------------------------------------|-------------|-------|---------|
| G     | 03.06.26 | Tank added                                     | MJ          | MJ    | MJ      |
| F     | 10.04.26 | Headwall and drainage updated for construction | MJ          | MJ    | MJ      |
| E     | 25.09.25 | Basin Note added                               | MJ          | MJ    | MJ      |
| D     | 23.07.25 | Watercourse details added                      | MJ          | MJ    | MJ      |
| C     | 31.03.25 | Easement added                                 | MJ          | MJ    | MJ      |
| B     | 11.11.24 | Electric Cable added, Basin location revised   | MJ          | MJ    | MJ      |
| A     | 18.10.24 | Basin location revised                         | MJ          | MJ    | MJ      |
| Drawn | Revised  | Date                                           | Description | Drawn | Revised |

ENGINEERING GROUP

Client

New City Joinery

Project

Land at Stoney Brook Farm, Walberton

Drawing title

Proposed Surface Water Drainage

Drawn

MJ

Checked

MJ

Approved

MJ

Date

10/24

Scale at A1

1:200

Drawing No.

A001-013/101

Revision

G

## **Appendix E -Environment Agency Flood Report**

# Flood map for planning

Your reference  
**Unspecified**

Location (easting/northing)  
**496083/106100**

Created  
**20 July 2026 09:15**

**Your selected location is in flood zone 1, an area with a low probability of flooding.**

You will need to do a flood risk assessment if your site is **any of the following**:

- bigger than 1 hectare (ha)
- in an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

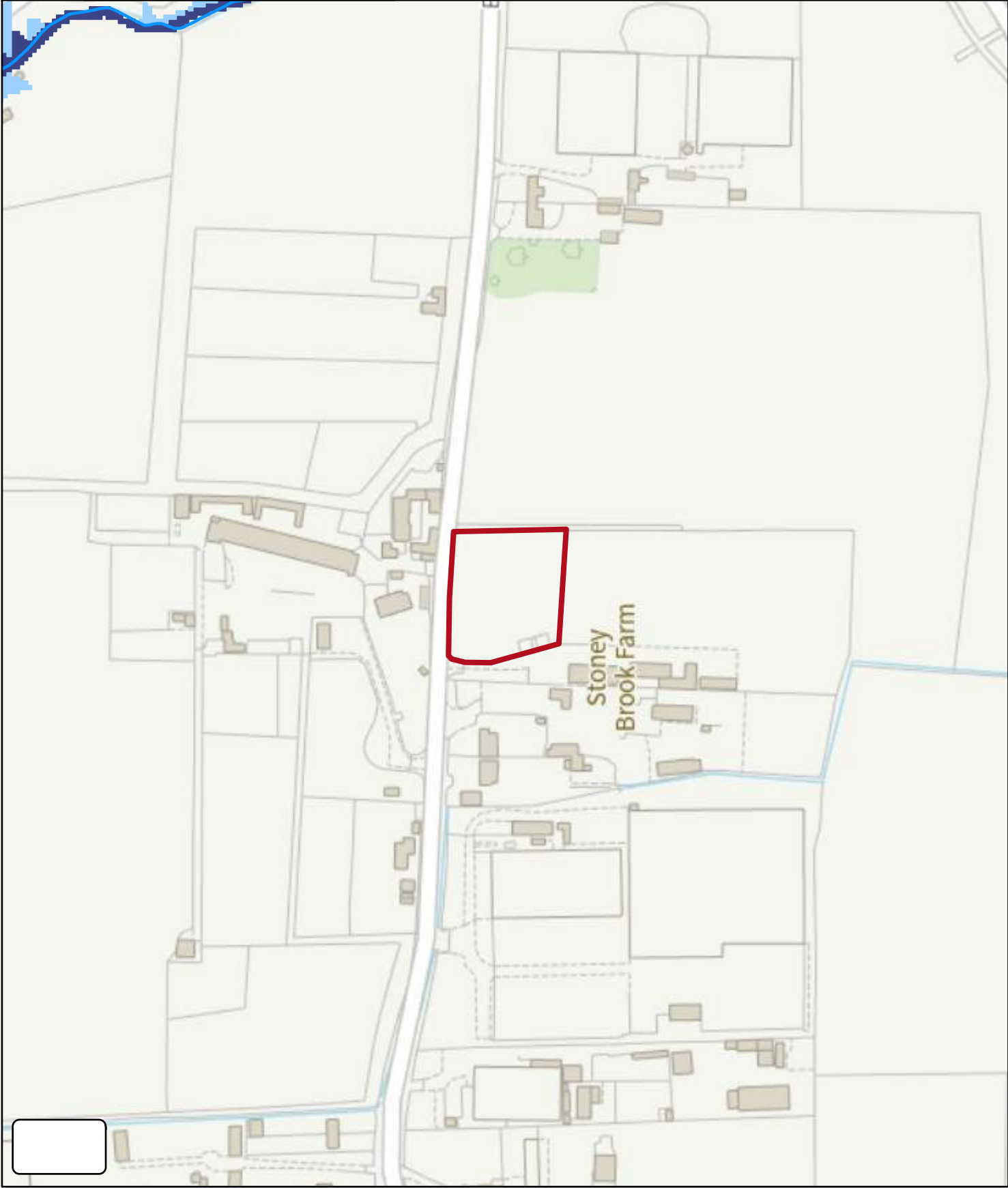
## Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2026 AC0000807064. <https://flood-map-for-planning.service.gov.uk/os-terms>





)ORRG PDS IRU S  
<RXU UHIHUHQFH  
8QVSHFLILHG  
/RFDWLRQ HDVWLQ  
6FDOH  
&UHDWHG  
-XO

6HOHFWHG DUH  
)ORRG JRQH  
)ORRG JRQH  
)ORRG JRQH  
)ORRG GHIHQFH  
0DLQ ULYHU  
:DWHU VWRUDJ



P

3DJH RI

## **Appendix F -Catchment Plan**



## **Appendix G - Greenfield runoff Report**

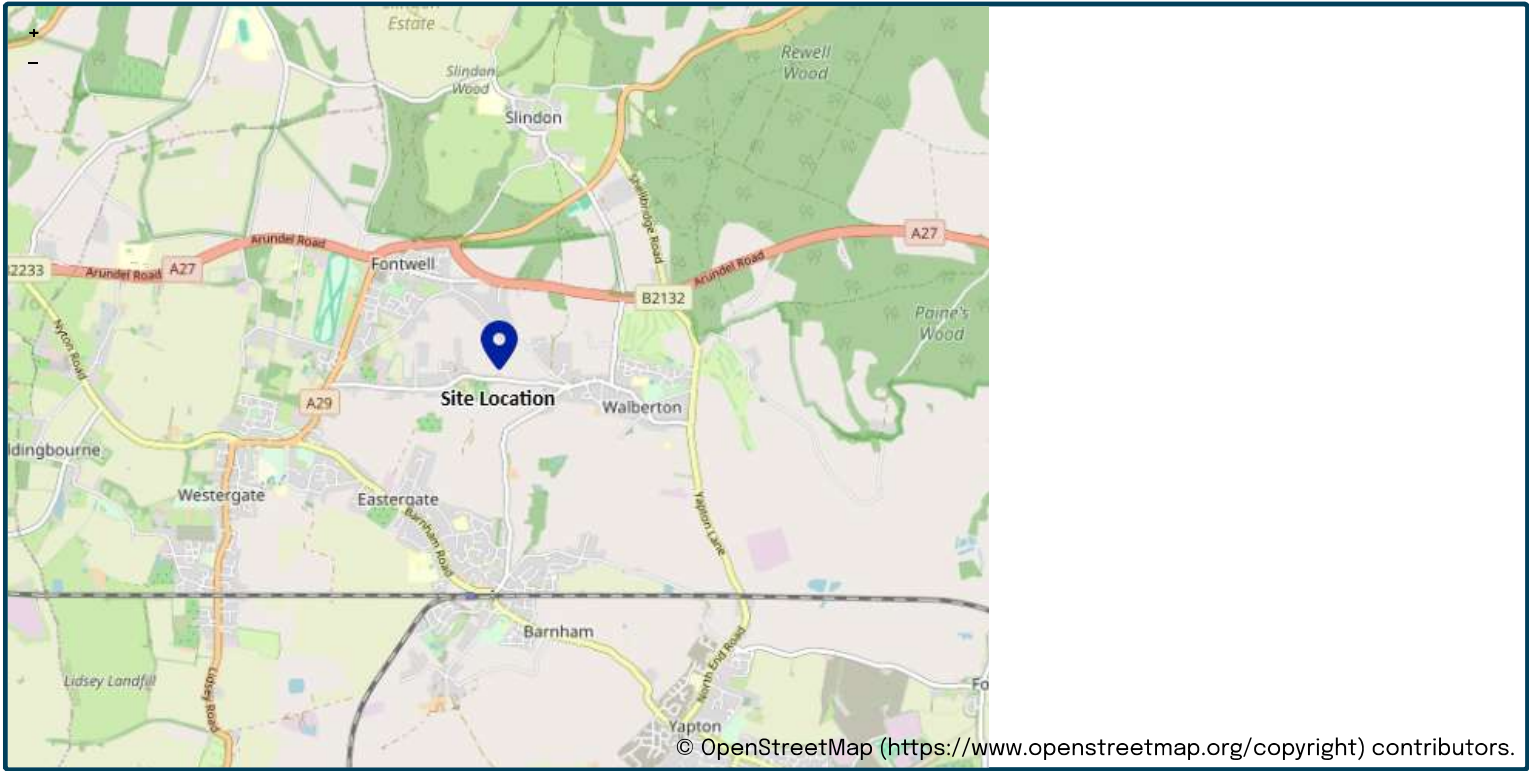
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015).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

## Project details

|               |            |
|---------------|------------|
| Date          | 17/07/2026 |
| Calculated by | Mark Jones |
| Reference     | A001-013   |
| Model version | 2.2.3      |

## Location

|               |                       |
|---------------|-----------------------|
| Site name     | Stoney Farm Walberton |
| Site location | Walberton             |



|                                       |        |
|---------------------------------------|--------|
| Site easting (British National Grid)  | 496072 |
| Site northing (British National Grid) | 106031 |

## Site details

|                      |        |    |
|----------------------|--------|----|
| Total site area (ha) | 0.1521 | ha |
|----------------------|--------|----|

# Greenfield runoff

## Method

|        |                        |
|--------|------------------------|
| Method | FEH statistical (2025) |
|--------|------------------------|

## FEH statistical (2025)

|                                   | My value                           |                       | Map value                          |
|-----------------------------------|------------------------------------|-----------------------|------------------------------------|
| SAAR9120 (mm)                     | <input type="text" value="817"/>   |                       | <input type="text" value="mm"/>    |
| BFIHOST19scaled                   | <input type="text" value="0.61"/>  |                       |                                    |
| QMed-QBar conversion              | <input type="text" value="1.136"/> | <input type="radio"/> | <input type="text" value="1.136"/> |
| QMed (l/s)                        | <input type="text" value="0.4"/>   |                       | <input type="text" value="l/s"/>   |
| QBar (FEH statistical 2025) (l/s) | <input type="text" value="0.4"/>   |                       | <input type="text" value="l/s"/>   |

## Growth curve factors

|                        | My value                          |                       | Map value                      |
|------------------------|-----------------------------------|-----------------------|--------------------------------|
| Hydrological region    | <input type="text" value="7"/>    | <input type="radio"/> | <input type="text" value="7"/> |
| 1 year growth factor   | <input type="text" value="0.85"/> |                       |                                |
| 2 year growth factor   | <input type="text" value="0.88"/> |                       |                                |
| 10 year growth factor  | <input type="text" value="1.62"/> |                       |                                |
| 30 year growth factor  | <input type="text" value="2.3"/>  |                       |                                |
| 100 year growth factor | <input type="text" value="3.19"/> |                       |                                |
| 200 year growth factor | <input type="text" value="3.74"/> |                       |                                |

## Results

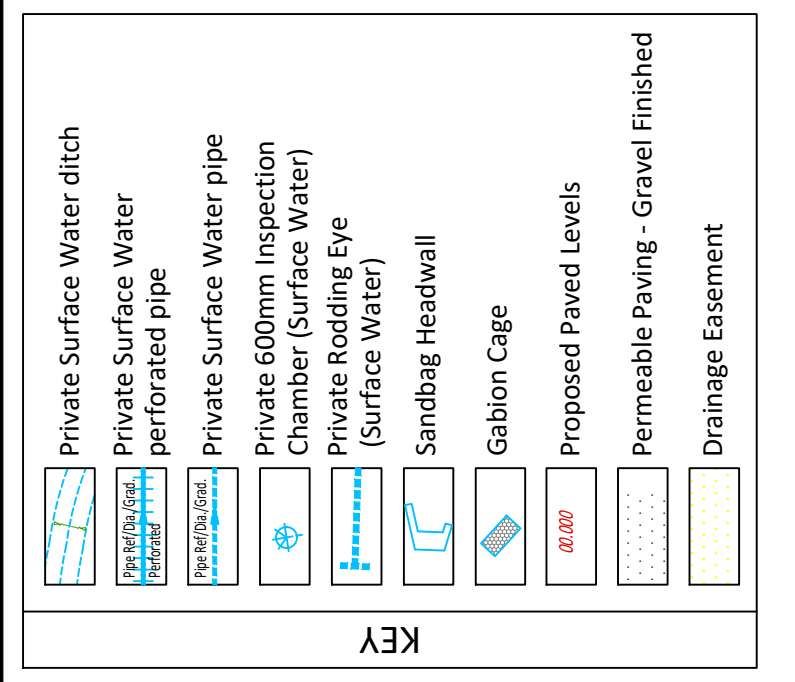
|                           |                                  |                                  |
|---------------------------|----------------------------------|----------------------------------|
| Method                    | FEH statistical (2025)           |                                  |
| Flow rate 1 year (l/s)    | <input type="text" value="0.4"/> | <input type="text" value="l/s"/> |
| Flow rate 2 year (l/s)    | <input type="text" value="0.4"/> | <input type="text" value="l/s"/> |
| Flow rate 10 years (l/s)  | <input type="text" value="0.7"/> | <input type="text" value="l/s"/> |
| Flow rate 30 years (l/s)  | <input type="text" value="1.0"/> | <input type="text" value="l/s"/> |
| Flow rate 100 years (l/s) | <input type="text" value="1.4"/> | <input type="text" value="l/s"/> |
| Flow rate 200 years (l/s) | <input type="text" value="1.6"/> | <input type="text" value="l/s"/> |

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent ‘zero’ figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

### Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

## Appendix H - Proposed Drainage Layout



1. This drawing is to be read in conjunction with all other engineers and architects drawings and specifications.
2. This drawing is to be read in conjunction with all other engineers and architects drawings and specifications.
3. All works are to be carried out in accordance with the specification for the works. The specification for the works is to be the "Civil Engineering Specification for the Water and Sewerage Industry" applicable for the drainage works.
4. All workmanship and materials are to be to current British Standards.
5. The contractor is responsible for and must take all necessary precautions to ensure the stability of the works at all times during construction.
6. All services are to be located and protected as necessary by the contractor prior to the commencement of the works.
7. Any existing details which are shown on this drawing are for guidance only and are to be checked on site by the contractor. Any variations are to be recorded and reported to the engineer immediately.

| Rev'n | Date | Description | Drawn | Chkd | Apd'd |
|-------|------|-------------|-------|------|-------|
|       |      |             |       |      |       |



Client

## New City Joinery

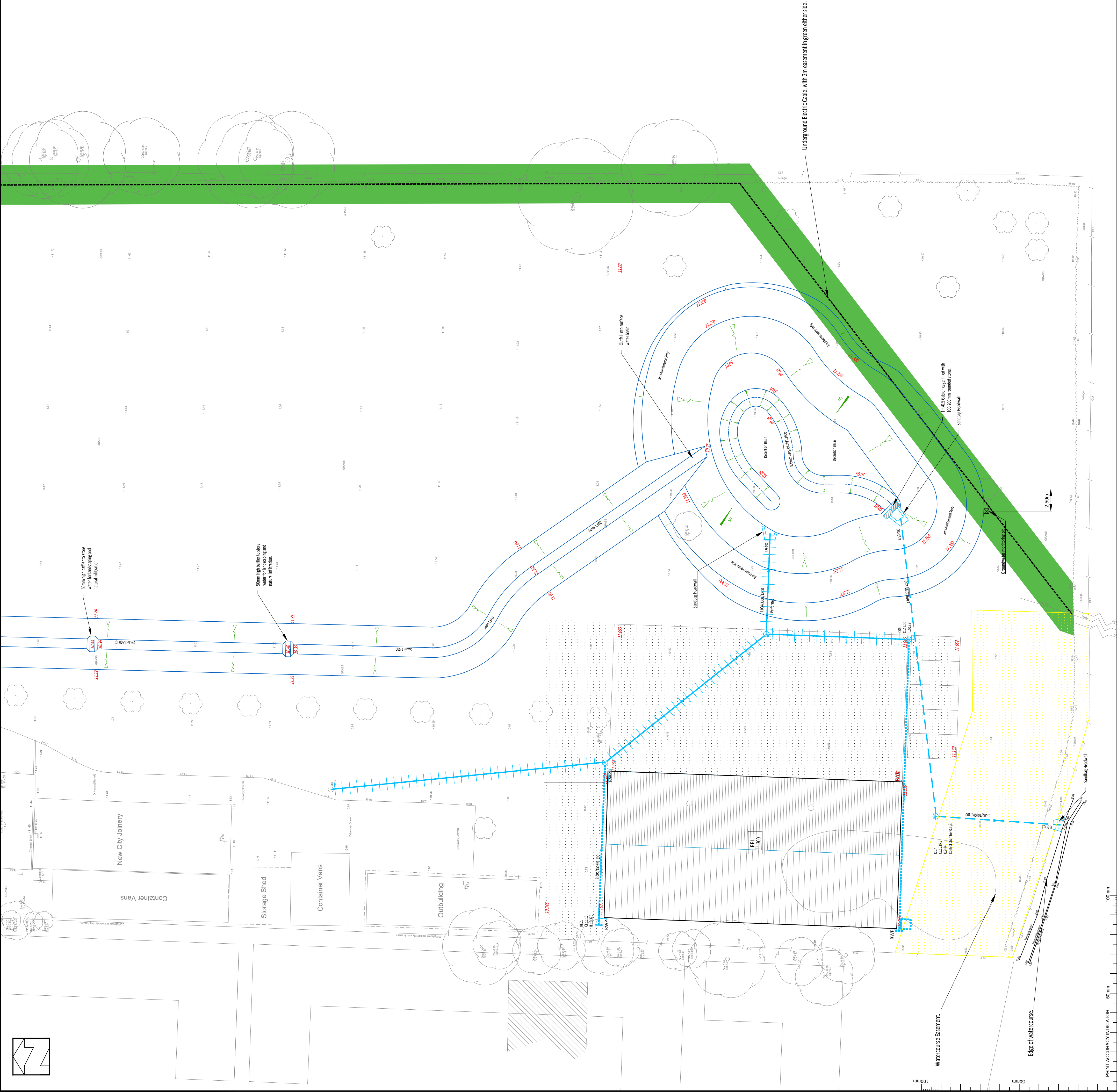
Project  
Land at Stoney Brook Farm,  
Walberton

Drawing title

Proposed Surface Water Drainage  
Sheet 1 of 2

|                                    |    |         |    |          |    |      |          |
|------------------------------------|----|---------|----|----------|----|------|----------|
| Drawn                              | MJ | Checked | MJ | Approved | MJ | Date | 07/26    |
| Drawing no.<br><b>A001-013/500</b> |    |         |    |          |    |      | Revision |
| Scale at A1<br>1:200               |    |         |    |          |    |      | -        |





## **Appendix J -Hydraulic Modelling**

**Nodes**

| Name    | Area<br>(ha) | Add<br>Area<br>(%) | T of E<br>(mins) | Cover<br>Level<br>(m) | Diameter<br>(mm) | Easting<br>(m) | Northing<br>(m) | Depth<br>(m) | Invert<br>Level<br>(m) |
|---------|--------------|--------------------|------------------|-----------------------|------------------|----------------|-----------------|--------------|------------------------|
| EX IC01 | 0.022        |                    | 5.00             | 11.500                | 600              | 1873687.952    | -215932.244     | 0.700        | 10.800                 |
| EX IC02 | 0.015        |                    | 5.00             | 11.480                | 600              | 1873686.779    | -215960.954     | 0.967        | 10.513                 |
| EX.IC03 |              |                    |                  | 11.100                | 600              | 1873685.842    | -215992.049     | 0.944        | 10.156                 |
| IC04    | 0.022        |                    | 5.00             | 11.150                | 600              | 1873688.606    | -216020.080     | 1.088        | 10.062                 |
| 5       |              |                    |                  | 11.300                |                  | 1873715.268    | -216037.046     | 1.353        | 9.947                  |
| 20      |              |                    |                  | 11.300                |                  | 1873713.507    | -216050.271     | 1.349        | 9.951                  |
| IC07    |              |                    |                  | 11.015                | 1200             | 1873683.089    | -216053.829     | 1.175        | 9.840                  |
| 22      |              |                    |                  | 10.490                |                  | 1873682.205    | -216066.557     | 0.774        | 9.716                  |
| 6       | 0.042        |                    | 5.00             | 11.300                |                  | 1873717.843    | -216034.627     | 1.355        | 9.945                  |
| 7       |              |                    |                  | 11.300                |                  | 1873719.676    | -216033.369     | 1.356        | 9.944                  |
| 8       |              |                    |                  | 11.300                |                  | 1873721.802    | -216032.718     | 2.200        | 9.100                  |
| 9       |              |                    |                  | 11.300                |                  | 1873723.587    | -216032.860     | 2.201        | 9.099                  |
| 10      |              |                    |                  | 11.300                |                  | 1873725.136    | -216033.759     | 2.201        | 9.099                  |
| 11      |              |                    |                  | 11.300                |                  | 1873725.830    | -216034.975     | 2.202        | 9.098                  |
| 12      |              |                    |                  | 11.300                |                  | 1873725.101    | -216037.230     | 1.344        | 9.956                  |
| 13      |              |                    |                  | 11.300                |                  | 1873722.729    | -216038.703     | 1.345        | 9.955                  |
| 14      |              |                    |                  | 11.300                |                  | 1873719.996    | -216039.277     | 1.346        | 9.954                  |
| 15      |              |                    |                  | 11.300                |                  | 1873717.972    | -216040.119     | 1.347        | 9.953                  |
| 16      |              |                    |                  | 11.300                |                  | 1873717.120    | -216041.511     | 1.348        | 9.952                  |
| 17      |              |                    |                  | 11.300                |                  | 1873717.019    | -216043.112     | 1.348        | 9.952                  |
| 18      |              |                    |                  | 11.300                |                  | 1873717.027    | -216044.136     | 1.349        | 9.951                  |
| 19      |              |                    |                  | 11.300                |                  | 1873716.501    | -216046.937     | 1.349        | 9.951                  |
| IC05    | 0.025        |                    | 5.00             | 11.005                | 600              | 1873701.705    | -216036.529     | 1.013        | 9.992                  |
| RE02    | 0.023        | 10                 | 5.00             | 11.150                | 150              | 1873671.366    | -216050.112     | 0.525        | 10.625                 |
| IC06    | 0.029        |                    | 5.00             | 11.005                | 600              | 1873701.142    | -216051.093     | 0.753        | 10.252                 |
| RE01    | 0.023        | 10                 | 5.00             | 11.150                | 150              | 1873672.015    | -216019.405     | 0.774        | 10.376                 |
| H1      | 0.061        |                    | 5.00             | 11.720                | 600              | 1873697.243    | -215899.290     | 1.000        | 10.720                 |
| H4      | 0.019        |                    | 5.00             | 11.704                | 450              | 1873701.039    | -215922.805     | 1.224        | 10.480                 |
| H5      |              |                    |                  | 11.621                |                  | 1873701.714    | -215927.875     | 1.192        | 10.429                 |
| H6      |              |                    |                  | 11.011                |                  | 1873699.823    | -216002.182     | 0.731        | 10.280                 |
| H7      |              |                    |                  | 10.983                |                  | 1873703.614    | -216008.667     | 0.718        | 10.265                 |
| H8      |              |                    |                  | 10.975                |                  | 1873708.166    | -216012.890     | 0.722        | 10.253                 |
| H9      |              |                    |                  | 10.965                |                  | 1873720.186    | -216030.158     | 0.754        | 10.211                 |
| H2      | 0.018        |                    | 5.00             | 12.150                | 450              | 1873728.882    | -215907.183     | 0.450        | 11.700                 |
| H3      |              |                    |                  | 12.150                | 450              | 1873728.881    | -215922.791     | 0.610        | 11.540                 |

**Links (Input)**

| Name    | US<br>Node | DS<br>Node | Length<br>(m) | ks (mm) /<br>n | US IL<br>(m) | DS IL<br>(m) | Fall<br>(m) | Slope<br>(1:X) | Dia<br>(mm) | T of C<br>(mins) | Rain<br>(mm/hr) |
|---------|------------|------------|---------------|----------------|--------------|--------------|-------------|----------------|-------------|------------------|-----------------|
| 1.000   | EX IC01    | EX IC02    | 28.734        | 0.600          | 10.800       | 10.513       | 0.287       | 100.1          | 100         | 5.62             | 50.0            |
| 3.001   | EX IC02    | EX.IC03    | 31.109        | 0.600          | 10.513       | 10.306       | 0.207       | 150.3          | 150         | 6.26             | 49.4            |
| 3.002   | EX.IC03    | IC04       | 28.167        | 0.600          | 10.156       | 10.062       | 0.094       | 299.6          | 300         | 6.78             | 47.5            |
| 3.003   | IC04       | IC05       | 21.027        | 0.600          | 10.062       | 9.992        | 0.070       | 300.4          | 300         | 7.17             | 46.2            |
| 3.006   | 6          | 7          | 2.223         | 0.012          | 9.945        | 9.944        | 0.001       | 2223.2         | 300         | 7.70             | 44.5            |
| 3.007   | 7          | 8          | 2.223         | 0.012          | 9.944        | 9.943        | 0.001       | 2223.4         | 300         | 7.82             | 44.2            |
| 1.004   | 5          | 6          | 3.297         | 0.012          | 9.947        | 9.945        | 0.002       | 1648.5         | 300         | 7.57             | 40.8            |
| 1.010   | 11         | 12         | 3.669         | 0.012          | 9.960        | 9.956        | 0.004       | 917.3          | 300         | 8.11             | 43.7            |
| 1.019   | 20         | IC07       | 32.187        | 0.012          | 10.000       | 9.840        | 0.160       | 201.2          | 225         | 9.36             | 37.7            |
| 1.008   | 8          | 9          | 1.791         | 0.600          | 9.100        | 9.099        | 0.001       | 1790.6         | 300         | 7.91             | 43.9            |
| 1.009   | 9          | 10         | 1.000         | 0.600          | 9.099        | 9.099        | 0.000       | 0.0            | 300         | 7.92             | 43.9            |
| 1.010_1 | 10         | 11         | 1.400         | 0.600          | 9.099        | 9.098        | 0.001       | 1400.1         | 300         | 7.98             | 43.7            |

**Links (Input)**

| Name    | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|---------|---------|---------|------------|-------------|-----------|-----------|----------|-------------|----------|---------------|--------------|
| 1.021   | IC07    | 22      | 12.759     | 0.012       | 9.840     | 9.716     | 0.124    | 102.9       | 100      | 9.67          | 39.5         |
| 1.012   | 12      | 13      | 2.792      | 0.012       | 9.956     | 9.955     | 0.001    | 2792.2      | 300      | 8.28          | 42.9         |
| 1.013   | 13      | 14      | 2.793      | 0.012       | 9.955     | 9.954     | 0.001    | 2792.6      | 300      | 8.46          | 42.4         |
| 1.014   | 14      | 15      | 2.192      | 0.012       | 9.954     | 9.953     | 0.001    | 2192.2      | 300      | 8.58          | 42.1         |
| 1.015   | 15      | 16      | 1.632      | 0.012       | 9.953     | 9.952     | 0.001    | 1632.0      | 300      | 8.65          | 41.9         |
| 1.016   | 16      | 17      | 1.000      | 0.012       | 9.952     | 9.952     | 0.000    | 0.0         | 300      | 8.67          | 41.8         |
| 1.017   | 17      | 18      | 1.024      | 0.012       | 9.952     | 9.951     | 0.001    | 1024.0      | 300      | 8.71          | 41.7         |
| 1.018   | 18      | 19      | 1.000      | 0.012       | 9.951     | 9.951     | 0.000    | 0.0         | 300      | 8.73          | 41.7         |
| 1.019_1 | 19      | 20      | 1.000      | 0.012       | 9.951     | 9.951     | 0.000    | 0.0         | 300      | 8.74          | 41.6         |
| 3.004   | IC05    | 5       | 13.573     | 0.600       | 9.992     | 9.947     | 0.045    | 301.6       | 300      | 7.42          | 45.4         |
| 5.000   | RE02    | IC06    | 29.792     | 0.600       | 10.625    | 10.252    | 0.373    | 79.9        | 225      | 5.34          | 50.0         |
| 5.001   | IC06    | IC05    | 14.575     | 0.600       | 10.252    | 10.067    | 0.185    | 78.8        | 225      | 5.50          | 50.0         |
| 4.000   | RE01    | IC04    | 16.605     | 0.600       | 10.376    | 10.210    | 0.166    | 100.0       | 150      | 5.28          | 50.0         |
| 2.000   | H1      | H4      | 23.819     | 0.600       | 10.720    | 10.482    | 0.238    | 100.1       | 150      | 5.40          | 50.0         |
| 1.002   | H4      | H5      | 5.115      | 0.600       | 10.480    | 10.429    | 0.051    | 100.3       | 225      | 5.56          | 50.0         |
| 1.003   | H5      | H6      | 74.331     | 0.600       | 10.429    | 10.280    | 0.149    | 498.9       | 1000     | 6.07          | 50.0         |
| 1.004_1 | H6      | H7      | 7.512      | 0.600       | 10.280    | 10.265    | 0.015    | 500.8       | 1000     | 6.13          | 49.9         |
| 1.005   | H7      | H8      | 6.209      | 0.600       | 10.265    | 10.253    | 0.012    | 517.4       | 1000     | 6.17          | 49.7         |
| 1.006   | H8      | H9      | 21.040     | 0.600       | 10.253    | 10.211    | 0.042    | 500.9       | 1000     | 6.32          | 49.2         |
| 1.007   | H9      | 8       | 3.027      | 0.600       | 10.211    | 9.100     | 1.111    | 2.7         | 1000     | 6.32          | 49.1         |
| 1.000_1 | H2      | H3      | 15.608     | 0.600       | 11.700    | 11.544    | 0.156    | 100.1       | 150      | 5.26          | 50.0         |
| 1.001   | H3      | H4      | 27.842     | 0.600       | 11.540    | 10.480    | 1.060    | 26.3        | 150      | 5.49          | 50.0         |

**SuDS Carriers****Time to  
Half Empty (mins)**1  
1  
1  
1**Simulation Settings**

|                      |          |                                         |        |                         |   |
|----------------------|----------|-----------------------------------------|--------|-------------------------|---|
| Rainfall Methodology | FEH-22   | Skip Steady State                       | x      | Check Discharge Rate(s) | x |
| Rainfall Events      | Singular | Drain Down Time (mins)                  | 10080  | Check Discharge Volume  | x |
| Summer CV            | 1.000    | Additional Storage (m <sup>3</sup> /ha) | 0.0    |                         |   |
| Analysis Speed       | Detailed | Starting Level (m)                      | 10.333 |                         |   |

**Storm Durations**

|    |     |     |     |     |      |      |      |      |       |
|----|-----|-----|-----|-----|------|------|------|------|-------|
| 15 | 60  | 180 | 360 | 600 | 960  | 2160 | 4320 | 7200 | 10080 |
| 30 | 120 | 240 | 480 | 720 | 1440 | 2880 | 5760 | 8640 |       |

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|-----------------------|-----------------------|-----------------------|-----------------------|
| 1                     | 0                     | 0                     | 0                     |
| 10                    | 40                    | 0                     | 0                     |
| 30                    | 40                    | 0                     | 0                     |
| 100                   | 45                    | 0                     | 0                     |

**Node IC07 Online Orifice Control**

|                          |       |                   |       |                       |       |
|--------------------------|-------|-------------------|-------|-----------------------|-------|
| Flap Valve               | x     | Design Depth (m)  | 1.000 | Discharge Coefficient | 0.600 |
| Replaces Downstream Link | ✓     | Design Flow (l/s) | 0.6   |                       |       |
| Invert Level (m)         | 9.840 | Diameter (m)      | 0.007 |                       |       |

**Node 6 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 14.9                   | 14.9                       | 1.250     | 32.7                   | 42.6                       |

**Node 7 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 14.9                   | 14.9                       | 1.250     | 32.7                   | 42.6                       |

**Node 8 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 14.9                   | 14.9                       | 1.250     | 32.7                   | 42.6                       |

**Node 9 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 14.9                   | 14.9                       | 1.250     | 32.7                   | 42.6                       |

**Node 10 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 14.9                   | 14.9                       | 1.250     | 32.7                   | 42.6                       |

**Node 11 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |



| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node 12 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node 13 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node 14 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node 15 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node 16 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node 17 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |



| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node 18 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node 19 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node IC04 Carpark Storage Structure**

|                             |         |                           |        |               |        |
|-----------------------------|---------|---------------------------|--------|---------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Invert Level (m)          | 10.695 | Slope (1:X)   | 1000.0 |
| Side Inf Coefficient (m/hr) | 0.00000 | Time to half empty (mins) |        | Depth (m)     | 0.305  |
| Safety Factor               | 1.5     | Width (m)                 | 14.800 | Inf Depth (m) |        |
| Porosity                    | 0.30    | Length (m)                | 50.000 |               |        |

**Node 20 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node H1 Carpark Storage Structure**

|                             |         |                           |        |               |       |
|-----------------------------|---------|---------------------------|--------|---------------|-------|
| Base Inf Coefficient (m/hr) | 0.00000 | Invert Level (m)          | 10.720 | Slope (1:X)   | 34.0  |
| Side Inf Coefficient (m/hr) | 0.00000 | Time to half empty (mins) | 0      | Depth (m)     |       |
| Safety Factor               | 2.0     | Width (m)                 | 12.000 | Inf Depth (m) | 0.125 |
| Porosity                    | 0.30    | Length (m)                | 31.000 |               |       |

**Results for 1 year Critical Storm Duration. Lowest mass balance: 97.39%**

| Node Event          | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|---------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 15 minute summer    | EX IC01 | 10          | 10.846    | 0.046     | 2.7          | 0.0132        | 0.0000     | OK         |
| 15 minute summer    | EX IC02 | 11          | 10.571    | 0.058     | 4.6          | 0.0164        | 0.0000     | OK         |
| 10080 minute summer | EX.IC03 | 6840        | 10.533    | 0.377     | 0.2          | 0.1067        | 0.0000     | SURCHARGED |
| 10080 minute summer | IC04    | 6840        | 10.533    | 0.471     | 0.4          | 0.1333        | 0.0000     | SURCHARGED |
| 10080 minute summer | 5       | 6900        | 10.533    | 0.586     | 0.7          | 0.0000        | 0.0000     | SURCHARGED |
| 10080 minute summer | 20      | 6900        | 10.533    | 0.582     | 0.2          | 8.8651        | 0.0000     | SURCHARGED |
| 10080 minute summer | IC07    | 6960        | 10.533    | 0.693     | 0.1          | 0.7838        | 0.0000     | SURCHARGED |
| 15 minute summer    | 22      | 1           | 9.716     | 0.000     | 0.1          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | 6       | 6900        | 10.533    | 0.588     | 0.9          | 8.8646        | 0.0000     | SURCHARGED |
| 10080 minute summer | 7       | 6900        | 10.533    | 0.589     | 0.8          | 8.8648        | 0.0000     | SURCHARGED |
| 10080 minute summer | 8       | 6900        | 10.533    | 1.433     | 0.9          | 8.8650        | 0.0000     | SURCHARGED |
| 10080 minute summer | 9       | 6900        | 10.533    | 1.434     | 0.8          | 8.8650        | 0.0000     | SURCHARGED |
| 10080 minute summer | 10      | 6900        | 10.533    | 1.434     | 0.7          | 8.8651        | 0.0000     | SURCHARGED |
| 10080 minute summer | 11      | 6900        | 10.533    | 1.435     | 0.7          | 8.8651        | 0.0000     | SURCHARGED |
| 10080 minute summer | 12      | 6900        | 10.533    | 0.577     | 0.6          | 8.8654        | 0.0000     | SURCHARGED |
| 10080 minute summer | 13      | 6900        | 10.533    | 0.578     | 0.5          | 8.8655        | 0.0000     | SURCHARGED |
| 10080 minute summer | 14      | 6900        | 10.533    | 0.579     | 0.5          | 8.8656        | 0.0000     | SURCHARGED |
| 10080 minute summer | 15      | 6900        | 10.533    | 0.580     | 0.4          | 8.8656        | 0.0000     | SURCHARGED |
| 10080 minute summer | 16      | 6900        | 10.533    | 0.581     | 0.4          | 8.8656        | 0.0000     | SURCHARGED |
| 10080 minute summer | 17      | 6900        | 10.533    | 0.581     | 0.4          | 8.8655        | 0.0000     | SURCHARGED |
| 10080 minute summer | 18      | 6900        | 10.533    | 0.582     | 0.3          | 8.8654        | 0.0000     | SURCHARGED |
| 10080 minute summer | 19      | 6900        | 10.533    | 0.582     | 0.2          | 8.8653        | 0.0000     | SURCHARGED |
| 10080 minute summer | IC05    | 6900        | 10.533    | 0.541     | 0.7          | 0.1531        | 0.0000     | SURCHARGED |
| 15 minute summer    | RE02    | 10          | 10.660    | 0.035     | 3.2          | 0.0006        | 0.0000     | OK         |
| 10080 minute summer | IC06    | 6960        | 10.533    | 0.281     | 0.2          | 0.0796        | 0.0000     | SURCHARGED |

| Link Event<br>(Upstream Depth) | US Node | Link    | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|---------|---------|---------------|----------------|----------|---------------|--------------------|
| 15 minute summer               | EX IC01 | 1.000   | EX IC02 | 2.7           | 0.659          | 0.442    | 0.1183        |                    |
| 15 minute summer               | EX IC02 | 3.001   | EX.IC03 | 4.5           | 0.717          | 0.308    | 0.1931        |                    |
| 10080 minute summer            | EX.IC03 | 3.002   | IC04    | 0.2           | 0.003          | 0.003    | 1.9835        |                    |
| 10080 minute summer            | IC04    | 3.003   | IC05    | 0.4           | 0.006          | 0.006    | 1.4807        |                    |
| 10080 minute summer            | 5       | 1.004   | 6       | 0.7           | 0.007          | 0.041    | 0.6058        |                    |
| 10080 minute summer            | 20      | 1.019   | IC07    | 0.1           | 0.003          | 0.004    | 1.2801        |                    |
| 10080 minute summer            | IC07    | Orifice | 22      | 0.1           |                |          |               | 95.4               |
| 10080 minute summer            | 6       | 3.006   | 7       | 0.8           | 0.008          | 0.058    | 0.4105        |                    |
| 10080 minute summer            | 7       | 3.007   | 8       | 0.8           | 0.007          | 0.055    | 0.4119        |                    |
| 10080 minute summer            | 8       | 1.008   | 9       | 0.8           | 0.001          | 0.046    | 1.9633        |                    |
| 10080 minute summer            | 9       | 1.009   | 10      | 0.7           | 0.001          | 0.015    | 1.0970        |                    |
| 10080 minute summer            | 10      | 1.010_1 | 11      | 0.7           | 0.001          | 0.035    | 1.5368        |                    |
| 10080 minute summer            | 11      | 1.010   | 12      | 0.6           | 0.006          | 0.027    | 0.6472        |                    |
| 10080 minute summer            | 12      | 1.012   | 13      | 0.5           | 0.005          | 0.042    | 0.4968        |                    |
| 10080 minute summer            | 13      | 1.013   | 14      | 0.5           | 0.005          | 0.037    | 0.4987        |                    |
| 10080 minute summer            | 14      | 1.014   | 15      | 0.4           | 0.004          | 0.029    | 0.3927        |                    |
| 10080 minute summer            | 15      | 1.015   | 16      | 0.4           | 0.004          | 0.023    | 0.2934        |                    |
| 10080 minute summer            | 16      | 1.016   | 17      | 0.4           | 0.003          | 0.008    | 0.1801        |                    |
| 10080 minute summer            | 17      | 1.017   | 18      | 0.3           | 0.003          | 0.015    | 0.1847        |                    |
| 10080 minute summer            | 18      | 1.018   | 19      | 0.2           | 0.002          | 0.005    | 0.1807        |                    |
| 10080 minute summer            | 19      | 1.019_1 | 20      | 0.2           | 0.002          | 0.004    | 0.1807        |                    |
| 10080 minute summer            | IC05    | 3.004   | 5       | 0.7           | 0.010          | 0.011    | 0.9558        |                    |
| 15 minute summer               | RE02    | 5.000   | IC06    | 3.1           | 0.306          | 0.054    | 0.3300        |                    |
| 10080 minute summer            | IC06    | 5.001   | IC05    | 0.2           | 0.006          | 0.004    | 0.5797        |                    |

**Results for 1 year Critical Storm Duration. Lowest mass balance: 97.39%**

| Node Event          | US<br>Node | Peak<br>(mins) | Level<br>(m) | Depth<br>(m) | Inflow<br>(l/s) | Node<br>Vol (m <sup>3</sup> ) | Flood<br>(m <sup>3</sup> ) | Status     |
|---------------------|------------|----------------|--------------|--------------|-----------------|-------------------------------|----------------------------|------------|
| 10080 minute summer | RE01       | 6840           | 10.533       | 0.157        | 0.1             | 0.0028                        | 0.0000                     | SURCHARGED |
| 15 minute summer    | H1         | 11             | 10.788       | 0.068        | 7.6             | 0.3115                        | 0.0000                     | OK         |
| 15 minute summer    | H4         | 11             | 10.553       | 0.073        | 11.8            | 0.0117                        | 0.0000                     | OK         |
| 10080 minute summer | H5         | 6900           | 10.533       | 0.104        | 0.7             | 0.0000                        | 0.0000                     | OK         |
| 10080 minute summer | H6         | 6900           | 10.533       | 0.253        | 0.5             | 0.0000                        | 0.0000                     | OK         |
| 10080 minute summer | H7         | 6900           | 10.533       | 0.268        | 0.3             | 0.0000                        | 0.0000                     | OK         |
| 10080 minute summer | H8         | 6900           | 10.533       | 0.280        | 0.4             | 0.0000                        | 0.0000                     | OK         |
| 10080 minute summer | H9         | 6900           | 10.533       | 0.322        | 0.4             | 0.0000                        | 0.0000                     | OK         |
| 15 minute summer    | H2         | 10             | 11.737       | 0.037        | 2.3             | 0.0059                        | 0.0000                     | OK         |
| 15 minute summer    | H3         | 10             | 11.566       | 0.026        | 2.3             | 0.0041                        | 0.0000                     | OK         |

| Link Event<br>(Upstream Depth) | US<br>Node | Link    | DS<br>Node | Outflow<br>(l/s) | Velocity<br>(m/s) | Flow/Cap | Link<br>Vol (m <sup>3</sup> ) | Discharge<br>Vol (m <sup>3</sup> ) |
|--------------------------------|------------|---------|------------|------------------|-------------------|----------|-------------------------------|------------------------------------|
| 10080 minute summer            | RE01       | 4.000   | IC04       | 0.1              | 0.016             | 0.006    | 0.2923                        |                                    |
| 15 minute summer               | H1         | 2.000   | H4         | 7.3              | 0.907             | 0.411    | 0.1915                        |                                    |
| 15 minute summer               | H4         | 1.002   | H5         | 11.9             | 1.834             | 0.228    | 0.0357                        |                                    |
| 10080 minute summer            | H5         | 1.003   | H6         | 0.5              | 0.010             | 0.000    | 21.6152                       |                                    |
| 10080 minute summer            | H6         | 1.004_1 | H7         | 0.3              | 0.004             | 0.000    | 3.4880                        |                                    |
| 10080 minute summer            | H7         | 1.005   | H8         | 0.4              | 0.002             | 0.000    | 3.1009                        |                                    |
| 10080 minute summer            | H8         | 1.006   | H9         | 0.4              | 0.002             | 0.000    | 12.0810                       |                                    |
| 10080 minute summer            | H9         | 1.007   | 8          | 0.3              | 0.000             | 0.000    | 12.4521                       |                                    |
| 15 minute summer               | H2         | 1.000_1 | H3         | 2.3              | 0.683             | 0.128    | 0.0518                        |                                    |
| 15 minute summer               | H3         | 1.001   | H4         | 2.2              | 0.448             | 0.064    | 0.1475                        |                                    |

**Results for 10 year +40% CC Critical Storm Duration. Lowest mass balance: 98.03%**

| Node Event          | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|---------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 15 minute summer    | EX IC01 | 12          | 11.500    | 0.700     | 11.3         | 0.1981        | 0.0073     | FLOOD      |
| 15 minute summer    | EX IC02 | 11          | 10.822    | 0.309     | 16.1         | 0.0876        | 0.0000     | SURCHARGED |
| 10080 minute summer | EX.IC03 | 8100        | 10.796    | 0.640     | 0.3          | 0.1812        | 0.0000     | SURCHARGED |
| 10080 minute summer | IC04    | 9780        | 10.796    | 0.734     | 0.7          | 17.1105       | 0.0000     | SURCHARGED |
| 10080 minute summer | 5       | 9480        | 10.796    | 0.849     | 1.4          | 0.0000        | 0.0000     | SURCHARGED |
| 10080 minute summer | 20      | 8460        | 10.796    | 0.845     | 0.2          | 15.0877       | 0.0000     | SURCHARGED |
| 10080 minute summer | IC07    | 9480        | 10.796    | 0.956     | 0.1          | 1.0814        | 0.0000     | FLOOD RISK |
| 15 minute summer    | 22      | 1           | 9.716     | 0.000     | 0.1          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | 6       | 8940        | 10.796    | 0.851     | 1.8          | 15.0877       | 0.0000     | SURCHARGED |
| 10080 minute summer | 7       | 9480        | 10.796    | 0.852     | 1.7          | 15.0877       | 0.0000     | SURCHARGED |
| 10080 minute summer | 8       | 9540        | 10.796    | 1.696     | 1.6          | 15.0877       | 0.0000     | SURCHARGED |
| 10080 minute summer | 9       | 9540        | 10.796    | 1.697     | 1.2          | 15.0877       | 0.0000     | SURCHARGED |
| 10080 minute summer | 10      | 9540        | 10.796    | 1.697     | 1.1          | 15.0877       | 0.0000     | SURCHARGED |
| 10080 minute summer | 11      | 9540        | 10.796    | 1.698     | 1.0          | 15.0878       | 0.0000     | SURCHARGED |
| 10080 minute summer | 12      | 9540        | 10.796    | 0.840     | 1.0          | 15.0878       | 0.0000     | SURCHARGED |
| 10080 minute summer | 13      | 9480        | 10.796    | 0.841     | 0.9          | 15.0878       | 0.0000     | SURCHARGED |
| 10080 minute summer | 14      | 9480        | 10.796    | 0.842     | 0.8          | 15.0878       | 0.0000     | SURCHARGED |
| 10080 minute summer | 15      | 9480        | 10.796    | 0.843     | 0.7          | 15.0878       | 0.0000     | SURCHARGED |
| 10080 minute summer | 16      | 9480        | 10.796    | 0.844     | 0.6          | 15.0878       | 0.0000     | SURCHARGED |
| 10080 minute summer | 17      | 9480        | 10.796    | 0.844     | 0.5          | 15.0878       | 0.0000     | SURCHARGED |
| 10080 minute summer | 18      | 9480        | 10.796    | 0.845     | 0.4          | 15.0877       | 0.0000     | SURCHARGED |
| 10080 minute summer | 19      | 9480        | 10.796    | 0.845     | 0.3          | 15.0877       | 0.0000     | SURCHARGED |
| 10080 minute summer | IC05    | 8040        | 10.796    | 0.804     | 1.4          | 0.2276        | 0.0000     | FLOOD RISK |
| 10080 minute summer | RE02    | 8040        | 10.796    | 0.171     | 0.2          | 0.0031        | 0.0000     | OK         |
| 10080 minute summer | IC06    | 8880        | 10.796    | 0.544     | 0.5          | 0.1540        | 0.0000     | FLOOD RISK |

| Link Event<br>(Upstream Depth) | US Node | Link    | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|---------|---------|---------------|----------------|----------|---------------|--------------------|
| 15 minute summer               | EX IC01 | 1.000   | EX IC02 | 8.8           | 1.124          | 1.457    | 0.2248        |                    |
| 15 minute summer               | EX IC02 | 3.001   | EX.IC03 | 15.6          | 0.886          | 1.080    | 0.5477        |                    |
| 10080 minute summer            | EX.IC03 | 3.002   | IC04    | 0.3           | 0.004          | 0.005    | 1.9835        |                    |
| 10080 minute summer            | IC04    | 3.003   | IC05    | 0.7           | 0.010          | 0.011    | 1.4807        |                    |
| 10080 minute summer            | 5       | 1.004   | 6       | 1.4           | 0.007          | 0.081    | 1.2706        |                    |
| 10080 minute summer            | 20      | 1.019   | IC07    | 0.1           | 0.003          | 0.003    | 1.2801        |                    |
| 10080 minute summer            | IC07    | Orifice | 22      | 0.1           |                |          |               | 111.7              |
| 10080 minute summer            | 6       | 3.006   | 7       | 1.7           | 0.008          | 0.116    | 0.8597        |                    |
| 10080 minute summer            | 7       | 3.007   | 8       | 1.6           | 0.007          | 0.110    | 0.8617        |                    |
| 10080 minute summer            | 8       | 1.008   | 9       | 1.2           | 0.001          | 0.074    | 2.7501        |                    |
| 10080 minute summer            | 9       | 1.009   | 10      | 1.1           | 0.001          | 0.024    | 1.5364        |                    |
| 10080 minute summer            | 10      | 1.010_1 | 11      | 1.0           | 0.001          | 0.055    | 2.1522        |                    |
| 10080 minute summer            | 11      | 1.010   | 12      | 1.0           | 0.005          | 0.042    | 1.3750        |                    |
| 10080 minute summer            | 12      | 1.012   | 13      | 0.9           | 0.004          | 0.066    | 1.0525        |                    |
| 10080 minute summer            | 13      | 1.013   | 14      | 0.8           | 0.004          | 0.059    | 1.0554        |                    |
| 10080 minute summer            | 14      | 1.014   | 15      | 0.7           | 0.003          | 0.045    | 0.8302        |                    |
| 10080 minute summer            | 15      | 1.015   | 16      | 0.6           | 0.003          | 0.033    | 0.6196        |                    |
| 10080 minute summer            | 16      | 1.016   | 17      | 0.5           | 0.002          | 0.010    | 0.3801        |                    |
| 10080 minute summer            | 17      | 1.017   | 18      | 0.4           | 0.002          | 0.018    | 0.3896        |                    |
| 10080 minute summer            | 18      | 1.018   | 19      | 0.3           | 0.002          | 0.006    | 0.3810        |                    |
| 10080 minute summer            | 19      | 1.019_1 | 20      | 0.2           | 0.002          | 0.004    | 0.3810        |                    |
| 10080 minute summer            | IC05    | 3.004   | 5       | 1.4           | 0.019          | 0.021    | 0.9558        |                    |
| 10080 minute summer            | RE02    | 5.000   | IC06    | 0.2           | 0.012          | 0.003    | 1.0762        |                    |
| 10080 minute summer            | IC06    | 5.001   | IC05    | 0.5           | 0.012          | 0.008    | 0.5797        |                    |

**Results for 10 year +40% CC Critical Storm Duration. Lowest mass balance: 98.03%**

| Node Event          | US<br>Node | Peak<br>(mins) | Level<br>(m) | Depth<br>(m) | Inflow<br>(l/s) | Node<br>Vol (m <sup>3</sup> ) | Flood<br>(m <sup>3</sup> ) | Status     |
|---------------------|------------|----------------|--------------|--------------|-----------------|-------------------------------|----------------------------|------------|
| 10080 minute summer | RE01       | 8760           | 10.796       | 0.420        | 0.2             | 0.0076                        | 0.0000                     | SURCHARGED |
| 15 minute summer    | H1         | 12             | 10.951       | 0.231        | 31.3            | 3.3463                        | 0.0000                     | SURCHARGED |
| 10080 minute summer | H4         | 9480           | 10.796       | 0.316        | 1.5             | 0.0503                        | 0.0000                     | SURCHARGED |
| 10080 minute summer | H5         | 9480           | 10.796       | 0.367        | 2.4             | 0.0000                        | 0.0000                     | OK         |
| 10080 minute summer | H6         | 9540           | 10.796       | 0.516        | 0.7             | 0.0000                        | 0.0000                     | OK         |
| 10080 minute summer | H7         | 9060           | 10.796       | 0.531        | 0.3             | 0.0000                        | 0.0000                     | OK         |
| 10080 minute summer | H8         | 8460           | 10.796       | 0.543        | 0.3             | 0.0000                        | 0.0000                     | OK         |
| 10080 minute summer | H9         | 9540           | 10.796       | 0.585        | 0.4             | 0.0000                        | 0.0000                     | OK         |
| 15 minute summer    | H2         | 10             | 11.781       | 0.081        | 9.4             | 0.0129                        | 0.0000                     | OK         |
| 15 minute summer    | H3         | 10             | 11.593       | 0.053        | 9.3             | 0.0084                        | 0.0000                     | OK         |

| Link Event<br>(Upstream Depth) | US<br>Node | Link    | DS<br>Node | Outflow<br>(l/s) | Velocity<br>(m/s) | Flow/Cap | Link<br>Vol (m <sup>3</sup> ) | Discharge<br>Vol (m <sup>3</sup> ) |
|--------------------------------|------------|---------|------------|------------------|-------------------|----------|-------------------------------|------------------------------------|
| 10080 minute summer            | RE01       | 4.000   | IC04       | 0.2              | 0.011             | 0.011    | 0.2923                        |                                    |
| 15 minute summer               | H1         | 2.000   | H4         | 20.6             | 1.173             | 1.160    | 0.4125                        |                                    |
| 10080 minute summer            | H4         | 1.002   | H5         | 2.4              | 0.668             | 0.047    | 0.2034                        |                                    |
| 10080 minute summer            | H5         | 1.003   | H6         | 0.7              | 0.005             | 0.000    | 77.5561                       |                                    |
| 10080 minute summer            | H6         | 1.004_1 | H7         | 0.3              | 0.003             | 0.000    | 10.1139                       |                                    |
| 10080 minute summer            | H7         | 1.005   | H8         | 0.3              | 0.002             | 0.000    | 8.7099                        |                                    |
| 10080 minute summer            | H8         | 1.006   | H9         | -0.3             | 0.001             | 0.000    | 31.9848                       |                                    |
| 10080 minute summer            | H9         | 1.007   | 8          | -0.4             | 0.000             | 0.000    | 18.0708                       |                                    |
| 15 minute summer               | H2         | 1.000_1 | H3         | 9.3              | 0.990             | 0.524    | 0.1468                        |                                    |
| 15 minute summer               | H3         | 1.001   | H4         | 9.3              | 0.774             | 0.266    | 0.3155                        |                                    |

**Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 98.11%**

| Node Event          | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|---------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 15 minute summer    | EX IC01 | 10          | 11.500    | 0.700     | 14.7         | 0.1981        | 1.0019     | FLOOD      |
| 15 minute summer    | EX IC02 | 11          | 10.974    | 0.461     | 17.9         | 0.1305        | 0.0000     | SURCHARGED |
| 10080 minute summer | EX.IC03 | 8460        | 10.860    | 0.704     | 0.4          | 0.1991        | 0.0000     | FLOOD RISK |
| 10080 minute summer | IC04    | 8460        | 10.860    | 0.798     | 0.9          | 31.2100       | 0.0000     | FLOOD RISK |
| 10080 minute summer | 5       | 8580        | 10.860    | 0.913     | 1.8          | 0.0000        | 0.0000     | SURCHARGED |
| 10080 minute summer | 20      | 8460        | 10.860    | 0.909     | 0.2          | 16.7353       | 0.0000     | SURCHARGED |
| 10080 minute summer | IC07    | 8460        | 10.860    | 1.020     | 0.1          | 1.1531        | 0.0000     | FLOOD RISK |
| 15 minute summer    | 22      | 1           | 9.716     | 0.000     | 0.1          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | 6       | 8580        | 10.860    | 0.915     | 2.3          | 16.7353       | 0.0000     | SURCHARGED |
| 10080 minute summer | 7       | 8580        | 10.860    | 0.916     | 2.1          | 16.7353       | 0.0000     | SURCHARGED |
| 10080 minute summer | 8       | 8580        | 10.860    | 1.760     | 2.0          | 16.7352       | 0.0000     | SURCHARGED |
| 10080 minute summer | 9       | 8580        | 10.860    | 1.761     | 1.5          | 16.7352       | 0.0000     | SURCHARGED |
| 10080 minute summer | 10      | 8580        | 10.860    | 1.761     | 1.4          | 16.7352       | 0.0000     | SURCHARGED |
| 10080 minute summer | 11      | 8580        | 10.860    | 1.762     | 1.3          | 16.7352       | 0.0000     | SURCHARGED |
| 10080 minute summer | 12      | 8580        | 10.860    | 0.904     | 1.1          | 16.7352       | 0.0000     | SURCHARGED |
| 10080 minute summer | 13      | 8580        | 10.860    | 0.905     | 1.0          | 16.7351       | 0.0000     | SURCHARGED |
| 10080 minute summer | 14      | 8460        | 10.860    | 0.906     | 0.9          | 16.7351       | 0.0000     | SURCHARGED |
| 10080 minute summer | 15      | 8460        | 10.860    | 0.907     | 0.8          | 16.7351       | 0.0000     | SURCHARGED |
| 10080 minute summer | 16      | 8460        | 10.860    | 0.908     | 0.7          | 16.7352       | 0.0000     | SURCHARGED |
| 10080 minute summer | 17      | 8460        | 10.860    | 0.908     | 0.5          | 16.7352       | 0.0000     | SURCHARGED |
| 10080 minute summer | 18      | 8460        | 10.860    | 0.909     | 0.4          | 16.7353       | 0.0000     | SURCHARGED |
| 10080 minute summer | 19      | 8460        | 10.860    | 0.909     | 0.3          | 16.7353       | 0.0000     | SURCHARGED |
| 10080 minute summer | IC05    | 8640        | 10.860    | 0.868     | 1.8          | 0.2455        | 0.0000     | FLOOD RISK |
| 10080 minute summer | RE02    | 8460        | 10.860    | 0.235     | 0.3          | 0.0042        | 0.0000     | FLOOD RISK |
| 10080 minute summer | IC06    | 8640        | 10.860    | 0.608     | 0.6          | 0.1720        | 0.0000     | FLOOD RISK |

| Link Event<br>(Upstream Depth) | US Node | Link    | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|---------|---------|---------------|----------------|----------|---------------|--------------------|
| 15 minute summer               | EX IC01 | 1.000   | EX IC02 | 8.6           | 1.097          | 1.422    | 0.2248        |                    |
| 15 minute summer               | EX IC02 | 3.001   | EX.IC03 | 17.2          | 0.975          | 1.188    | 0.5477        |                    |
| 10080 minute summer            | EX.IC03 | 3.002   | IC04    | 0.4           | 0.006          | 0.006    | 1.9835        |                    |
| 10080 minute summer            | IC04    | 3.003   | IC05    | 0.9           | 0.013          | 0.014    | 1.4807        |                    |
| 10080 minute summer            | 5       | 1.004   | 6       | 1.8           | 0.007          | 0.104    | 1.4672        |                    |
| 10080 minute summer            | 20      | 1.019   | IC07    | 0.1           | 0.003          | 0.003    | 1.2801        |                    |
| 10080 minute summer            | IC07    | Orifice | 22      | 0.1           |                |          |               | 115.1              |
| 10080 minute summer            | 6       | 3.006   | 7       | 2.1           | 0.008          | 0.148    | 0.9925        |                    |
| 10080 minute summer            | 7       | 3.007   | 8       | 2.0           | 0.008          | 0.140    | 0.9946        |                    |
| 10080 minute summer            | 8       | 1.008   | 9       | 1.5           | 0.001          | 0.089    | 2.9596        |                    |
| 10080 minute summer            | 9       | 1.009   | 10      | 1.4           | 0.001          | 0.028    | 1.6534        |                    |
| 10080 minute summer            | 10      | 1.010_1 | 11      | 1.3           | 0.001          | 0.066    | 2.3160        |                    |
| 10080 minute summer            | 11      | 1.010   | 12      | 1.1           | 0.005          | 0.050    | 1.5910        |                    |
| 10080 minute summer            | 12      | 1.012   | 13      | 1.0           | 0.004          | 0.078    | 1.2174        |                    |
| 10080 minute summer            | 13      | 1.013   | 14      | 0.9           | 0.004          | 0.069    | 1.2204        |                    |
| 10080 minute summer            | 14      | 1.014   | 15      | 0.8           | 0.003          | 0.053    | 0.9599        |                    |
| 10080 minute summer            | 15      | 1.015   | 16      | 0.7           | 0.003          | 0.039    | 0.7162        |                    |
| 10080 minute summer            | 16      | 1.016   | 17      | 0.5           | 0.002          | 0.011    | 0.4393        |                    |
| 10080 minute summer            | 17      | 1.017   | 18      | 0.4           | 0.002          | 0.020    | 0.4504        |                    |
| 10080 minute summer            | 18      | 1.018   | 19      | 0.3           | 0.002          | 0.007    | 0.4403        |                    |
| 10080 minute summer            | 19      | 1.019_1 | 20      | 0.2           | 0.002          | 0.004    | 0.4403        |                    |
| 10080 minute summer            | IC05    | 3.004   | 5       | 1.8           | 0.025          | 0.028    | 0.9558        |                    |
| 10080 minute summer            | RE02    | 5.000   | IC06    | 0.3           | 0.013          | 0.005    | 1.1849        |                    |
| 10080 minute summer            | IC06    | 5.001   | IC05    | 0.6           | 0.015          | 0.010    | 0.5797        |                    |

**Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 98.11%**

| Node Event          | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|---------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 10080 minute summer | RE01    | 8580        | 10.860    | 0.484     | 0.3          | 0.0087        | 0.0000     | FLOOD RISK |
| 15 minute summer    | H1      | 13          | 11.027    | 0.307     | 40.7         | 5.8850        | 0.0000     | SURCHARGED |
| 10080 minute summer | H4      | 8520        | 10.860    | 0.380     | 1.5          | 0.0603        | 0.0000     | SURCHARGED |
| 10080 minute summer | H5      | 8520        | 10.860    | 0.431     | 1.7          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | H6      | 8460        | 10.860    | 0.580     | 0.7          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | H7      | 8460        | 10.860    | 0.595     | 0.8          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | H8      | 8520        | 10.860    | 0.607     | 0.8          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | H9      | 8580        | 10.860    | 0.649     | 0.7          | 0.0000        | 0.0000     | OK         |
| 15 minute summer    | H2      | 10          | 11.797    | 0.097     | 12.3         | 0.0154        | 0.0000     | OK         |
| 15 minute summer    | H3      | 10          | 11.601    | 0.061     | 12.2         | 0.0097        | 0.0000     | OK         |

| Link Event<br>(Upstream Depth) | US Node | Link    | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|---------|---------|---------------|----------------|----------|---------------|--------------------|
| 10080 minute summer            | RE01    | 4.000   | IC04    | 0.3           | 0.017          | 0.017    | 0.2923        |                    |
| 15 minute summer               | H1      | 2.000   | H4      | 22.2          | 1.264          | 1.253    | 0.4193        |                    |
| 10080 minute summer            | H4      | 1.002   | H5      | 1.7           | 0.668          | 0.032    | 0.2034        |                    |
| 10080 minute summer            | H5      | 1.003   | H6      | 0.7           | 0.005          | 0.000    | 95.6598       |                    |
| 10080 minute summer            | H6      | 1.004_1 | H7      | 0.8           | 0.003          | 0.000    | 12.1781       |                    |
| 10080 minute summer            | H7      | 1.005   | H8      | 0.8           | 0.003          | 0.000    | 10.4477       |                    |
| 10080 minute summer            | H8      | 1.006   | H9      | 0.7           | 0.002          | 0.000    | 38.0903       |                    |
| 10080 minute summer            | H9      | 1.007   | 8       | 0.6           | 0.000          | 0.000    | 19.6134       |                    |
| 15 minute summer               | H2      | 1.000_1 | H3      | 12.2          | 1.049          | 0.685    | 0.1809        |                    |
| 15 minute summer               | H3      | 1.001   | H4      | 12.1          | 0.882          | 0.347    | 0.3387        |                    |

**Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 98.31%**

| Node Event                     | US Node | Peak (mins) | Level (m) | Depth (m)     | Inflow (l/s)   | Node Vol (m³) | Flood (m³)    | Status             |
|--------------------------------|---------|-------------|-----------|---------------|----------------|---------------|---------------|--------------------|
| 30 minute summer               | EX IC01 | 16          | 11.500    | 0.700         | 17.5           | 0.1981        | 2.7427        | FLOOD              |
| 15 minute summer               | EX IC02 | 11          | 11.130    | 0.617         | 19.9           | 0.1747        | 0.0000        | SURCHARGED         |
| 10080 minute summer            | EX.IC03 | 9840        | 10.950    | 0.794         | 0.5            | 0.2248        | 0.0000        | FLOOD RISK         |
| 10080 minute summer            | IC04    | 9600        | 10.950    | 0.888         | 1.1            | 51.3507       | 0.0000        | FLOOD RISK         |
| 10080 minute summer            | 5       | 9660        | 10.950    | 1.003         | 2.0            | 0.0000        | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 20      | 9600        | 10.950    | 0.999         | 0.2            | 19.1875       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | IC07    | 9600        | 10.950    | 1.110         | 0.1            | 1.2555        | 0.0000        | FLOOD RISK         |
| 15 minute summer               | 22      | 1           | 9.716     | 0.000         | 0.1            | 0.0000        | 0.0000        | OK                 |
| 10080 minute summer            | 6       | 9660        | 10.950    | 1.005         | 2.5            | 19.1882       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 7       | 9660        | 10.950    | 1.006         | 2.4            | 19.1881       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 8       | 9660        | 10.950    | 1.850         | 2.3            | 19.1879       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 9       | 9660        | 10.950    | 1.851         | 1.5            | 19.1879       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 10      | 9660        | 10.950    | 1.851         | 1.4            | 19.1879       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 11      | 9660        | 10.950    | 1.852         | 1.3            | 19.1879       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 12      | 9660        | 10.950    | 0.994         | 1.2            | 19.1876       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 13      | 9600        | 10.950    | 0.995         | 1.0            | 19.1875       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 14      | 9600        | 10.950    | 0.996         | 0.9            | 19.1875       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 15      | 9600        | 10.950    | 0.997         | 0.8            | 19.1875       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 16      | 9600        | 10.950    | 0.998         | 0.7            | 19.1875       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 17      | 9600        | 10.950    | 0.998         | 0.6            | 19.1875       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 18      | 9600        | 10.950    | 0.999         | 0.4            | 19.1875       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 19      | 9600        | 10.950    | 0.999         | 0.3            | 19.1875       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | IC05    | 9600        | 10.950    | 0.958         | 2.0            | 0.2712        | 0.0000        | FLOOD RISK         |
| 10080 minute summer            | RE02    | 10020       | 10.950    | 0.325         | 0.3            | 0.0059        | 0.0000        | FLOOD RISK         |
| 10080 minute summer            | IC06    | 10020       | 10.950    | 0.698         | 0.7            | 0.1976        | 0.0000        | FLOOD RISK         |
| Link Event<br>(Upstream Depth) | US Node | Link        | DS Node   | Outflow (l/s) | Velocity (m/s) | Flow/Cap      | Link Vol (m³) | Discharge Vol (m³) |
| 30 minute summer               | EX IC01 | 1.000       | EX IC02   | 8.3           | 1.060          | 1.375         | 0.2248        |                    |
| 15 minute summer               | EX IC02 | 3.001       | EX.IC03   | 18.9          | 1.075          | 1.310         | 0.5477        |                    |
| 10080 minute summer            | EX.IC03 | 3.002       | IC04      | 0.5           | 0.007          | 0.008         | 1.9835        |                    |
| 10080 minute summer            | IC04    | 3.003       | IC05      | 1.1           | 0.015          | 0.017         | 1.4807        |                    |
| 10080 minute summer            | 5       | 1.004       | 6         | 2.0           | 0.007          | 0.120         | 1.7727        |                    |
| 10080 minute summer            | 20      | 1.019       | IC07      | 0.1           | 0.003          | 0.003         | 1.2801        |                    |
| 10080 minute summer            | IC07    | Orifice     | 22        | 0.1           |                |               |               | 119.6              |
| 10080 minute summer            | 6       | 3.006       | 7         | 2.4           | 0.008          | 0.165         | 1.1988        |                    |
| 10080 minute summer            | 7       | 3.007       | 8         | 2.3           | 0.008          | 0.157         | 1.2011        |                    |
| 10080 minute summer            | 8       | 1.008       | 9         | 1.5           | 0.001          | 0.091         | 3.2721        |                    |
| 10080 minute summer            | 9       | 1.009       | 10        | 1.4           | 0.001          | 0.029         | 1.8279        |                    |
| 10080 minute summer            | 10      | 1.010_1     | 11        | 1.3           | 0.001          | 0.068         | 2.5604        |                    |
| 10080 minute summer            | 11      | 1.010       | 12        | 1.2           | 0.004          | 0.051         | 1.9268        |                    |
| 10080 minute summer            | 12      | 1.012       | 13        | 1.0           | 0.004          | 0.081         | 1.4735        |                    |
| 10080 minute summer            | 13      | 1.013       | 14        | 0.9           | 0.004          | 0.071         | 1.4770        |                    |
| 10080 minute summer            | 14      | 1.014       | 15        | 0.8           | 0.003          | 0.055         | 1.1614        |                    |
| 10080 minute summer            | 15      | 1.015       | 16        | 0.7           | 0.003          | 0.040         | 0.8664        |                    |
| 10080 minute summer            | 16      | 1.016       | 17        | 0.6           | 0.003          | 0.012         | 0.5314        |                    |
| 10080 minute summer            | 17      | 1.017       | 18        | 0.4           | 0.003          | 0.021         | 0.5447        |                    |
| 10080 minute summer            | 18      | 1.018       | 19        | 0.3           | 0.002          | 0.007         | 0.5325        |                    |
| 10080 minute summer            | 19      | 1.019_1     | 20        | 0.2           | 0.002          | 0.004         | 0.5325        |                    |
| 10080 minute summer            | IC05    | 3.004       | 5         | 2.0           | 0.029          | 0.032         | 0.9558        |                    |
| 10080 minute summer            | RE02    | 5.000       | IC06      | 0.3           | 0.013          | 0.005         | 1.1849        |                    |
| 10080 minute summer            | IC06    | 5.001       | IC05      | 0.7           | 0.017          | 0.012         | 0.5797        |                    |

**Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 98.31%**

| Node Event          | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|---------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 15 minute summer    | RE01    | 11          | 11.000    | 0.624     | 21.9         | 0.0112        | 0.0000     | FLOOD RISK |
| 30 minute summer    | H1      | 21          | 11.111    | 0.391     | 48.6         | 9.5082        | 0.0000     | SURCHARGED |
| 10080 minute summer | H4      | 9600        | 10.950    | 0.470     | 1.4          | 0.0747        | 0.0000     | SURCHARGED |
| 10080 minute summer | H5      | 9600        | 10.950    | 0.521     | 2.1          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | H6      | 9600        | 10.950    | 0.670     | 0.8          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | H7      | 9600        | 10.950    | 0.685     | 0.8          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | H8      | 9600        | 10.950    | 0.697     | 0.8          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | H9      | 9660        | 10.950    | 0.739     | 0.9          | 0.0000        | 0.0000     | OK         |
| 15 minute summer    | H2      | 10          | 11.819    | 0.119     | 15.9         | 0.0189        | 0.0000     | OK         |
| 15 minute summer    | H3      | 10          | 11.611    | 0.071     | 15.7         | 0.0112        | 0.0000     | OK         |

| Link Event<br>(Upstream Depth) | US Node | Link    | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|---------|---------|---------------|----------------|----------|---------------|--------------------|
| 15 minute summer               | RE01    | 4.000   | IC04    | 21.1          | 1.200          | 1.190    | 0.2923        |                    |
| 30 minute summer               | H1      | 2.000   | H4      | 24.0          | 1.361          | 1.350    | 0.4193        |                    |
| 10080 minute summer            | H4      | 1.002   | H5      | 2.1           | 0.668          | 0.040    | 0.2034        |                    |
| 10080 minute summer            | H5      | 1.003   | H6      | 0.8           | 0.004          | 0.000    | 124.6280      |                    |
| 10080 minute summer            | H6      | 1.004_1 | H7      | 0.8           | 0.003          | 0.000    | 15.4404       |                    |
| 10080 minute summer            | H7      | 1.005   | H8      | 0.8           | 0.003          | 0.000    | 13.1899       |                    |
| 10080 minute summer            | H8      | 1.006   | H9      | 0.9           | 0.002          | 0.000    | 47.6913       |                    |
| 10080 minute summer            | H9      | 1.007   | 8       | 0.8           | 0.000          | 0.000    | 21.9435       |                    |
| 15 minute summer               | H2      | 1.000_1 | H3      | 15.7          | 1.096          | 0.886    | 0.2240        |                    |
| 15 minute summer               | H3      | 1.001   | H4      | 15.7          | 1.056          | 0.449    | 0.3583        |                    |

**Nodes**

| Name    | Area<br>(ha) | Add<br>Area<br>(%) | T of E<br>(mins) | Cover<br>Level<br>(m) | Diameter<br>(mm) | Easting<br>(m) | Northing<br>(m) | Depth<br>(m) | Invert<br>Level<br>(m) |
|---------|--------------|--------------------|------------------|-----------------------|------------------|----------------|-----------------|--------------|------------------------|
| EX IC01 | 0.022        |                    | 5.00             | 11.500                | 600              | 1873687.952    | -215932.244     | 0.700        | 10.800                 |
| EX IC02 | 0.015        |                    | 5.00             | 11.480                | 600              | 1873686.779    | -215960.954     | 0.967        | 10.513                 |
| EX.IC03 |              |                    |                  | 11.100                | 600              | 1873685.842    | -215992.049     | 0.944        | 10.156                 |
| IC04    | 0.022        |                    | 5.00             | 11.150                | 600              | 1873688.606    | -216020.080     | 1.088        | 10.062                 |
| 5       |              |                    |                  | 11.300                |                  | 1873715.268    | -216037.046     | 1.353        | 9.947                  |
| 20      |              |                    |                  | 11.300                |                  | 1873713.507    | -216050.271     | 1.349        | 9.951                  |
| IC07    |              |                    |                  | 11.015                | 1200             | 1873683.089    | -216053.829     | 1.175        | 9.840                  |
| 22      |              |                    |                  | 10.490                |                  | 1873682.205    | -216066.557     | 0.774        | 9.716                  |
| 6       | 0.042        |                    | 5.00             | 11.300                |                  | 1873717.843    | -216034.627     | 1.355        | 9.945                  |
| 7       |              |                    |                  | 11.300                |                  | 1873719.676    | -216033.369     | 1.356        | 9.944                  |
| 8       |              |                    |                  | 11.300                |                  | 1873721.802    | -216032.718     | 2.200        | 9.100                  |
| 9       |              |                    |                  | 11.300                |                  | 1873723.587    | -216032.860     | 2.201        | 9.099                  |
| 10      |              |                    |                  | 11.300                |                  | 1873725.136    | -216033.759     | 2.201        | 9.099                  |
| 11      |              |                    |                  | 11.300                |                  | 1873725.830    | -216034.975     | 2.202        | 9.098                  |
| 12      |              |                    |                  | 11.300                |                  | 1873725.101    | -216037.230     | 1.344        | 9.956                  |
| 13      |              |                    |                  | 11.300                |                  | 1873722.729    | -216038.703     | 1.345        | 9.955                  |
| 14      |              |                    |                  | 11.300                |                  | 1873719.996    | -216039.277     | 1.346        | 9.954                  |
| 15      |              |                    |                  | 11.300                |                  | 1873717.972    | -216040.119     | 1.347        | 9.953                  |
| 16      |              |                    |                  | 11.300                |                  | 1873717.120    | -216041.511     | 1.348        | 9.952                  |
| 17      |              |                    |                  | 11.300                |                  | 1873717.019    | -216043.112     | 1.348        | 9.952                  |
| 18      |              |                    |                  | 11.300                |                  | 1873717.027    | -216044.136     | 1.349        | 9.951                  |
| 19      |              |                    |                  | 11.300                |                  | 1873716.501    | -216046.937     | 1.349        | 9.951                  |
| IC05    | 0.025        |                    | 5.00             | 11.005                | 600              | 1873701.705    | -216036.529     | 1.013        | 9.992                  |
| RE02    | 0.023        | 10                 | 5.00             | 11.150                | 150              | 1873671.366    | -216050.112     | 0.525        | 10.625                 |
| IC06    | 0.029        |                    | 5.00             | 11.005                | 600              | 1873701.142    | -216051.093     | 0.753        | 10.252                 |
| RE01    | 0.023        | 10                 | 5.00             | 11.150                | 150              | 1873672.015    | -216019.405     | 0.774        | 10.376                 |
| H1      | 0.061        |                    | 5.00             | 11.720                | 600              | 1873697.243    | -215899.290     | 1.000        | 10.720                 |
| H4      | 0.019        |                    | 5.00             | 11.704                | 450              | 1873701.039    | -215922.805     | 1.224        | 10.480                 |
| H5      |              |                    |                  | 11.621                |                  | 1873701.714    | -215927.875     | 1.192        | 10.429                 |
| H6      |              |                    |                  | 11.011                |                  | 1873699.823    | -216002.182     | 0.731        | 10.280                 |
| H7      |              |                    |                  | 11.000                |                  | 1873703.614    | -216008.667     | 0.735        | 10.265                 |
| H8      |              |                    |                  | 11.000                |                  | 1873708.166    | -216012.890     | 0.747        | 10.253                 |
| H9      |              |                    |                  | 11.250                |                  | 1873720.186    | -216030.158     | 1.039        | 10.211                 |
| H2      | 0.018        |                    | 5.00             | 12.150                | 450              | 1873728.882    | -215907.183     | 0.450        | 11.700                 |
| H3      |              |                    |                  | 12.150                | 450              | 1873728.881    | -215922.791     | 0.610        | 11.540                 |

**Links (Input)**

| Name    | US<br>Node | DS<br>Node | Length<br>(m) | ks (mm) /<br>n | US IL<br>(m) | DS IL<br>(m) | Fall<br>(m) | Slope<br>(1:X) | Dia<br>(mm) | T of C<br>(mins) | Rain<br>(mm/hr) |
|---------|------------|------------|---------------|----------------|--------------|--------------|-------------|----------------|-------------|------------------|-----------------|
| 1.000   | EX IC01    | EX IC02    | 28.734        | 0.600          | 10.800       | 10.513       | 0.287       | 100.1          | 100         | 5.62             | 50.0            |
| 3.001   | EX IC02    | EX.IC03    | 31.109        | 0.600          | 10.513       | 10.306       | 0.207       | 150.3          | 150         | 6.26             | 49.4            |
| 3.002   | EX.IC03    | IC04       | 28.167        | 0.600          | 10.156       | 10.062       | 0.094       | 299.6          | 300         | 6.78             | 47.5            |
| 3.003   | IC04       | IC05       | 21.027        | 0.600          | 10.062       | 9.992        | 0.070       | 300.4          | 300         | 7.17             | 46.2            |
| 3.006   | 6          | 7          | 2.223         | 0.012          | 9.945        | 9.944        | 0.001       | 2223.2         | 300         | 7.70             | 44.5            |
| 3.007   | 7          | 8          | 2.223         | 0.012          | 9.944        | 9.943        | 0.001       | 2223.4         | 300         | 7.82             | 44.2            |
| 1.004   | 5          | 6          | 3.297         | 0.012          | 9.947        | 9.945        | 0.002       | 1648.5         | 300         | 7.57             | 40.8            |
| 1.010   | 11         | 12         | 3.669         | 0.012          | 9.960        | 9.956        | 0.004       | 917.3          | 300         | 8.11             | 43.7            |
| 1.019   | 20         | IC07       | 32.187        | 0.012          | 10.000       | 9.840        | 0.160       | 201.2          | 225         | 9.36             | 37.7            |
| 1.008   | 8          | 9          | 1.791         | 0.600          | 9.100        | 9.099        | 0.001       | 1790.6         | 300         | 7.91             | 43.9            |
| 1.009   | 9          | 10         | 1.000         | 0.600          | 9.099        | 9.099        | 0.000       | 0.0            | 300         | 7.92             | 43.9            |
| 1.010_1 | 10         | 11         | 1.400         | 0.600          | 9.099        | 9.098        | 0.001       | 1400.1         | 300         | 7.98             | 43.7            |

**Links (Input)**

| Name    | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|---------|---------|---------|------------|-------------|-----------|-----------|----------|-------------|----------|---------------|--------------|
| 1.021   | IC07    | 22      | 12.759     | 0.012       | 9.840     | 9.716     | 0.124    | 102.9       | 100      | 9.67          | 39.5         |
| 1.012   | 12      | 13      | 2.792      | 0.012       | 9.956     | 9.955     | 0.001    | 2792.2      | 300      | 8.28          | 42.9         |
| 1.013   | 13      | 14      | 2.793      | 0.012       | 9.955     | 9.954     | 0.001    | 2792.6      | 300      | 8.46          | 42.4         |
| 1.014   | 14      | 15      | 2.192      | 0.012       | 9.954     | 9.953     | 0.001    | 2192.2      | 300      | 8.58          | 42.1         |
| 1.015   | 15      | 16      | 1.632      | 0.012       | 9.953     | 9.952     | 0.001    | 1632.0      | 300      | 8.65          | 41.9         |
| 1.016   | 16      | 17      | 1.000      | 0.012       | 9.952     | 9.952     | 0.000    | 0.0         | 300      | 8.67          | 41.8         |
| 1.017   | 17      | 18      | 1.024      | 0.012       | 9.952     | 9.951     | 0.001    | 1024.0      | 300      | 8.71          | 41.7         |
| 1.018   | 18      | 19      | 1.000      | 0.012       | 9.951     | 9.951     | 0.000    | 0.0         | 300      | 8.73          | 41.7         |
| 1.019_1 | 19      | 20      | 1.000      | 0.012       | 9.951     | 9.951     | 0.000    | 0.0         | 300      | 8.74          | 41.6         |
| 3.004   | IC05    | 5       | 13.573     | 0.600       | 9.992     | 9.947     | 0.045    | 301.6       | 300      | 7.42          | 45.4         |
| 5.000   | RE02    | IC06    | 29.792     | 0.600       | 10.625    | 10.252    | 0.373    | 79.9        | 225      | 5.34          | 50.0         |
| 5.001   | IC06    | IC05    | 14.575     | 0.600       | 10.252    | 10.067    | 0.185    | 78.8        | 225      | 5.50          | 50.0         |
| 4.000   | RE01    | IC04    | 16.605     | 0.600       | 10.376    | 10.210    | 0.166    | 100.0       | 150      | 5.28          | 50.0         |
| 2.000   | H1      | H4      | 23.819     | 0.600       | 10.720    | 10.482    | 0.238    | 100.1       | 150      | 5.40          | 50.0         |
| 1.002   | H4      | H5      | 5.115      | 0.600       | 10.480    | 10.429    | 0.051    | 100.3       | 225      | 5.56          | 50.0         |
| 1.003   | H5      | H6      | 74.331     | 0.600       | 10.429    | 10.280    | 0.149    | 498.9       | 1000     | 6.07          | 50.0         |
| 1.004_1 | H6      | H7      | 7.512      | 0.600       | 10.280    | 10.265    | 0.015    | 500.8       | 1000     | 6.13          | 49.9         |
| 1.005   | H7      | H8      | 6.209      | 0.600       | 10.265    | 10.253    | 0.012    | 517.4       | 1000     | 6.17          | 49.7         |
| 1.006   | H8      | H9      | 21.040     | 0.600       | 10.253    | 10.211    | 0.042    | 500.9       | 1000     | 6.32          | 49.2         |
| 1.007   | H9      | 8       | 3.027      | 0.600       | 10.211    | 9.100     | 1.111    | 2.7         | 1000     | 6.32          | 49.1         |
| 1.000_1 | H2      | H3      | 15.608     | 0.600       | 11.700    | 11.544    | 0.156    | 100.1       | 150      | 5.26          | 50.0         |
| 1.001   | H3      | H4      | 27.842     | 0.600       | 11.540    | 10.480    | 1.060    | 26.3        | 150      | 5.49          | 50.0         |

**SuDS Carriers****Time to  
Half Empty (mins)**1  
1  
1  
1**Simulation Settings**

|                      |          |                                         |        |                         |   |
|----------------------|----------|-----------------------------------------|--------|-------------------------|---|
| Rainfall Methodology | FEH-22   | Skip Steady State                       | x      | Check Discharge Rate(s) | x |
| Rainfall Events      | Singular | Drain Down Time (mins)                  | 10080  | Check Discharge Volume  | x |
| Summer CV            | 1.000    | Additional Storage (m <sup>3</sup> /ha) | 0.0    |                         |   |
| Analysis Speed       | Detailed | Starting Level (m)                      | 10.410 |                         |   |

**Storm Durations**

|    |     |     |     |     |      |      |      |      |       |
|----|-----|-----|-----|-----|------|------|------|------|-------|
| 15 | 60  | 180 | 360 | 600 | 960  | 2160 | 4320 | 7200 | 10080 |
| 30 | 120 | 240 | 480 | 720 | 1440 | 2880 | 5760 | 8640 |       |

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|-----------------------|-----------------------|-----------------------|-----------------------|
| 1                     | 0                     | 0                     | 0                     |
| 10                    | 40                    | 0                     | 0                     |
| 30                    | 40                    | 0                     | 0                     |
| 100                   | 45                    | 0                     | 0                     |

**Node IC07 Online Orifice Control**

|                          |       |                   |       |                       |       |
|--------------------------|-------|-------------------|-------|-----------------------|-------|
| Flap Valve               | x     | Design Depth (m)  | 1.000 | Discharge Coefficient | 0.600 |
| Replaces Downstream Link | ✓     | Design Flow (l/s) | 0.6   |                       |       |
| Invert Level (m)         | 9.840 | Diameter (m)      | 0.007 |                       |       |

**Node 6 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 14.9                   | 14.9                       | 1.250     | 32.7                   | 42.6                       |

**Node 7 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 14.9                   | 14.9                       | 1.250     | 32.7                   | 42.6                       |

**Node 8 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 14.9                   | 14.9                       | 1.250     | 32.7                   | 42.6                       |

**Node 9 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 14.9                   | 14.9                       | 1.250     | 32.7                   | 42.6                       |

**Node 10 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 14.9                   | 14.9                       | 1.250     | 32.7                   | 42.6                       |

**Node 11 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |



| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node 12 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node 13 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node 14 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node 15 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node 16 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node 17 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |



| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node 18 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node 19 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node IC04 Carpark Storage Structure**

|                             |         |                           |        |               |        |
|-----------------------------|---------|---------------------------|--------|---------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Invert Level (m)          | 10.695 | Slope (1:X)   | 1000.0 |
| Side Inf Coefficient (m/hr) | 0.00000 | Time to half empty (mins) |        | Depth (m)     | 0.305  |
| Safety Factor               | 1.5     | Width (m)                 | 14.800 | Inf Depth (m) |        |
| Porosity                    | 0.30    | Length (m)                | 50.000 |               |        |

**Node 20 Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 10.050 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 1.00 | Time to half empty (mins) |        |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 14.9                      | 14.9                          | 1.250        | 32.7                      | 42.6                          |

**Node H1 Carpark Storage Structure**

|                             |         |                           |        |               |       |
|-----------------------------|---------|---------------------------|--------|---------------|-------|
| Base Inf Coefficient (m/hr) | 0.00000 | Invert Level (m)          | 10.720 | Slope (1:X)   | 34.0  |
| Side Inf Coefficient (m/hr) | 0.00000 | Time to half empty (mins) | 0      | Depth (m)     |       |
| Safety Factor               | 2.0     | Width (m)                 | 12.000 | Inf Depth (m) | 0.125 |
| Porosity                    | 0.30    | Length (m)                | 31.000 |               |       |

**Results for 1 year Critical Storm Duration. Lowest mass balance: 97.63%**

| Node Event          | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|---------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 15 minute summer    | EX IC01 | 10          | 10.846    | 0.046     | 2.7          | 0.0132        | 0.0000     | OK         |
| 10080 minute summer | EX IC02 | 6720        | 10.584    | 0.071     | 0.2          | 0.0200        | 0.0000     | OK         |
| 10080 minute summer | EX.IC03 | 6840        | 10.583    | 0.427     | 0.2          | 0.1210        | 0.0000     | SURCHARGED |
| 10080 minute summer | IC04    | 6900        | 10.584    | 0.522     | 0.4          | 0.1476        | 0.0000     | SURCHARGED |
| 10080 minute summer | 5       | 6900        | 10.583    | 0.636     | 0.7          | 0.0000        | 0.0000     | SURCHARGED |
| 10080 minute summer | 20      | 6900        | 10.583    | 0.632     | 0.2          | 9.9805        | 0.0000     | SURCHARGED |
| 10080 minute summer | IC07    | 6900        | 10.583    | 0.743     | 0.1          | 0.8408        | 0.0000     | SURCHARGED |
| 15 minute summer    | 22      | 1           | 9.716     | 0.000     | 0.1          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | 6       | 6900        | 10.583    | 0.638     | 0.9          | 9.9804        | 0.0000     | SURCHARGED |
| 10080 minute summer | 7       | 6900        | 10.583    | 0.639     | 0.8          | 9.9802        | 0.0000     | SURCHARGED |
| 10080 minute summer | 8       | 6900        | 10.583    | 1.483     | 0.8          | 9.9803        | 0.0000     | SURCHARGED |
| 10080 minute summer | 9       | 6900        | 10.583    | 1.484     | 0.7          | 9.9803        | 0.0000     | SURCHARGED |
| 10080 minute summer | 10      | 6900        | 10.583    | 1.484     | 0.6          | 9.9802        | 0.0000     | SURCHARGED |
| 10080 minute summer | 11      | 6900        | 10.583    | 1.485     | 0.6          | 9.9802        | 0.0000     | SURCHARGED |
| 10080 minute summer | 12      | 6900        | 10.583    | 0.627     | 0.6          | 9.9802        | 0.0000     | SURCHARGED |
| 10080 minute summer | 13      | 6900        | 10.583    | 0.628     | 0.5          | 9.9802        | 0.0000     | SURCHARGED |
| 10080 minute summer | 14      | 6900        | 10.583    | 0.629     | 0.5          | 9.9804        | 0.0000     | SURCHARGED |
| 10080 minute summer | 15      | 6900        | 10.583    | 0.630     | 0.4          | 9.9804        | 0.0000     | SURCHARGED |
| 10080 minute summer | 16      | 6900        | 10.583    | 0.631     | 0.4          | 9.9805        | 0.0000     | SURCHARGED |
| 10080 minute summer | 17      | 6900        | 10.583    | 0.631     | 0.3          | 9.9805        | 0.0000     | SURCHARGED |
| 10080 minute summer | 18      | 6900        | 10.583    | 0.632     | 0.3          | 9.9805        | 0.0000     | SURCHARGED |
| 10080 minute summer | 19      | 6900        | 10.583    | 0.632     | 0.3          | 9.9805        | 0.0000     | SURCHARGED |
| 10080 minute summer | IC05    | 6900        | 10.583    | 0.591     | 0.7          | 0.1674        | 0.0000     | SURCHARGED |
| 15 minute summer    | RE02    | 10          | 10.660    | 0.035     | 3.2          | 0.0006        | 0.0000     | OK         |
| 10080 minute summer | IC06    | 6900        | 10.583    | 0.331     | 0.2          | 0.0938        | 0.0000     | SURCHARGED |

| Link Event<br>(Upstream Depth) | US Node | Link    | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|---------|---------|---------------|----------------|----------|---------------|--------------------|
| 15 minute summer               | EX IC01 | 1.000   | EX IC02 | 2.7           | 0.656          | 0.442    | 0.1169        |                    |
| 10080 minute summer            | EX IC02 | 3.001   | EX.IC03 | 0.2           | 0.022          | 0.014    | 0.4007        |                    |
| 10080 minute summer            | EX.IC03 | 3.002   | IC04    | 0.2           | 0.003          | 0.003    | 1.9835        |                    |
| 10080 minute summer            | IC04    | 3.003   | IC05    | 0.4           | 0.006          | 0.006    | 1.4807        |                    |
| 10080 minute summer            | 5       | 1.004   | 6       | 0.7           | 0.005          | 0.041    | 0.7143        |                    |
| 10080 minute summer            | 20      | 1.019   | IC07    | 0.1           | 0.003          | 0.003    | 1.2801        |                    |
| 10080 minute summer            | IC07    | Orifice | 22      | 0.1           |                |          |               | 100.0              |
| 10080 minute summer            | 6       | 3.006   | 7       | 0.8           | 0.006          | 0.058    | 0.4838        |                    |
| 10080 minute summer            | 7       | 3.007   | 8       | 0.8           | 0.006          | 0.056    | 0.4853        |                    |
| 10080 minute summer            | 8       | 1.008   | 9       | 0.7           | 0.001          | 0.040    | 2.1037        |                    |
| 10080 minute summer            | 9       | 1.009   | 10      | 0.6           | 0.001          | 0.013    | 1.1754        |                    |
| 10080 minute summer            | 10      | 1.010_1 | 11      | 0.6           | 0.001          | 0.031    | 1.6466        |                    |
| 10080 minute summer            | 11      | 1.010   | 12      | 0.6           | 0.004          | 0.025    | 0.7656        |                    |
| 10080 minute summer            | 12      | 1.012   | 13      | 0.5           | 0.004          | 0.041    | 0.5872        |                    |
| 10080 minute summer            | 13      | 1.013   | 14      | 0.5           | 0.004          | 0.037    | 0.5893        |                    |
| 10080 minute summer            | 14      | 1.014   | 15      | 0.4           | 0.003          | 0.030    | 0.4639        |                    |
| 10080 minute summer            | 15      | 1.015   | 16      | 0.4           | 0.003          | 0.023    | 0.3465        |                    |
| 10080 minute summer            | 16      | 1.016   | 17      | 0.3           | 0.002          | 0.007    | 0.2127        |                    |
| 10080 minute summer            | 17      | 1.017   | 18      | 0.3           | 0.002          | 0.014    | 0.2181        |                    |
| 10080 minute summer            | 18      | 1.018   | 19      | 0.3           | 0.002          | 0.006    | 0.2133        |                    |
| 10080 minute summer            | 19      | 1.019_1 | 20      | 0.2           | 0.001          | 0.004    | 0.2133        |                    |
| 10080 minute summer            | IC05    | 3.004   | 5       | 0.7           | 0.010          | 0.011    | 0.9558        |                    |
| 15 minute summer               | RE02    | 5.000   | IC06    | 3.1           | 0.170          | 0.054    | 0.5700        |                    |
| 10080 minute summer            | IC06    | 5.001   | IC05    | 0.2           | 0.006          | 0.004    | 0.5797        |                    |

**Results for 1 year Critical Storm Duration. Lowest mass balance: 97.63%**

| Node Event          | US<br>Node | Peak<br>(mins) | Level<br>(m) | Depth<br>(m) | Inflow<br>(l/s) | Node<br>Vol (m <sup>3</sup> ) | Flood<br>(m <sup>3</sup> ) | Status     |
|---------------------|------------|----------------|--------------|--------------|-----------------|-------------------------------|----------------------------|------------|
| 10080 minute summer | RE01       | 6900           | 10.584       | 0.208        | 0.1             | 0.0037                        | 0.0000                     | SURCHARGED |
| 15 minute summer    | H1         | 11             | 10.788       | 0.068        | 7.6             | 0.3114                        | 0.0000                     | OK         |
| 10080 minute summer | H4         | 6900           | 10.583       | 0.103        | 1.0             | 0.0165                        | 0.0000                     | OK         |
| 10080 minute summer | H5         | 6900           | 10.583       | 0.154        | 1.4             | 0.0000                        | 0.0000                     | OK         |
| 10080 minute summer | H6         | 6900           | 10.583       | 0.303        | 0.4             | 0.0000                        | 0.0000                     | OK         |
| 10080 minute summer | H7         | 6900           | 10.583       | 0.318        | 0.4             | 0.0000                        | 0.0000                     | OK         |
| 10080 minute summer | H8         | 6900           | 10.583       | 0.330        | 0.4             | 0.0000                        | 0.0000                     | OK         |
| 10080 minute summer | H9         | 6900           | 10.583       | 0.372        | 0.4             | 0.0000                        | 0.0000                     | OK         |
| 15 minute summer    | H2         | 10             | 11.737       | 0.037        | 2.3             | 0.0059                        | 0.0000                     | OK         |
| 15 minute summer    | H3         | 10             | 11.566       | 0.026        | 2.3             | 0.0041                        | 0.0000                     | OK         |

| Link Event<br>(Upstream Depth) | US<br>Node | Link    | DS<br>Node | Outflow<br>(l/s) | Velocity<br>(m/s) | Flow/Cap | Link<br>Vol (m <sup>3</sup> ) | Discharge<br>Vol (m <sup>3</sup> ) |
|--------------------------------|------------|---------|------------|------------------|-------------------|----------|-------------------------------|------------------------------------|
| 10080 minute summer            | RE01       | 4.000   | IC04       | 0.1              | 0.009             | 0.006    | 0.2923                        |                                    |
| 15 minute summer               | H1         | 2.000   | H4         | 7.3              | 0.907             | 0.411    | 0.1915                        |                                    |
| 10080 minute summer            | H4         | 1.002   | H5         | 1.4              | 0.668             | 0.027    | 0.1198                        |                                    |
| 10080 minute summer            | H5         | 1.003   | H6         | 0.4              | 0.004             | 0.000    | 29.9349                       |                                    |
| 10080 minute summer            | H6         | 1.004_1 | H7         | 0.4              | 0.002             | 0.000    | 4.5152                        |                                    |
| 10080 minute summer            | H7         | 1.005   | H8         | 0.4              | 0.001             | 0.000    | 3.9752                        |                                    |
| 10080 minute summer            | H8         | 1.006   | H9         | 0.4              | 0.001             | 0.000    | 15.2157                       |                                    |
| 10080 minute summer            | H9         | 1.007   | 8          | 0.4              | 0.000             | 0.000    | 13.4307                       |                                    |
| 15 minute summer               | H2         | 1.000_1 | H3         | 2.3              | 0.683             | 0.128    | 0.0518                        |                                    |
| 15 minute summer               | H3         | 1.001   | H4         | 2.2              | 0.447             | 0.064    | 0.1475                        |                                    |

**Results for 10 year +40% CC Critical Storm Duration. Lowest mass balance: 97.98%**

| Node Event                     | US Node | Peak (mins) | Level (m) | Depth (m)     | Inflow (l/s)   | Node Vol (m³) | Flood (m³)    | Status             |
|--------------------------------|---------|-------------|-----------|---------------|----------------|---------------|---------------|--------------------|
| 15 minute summer               | EX IC01 | 11          | 11.500    | 0.700         | 11.3           | 0.1981        | 0.1738        | FLOOD              |
| 15 minute summer               | EX IC02 | 11          | 10.879    | 0.366         | 15.8           | 0.1036        | 0.0000        | SURCHARGED         |
| 10080 minute summer            | EX.IC03 | 8280        | 10.826    | 0.670         | 0.3            | 0.1896        | 0.0000        | FLOOD RISK         |
| 10080 minute summer            | IC04    | 7920        | 10.826    | 0.764         | 0.7            | 23.7238       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 5       | 8040        | 10.826    | 0.879         | 1.4            | 0.0000        | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 20      | 7980        | 10.826    | 0.875         | 0.2            | 15.8531       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | IC07    | 7980        | 10.826    | 0.986         | 0.1            | 1.1150        | 0.0000        | FLOOD RISK         |
| 15 minute summer               | 22      | 1           | 9.716     | 0.000         | 0.1            | 0.0000        | 0.0000        | OK                 |
| 10080 minute summer            | 6       | 8040        | 10.826    | 0.881         | 1.8            | 15.8535       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 7       | 8040        | 10.826    | 0.882         | 1.7            | 15.8535       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 8       | 8040        | 10.826    | 1.726         | 1.6            | 15.8535       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 9       | 8040        | 10.826    | 1.727         | 1.2            | 15.8536       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 10      | 8040        | 10.826    | 1.727         | 1.1            | 15.8536       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 11      | 8040        | 10.826    | 1.728         | 1.0            | 15.8536       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 12      | 8040        | 10.826    | 0.870         | 0.9            | 15.8535       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 13      | 8040        | 10.826    | 0.871         | 0.8            | 15.8532       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 14      | 8100        | 10.826    | 0.872         | 0.7            | 15.8531       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 15      | 7980        | 10.826    | 0.873         | 0.6            | 15.8531       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 16      | 7980        | 10.826    | 0.874         | 0.5            | 15.8531       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 17      | 7980        | 10.826    | 0.874         | 0.5            | 15.8531       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 18      | 7980        | 10.826    | 0.875         | 0.4            | 15.8531       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | 19      | 7980        | 10.826    | 0.875         | 0.3            | 15.8531       | 0.0000        | SURCHARGED         |
| 10080 minute summer            | IC05    | 8040        | 10.826    | 0.834         | 1.4            | 0.2360        | 0.0000        | FLOOD RISK         |
| 10080 minute summer            | RE02    | 8880        | 10.826    | 0.201         | 0.2            | 0.0036        | 0.0000        | OK                 |
| 10080 minute summer            | IC06    | 8880        | 10.826    | 0.574         | 0.5            | 0.1625        | 0.0000        | FLOOD RISK         |
| Link Event<br>(Upstream Depth) | US Node | Link        | DS Node   | Outflow (l/s) | Velocity (m/s) | Flow/Cap      | Link Vol (m³) | Discharge Vol (m³) |
| 15 minute summer               | EX IC01 | 1.000       | EX IC02   | 8.5           | 1.087          | 1.409         | 0.2248        |                    |
| 15 minute summer               | EX IC02 | 3.001       | EX.IC03   | 15.4          | 0.873          | 1.064         | 0.5477        |                    |
| 10080 minute summer            | EX.IC03 | 3.002       | IC04      | 0.3           | 0.004          | 0.005         | 1.9835        |                    |
| 10080 minute summer            | IC04    | 3.003       | IC05      | 0.7           | 0.010          | 0.011         | 1.4807        |                    |
| 10080 minute summer            | 5       | 1.004       | 6         | 1.4           | 0.006          | 0.081         | 1.3611        |                    |
| 10080 minute summer            | 20      | 1.019       | IC07      | 0.1           | 0.003          | 0.003         | 1.2801        |                    |
| 10080 minute summer            | IC07    | Orifice     | 22        | 0.1           |                |               |               | 114.6              |
| 10080 minute summer            | 6       | 3.006       | 7         | 1.7           | 0.007          | 0.116         | 0.9208        |                    |
| 10080 minute summer            | 7       | 3.007       | 8         | 1.6           | 0.006          | 0.109         | 0.9228        |                    |
| 10080 minute summer            | 8       | 1.008       | 9         | 1.2           | 0.001          | 0.072         | 2.8474        |                    |
| 10080 minute summer            | 9       | 1.009       | 10        | 1.1           | 0.001          | 0.023         | 1.5908        |                    |
| 10080 minute summer            | 10      | 1.010_1     | 11        | 1.0           | 0.001          | 0.053         | 2.2283        |                    |
| 10080 minute summer            | 11      | 1.010       | 12        | 0.9           | 0.004          | 0.040         | 1.4744        |                    |
| 10080 minute summer            | 12      | 1.012       | 13        | 0.8           | 0.003          | 0.063         | 1.1284        |                    |
| 10080 minute summer            | 13      | 1.013       | 14        | 0.7           | 0.003          | 0.056         | 1.1313        |                    |
| 10080 minute summer            | 14      | 1.014       | 15        | 0.6           | 0.003          | 0.043         | 0.8898        |                    |
| 10080 minute summer            | 15      | 1.015       | 16        | 0.5           | 0.003          | 0.032         | 0.6640        |                    |
| 10080 minute summer            | 16      | 1.016       | 17        | 0.5           | 0.003          | 0.009         | 0.4073        |                    |
| 10080 minute summer            | 17      | 1.017       | 18        | 0.4           | 0.002          | 0.017         | 0.4176        |                    |
| 10080 minute summer            | 18      | 1.018       | 19        | 0.3           | 0.002          | 0.006         | 0.4082        |                    |
| 10080 minute summer            | 19      | 1.019_1     | 20        | 0.2           | 0.001          | 0.004         | 0.4082        |                    |
| 10080 minute summer            | IC05    | 3.004       | 5         | 1.4           | 0.019          | 0.022         | 0.9558        |                    |
| 10080 minute summer            | RE02    | 5.000       | IC06      | 0.2           | 0.009          | 0.003         | 1.1509        |                    |
| 10080 minute summer            | IC06    | 5.001       | IC05      | 0.5           | 0.012          | 0.008         | 0.5797        |                    |

**Results for 10 year +40% CC Critical Storm Duration. Lowest mass balance: 97.98%**

| Node Event          | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|---------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 10080 minute summer | RE01    | 9360        | 10.826    | 0.450     | 0.2          | 0.0081        | 0.0000     | SURCHARGED |
| 15 minute summer    | H1      | 12          | 10.951    | 0.231     | 31.3         | 3.3463        | 0.0000     | SURCHARGED |
| 10080 minute summer | H4      | 8040        | 10.826    | 0.346     | 1.3          | 0.0550        | 0.0000     | SURCHARGED |
| 10080 minute summer | H5      | 8040        | 10.826    | 0.397     | 1.4          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | H6      | 7980        | 10.826    | 0.546     | 0.6          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | H7      | 7980        | 10.826    | 0.561     | 0.4          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | H8      | 7980        | 10.826    | 0.573     | 0.4          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | H9      | 8040        | 10.826    | 0.615     | 0.4          | 0.0000        | 0.0000     | OK         |
| 15 minute summer    | H2      | 10          | 11.781    | 0.081     | 9.4          | 0.0129        | 0.0000     | OK         |
| 15 minute summer    | H3      | 10          | 11.593    | 0.053     | 9.3          | 0.0084        | 0.0000     | OK         |

| Link Event<br>(Upstream Depth) | US Node | Link    | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|---------|---------|---------------|----------------|----------|---------------|--------------------|
| 10080 minute summer            | RE01    | 4.000   | IC04    | 0.2           | 0.011          | 0.011    | 0.2923        |                    |
| 15 minute summer               | H1      | 2.000   | H4      | 20.6          | 1.173          | 1.160    | 0.4125        |                    |
| 10080 minute summer            | H4      | 1.002   | H5      | 1.4           | 0.459          | 0.026    | 0.2034        |                    |
| 10080 minute summer            | H5      | 1.003   | H6      | 0.6           | 0.002          | 0.000    | 85.8219       |                    |
| 10080 minute summer            | H6      | 1.004_1 | H7      | 0.4           | 0.002          | 0.000    | 11.0595       |                    |
| 10080 minute summer            | H7      | 1.005   | H8      | 0.4           | 0.002          | 0.000    | 9.5063        |                    |
| 10080 minute summer            | H8      | 1.006   | H9      | 0.4           | 0.001          | 0.000    | 34.7846       |                    |
| 10080 minute summer            | H9      | 1.007   | 8       | 0.4           | 0.000          | 0.000    | 18.7854       |                    |
| 15 minute summer               | H2      | 1.000_1 | H3      | 9.3           | 0.990          | 0.524    | 0.1468        |                    |
| 15 minute summer               | H3      | 1.001   | H4      | 9.3           | 0.774          | 0.266    | 0.3155        |                    |

**Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 98.18%**

| Node Event          | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|---------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 30 minute summer    | EX IC01 | 17          | 11.500    | 0.700     | 13.4         | 0.1981        | 1.0710     | FLOOD      |
| 15 minute summer    | EX IC02 | 11          | 11.015    | 0.502     | 17.6         | 0.1421        | 0.0000     | SURCHARGED |
| 10080 minute summer | EX.IC03 | 8520        | 10.888    | 0.732     | 0.4          | 0.2071        | 0.0000     | FLOOD RISK |
| 10080 minute summer | IC04    | 8580        | 10.888    | 0.826     | 0.9          | 37.4790       | 0.0000     | FLOOD RISK |
| 10080 minute summer | 5       | 8460        | 10.888    | 0.941     | 1.8          | 0.0000        | 0.0000     | SURCHARGED |
| 10080 minute summer | 20      | 8460        | 10.888    | 0.937     | 0.2          | 17.4869       | 0.0000     | SURCHARGED |
| 10080 minute summer | IC07    | 8460        | 10.888    | 1.048     | 0.1          | 1.1850        | 0.0000     | FLOOD RISK |
| 15 minute summer    | 22      | 1           | 9.716     | 0.000     | 0.1          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | 6       | 8460        | 10.888    | 0.943     | 2.3          | 17.4867       | 0.0000     | SURCHARGED |
| 10080 minute summer | 7       | 8460        | 10.888    | 0.944     | 2.1          | 17.4867       | 0.0000     | SURCHARGED |
| 10080 minute summer | 8       | 8460        | 10.888    | 1.788     | 2.0          | 17.4866       | 0.0000     | SURCHARGED |
| 10080 minute summer | 9       | 8460        | 10.888    | 1.789     | 1.4          | 17.4866       | 0.0000     | SURCHARGED |
| 10080 minute summer | 10      | 8460        | 10.888    | 1.789     | 1.3          | 17.4866       | 0.0000     | SURCHARGED |
| 10080 minute summer | 11      | 8460        | 10.888    | 1.790     | 1.2          | 17.4866       | 0.0000     | SURCHARGED |
| 10080 minute summer | 12      | 8460        | 10.888    | 0.932     | 1.1          | 17.4866       | 0.0000     | SURCHARGED |
| 10080 minute summer | 13      | 8460        | 10.888    | 0.933     | 1.0          | 17.4867       | 0.0000     | SURCHARGED |
| 10080 minute summer | 14      | 8460        | 10.888    | 0.934     | 0.9          | 17.4868       | 0.0000     | SURCHARGED |
| 10080 minute summer | 15      | 8460        | 10.888    | 0.935     | 0.7          | 17.4868       | 0.0000     | SURCHARGED |
| 10080 minute summer | 16      | 8460        | 10.888    | 0.936     | 0.6          | 17.4868       | 0.0000     | SURCHARGED |
| 10080 minute summer | 17      | 8460        | 10.888    | 0.936     | 0.5          | 17.4868       | 0.0000     | SURCHARGED |
| 10080 minute summer | 18      | 8460        | 10.888    | 0.937     | 0.4          | 17.4868       | 0.0000     | SURCHARGED |
| 10080 minute summer | 19      | 8460        | 10.888    | 0.937     | 0.3          | 17.4868       | 0.0000     | SURCHARGED |
| 10080 minute summer | IC05    | 8460        | 10.888    | 0.896     | 1.8          | 0.2535        | 0.0000     | FLOOD RISK |
| 10080 minute summer | RE02    | 8520        | 10.888    | 0.263     | 0.3          | 0.0047        | 0.0000     | FLOOD RISK |
| 10080 minute summer | IC06    | 8520        | 10.888    | 0.636     | 0.6          | 0.1800        | 0.0000     | FLOOD RISK |

| Link Event<br>(Upstream Depth) | US Node | Link    | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|---------|---------|---------------|----------------|----------|---------------|--------------------|
| 30 minute summer               | EX IC01 | 1.000   | EX IC02 | 8.3           | 1.066          | 1.382    | 0.2248        |                    |
| 15 minute summer               | EX IC02 | 3.001   | EX.IC03 | 16.9          | 0.958          | 1.168    | 0.5477        |                    |
| 10080 minute summer            | EX.IC03 | 3.002   | IC04    | 0.4           | 0.006          | 0.006    | 1.9835        |                    |
| 10080 minute summer            | IC04    | 3.003   | IC05    | 0.9           | 0.013          | 0.014    | 1.4807        |                    |
| 10080 minute summer            | 5       | 1.004   | 6       | 1.8           | 0.006          | 0.104    | 1.5593        |                    |
| 10080 minute summer            | 20      | 1.019   | IC07    | 0.1           | 0.003          | 0.003    | 1.2801        |                    |
| 10080 minute summer            | IC07    | Orifice | 22      | 0.1           |                |          |               | 117.8              |
| 10080 minute summer            | 6       | 3.006   | 7       | 2.1           | 0.007          | 0.148    | 1.0547        |                    |
| 10080 minute summer            | 7       | 3.007   | 8       | 2.0           | 0.007          | 0.140    | 1.0568        |                    |
| 10080 minute summer            | 8       | 1.008   | 9       | 1.4           | 0.001          | 0.085    | 3.0552        |                    |
| 10080 minute summer            | 9       | 1.009   | 10      | 1.3           | 0.001          | 0.027    | 1.7068        |                    |
| 10080 minute summer            | 10      | 1.010_1 | 11      | 1.2           | 0.001          | 0.063    | 2.3908        |                    |
| 10080 minute summer            | 11      | 1.010   | 12      | 1.1           | 0.004          | 0.048    | 1.6922        |                    |
| 10080 minute summer            | 12      | 1.012   | 13      | 1.0           | 0.003          | 0.075    | 1.2946        |                    |
| 10080 minute summer            | 13      | 1.013   | 14      | 0.9           | 0.003          | 0.067    | 1.2977        |                    |
| 10080 minute summer            | 14      | 1.014   | 15      | 0.7           | 0.003          | 0.051    | 1.0206        |                    |
| 10080 minute summer            | 15      | 1.015   | 16      | 0.6           | 0.002          | 0.038    | 0.7615        |                    |
| 10080 minute summer            | 16      | 1.016   | 17      | 0.5           | 0.002          | 0.011    | 0.4671        |                    |
| 10080 minute summer            | 17      | 1.017   | 18      | 0.4           | 0.002          | 0.020    | 0.4788        |                    |
| 10080 minute summer            | 18      | 1.018   | 19      | 0.3           | 0.002          | 0.006    | 0.4681        |                    |
| 10080 minute summer            | 19      | 1.019_1 | 20      | 0.2           | 0.001          | 0.004    | 0.4681        |                    |
| 10080 minute summer            | IC05    | 3.004   | 5       | 1.8           | 0.025          | 0.028    | 0.9558        |                    |
| 10080 minute summer            | RE02    | 5.000   | IC06    | 0.3           | 0.010          | 0.005    | 1.1849        |                    |
| 10080 minute summer            | IC06    | 5.001   | IC05    | 0.6           | 0.015          | 0.010    | 0.5797        |                    |

**Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 98.18%**

| Node Event          | US<br>Node | Peak<br>(mins) | Level<br>(m) | Depth<br>(m) | Inflow<br>(l/s) | Node<br>Vol (m <sup>3</sup> ) | Flood<br>(m <sup>3</sup> ) | Status     |
|---------------------|------------|----------------|--------------|--------------|-----------------|-------------------------------|----------------------------|------------|
| 10080 minute summer | RE01       | 8700           | 10.888       | 0.512        | 0.3             | 0.0092                        | 0.0000                     | FLOOD RISK |
| 15 minute summer    | H1         | 13             | 11.027       | 0.307        | 40.7            | 5.8850                        | 0.0000                     | SURCHARGED |
| 10080 minute summer | H4         | 8460           | 10.888       | 0.408        | 1.1             | 0.0648                        | 0.0000                     | SURCHARGED |
| 10080 minute summer | H5         | 8460           | 10.888       | 0.459        | 1.4             | 0.0000                        | 0.0000                     | OK         |
| 10080 minute summer | H6         | 8460           | 10.888       | 0.608        | 0.7             | 0.0000                        | 0.0000                     | OK         |
| 10080 minute summer | H7         | 8460           | 10.888       | 0.623        | 0.5             | 0.0000                        | 0.0000                     | OK         |
| 10080 minute summer | H8         | 8460           | 10.888       | 0.635        | 0.5             | 0.0000                        | 0.0000                     | OK         |
| 10080 minute summer | H9         | 8460           | 10.888       | 0.677        | 0.4             | 0.0000                        | 0.0000                     | OK         |
| 15 minute summer    | H2         | 10             | 11.797       | 0.097        | 12.3            | 0.0154                        | 0.0000                     | OK         |
| 15 minute summer    | H3         | 10             | 11.601       | 0.061        | 12.2            | 0.0097                        | 0.0000                     | OK         |

| Link Event<br>(Upstream Depth) | US<br>Node | Link    | DS<br>Node | Outflow<br>(l/s) | Velocity<br>(m/s) | Flow/Cap | Link<br>Vol (m <sup>3</sup> ) | Discharge<br>Vol (m <sup>3</sup> ) |
|--------------------------------|------------|---------|------------|------------------|-------------------|----------|-------------------------------|------------------------------------|
| 10080 minute summer            | RE01       | 4.000   | IC04       | 0.3              | 0.017             | 0.017    | 0.2923                        |                                    |
| 15 minute summer               | H1         | 2.000   | H4         | 22.2             | 1.264             | 1.253    | 0.4193                        |                                    |
| 10080 minute summer            | H4         | 1.002   | H5         | 1.4              | 0.454             | 0.027    | 0.2034                        |                                    |
| 10080 minute summer            | H5         | 1.003   | H6         | 0.7              | 0.002             | 0.000    | 104.2953                      |                                    |
| 10080 minute summer            | H6         | 1.004_1 | H7         | 0.5              | 0.001             | 0.000    | 13.1551                       |                                    |
| 10080 minute summer            | H7         | 1.005   | H8         | 0.5              | 0.001             | 0.000    | 11.2696                       |                                    |
| 10080 minute summer            | H8         | 1.006   | H9         | 0.4              | 0.001             | 0.000    | 40.9709                       |                                    |
| 10080 minute summer            | H9         | 1.007   | 8          | -0.4             | 0.000             | 0.000    | 20.3232                       |                                    |
| 15 minute summer               | H2         | 1.000_1 | H3         | 12.2             | 1.049             | 0.685    | 0.1809                        |                                    |
| 15 minute summer               | H3         | 1.001   | H4         | 12.1             | 0.882             | 0.347    | 0.3387                        |                                    |

**Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 98.42%**

| Node Event          | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|---------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 30 minute summer    | EX IC01 | 16          | 11.500    | 0.700     | 17.5         | 0.1981        | 2.7991     | FLOOD      |
| 15 minute summer    | EX IC02 | 11          | 11.138    | 0.625     | 19.6         | 0.1770        | 0.0000     | SURCHARGED |
| 10080 minute summer | EX.IC03 | 9780        | 10.976    | 0.820     | 0.5          | 0.2322        | 0.0000     | FLOOD RISK |
| 10080 minute summer | IC04    | 9660        | 10.976    | 0.914     | 1.1          | 57.1569       | 0.0000     | FLOOD RISK |
| 10080 minute summer | 5       | 9600        | 10.976    | 1.029     | 1.8          | 0.0000        | 0.0000     | SURCHARGED |
| 10080 minute summer | 20      | 9600        | 10.976    | 1.025     | 0.2          | 19.9182       | 0.0000     | SURCHARGED |
| 10080 minute summer | IC07    | 9600        | 10.976    | 1.136     | 0.1          | 1.2851        | 0.0000     | FLOOD RISK |
| 15 minute summer    | 22      | 1           | 9.716     | 0.000     | 0.1          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | 6       | 9600        | 10.976    | 1.031     | 2.2          | 19.9187       | 0.0000     | SURCHARGED |
| 10080 minute summer | 7       | 9600        | 10.976    | 1.032     | 2.0          | 19.9186       | 0.0000     | SURCHARGED |
| 10080 minute summer | 8       | 9600        | 10.976    | 1.876     | 1.9          | 19.9185       | 0.0000     | SURCHARGED |
| 10080 minute summer | 9       | 9600        | 10.976    | 1.877     | 1.4          | 19.9186       | 0.0000     | SURCHARGED |
| 10080 minute summer | 10      | 9600        | 10.976    | 1.877     | 1.2          | 19.9186       | 0.0000     | SURCHARGED |
| 10080 minute summer | 11      | 9600        | 10.976    | 1.878     | 1.1          | 19.9186       | 0.0000     | SURCHARGED |
| 10080 minute summer | 12      | 9600        | 10.976    | 1.020     | 1.0          | 19.9185       | 0.0000     | SURCHARGED |
| 10080 minute summer | 13      | 9600        | 10.976    | 1.021     | 0.9          | 19.9185       | 0.0000     | SURCHARGED |
| 10080 minute summer | 14      | 9600        | 10.976    | 1.022     | 0.8          | 19.9184       | 0.0000     | SURCHARGED |
| 10080 minute summer | 15      | 9600        | 10.976    | 1.023     | 0.7          | 19.9183       | 0.0000     | SURCHARGED |
| 10080 minute summer | 16      | 9600        | 10.976    | 1.024     | 0.6          | 19.9182       | 0.0000     | SURCHARGED |
| 10080 minute summer | 17      | 9600        | 10.976    | 1.024     | 0.5          | 19.9182       | 0.0000     | SURCHARGED |
| 10080 minute summer | 18      | 9600        | 10.976    | 1.025     | 0.4          | 19.9182       | 0.0000     | SURCHARGED |
| 10080 minute summer | 19      | 9600        | 10.976    | 1.025     | 0.3          | 19.9182       | 0.0000     | SURCHARGED |
| 10080 minute summer | IC05    | 9600        | 10.976    | 0.984     | 1.8          | 0.2785        | 0.0000     | FLOOD RISK |
| 10080 minute summer | RE02    | 9540        | 10.977    | 0.352     | 0.3          | 0.0063        | 0.0000     | FLOOD RISK |
| 10080 minute summer | IC06    | 9540        | 10.976    | 0.724     | 0.7          | 0.2050        | 0.0000     | FLOOD RISK |

| Link Event<br>(Upstream Depth) | US Node | Link    | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|---------|---------|---------------|----------------|----------|---------------|--------------------|
| 30 minute summer               | EX IC01 | 1.000   | EX IC02 | 7.9           | 1.009          | 1.308    | 0.2248        |                    |
| 15 minute summer               | EX IC02 | 3.001   | EX.IC03 | 18.9          | 1.072          | 1.306    | 0.5477        |                    |
| 10080 minute summer            | EX.IC03 | 3.002   | IC04    | 0.5           | 0.007          | 0.008    | 1.9835        |                    |
| 10080 minute summer            | IC04    | 3.003   | IC05    | 0.9           | 0.013          | 0.014    | 1.4807        |                    |
| 10080 minute summer            | 5       | 1.004   | 6       | 1.8           | 0.006          | 0.104    | 1.8664        |                    |
| 10080 minute summer            | 20      | 1.019   | IC07    | 0.1           | 0.003          | 0.003    | 1.2801        |                    |
| 10080 minute summer            | IC07    | Orifice | 22      | 0.1           |                |          |               | 122.1              |
| 10080 minute summer            | 6       | 3.006   | 7       | 2.0           | 0.007          | 0.141    | 1.2620        |                    |
| 10080 minute summer            | 7       | 3.007   | 8       | 1.9           | 0.006          | 0.134    | 1.2644        |                    |
| 10080 minute summer            | 8       | 1.008   | 9       | 1.4           | 0.001          | 0.081    | 3.3653        |                    |
| 10080 minute summer            | 9       | 1.009   | 10      | 1.2           | 0.001          | 0.026    | 1.8800        |                    |
| 10080 minute summer            | 10      | 1.010_1 | 11      | 1.1           | 0.001          | 0.060    | 2.6334        |                    |
| 10080 minute summer            | 11      | 1.010   | 12      | 1.0           | 0.004          | 0.046    | 2.0299        |                    |
| 10080 minute summer            | 12      | 1.012   | 13      | 0.9           | 0.003          | 0.072    | 1.5522        |                    |
| 10080 minute summer            | 13      | 1.013   | 14      | 0.8           | 0.003          | 0.063    | 1.5557        |                    |
| 10080 minute summer            | 14      | 1.014   | 15      | 0.7           | 0.003          | 0.049    | 1.2233        |                    |
| 10080 minute summer            | 15      | 1.015   | 16      | 0.6           | 0.003          | 0.036    | 0.9125        |                    |
| 10080 minute summer            | 16      | 1.016   | 17      | 0.5           | 0.002          | 0.011    | 0.5597        |                    |
| 10080 minute summer            | 17      | 1.017   | 18      | 0.4           | 0.002          | 0.019    | 0.5736        |                    |
| 10080 minute summer            | 18      | 1.018   | 19      | 0.3           | 0.002          | 0.006    | 0.5607        |                    |
| 10080 minute summer            | 19      | 1.019_1 | 20      | 0.2           | 0.001          | 0.004    | 0.5607        |                    |
| 10080 minute summer            | IC05    | 3.004   | 5       | 1.8           | 0.025          | 0.028    | 0.9558        |                    |
| 10080 minute summer            | RE02    | 5.000   | IC06    | 0.3           | 0.010          | 0.005    | 1.1849        |                    |
| 10080 minute summer            | IC06    | 5.001   | IC05    | 0.7           | 0.017          | 0.012    | 0.5797        |                    |

**Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 98.42%**

| Node Event          | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|---------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 15 minute summer    | RE01    | 11          | 11.010    | 0.634     | 21.9         | 0.0114        | 0.0000     | FLOOD RISK |
| 30 minute summer    | H1      | 21          | 11.112    | 0.392     | 48.6         | 9.5273        | 0.0000     | SURCHARGED |
| 10080 minute summer | H4      | 9600        | 10.976    | 0.496     | 1.3          | 0.0789        | 0.0000     | SURCHARGED |
| 10080 minute summer | H5      | 9600        | 10.976    | 0.547     | 1.6          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | H6      | 9600        | 10.976    | 0.696     | 0.9          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | H7      | 9600        | 10.976    | 0.711     | 1.0          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | H8      | 9600        | 10.976    | 0.723     | 1.1          | 0.0000        | 0.0000     | OK         |
| 10080 minute summer | H9      | 9600        | 10.976    | 0.765     | 1.2          | 0.0000        | 0.0000     | OK         |
| 15 minute summer    | H2      | 10          | 11.819    | 0.119     | 15.9         | 0.0189        | 0.0000     | OK         |
| 15 minute summer    | H3      | 10          | 11.611    | 0.071     | 15.7         | 0.0112        | 0.0000     | OK         |

| Link Event<br>(Upstream Depth) | US Node | Link    | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|---------|---------|---------------|----------------|----------|---------------|--------------------|
| 15 minute summer               | RE01    | 4.000   | IC04    | 21.1          | 1.200          | 1.190    | 0.2923        |                    |
| 30 minute summer               | H1      | 2.000   | H4      | 23.2          | 1.317          | 1.306    | 0.4193        |                    |
| 10080 minute summer            | H4      | 1.002   | H5      | 1.6           | 0.454          | 0.031    | 0.2034        |                    |
| 10080 minute summer            | H5      | 1.003   | H6      | 0.9           | 0.002          | 0.000    | 133.6865      |                    |
| 10080 minute summer            | H6      | 1.004_1 | H7      | 1.0           | 0.001          | 0.000    | 16.4525       |                    |
| 10080 minute summer            | H7      | 1.005   | H8      | 1.1           | 0.001          | 0.000    | 14.0392       |                    |
| 10080 minute summer            | H8      | 1.006   | H9      | 1.2           | 0.001          | 0.000    | 50.6595       |                    |
| 10080 minute summer            | H9      | 1.007   | 8       | 1.0           | 0.000          | 0.000    | 22.6447       |                    |
| 15 minute summer               | H2      | 1.000_1 | H3      | 15.7          | 1.096          | 0.886    | 0.2240        |                    |
| 15 minute summer               | H3      | 1.001   | H4      | 15.7          | 1.056          | 0.449    | 0.3583        |                    |

# Appendix K -Maintenance Schedules



ENGINEERING GROUP

# Stoney Brook Farm, Walberton

SURFACE WATER MANAGEMENT PLAN

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# Revisions and Additional Material

## Document History and Status

| Revision | Date       | Purpose/Status |
|----------|------------|----------------|
| -        | 03.06.2026 | First Issue    |
|          |            |                |
|          |            |                |
|          |            |                |

## Document Details

|                  |                              |
|------------------|------------------------------|
| Project Director | Mark Jones                   |
| Report Author    | Mark Jones                   |
| Project Number   | A001-013                     |
| Project Name     | Stoney Brook Farm, Walberton |

# 1 Introduction and Limitation

## 1.1 Introduction

- 1.1.1 MJ Engineering Group (MJEG) has been appointed to prepare a Surface Water Management Plan (SWMP) for Land at Stoney Brook Farm, Walberton, BN18 0BA.

## 1.2 Limitation

- 1.2.1 This Report has been prepared by MJ Engineering Group Ltd (MJEG) for the sole use of the “client”. This Report is confidential and may not be disclosed by the client nor relied upon by any other party without the prior and express written agreement of MJEG.
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## 2 Site Description

- 2.1.1 The site is located off Eastergate Lane in the village of Walberton at grid reference SU960060.
- 2.1.2 The ground conditions according to the British Geological Society across the site reports Head deposits comprising of Gravel, Sand, Silt and Clay, over a bedrock of London Clay.
- 2.1.3 The immediate neighbouring site has been subject of a planning application that reported Clay to be present across the site, with a groundwater level at 0.69m below existing ground level.
- 2.1.4 Groundwater monitoring has been carried out between November 2025 to February 2026 in the area of the proposed basin. The monitoring recorded groundwater at 0.347m below existing ground level making the use of infiltration as the primary means of discharging surface water not viable.
- 2.1.5 The surface water drainage will outfall to the existing watercourse, using the existing outfall pipe.
- 2.1.6 Sustainable Drainage Systems (SuDS) features will manage rainfall to deal with Surface Water. The SuDS features will control the flow rate to greenfield run-off rate and volume of water leaving the development area. The drainage system will also provide provision for collecting and reusing surface water on the site and allow for surface water to infiltrate/feed the landscape areas from the basin.

## 3 Roles and Responsibilities

- 3.1.1 This section identifies the key roles and responsibilities for the drainage features.

| SuDS Features          | Company Responsible |
|------------------------|---------------------|
| Catchpit chambers      | Landowner           |
| Surface Water pipework | Landowner           |
| Basin Headwalls        | Landowner           |
| Permeable Paving       | Landowner           |
| Landscape areas        | Landowner           |

## 4 Managing SuDS

- 4.1.1 With all drainage systems, SuDS components require regular inspection and maintenance to ensure the operational efficiency and reduce the risk of failure. The level of inspection and maintenance will vary depending on the type of SuDS component. The maintenance schedules

set out in **Appendix A** reflects the guidance set out in The SuDS Manual (CIRIA publication C753).

4.1.2 The SuDS Maintenance Schedules, as set out in The SuDS Manual, are designed for easy maintenance comprising of:

- Regular daily – Litter collection and clearing inlets and outlets.
- Occasional tasks – removing silt that builds up, clearing excessive vegetation, etc.
- Remedial Work – Repairing damage to the features as required.

## 5 Appendices

## *Appendix A – Management, Maintenance and Remediation Schedule*

## Operation and Maintenance requirements for SW Pipes and Chambers

|                             |                                                                                |                                                                                           |
|-----------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Responsible for Maintenance | Farm Owner                                                                     |                                                                                           |
| Maintenance Schedule        | Required Action                                                                | Typical Frequency                                                                         |
| Routine maintenance         | Remove litter and debris and inspect for sediment, oil and grease accumulation | Six monthly                                                                               |
|                             | Remove sediment, oil, grease and floatables                                    | As necessary – indicated by system inspections or immediately following significant spill |
| Remedial actions            | Replace damaged guttering, and pipework                                        | As required                                                                               |
|                             | Cleanout guttering of debris                                                   | Annually or as required                                                                   |
| Monitoring                  | Inspect for guttering and pipework for debris and blockages                    | Six monthly                                                                               |

## Operation and Maintenance requirements for Pervious Pavements

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

| Operation and Maintenance requirements for SW Pipes and Chambers |                                                                                |                                                                                           |
|------------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Responsible for Maintenance                                      | Water Authority/Household                                                      |                                                                                           |
| Maintenance Schedule                                             | Required Action                                                                | Typical Frequency                                                                         |
| Routine maintenance                                              | Remove litter and debris and inspect for sediment, oil and grease accumulation | Six monthly                                                                               |
|                                                                  | Remove sediment, oil, grease and floatables                                    | As necessary – indicated by system inspections or immediately following significant spill |
| Remedial actions                                                 | Replace damaged guttering, and pipework                                        | As required                                                                               |
|                                                                  | Cleanout guttering of debris                                                   | Annually or as required                                                                   |
| Monitoring                                                       | Inspect for guttering and pipework for debris and blockages                    | Six monthly                                                                               |

## Operation and Maintenance requirements for Swales

| Responsible for Maintenance | Landowner                                                                                                                              |                                                                                     |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Maintenance Schedule        | Required Action                                                                                                                        | Typical Frequency                                                                   |
| Regular maintenance         | Remove litter and debris                                                                                                               | Monthly, or as required                                                             |
|                             | Cut grass - retain grass height within specified design range                                                                          | Monthly (during growing season), or as required                                     |
|                             | Manage other vegetation and remove nuisance plants                                                                                     | Monthly at start, then as required                                                  |
|                             | Inspect inlets, outlets and overflows for blockages, and clear if required                                                             | Monthly                                                                             |
|                             | Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for .48hrs               | Monthly, or when required                                                           |
|                             | Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies                              | Half yearly                                                                         |
| Occasional maintenance      | Reseed areas of poor vegetation growth, after 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 reseed                                                                                 | As required                                                                         |
|                             | Relevel uneven surfaces and reinstate design levels                                                                                    | As required                                                                         |
|                             | Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface | As required                                                                         |
|                             | Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip                                         | As required                                                                         |
|                             | Remove and dispose of oils or petrol residues using safe standard practices                                                            | As required                                                                         |

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