

Drainage Strategy

Land South of Saltmarsh Lane

Hayling Island, PO11 0JT

for

Hayling Island Builders Ltd

1139

October 2025

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1.0	22.10.2021	Initial Issue	AJ	DB
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Description	
CGV Transport Consultants has been instructed by Hayling Island Builders Ltd, to produce a Drainage Strategy to support the Planning Application for the site at Land South of Saltmarsh Lane, Hayling Island, PO11 0JT.	
Site Parameters	
Total Area:	24,800m ² (2.48 Ha)
Greenfield:	YES
Brownfield:	NO
Mixed Green and Brownfield:	NO
Existing Runoff Location:	Ground and existing ditches.
Ground Conditions:	Clay
Method of Study:	Desk Investigation
Ground Infiltration Potential:	Low
Drainage Strategy / SuDS	
Infiltration Viable:	NO
Discharge Point (SW):	Watercourse
Flow Control:	8.4 l/s
Storage Provided:	1 in 100 Year + 40% Climate Change
Discharge Point (FW):	Sewer
SuDS Elements:	Porous Surfacing, Swales, Water butts Rainwater planters, crated storage and a Pond
Water Quality Measures:	Catchpits, Geotextiles, clean stone
Exceedance flows:	Managed within site
Conclusions	
Infiltration is unlikely to be viable on site and so attenuation is provided in open sustainable drainage features such as ponds and swales, with additional storage in storage crates and porous surfacing systems. All runoff will be treated before it enters the local watercourse.	

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1.0 Introduction

- 1.1.1 Hayling Island Builders Ltd is planning a proposed development on the site at Land South of Saltmarsh Lane, Hayling Island, PO11 0JT.
- 1.1.2 CGV Transport Consultants has been instructed by Hayling Island Builders Ltd, to produce a Drainage Strategy to support the Planning Application.
- 1.1.3 This report aims to demonstrate that a reduction in surface water run-off from the site can be achieved.
- 1.1.4 This report demonstrates that the objectives of the “National standards for sustainable drainage systems (SuDS) “can be achieved.
- 1.1.5 This report has had the benefit of taking onboard comments raised by the LLFA in their response to version 2 of this report.
- 1.1.6 The general limitations of this assessment are that:
 - Several data sources have been used in compiling this report. Whilst CGV Transport Consultants believe them to be trustworthy; it is unable to guarantee the accuracy of the information that has been provided by others.
 - This report is based on information available at the time of preparation. There is potential for further information to become available, which may create a need to modify conclusions drawn in this report.

2.0 Location of Site

- 2.1.1 The site is located south of Saltmarsh Lane in Hayling Island. A location plan is enclosed in **Appendix A**.
- 2.1.2 The Local Authorities are Havant Borough Council and Hampshire County Council.

3.0 Site Description

3.1 Existing Site

- 3.1.1 The existing site is the parcel of land to the south of Saltmarsh Lane. A topographical survey has been commissioned for the site and can be found in **Appendix B**.

3.2 Existing Drainage System

- 3.2.1 Sewer records were obtained from Southern Water and can be found at **Appendix C**. There are public foul water and surface water sewers located within Saltmarsh Lane.
- 3.2.2 There is a public 225mm diameter foul water sewer within Saltmarsh Lane. The closest public manhole is No. 1201 with cover level 4.36m AOD and an invert level of 0.36m AOD.
- 3.2.3 There is a public 600mm diameter surface water sewer within Saltmarsh Lane. The closest public manhole is No. 2252 with cover level 3.53m AOD and an invert level of 1.98m AOD.
- 3.2.4 There are existing ditches running through the site from south and the east that join a 600mm diameter pipe running through 64 Saltmarsh Lane.

3.3 Existing Geology

- 3.3.1 The geology of the site has been ascertained by reference to the 1:50,000 British Geological Survey website. The data provided on the website indicates the bedrock and superficial drift geology for the site.

- 3.3.2 The strata of the site (bedrock geology) comprises London Clay formation, described as follows:

“London Clay Formation - Clay, Silt and Sand. Sedimentary Bedrock formed approximately 48 to 56 million years ago in the Palaeogene Period. Local environment previously dominated by deep seas. These sedimentary rocks are marine in origin. They are detrital and comprise coarse- to fine-grained slurries of debris from the continental shelf flowing into a deep-sea environment, forming distinctively graded beds.”

- 3.3.3 The strata of the site (superficial drift) comprises River Terrace Deposits, described as follows:

“River Terrace Deposits (undifferentiated) - Sand, Silt and Clay. Superficial Deposits formed up to 3 million years ago in the Quaternary Period. Local environment previously dominated by rivers (U). These sedimentary deposits are fluvial in origin. They are detrital, ranging from coarse- to fine-grained and form beds and lenses of deposits reflecting the channels, floodplains and levees of a river or estuary (if in a coastal setting).”

3.4 Geological Assessment

- 3.4.1 Boreholes in the local area indicate predominantly clay with seams of sand and gravel and chalk at depth.
- 3.4.2 It has not been possible to undertake site investigations at the time of writing this report to determine the underlying geology. It is recommended that a full geotechnical investigation be completed prior to any detailed design of the scheme.
- 3.4.3 Based on the desk study information on the geology of the site, infiltration is not likely to be suitable for the development. The requirement for a positive surface water discharge has been considered in this report.

3.5 Hydrogeology Setting

- 3.5.1 The Environment Agency (EA) mapping service, as provided by Magic Map, indicates the aquifer designation for the bedrock and superficial drift geology and the groundwater vulnerability in the area. The mapping, as included at **Appendix D**, provide the following information for the site:

Geology Map	Site Description
Aquifer Designation (Bedrock)	Unproductive
Aquifer Designation (Superficial Drift)	Secondary A
Groundwater Vulnerability	Medium / Low
Groundwater Source Protection Zone	None

4.0 Site Run-Off

4.1 Existing Surface Water Runoff

- 4.1.1 The site has not been previously developed, so an analysis of the Greenfield run-off rate is appropriate and will be made for the developable site area of 2.48 hectares.
- 4.1.2 The Greenfield run-off rates have been calculated for the existing site. The existing site run-off rates have been calculated based on the Interim Code of Practice for Sustainable Drainage Systems, Chapter 6 using the Micro Drainage design software. The output from the software analysis can be found at **Appendix E**.
- 4.1.3 The Qbar (rural) value for the site is 8.4 litres per second. This is the nationally accepted method that use the greenfield (pre-development) runoff rate for the whole area that currently contributes runoff to the receiving system (i.e. the whole site or contributing catchment), not just the impermeable/developable portion — then control post-development runoff from the developable/impermeable area so that the discharge from the site does not exceed that greenfield rate.
- 4.1.4 “Greenfield runoff” describes the pre-development (undeveloped/vegetated) behaviour of the whole site or contributing catchment, so the benchmark/target discharge is normally based on that full pre-development area. Designers must therefore show that post-development flows (from the new impermeable areas) are attenuated so the site does not increase peak flow to the receiving watercourse.

4.2 Greenfield Run-Off Assessment

- 4.2.1 An assessment of the most appropriate flow restriction on site can be made with an engineering judgement made on the following parameters:
- Proposed depth of surface water system. Shallow systems will not be able to construct certain flow controls.
 - Risk of blockages, open drainage systems and conventional piped systems will have a significantly higher chance of blockage.
 - Potential for soakage or a hybrid solution with some infiltration and some positive discharge.
 - The existing use of the site (green/brown field) and the most appropriate reduction in surface water flows from the proposed development.
 - Potential development costs and the viability of achieving very low flow rates on sites.
 - Manufacturer limits, with Hydro-International stating they can achieve between 0.7 and 550 l/s on their product range.
- 4.2.2 Infiltration has not been selected, based on the geotechnical information provided within this report.
- 4.2.3 A flow control of 8.4 litres per second has been proposed, which is equivalent to the greenfield run-off rate.

4.3 Runoff destinations

4.3.1 An assessment of the most appropriate management of surface water will be addressed as part of this strategy. The runoff from the development shall meet the priorities as listed below where practicable:

- priority 1: collected for non-potable use
- priority 2: infiltrated to ground
- priority 3: discharged to an above ground surface water body
- priority 4: discharged to a surface water sewer, or another piped surface water drainage system
- priority 5: discharged to a combined sewer

4.3.2 The most appropriate management of surface water for this site will be a mixture of priority 1 by providing a water butt for each unit and priority 3 by discharging into the above ground surface water body (ditch). Any run-off will be treated before it enters the local system.

5.0 Proposed Development

5.1.1 The proposal is for 62 No. residential units. A site layout can be found at **Appendix F**.

5.2 Infiltration Potential

5.2.1 The geotechnical information provided in this report indicates that standard infiltration methods will not be suitable on site.

5.2.2 The table below summarises the potential for infiltration.

Low infiltration potential: There is a low potential for infiltration SuDS in parts of the Site. Comments: It is likely that the underlying geology at the Site, or in areas of the site, is relatively impermeable which would limit the effectiveness of a proposed infiltration SuDS scheme. Recommendations: Infiltration SuDS should be focused in more suitable parts of the site. If a site investigation confirms that infiltration SuDS are not possible at the site, then attenuation SuDS with a controlled discharge into a nearby surface water feature or existing surface water drainage is recommended.	YES
Moderate infiltration potential: There is a moderate potential for infiltration SuDS in parts of the Site. Comments: It is likely that the permeability of the underlying material at the site would be suitable for infiltration drainage. However, there may be constraints on the use of infiltration SuDS because of any of the following: a high water-table, the limited thickness of the receiving formation, the potential for a significant range in permeability in the underlying geology and confirmation of the infiltration capacity is recommended. Recommendations: A site investigation is recommended to investigate groundwater levels and formation thickness and to confirm that infiltration rates at the site are sufficient to accommodate an infiltration SuDS feature. If a site investigation confirms that infiltration SuDS are possible at the Site then assorted options can be considered for infiltration SuDS and these include infiltration trenches, soakaways, swales, permeable pavements and infiltration basins without outlets.	NO
High infiltration potential: There is a high potential for infiltration SuDS in parts of the Site. Comments: It is likely that the underlying geology at the Site is highly permeable and an infiltration SuDS scheme should be possible at the Site. Groundwater levels are expected to be sufficiently deep at the site. Recommendations: A site investigation is recommended to confirm the high infiltration capacity and the depth of the winter water table. Assorted options can be considered for infiltration SuDS and these include infiltration trenches, soakaways, swales, permeable pavements and infiltration basins without outlets.	NO

6.0 Sustainable Drainage Assessment

6.1 SuDS Hierarchy

- 6.1.1 Options for the destination for the run-off generated on site have been assessed in line with the prioritisation set out in the Building Regulations Part H document and DEFRA's Draft National Standards for SuDS as follows:

Discharge to Ground	Not viable based on desk study
Discharge to Watercourse	Selected Option
Discharge to Surface Water Sewer	N/A
Discharge to Other Sewer	N/A

- 6.1.2 The indicative potential for different SuDS devices has been assessed and can be seen in the table below:

SuDS Feature	Environmental benefits	Water quality improvement	Suitability for low permeability soils ($k < 10^{-6}$)	Ground-water recharge	Suitable for small / confined sites?	Site specific restrictions	Appropriate for subject site?
Wetlands	✓	✓	✓	X	X	Site Constraints	No
Retention ponds	✓	✓	✓	X	X	None	Yes
Detention basins	✓	✓	✓	X	X	None	Yes
Infiltration basins	✓	✓	X	✓	X	Poor Ground	No
Soakaways	X	✓	X	✓	✓	Poor Ground	No
Underground storage	X	X	✓	X	✓	None	Yes
Swales	✓	✓	✓	✓	X	None	Yes
Filter strips	✓	✓	✓	✓	X	None	Yes
Rainwater harvesting	X	✓	✓	✓	✓	None	Yes
Permeable paving	X	✓	✓	✓	✓	None	Yes
Green roofs	✓	✓	✓	X	✓	N/A	No
Rain Garden (external)	✓	✓	✓	X	X	Site Constraints	No
Rain Garden (planter)	✓	✓	✓	X	✓	None	Yes

6.2 Detailed SuDS Assessment

6.2.1 To maximize the potential use of SuDS at the site, a review has been undertaken in accordance with the SuDS Hierarchy (National standards for sustainable drainage systems (SuDS)). The following table indicates the potential setting for SuDS elements:

	Description	Setting	Required Area
Green Roof	A planted soil layer is constructed on the roof of a building to create a living surface. Water is stored in the soil layer and absorbed by vegetation.	Building	Building integrated
Rainwater Harvesting	Rainwater is collected from the roof of a building or from other paved surfaces and stored in an overground or underground tank for treatment and reuse locally. Water could be used for toilet flushing and irrigation.	Building	Water storage (underground or above ground)
Soakaway	A soakaway is designed to allow water to quickly soak into permeable layers of soil. Constructed like a dry well, an underground pit is dug filled with gravel or rubble. Water can be piped to a soakaway where it will be stored and allowed to gradually seep into the ground.	Open Space	Dependant on Run-off volumes and soils
Filter Strip	Filter strips are grassed or planted areas that runoff can run across to promote infiltration and cleansing.	Open Space	Maximum length 5 metres
Permeable Paving	Paving which allows water to soak through. Can be in the form of paving blocks with gaps between solid blocks or porous paving where water filters through the block itself. Water can be stored in the sub-base beneath or allowed to infiltrate into ground below.	Street / Open Space	Can typically drain double its area
Bioretention Area	A vegetated area with gravel and sand layers below designed to channel, filter and cleanse water vertically. Water can infiltrate into the ground below or drain to a perforated pipe and be conveyed elsewhere. Bioretention systems can be integrated with tree-pits or gardens.	Street / Open Space	Typically, surface area is 5-10% of drained area with storage below.
Swale	Swales are vegetated shallow depressions designed to convey and filter water. These can be 'wet' where water gathers above the surface, or 'dry' where water gathers in a gravel layer beneath. Can be lined or unlined to allow infiltration.	Street / Open Space	Account for width to allow safe maintenance typically 2-3 metres wide.
Hardscape Storage	Hardscape water features can be used to store run-off above ground within a constructed container. Storage features can be integrated into public realm areas with a more urban character.	Open Space	Could be above or below ground and sized to storage need.
Pond / Basin	Ponds can be used to store and treat water. 'Wet' ponds have a constant body of water and run-off is additional, while 'dry' ponds are empty during periods without rainfall. Ponds can be designed to allow infiltration into the ground or to store water for a period of time before discharge.	Open Space	Dependant on runoff volumes and soils.
Wetland	Wetlands are shallow vegetated water bodies with a varying water level. Specially selected plant species are used to filter water. Water flows horizontally and is gradually treated before being discharged. Wetlands can be integrated with a natural or hardscape environment.	Open Space	Typically, 5-15% of drainage area to provide good treatment.
Underground Storage	Water can be stored in tanks, gravel or plastic crates beneath the ground to provide attenuation.	Open Space	Dependant on runoff volumes and soils.

6.2.2 This review highlights the components referenced in the SuDS Hierarchy and provides recommendations on whether the components could be incorporated into the development.

Component	Recommendation / Opinion	
Green (living) roofs or Blue/Green roof systems	There is no scope for blue or green roofs on the development.	↓
Basins and Ponds	There is some potential for basins and ponds on the site, which have been selected as the primary attenuation device.	↓
Filter Strips and Swales	There is some scope for use of surface mounted SuDS on the scheme to convey water, subject to further design.	↓
Infiltration Devices	Infiltration devices are unlikely to be viable on site.	↓
Permeable Surfaces and Filter Drains	Porous surfaces should be viable on site in a tanked configuration.	↓
Tanked Systems	These will be required to cater for the extreme storm events	↓

- 6.2.3 The proposed drainage system incorporates sustainable drainage features in accordance with the SuDS hierarchy, current legislation and best practice as much as practicable on site.
- 6.2.4 There will be an opportunity for small-scale bespoke SuDS elements (such as planters) to be included as part of the landscaping proposals. These should be considered fully before construction commences. These have been partially shown on a section of the drainage strategy plan.

7.0 Drainage Proposal

7.1 Surface Water Drainage

- 7.1.1 Surface water drainage at the site will follow the Sustainable Drainage Systems (SuDS) management train. The surface water from the site will discharge into the existing watercourse at a restricted rate. A Drainage Plan can be found at **Appendix G**. The scheme has indicated two possible points for discharge either directly into the water course or the Southern Water Sewer in Saltmarsh Lane.
- 7.1.2 All rainwater will pass through some form of treatment before it enters the watercourse as indicated on the Drainage Layout. For example, the extensive use of porous surfacing offers stormwater management by reducing runoff, controlling flooding, and recharging groundwater, while also improving water quality by filtering pollutants and helping to mitigate impact through evaporation. In addition, the pond will provide further treatment. At the detailed design stage consideration will be given to providing rainwater planters where down pipes cannot connect directly to porous surfacing. This will be established when plot drainage is designed.
- 7.1.3 All parking bays and private drives will be formed with porous surfacing. Each property will be given a water butt. Where practicable rainwater from roof areas will discharge directly onto porous surfacing or via diffusers into the clean stone beneath the porous surfacing. Partial infiltration pipes will then capture the water and direct the water to a conventional drainage system. The drainage system has been designed to accommodate a 1 in 100 year plus climate change event.
- 7.1.4 The final outfall will be into either the adjacent ditch or into the public surface water sewer which the ditch connects to.
- 7.1.5 The storage crates will be wrapped with a geomembrane to reduce any likely impact with groundwater, and the pond will be also lined where necessary. If at the detailed design stage, there is the opportunity to establish whether some infiltration is possible, then the pond could be partially lined.
- 7.1.6 With the final restricted discharge to a recognised watercourse either via a new headwall or a new sewer into the public surface water sewer in Saltmarsh Lane.
- 7.1.7 The existing ditch work will be improved and any sections within the site that are already culverted will be improved and pipework replaced if necessary.

7.2 Climate Change

- 7.2.1 It is globally recognised that the rise in carbon monoxide and other greenhouse gases (such as methane) in the atmosphere enhance the 'greenhouse effect' where more of the Sun's energy is trapped, causing the Earth to warm. It is also recognised that this process has been aggravated by human activities and forecasts predict significant changes to the planet's temperatures and weather.

7.2.2 The Environment Agency publish climate change allowances to be used in Flood Risk Assessments and drainage calculations, and the current estimates were published in May 2022. For drainage calculations Peak rainfall intensity allowances are used.

7.2.3 The peak rainfall intensity allowances to be applied to the drainage calculations for a specific site are obtained from the EA's peak rainfall allowances map. The site is located within the Arun and Western Management Catchment and the predicted increase in rainfall intensities are as follows:

EPOCH	CENTRAL ALLOWANCE	UPPER END ALLOWANCE
2050'S	20%	35%
2070'S	25%	40%

Table: 3.3% (1 in 30) Annual Exceedance Rainfall Events Climate Change Allowances

EPOCH	CENTRAL ALLOWANCE	UPPER END ALLOWANCE
2050'S	20%	45%
2070'S	25%	45%

Table: 1% (1 in 100) Annual Exceedance Rainfall Events Climate Change Allowances

7.2.4 The 2050s epoch allowances are used for development with a lifetime up to 2060 and the 2070s epoch allowances are used for development with a lifetime between 2061 and 2125.

7.2.4 For development with a lifetime up to 2060, use the central allowance for the 2050s epoch (2022 to 2060) should be used. For development with a lifetime between 2061 and 2100 the central allowance for the 2070s epoch (2061 to 2125) should be used. For development with a lifetime beyond 2100 the upper end allowances should be used for both the 1% and 3.3% annual exceedance probability events for the 2070s epoch (2061 to 2125).

7.2.5 The development lifetime guidance should be used to work out the lifetime of a development, however, the guidance says that residential development should be considered to have a minimum lifetime of 100 years. For this development the upper end allowance for the 2070s epoch should be used i.e. 40% for the 3.3% annual exceedance rainfall event, and 45% for the 1% annual exceedance rainfall event. The latter event should prove the following:

- there is no increase in flood risk elsewhere
- your development will be safe from surface water flooding

The following guidance should be used to do this:

- Planning practice guidance on flood risk
- Preparing a flood risk assessment: standing advice – Surface water management section
- Sustainable drainage systems: non-statutory technical standards
- CIRIA SuDS manual
- Water UK sewerage sector guidance – Design and construction standards
- ICE SuDS route maps

7.2.6 Any water up to a 1 in 100 year storm event including 45% climate change will be attenuated within the curtilage of the site in the proposed drainage system.

7.2.7 National standards for sustainable drainage systems (SuDS) published 19 June 2025 the Design and Construction Guidance 2020 and Sewers for Adoption recommend that the 1 in 30 year storm event is managed below ground with exceedance flows managed above ground. It should be noted that in the current design all storm events have been managed below ground.

7.2.8 Causeway Flow calculations have been undertaken, which can be found at **Appendix H**. Although the application is outline, an extensive system has been designed, and the model has shown that for all surface water events the water can be accommodated in the system. At the detailed design stage when more pipework, chambers and SuDs features are added to the system more storage and treatment will be provided.

7.2.9 The model provided is very conservative and indicates a worst case as it does not make an allowance for every permeable parking area but shows that any storm event can be accommodated within the system.

7.3 Designing for Exceedance Events

7.3.1 Current best practice guidance on flood risk requires an evaluation of how rainfall events beyond the design capacity of the proposed drainage system would be managed and what effects they are likely to have on flood risk at the site or surrounding areas.

7.3.2 Should a rainfall event exceeding the 1.0% AEP (1 in 100 year) event plus climate change event occur, the proposed storage and flow paths of surface water should be considered.

7.3.3 The surface water SuDS features included for the 1 in 100 year storm will be designed with sufficient resilience to manage and convey exceedance flows away from any properties to minimise risk.

7.3.4 Indicative exceedance pathways have been shown on the drainage layout, with further information to be defined once the detailed levels of the scheme have been developed. Any levels shown on the drainage can be modified within reason at the detailed design stage.

7.4 Designing for System Failure

7.4.1 Current best practice on sustainable drainage design should consider failure of the surface water system and potential blockages from multiple sources.

7.4.2 The potential risks to the surface water system have been indicated below:

Risk	Description	Comments / Recommendations
Blockage	Potential blockage of outfall from surface water system	Regular inspection and maintenance of the drainage system should be undertaken in line with the findings of this report
Failure	Potential blockage of outfall from flow control failure or build-up of debris	Regular inspection and maintenance of the drainage system should be undertaken in line with the findings of this report
Surcharge	Potential back-up of system due to surcharging or poorly maintained public surface water infrastructure or watercourse	Regular inspection and maintenance of the drainage system should be undertaken in line with the findings of this report
Blockage	Potential risk of flooding due to build-up of sediment within system	Catchpit manholes have been provided to remove solids and sediment. Regular inspection and maintenance of the drainage system should be undertaken in line with the findings of this report.
Failure	Potential risk of surface water flows from poor maintenance of surface mounted SuDS features (such as porous paving or swales)	Regular inspection and maintenance of the surface mounted SuDS should be undertaken in line with the findings of this report.
Surcharge	Potential risk of additional surface water flows or overland flows from extreme (exceedance storm) events in adjacent sites causing the surface water system to be overloaded.	Exceedance flow routes have been assessed and shown on the drainage layout.
Failure	Potential risk from failure of third-party specialist equipment such as pump stations or interceptors	Any pump stations or interceptors installed on site should be maintained in line with the specialist manufacturer's recommendations.
Blockage	Potential risk from poor maintenance of gullies	Regular inspection and maintenance of the underground drainage system should be undertaken in line with the findings of this report.
Blockage	Potential reduction in infiltration on site from compaction of soils during the construction phase	Ground consolidation should not have a major impact.
Failure	Poor planting and maintenance of green areas could reduce the hydraulic properties of SuDS devices (and amenity/biodiversity benefits)	Regular inspection and maintenance of the surface mounted SuDS should be undertaken in line with the findings of this report. The high groundwater table should be noted, and any observed risks reported.

7.5 Urban Creep

7.5.1 Urban Creep is the conversion of permeable surfaces to impermeable over time. e.g. impermeable surfacing of front gardens to provide additional parking spaces, extensions to existing buildings, creation of large patio areas. The consideration of urban creep (is best) assessed on a site-by-site basis but is limited to residential development only.

7.5.2 It is important that the appropriate allowance for urban creep is included in the design of the drainage system over the lifetime of the proposed development. The allowances set out below are applied to the impermeable area within the property curtilage:

Residential development density Dwellings per hectar	Change allowance % of impermeable area
≤ 25	10
30	8
35	6
45	4
≥ 50	2
Flats & apartments	0

7.5.3 Note where the inclusion of the appropriate allowance would increase the total impermeable area to greater than 100%, 100% should be used as the maximum.

7.5.4 The proposed development has some scope for expansion. Based on this, 5% allowance for urban creep is required for the development.

7.6 Construction Phase Drainage

7.6.1 It is an offence to cause or knowingly permit the entry of poisonous, noxious or polluting material into the water environment. Prosecution may ensue if the pollution is serious enough to lower the ecological status of the water body in terms set by the Water Framework Directive (2000/60/EC).

7.6.2 The polluter does not have to be prosecuted first for remediation of damage to be required. If water pollution is serious enough to be classed as environmental damage the damage will require to be remediated such that the area is returned to the condition, it would have been in if the damage had not occurred.

7.6.3 An offence may also be committed if environmental damage or the threat of environmental damage is not reported by the polluter or if no action is taken by the polluter to prevent further damage. Third parties (e.g. private water supply users, landowners, recreational users and the public) who may be affected by possible damage may also report 'risk' of environmental damage to the enforcing authority; in this instance an offence may be committed if action is not taken to prevent the potential environmental damage occurring.

7.6.4 The principles of Sustainable Drainage Systems (SuDS) shall be applied to all components of design and construction regarding surface water management. Any design or site works that may impact on the site drainage or water quality shall:

- Soakaway where soils allow
- Consider and manage erosion
- Retain any silts on site and prevent silts from discharging into watercourses or drains
- Remove pollutants in surface water
- Keep runoff rates at existing greenfield runoff

- Prevent accidental spillages reaching watercourses.
- 7.6.5 As infiltration is not expected to be viable on site, the temporary drainage for the development will be in the form of land drainage with discharge into the existing sewer, with the appropriate levels of treatment.
- 7.6.6 Pollution will be controlled via the use of catchpit manholes and geotextiles.
- 7.6.7 Any potentially hazardous substances (i.e. from plant / deliveries) will be within a controlled compound with a separate drainage system that will contain a penstock valve / containment kit in the event of a spillage.

7.7 Foul Water Drainage

- 7.7.1 The foul water for the development will discharge into the existing public sewer. Foul water flows are anticipated to be 2.87 litres per second based on 4000 litres per dwelling per day in accordance with Sewers for Adoption 7th Edition and the Design and Construction Guidance 2020.

8.0 Water Quality

8.1 Water Quality Overview

- 8.1.1 A key requirement of any SuDS system is that it protects the receiving water body from the risk of pollution. This can be effectively managed by an appropriate “train” or sequence of SuDS components that are connected in series.
- 8.1.2 The frequent and short duration rainfall events are those that are most loaded with potential contaminants (silts, fines, heavy metals and various organic and inorganic contaminants). Therefore, the first 5-10 mm of rainfall (first flush) should be adequately treated with SuDS.
- 8.1.3 The minimum number of treatment stages will depend on the sensitivity of the receiving water body and the potential hazard associated with the proposed development SuDS Manual (CIRIA, 2015).
- 8.1.4 The proposed development is a combination of very low (roof water) to low hazard (runoff from small car parking areas), as indicated on the table below:

Hazard	Source of Hazard	Present
Very Low	Residential Roof drainage.	YES
Low	Residential amenity uses including low usage car parking spaces and roads, other roof drainage	YES
Medium	Commercial, industrial uses including car parking spaces and roads (excluding low usage road, trunk roads and motorways)	NO
High	Areas used for handling and storage of chemicals and fuels, handling of storage and waste	NO

- 8.1.5 The site does lie within a source protection zone and therefore additional treatment stages are required.
- 8.1.6 The treatment processes provided by different SuDS components will have varying capabilities for removal of different types of contaminants as per the table below:

Hazard	Requirements for discharge to surface water and groundwater	Present
Very Low	Removal of gross solids and sediments only.	YES
Low	Simple index approach	YES
Medium	Surface water: Simple index approach Ground water: Simple index approach and risk screening	NO
High	Guidance and risk assessment process in HA (2009). Discharge may require environmental permit or licence. Obtain pre-permitting advice from environmental regulator. Risk assessment likely to be required.	NO

8.2 Simple Index Approach

- 8.2.1 The index approach as defined by CIRIA C753 (the SuDS Manual) defines the index approach to water quality in three steps as defined in Box 26.2 below:

**BOX
26.2**

Steps of the simple index approach

Step 1 – Allocate suitable pollution hazard indices for the proposed land use

Step 2 – Select SuDS with a total pollution mitigation index that equals or exceeds the pollution hazard index

Step 3 – Where the discharge is to protected¹ surface waters or groundwater, consider the need for a more precautionary approach

Note:

¹ Designated as those protected for the supply of drinking water (Table 4.3).

8.3 Step 1- Allocate Potential Hazards

- 8.3.1 To deliver adequate treatment, the selected SuDS components should have a total pollution mitigation index (for each contaminant type) that equals or exceeds the pollution hazard index (for each contaminant type):

Total SuDS mitigation index $\geq$ pollution hazard index

(for each contaminant type) (for each contaminant type)

- 8.3.2 Where the only destination of the runoff is to a surface water – that is there is no infiltration from the SuDS to groundwater – the surface water indices should be used.
- 8.3.3 In England and Wales, where the principal destination of the runoff is to a surface water, but small amounts of infiltration may occur from unlined components (Interception), then the groundwater indices should be used for the discharge to groundwater, and the surface water indices should be used for the main surface water discharge (as suggested in Table 26.3).
- 8.3.4 Where the principal destination of the runoff is to groundwater, but discharges to surface waters may occur once the infiltration capacity is exceeded, the groundwater indices should be used, as suggested in Table 26.4. The risk to surface waters will be low, as dilution will be high for large events, so treatment is not required.
- 8.3.5 The pollution indices for this site have been selected using the guidance in CIRIA C753 and are as per Table 26.2 below:

TABLE 26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

Notes

- 1 Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).
- 2 These should only be used if considered appropriate as part of a detailed risk assessment – required for all these land use types (Table 4.3). When dealing with high hazard sites, the environmental regulator should first be consulted for pre-permitting advice. This will help determine the most appropriate approach to the development of a design solution.

Where a site land use falls outside the defined categories, the indices should be adapted (and agreed with the drainage approving body) or else the more detailed risk assessment method should be adopted.

Where nutrient or bacteria and pathogen removal is important for a particular receiving water, equivalent indices should be developed for these pollutants (if acceptable to the drainage approving body) or the risk assessment method adopted.

8.3.6 The identified hazard levels are as follows:

- Total Suspended Solids (TSS) 0.70
- Metals 0.60
- Hydrocarbons 0.45

8.3.7 Treatment has been provided in the form of catchpit manholes to remove sediment and contaminated particles and geotextiles within the porous paving as a filter medium. Where rainwater planters are provided, they will also remove contaminated particles.

8.3.8 Additional treatment is provided in the pond with appropriate planting and reeds.

8.4 Treatment with Discharge to Surface Water

8.5 As the site is discharging to a watercourse or sewer, Table 26.3 of the CIRIA C753 manual is used to evaluate the water quality mitigation measures offered by the proposed drainage system.

TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters				
Type of SuDS component	Mitigation indices¹			
	TSS	Metals	Hydrocarbons	
Filter strip	0.4	0.4	0.5	
Filter drain	0.4 ²	0.4	0.4	
Swale	0.5	0.6	0.6	
Bioretention system	0.8	0.8	0.8	
Permeable pavement	0.7	0.6	0.7	
Detention basin	0.5	0.5	0.5	
Pond ⁴	0.7 ³	0.7	0.5	
Wetland	0.8 ³	0.8	0.8	
Proprietary treatment systems ^{5,6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.			

Notes

- 1 SuDS components only deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters.
- 2 Filter drains can remove coarse sediments, but their use for this purpose will have significant implications with respect to maintenance requirements, and this should be taken into account in the design and Maintenance Plan.
- 3 Ponds and wetlands can remove coarse sediments, but their use for this purpose will have significant implications with respect to the maintenance requirements and amenity value of the system. Sediment should normally be removed upstream, unless they are specifically designed to retain sediment in a separate part of the component, where it cannot easily migrate to the main body of water.
- 4 Where a wetland is not specifically designed to provide significantly enhanced treatment, it should be considered as having the same mitigation indices as a pond.
- 5 See Chapter 14 for approaches to demonstrate product performance. A British Water/Environment Agency assessment code of practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at: <http://tinyurl.com/qf7yuj7>
- 6 SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution where there is a requirement to retrofit treatment. SEPA (2014) also provides a flowchart with a summary of checks on suitability of a proprietary system.

8.5.1 The identified hazard remediation levels are as follows:

	Hazard	Treatment	Result
– Total Suspended Solids (TSS)	0.70	1.4	0
– Metals	0.60	1.3	0
– Hydrocarbons	0.45	1.2	0

9.0 Ownership Responsibility

9.1.1 The drainage has been separated by ownership as part of this strategy. The separation is as follows:

Drainage Element	Ownership	Adopted
Private Surface Water system *	Maintenance company appointed by Hayling Island Builders Ltd	Private
Private / Residential Foul Water System *	Maintenance company appointed by Hayling Island Builders Ltd	Private
Public / Road Surface Water system	Southern Water (offered under S104)	Public
Public / Road Foul Water system	Southern Water (offered under S104)	Public
Sustainable drainage features	Maintenance company appointed by Hayling Island Builders Ltd	Private
Riparian Foul Plot Drainage	Property Owner	Private
Riparian Surface Water Plot Drainage	Private Owner	Private

***Note*:** Predominately two units or more

9.2 Adoptable Drainage

9.2.1 Sewers for Adoption (7th and 6th Edition) are guidance documents used by the water companies to approve and review drainage designs that are offered to them (or vested) for adoption. This is usually via a S104 or similar agreement.

9.2.2 As of 1st April 2020, the Design and Construction Guidance documentation will replace both the previous versions and will be mandatory as part of the Code for Adoption agreements.

9.2.3 Appendix C of the Design and Construction Guidance (DCG) is in effect the replacement for Sewers for Adoption (SfA) 6th and 7th edition.

9.3 Adoptable Systems

9.3.1 The table below indicates the type of drainage element that is currently allowed to be offered for adoption under DCG 2020, with the previous allowances shown for reference.

	SfA6 / 7	DCG	LA	PRIVATE
Rainwater Harvesting	X	X	X	✓
Green Roofs	X	X	X	✓
Infiltration Systems	X	✓	✓	✓
Proprietary Treatment Systems	✓	✓	✓	✓
Filter Strips	X	X	✓	✓
Filter Drains	X	✓	✓	✓
Swales	X	✓	✓	✓
Bioretention Systems	X	✓	X	✓
Trees	X	X	✓	✓
Pervious Pavements	X	X	✓	✓
Attenuation Storage Tanks	✓	✓	✓	✓
Detention Basins	X	✓	✓	✓
Ponds and Wetlands	X	✓	✓	✓

9.3.2 The drainage elements on this system that are intended to be offered for adoption will be shown on the drainage plan at the appropriate time.

10.0 Drainage Maintenance

10.1.1 Regular inspection and maintenance is particularly important to ensure the effective long-term operation of surface water drainage, sewers and sustainable drainage systems (SuDS).

10.1.2 When designing, we have considered the required maintenance over the design life of the project, ensuring sufficient and permanent access to all areas of the system.

10.1.3 Maintenance operations can be divided into the following categories:

- Regular (or routine frequent) - this covers items that are carried out typically with a frequency from monthly to annually. It includes items such as inspection and monitoring, litter removal, grass cutting or other vegetation management, sweeping permeable pavements.
- Infrequent (or routine infrequent) - this covers items that are required typically with a frequency from annually up to 25 years (or possibly greater). It includes items such as wetland vegetation management, silt removal from swales, ponds or wetlands, scarifying and spiking infiltration basins and gravel replacement to filter drains.
- Remedial (or reactive) - this covers maintenance that is not usually required, but may be necessary as a result of vandalism, accidental damage, rainfall that exceeds the design capacity or similar events. Examples include repair of erosion in a swale or repair of permeable surfaces blocked for example by mixing concrete on them.

10.2 Riparian Responsibility

10.2.1 If an occupier owns land adjoining, above or with a portion of the drainage system running through it, they have certain rights and responsibilities. In legal terms they are a 'riparian owner'. If they rent the land, they should agree with the owner who will manage these rights and responsibilities.

10.2.2 It is recommended that the owner's appointed Management Company handle the maintenance of all underground drainage and all SuDS devices, with the following exceptions:

- Inspecting and cleaning out any surface mounted hard drainage systems (such as channel drains);
- Inspecting and cleaning out (or reporting) SuDS systems on a small scale (such as garden ditches and swales).

10.3 Allowing for Replacement

10.3.1 The design life of some SuDS elements and drainage elements of the proposed system is shorter than the predicted design life of the development. Therefore, the design and maintenance regime consider any potential replacement works (such as replacing permeable paving).

10.3.2 Regular inspection of the underground drainage system should be as per the tables below.

Operation and maintenance requirements for Surface Water and Foul Systems		
Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect for sediment and debris in catchpit manholes and gullies. Clean out as required	Twice Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional Maintenance	Remove sediment and debris from catchpits, gullies, attenuation devices and inside of concrete manhole rings	As required, based on inspections
Remedial Actions	Reconstruct and/or replace components, if performance deteriorates or failure/blockage occurs	As required
	Replacement of clogged components (flow restriction)	As required
Monitoring	Inspect silt traps/gullies/catchpits and note rate of sediment accumulation	Monthly in the first year and then annually
	Check flow control chamber and attenuation devices	Annually

11.0 Suds Maintenance

- 11.1.1 Like all drainage systems, SuDS components should be inspected and maintained. This ensures efficient operation and prevents failure. Usually, SuDS components are on or near the surface and most can be managed using landscape maintenance techniques.
- 11.1.2 For below-ground SuDS such as permeable paving and modular geocellular storage the manufacturer or designer should provide maintenance advice. This should include routine and long-term actions that can be incorporated into a maintenance plan.
- 11.1.3 The design process considers the maintenance of the components (access, waste management etc.) including any corrective maintenance to repair defects or improve performance.
- 11.1.4 In the absence of legislation funding for the adopter to maintain their SuDS may need to be resolved at the start of the development process to ensure that either the local authority, a maintenance company, local residents or the water company have sufficient resources to maintain the system in the long-term.
- 11.1.5 Further information on maintenance can be found in The SUDS Manual (CIRIA publication C697), which has been used as a guide for this report.
- 11.1.6 The SuDS scheme is unlikely to be handed over for maintenance until all parties are confident that the scheme is constructed and performs as designed. An interim maintenance plan can be incorporated on larger or phased schemes.
- 11.1.7 Maintenance of SuDS drainage should be in accordance with the guidance presented in CIRIA Factsheet “Maintenance of SuDS” May 2017. A detailed maintenance plan for the scheme will be generated by the appointed owner/maintainer of the site or a selected maintenance company and this section is for guidance only.

11.1.8 Regular inspection of the sustainable drainage system should be as per the tables below.

Operation and maintenance requirements for Swales		
Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly, or as required
	Cut grass – to 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 > 48 hours	Monthly, or when required
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
Occasional Maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial Actions	Repair erosion or other damage by re-turfing or 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

Operation and maintenance requirements for Pervious Pavements		
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 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 50 mm 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 h 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 Storage Crates		
Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	Annually
	Cleaning any pipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional Maintenance	Remove sediment and debris from pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	As required, based on inspections
Remedial Actions	Reconstruct storage crate and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile or geomembrane	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check storage crates to ensure emptying is occurring	Annually

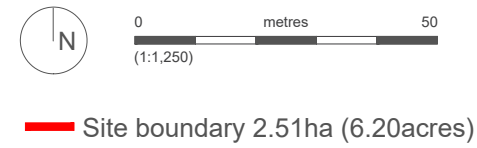
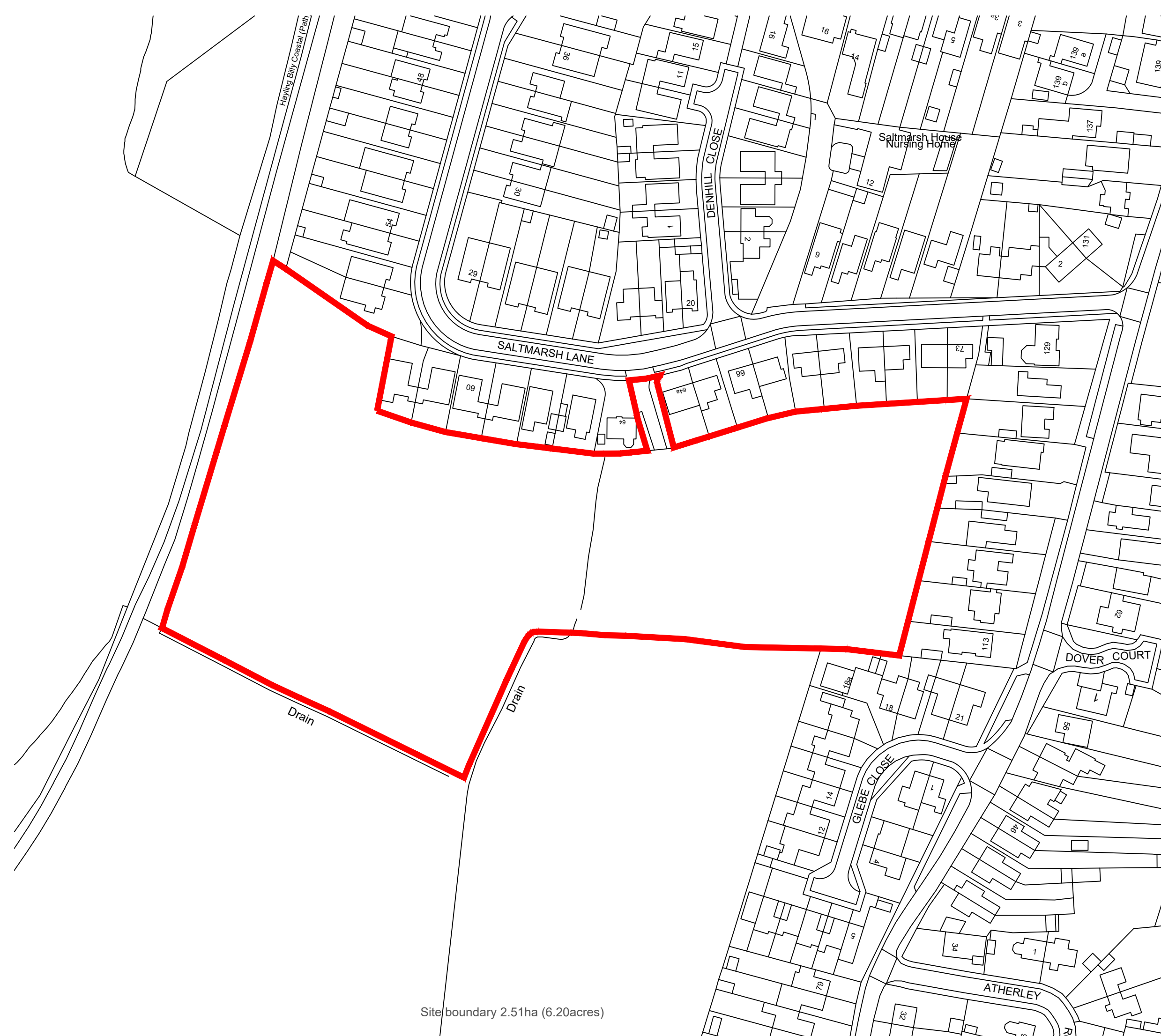
Operation and maintenance requirements for Ponds and Wetlands		
Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly (or as required)
	Cut the grass – public areas	Monthly (during growing season)
	Cut the meadow grass	Half yearly (spring, before nesting season, and autumn)
	Inspect marginal and bankside vegetation and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Inspect inlets, outlets, banksides, structures, pipework etc. for evidence of blockage and/or physical damage	Monthly
	Inspect water body for signs of poor water quality	Monthly (May – October)
	Inspect silt accumulation rates in any forebay and in main body of the pond and establish appropriate removal frequencies; undertake contamination testing once some build-up has occurred, to inform management and disposal options	Half yearly
	Check any mechanical devices eg penstocks	Half yearly
	Hand cut submerged and emergent aquatic plants (at minimum of 0.1 m above pond base; include max 25% of pond surface)	Annually
	Remove 25% of bank vegetation from water's edge to a minimum of 1 m above water level	Annually
	Tidy all dead growth (scrub clearance) before start of growing season (Note: tree maintenance is usually part of overall landscape management contract)	Annually
	Remove sediment from any forebay.	Every 1–5 years, or as required
	Remove sediment and planting from one quadrant of the main body of ponds without sediment forebays.	Every 5 years, or as required
Occasional Maintenance	Remove sediment from the main body of big ponds when pool volume is reduced by 20%	With effective pre-treatment, this will only be required rarely, e.g. every 25–50 years
Remedial Actions	Repair erosion or other damage	As required
	Replant, where necessary	As required
	Aerate pond when signs of eutrophication are detected	As required
	Realign rip-rap or repair other damage	As required
	Repair / rehabilitate inlets, outlets and overflows.	As required

12.0 Summary and Conclusions

- 12.1.1 Hayling Island Builders Ltd is planning a proposed development on the site at Land South of Saltmarsh Lane, Hayling Island, PO11 0JT.
- 12.1.2 CGV Transport Consultants has been instructed by Hayling Island Builders Ltd, to produce a Drainage Strategy to support the Planning Application.
- 12.1.3 The surface water system will discharge into the existing watercourse at a restricted rate. All surface water will be treated before reaching the watercourse.
- 12.1.4 The foul water will discharge into the existing public sewer.
- 12.1.5 The report has demonstrated that the proposed drainage measures ensure that no property will be at risk of flooding if the development proceeds and that suitable means of surface water and foul drainage can be achieved for the proposed development.

Appendix A

Location Plan



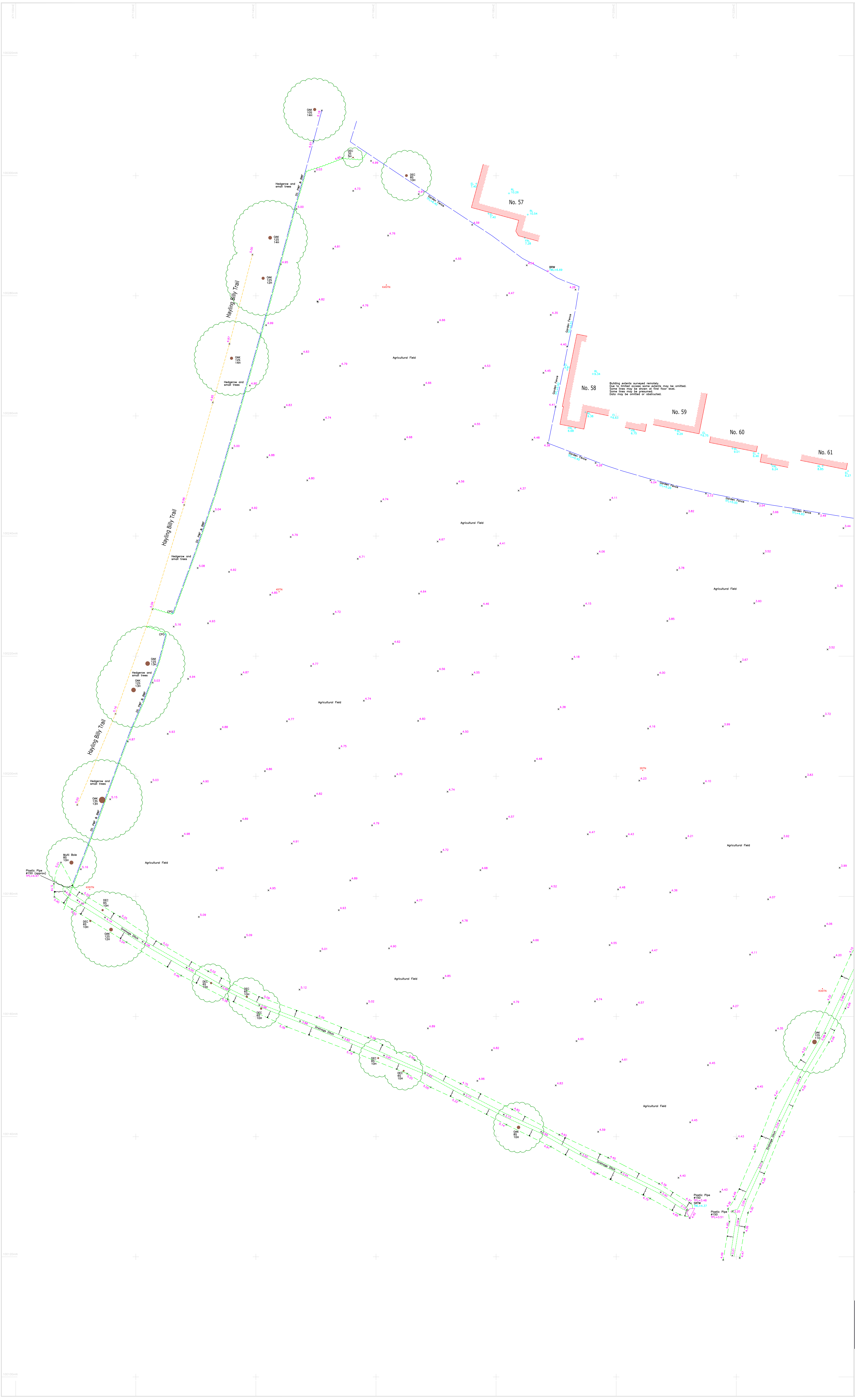
Site boundary 2.51ha (6.20acres)

Site boundary 2.51ha (6.20acres)

Project			
Land South of Saltmarsh Lane			
Drawing Title			
Site Location Plan			
Date	Scale	Drawn by	Check by
08/03/2021	1:1,250 at A3	ML	SR
Project No	Drawing No	Revision	
1240	001	-	

Appendix B

Topographical Survey



Notes

- The survey grid is a local grid, coincident with Ordnance Survey National Grid at 35 TN.
- Surveyed boundary features are not necessarily legal boundaries.
- Dimensions should not be scaled. All dimensions should be checked on site before any fabrication / construction.
- Copyright of all data produced by Technics Group shall remain with Technics Group unless otherwise specifically agreed.
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- If the AutoCAD drawing is being read by any system other than AutoCAD it should be checked against a hard copy. Technics Group cannot accept liability for omissions.
- All utilities have been identified to the best of the surveyors knowledge. The correct identification of the utility types can not be 100% guaranteed, therefore these should be independently verified prior to use in any design and building works.
- External levels are surveyed to lowest of position.

Level Datum

ALL LEVELS ARE ORTHOMETRIC HEIGHTS RELATED TO OSBM15 GPS DATUM, COMPUTED USING LEICA SMARTNET RTX NETWORK.

Topo Key

STREET FURNITURE	LEVELS & DEPTHS	INSPECTION CHAMBERS
AL Alder	AL Alder	AL Alder
BE Birch	BE Birch	BE Birch
CH Cherry	CH Cherry	CH Cherry
CO Cornus	CO Cornus	CO Cornus
CY Cypress	CY Cypress	CY Cypress
DE Deer	DE Deer	DE Deer
DEC Deciduous	DEC Deciduous	DEC Deciduous
ED Elder	ED Elder	ED Elder
EU Eucalyptus	EU Eucalyptus	EU Eucalyptus
FR Fruit	FR Fruit	FR Fruit
HA Hawthorn	HA Hawthorn	HA Hawthorn
HB Hornbeam	HB Hornbeam	HB Hornbeam
HC Horse Chestnut	HC Horse Chestnut	HC Horse Chestnut
HL Holly	HL Holly	HL Holly
HZ Hazel	HZ Hazel	HZ Hazel
LA Larch	LA Larch	LA Larch
LB Laburnum	LB Laburnum	LB Laburnum
LI Lime	LI Lime	LI Lime
LO Larch	LO Larch	LO Larch
LU Laurel	LU Laurel	LU Laurel
MA Maple	MA Maple	MA Maple
MG Magnolia	MG Magnolia	MG Magnolia
NI Norway Spruce	NI Norway Spruce	NI Norway Spruce
PI Pine	PI Pine	PI Pine
PR Privet	PR Privet	PR Privet
PL Plane	PL Plane	PL Plane
RH Rhododendron	RH Rhododendron	RH Rhododendron
RO Rose	RO Rose	RO Rose
SAP Sycamore	SAP Sycamore	SAP Sycamore
SB Silver Birch	SB Silver Birch	SB Silver Birch
SCN Sweet Chestnut	SCN Sweet Chestnut	SCN Sweet Chestnut
SHR Shrub	SHR Shrub	SHR Shrub
ST Shrub	ST Shrub	ST Shrub
SY Sytamar	SY Sytamar	SY Sytamar
WB Willow	WB Willow	WB Willow
WG Wallingford	WG Wallingford	WG Wallingford
WI Willow	WI Willow	WI Willow
WN Walnut	WN Walnut	WN Walnut

Symbology

Single Gate	Double Gate	Banking	Step Up	Diameter shown in mm	Survey Station
-------------	-------------	---------	---------	----------------------	----------------

Linetypes

Double Gate	Double Gate	Double Gate	Double Gate	Double Gate	Double Gate
-------------	-------------	-------------	-------------	-------------	-------------

Trees

SPECIES ABBREVIATION	SPECIES ABBREVIATION	SPECIES ABBREVIATION
AL Alder	HL Holly	RH Rhododendron
BE Birch	HZ Hazel	RO Rose
CH Cherry	LA Larch	SAP Sycamore
CO Cornus	LB Laburnum	SB Silver Birch
CY Cypress	LI Lime	SCN Sweet Chestnut
DE Deer	LO Larch	SHR Shrub
DEC Deciduous	LU Laurel	ST Shrub
ED Elder	MA Maple	SY Sytamar
EU Eucalyptus	MG Magnolia	WB Willow
FR Fruit	NI Norway Spruce	WG Wallingford
HA Hawthorn	PI Pine	WI Willow
HB Hornbeam	PR Privet	WN Walnut
HC Horse Chestnut	PL Plane	

NOTES

- The tree species have been identified to the best of the surveyors knowledge. They have not been verified by an arborist and are not guaranteed. If they are important they should be verified.
- The heights are estimated.
- A CAD layer exists with the full tree canopies intact which is turned off.
- Trees with bole diameters below the specified minimum size may not have been surveyed.
- Multiple sizes are indicative.

SURVEY STATIONS

Name	Easting	Northing	Height
1STN	471352.889	100208.049	4.516
2STN	471353.177	100211.211	4.295
3STN	471353.177	100211.211	4.295
4STN	471353.177	100211.211	4.295
5STN	471353.177	100211.211	4.295
6STN	471353.177	100211.211	4.295
7STN	471353.177	100211.211	4.295
8STN	471353.177	100211.211	4.295
9STN	471353.177	100211.211	4.295
10STN	471353.177	100211.211	4.295

CLIENT

Hayling Island Builders Limited

SITE

Parcel 2
Land South of Saltmarsh Lane
Hayling Island PO11 0JT

DRAWING TITLE

Topographical Survey

PROJECT NUMBER

SP21219

DRAWING NUMBER

SD21219-01

DATE

Mar 2021

SURVEYED BY

CJ

DRAWN BY

CJ

CHECKED BY

CJ

SCALE

1:200

SHEET SIZE

A0

SHEET

3 of 4

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Notes

1. The survey grid is a local grid, coincident with Ordnance Survey National Grid at 357N.
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3. Dimensions should not be scaled. All measurements should be taken on site before any calculation or conversion.
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7. All data should be read by any system other than AutoCAD II should be checked against a hard copy. Technics Group cannot accept liability for omissions.
8. All data have been checked for accuracy to the best of the surveyors knowledge. The correct identification of the utility types can not be 100% guaranteed, therefore these should be independently checked for use in any design and costing work.
9. External elevations are surveyed to lowest tide position.

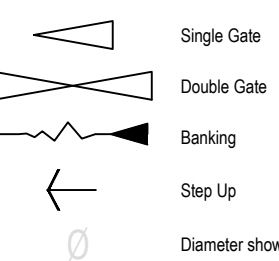
Level Datum

ALL LEVELS ARE ORTHOMETRIC HEIGHTS RELATED TO OSGM15
GPS DATUM, COMPUTED USING LEICA SMARTNET RTK NETWORK.

Topo Key

ITEMS	FURNITURE	LEVELS OF DESIGNS	INFORMATION CHAMBERS
1	Bedroom	1	1
2	Bedroom	2	2
3	Bedroom	3	3
4	Bedroom	4	4
5	Bedroom	5	5
6	Bedroom	6	6
7	Bedroom	7	7
8	Bedroom	8	8
9	Bedroom	9	9
10	Bedroom	10	10
11	Bedroom	11	11
12	Bedroom	12	12
13	Bedroom	13	13
14	Bedroom	14	14
15	Bedroom	15	15
16	Bedroom	16	16
17	Bedroom	17	17
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100	Bedroom	100	100

Symbology



Linetypes

Telecom Overhead
Power Overhead
Foul Water
Surface Water
Combined Water
Unknown Services
Change of Surface
Drop Kerb
Wall
Kerb
Building Face
Overhead Feature
Trench Scar
Tree Canopy
Bushes/Foliage/Overgrowth

Trees

SPECIES ABBREVIATION

AL	Alder	HL	Hemlock	RH	Rhododendron
BE	Beech	HO	Holly	RO	Rowan
CE	Cedar	HZ	Hazelnut	SA	Sapling
CH	Cherry	LA	Larch	SB	Silver Birch
COM	Comiferous	LB	Lb. Laburnum	SCW	Scot. Sweet Chestnut
CY	Cypress	LM	Lime	SHR	Shrub
DE	Deed	LO	Locust	ST	Stump
DEC	Deciduous	LU	Laurel	SY	Sycamore
ED	Edible	MA	Maple	WB	Whorbeam
EU	Eucalyptus	MG	Magnolia	WI	Wildingia
FR	Fruit	NS	Norway Spruce	WN	Walnut
HA	Hawthorn	PI	Pine	WV	Willow
HB	Hornbeam	PO	Poplar		
HC	Horse Chestnut	PL	Plane		

NOTES:

1. The tree species have been identified to the best of the surveyors knowledge. They have not been verified by an arborist and are not guaranteed. If they are important they should be verified.
2. Trees heights are estimated.
3. A CAD layer exists with the full tree canopies intact which is turned off.
4. Trees with bole diameters below the specified minimum size may not have been surveyed.
5. Multibole sizes are indicative.

SURVEY STATIONS				
Name		Easting	Northing	Height
1STN		471352.886	100208.049	4.519
2STN		471281.177	100211.211	4.296
3STN		471204.421	100201.008	4.229
4STN		471143.864	100230.739	4.823
K1STN		471341.633	100173.046	4.020
K2STN		471267.943	100234.529	3.560
K3STN		471234.351	100164.648	4.445
K4STN		471161.726	100281.814	4.795
K5STN		471112.329	100181.178	5.394

CLIENT

Hayling Island Builders Limited

SITE
Parcel 2
Land South of Saltmarsh Lane
Hayling Island PO11 0JT

DRAWING TITLE		
Topographical Survey		
PROJECT NUMBER	DRAWING NUMBER	DATE
SP21219	SD21219-01	Mar 2021
SURVEYED BY	DRAWN BY	CHECKED BY
CJ	CJ	CJ
SCALE	SHEET SIZE	SHEET
1:200	A0	4 OF 4



Technics Group
Technics House
Merrow Business Park
Guildford
Surrey, GU4 7WA

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E: mail@technicsgroup.com
W: technicsgroup.com

Appendix C

Southern Water Sewer Records

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
0301	F	5.08	0.00	
0401	F	4.28	0.00	
0501	F	2.10	0.58	
0601	F	5.84	3.48	
1201	F	4.36	0.36	
1401	F	1.98	0.30	
1601	F	6.08	4.30	
1802	F	5.98	3.24	
1603	F	5.71	3.13	
1604	F	5.56	3.02	
1605	F	0.00	0.00	
1607	F	0.00	0.00	
1608	F	0.00	0.00	
1609	F	0.00	0.00	
1610	F	0.00	0.00	
1611	F	0.00	0.00	
2301	F	2.71	-0.14	
2302	F	3.70	0.12	
2303	F	0.00	0.00	
2304	F	0.00	0.00	
2305	F	0.00	0.00	
2306	F	0.00	0.00	
2307	F	0.00	0.00	
2308	F	0.00	0.00	
2309	F	0.00	0.00	
2310	F	0.00	0.00	
2311	F	0.00	0.00	
2312	F	0.00	0.00	
2313	F	0.00	0.00	
2401	F	3.66	0.00	
2402	F	0.00	0.00	
2403	F	1.89	0.13	
2404	F	0.00	0.00	
2406	F	0.00	0.00	
2407	F	0.00	0.00	
2408	F	0.00	0.00	
2409	F	0.00	0.00	
2411	F	0.00	0.00	
2412	F	0.00	0.00	
2501	F	6.33	4.50	
2502	F	0.00	0.00	
2601	F	5.78	2.58	
2602	F	5.68	2.72	
2603	F	5.73	2.99	
2604	F	5.87	2.81	
2605	F	5.80	2.81	
2606	F	5.73	2.63	
2701	F	5.43	3.72	
2702	F	5.31	2.34	
2703	F	5.68	3.48	
2704	F	5.68	3.30	
2705	F	5.58	2.44	
2801	F	5.85	3.95	
2802	F	5.69	3.84	
2803	F	0.00	0.00	
2804	F	0.00	0.00	
2805	F	0.00	0.00	
2806	F	0.00	0.00	
2901	F	5.58	4.10	
2902	F	0.00	0.00	
2903	F	0.00	0.00	
2904	F	0.00	0.00	
2905	F	0.00	0.00	
2906	F	0.00	0.00	
2907	F	0.00	0.00	
2908	F	0.00	0.00	
2909	F	0.00	0.00	
2910	F	0.00	0.00	
2911	F	0.00	0.00	
2912	F	0.00	0.00	
3001	F	0.00	0.00	
3002	F	5.10	0.83	
3101	F	4.99	3.75	
3102	F	4.83	3.43	
3201	F	0.00	0.00	
3202	F	0.00	0.00	
3203	F	0.00	0.00	
3301	F	2.61	1.53	
3302	F	2.78	1.77	
3303	F	0.00	0.00	
3304	F	0.00	0.00	
3305	F	0.00	0.00	
3306	F	0.00	0.00	
3307	F	0.00	0.00	
3308	F	0.00	0.00	
3309	F	0.00	0.00	
3310	F	0.00	0.00	
3311	F	0.00	0.00	
3401	F	7.10	5.44	
3401	F	2.89	0.00	
3402	F	3.53	2.21	
3403	F	0.00	0.00	
3404	F	0.00	0.00	
3501	F	6.96	4.90	
3503	F	0.00	0.00	
3601	F	6.17	3.00	
3701	F	5.99	4.07	
3702	F	5.75	3.81	
3703	F	5.94	4.00	
3704	F	5.90	3.28	
3705	F	0.00	0.00	
3706	F	0.00	0.00	
3707	F	0.00	0.00	
3708	F	0.00	0.00	
3709	F	0.00	0.00	
3710	F	0.00	0.00	
3711	F	0.00	0.00	
3712	F	0.00	0.00	
3801	F	5.17	0.48	
3802	F	5.30	0.00	
3803	F	5.30	2.20	
3809	F	0.00	0.00	
3810	F	0.00	0.00	
3811	F	0.00	0.00	
3812	F	0.00	0.00	
3901	F	4.93	0.63	
4001	F	5.36	3.16	
4002	F	5.44	3.48	
4101	F	4.92	1.09	
4103	F	0.00	0.00	
4104	F	0.00	0.00	
4106	F	0.00	0.00	
4201	F	4.86	1.31	
4301	F	4.78	1.54	
4302	F	0.00	0.00	
4303	F	0.00	0.00	
4304	F	0.00	0.00	
4305	F	0.00	0.00	
4306	F	0.00	0.00	
4401	F	6.65	4.32	
4401	F	4.57	1.77	
4402	F	6.73	4.23	
4402	F	4.59	1.72	
4403	F	7.05	4.84	
4404	F	6.67	4.43	
4405	F	6.62	5.12	
4501	F	6.50	4.69	
4502	F	6.66	0.00	
4503	F	6.76	4.53	
4504	F	0.00	0.00	
4505	F	0.00	0.00	
4506	F	0.00	0.00	
4601	F	6.48	4.83	
4602	F	6.14	4.34	
4603	F	6.43	0.00	
4604	F	6.64	0.00	
4605	F	6.46	4.80	
4606	F	6.33	4.60	
4702	F	5.97	4.32	
4703	F	6.27	4.31	
4704	F	0.00	0.00	
4705	F	5.71	4.41	
4706	F	6.14	4.51	
4707	F	5.99	4.10	
4708	F	6.10	4.25	
4709	F	6.24	4.75	
4710	F	6.12	4.74	
4711	F	6.16	4.28	
4801	F	5.80	2.64	
4802	F	5.75	2.57	
4803	F	5.63	2.91	
4804	F	5.79	2.49	
4900	F	0.00	0.00	
4901	F	5.23	3.22	
4902	F	5.28	3.41	
5001	F	5.48	3.08	
5101	F	5.45	3.25	
5102	F	5.46	4.32	
5103	F	0.00	0.00	
5104	F	0.00	0.00	
5201	F	0.00	0.00	
5202	F	0.00	0.00	
5203	F	0.00	0.00	
5205	F	0.00	0.00	
5206	F	0.00	0.00	
5207	F	0.00	0.00	
5301	F	4.81	3.31	
5302	F	5.01	3.48	
5303	F	5.15	3.57	
5304	F	0.00	0.00	
5305	F	0.00	0.00	
5401	F	6.33	4.56	
5401	F	4.68	0.00	
5402	F	6.34	4.52	
5403	F	6.94	5.36	
5404	F	0.00	0.00	
5405	F	0.00	0.00	
5501	F	7.16	5.53	
5501	F	0.00	0.00	
5502	F	7.29	5.67	
5503	F	7.32	5.81	
5504	F	7.29	5.92	
5505	F	7.01	5.65	
5506	F	0.00	0.00	
5601	F	6.35	5.02	
5602	F	6.76	5.18	
5603	F	6.92	5.43	
5604	F	0.00	0.00	
5605	F	0.00	0.00	
5606	F	0.00	0.00	
5607	F	0.00	0.00	
5608	F	6.42	5.03	
5610	F	6.40	5.48	
5701	F	6.27	4.31	
5702	F	6.61	4.13	
5703	F	6.48	4.24	
5704	F	6.61	4.81	
5705	F	6.74	4.92	
5706	F	6.47	4.95	
5901	F	5.80	2.90	
6101	F	5.56	3.48	
6201	F	5.49	3.75	
6203	F	0.00	0.00	
6204	F	0.00	0.00	
6301	F	5.37	3.72	

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
6302	F	5.54	3.91	
6303	F	0.00	0.00	
6304	F	0.00	0.00	
6305	F	0.00	0.00	
6306	F	0.00	0.00	
6401	F	6.16	4.36	
6402	F	6.37	4.56	
6403	F	6.16	4.15	
6501	F	7.16	6.16	
6502	F	7.20	6.30	
6503	F	0.00	0.00	
6504	F	0.00	0.00	
6505	F	0.00	0.00	
6506	F	7.20	0.00	
6507	F	0.00	0.00	
6601	F	0.00	0.00	
6602	F	0.00	0.00	
6801	F	6.45	3.91	
7001	F	5.28	2.37	
7002	F	5.54	2.62	
7301	F	5.74	3.96	
7302	F	5.86	4.36	
7305	F	5.57	4.13	
7401	F	6.10	4.83	
7402	F	6.33	4.01	
7503	F	7.39	5.86	
7504	F	6.91	5.34	
7601	F	7.48	6.66	
7602	F	7.39	6.88	
7603	F	7.39	6.56	
7702	F	6.04	3.95	
7801	F	6.51	3.87	
8101	F	5.10	2.17	
8601	F	7.24	6.53	
8602	F	7.53	6.38	
8603	F	7.39	6.28	
8604	F	0.00	0.00	
8605	F	0.00	0.00	
8701	F	6.04	4.96	
9201	F	5.49	0.00	
9202	F	5.69	0.00	
9401	F	7.28	5.23	
9501	F	7.00	4.81	
9503	F	0.00	0.00	
9504	F	0.00	0.00	
9505	F	0.00	0.00	
9601	F	6.54	4.35	
9701	F	6.13	3.79	
9702	F	5.96	3.62	
9703	F	6.17	4.27	
9704	F	6.19	4.00	
9705	F	6.12	3.73	
9801	F	5.63	4.70	
9802	F	5.94	4.50	
0550	S	4.57	3.02	
0551	S	0.00	0.00	
0552	S	0.00	0.00	
0553	S	5.73	4.50	
0650	S	5.85	4.78	
0651	S	5.83	4.76	
0652	S	5.77	4.72	
0653	S	5.82	4.78	
0654	S	5.93	4.69	
0655	S	5.81	5.08	
0750	S	5.98	5.27	
0751	S	5.95	5.19	
0752	S	5.87	5.12	
1450	S	2.57	0.90	
1650	S	4.60	0.00	
1651	S	6.02	4.82	
1652	S	6.02	4.80	
1654	S	5.98	4.67	
1655	S	5.94	4.60	
1656	S	5.79	4.58	
1657	S	5.60	4.40	
1658	S	0.00	0.00	
2250	S	3.77	2.93	
2251	S	3.54	1.94	
2252	S	3.53	1.98	
2253	S	3.70	2.14	
2350	S	2.79	1.46	
2351	S	3.68	2.65	
2352	S	0.00	0.00	
2450	S	2.37	0.98	
2550	S	6.03	5.13	
2551	S	6.07	5.39	
2552	S	6.35	5.49	
2550	S	5.55	0.00	
2651	S	0.00	0.00	
2652	S	5.79	0.00	
2653	S	5.56	0.00	
2654	S	5.72	0.00	
2655	S	5.75	4.80	
2656	S	5.46	4.53	
2752	S	5.62	4.63	
2850	S	5.75	4.34	
2851	S	5.74	4.45	
2852	S	5.79	4.59	
2853	S	5.60	4.22	
2854	S	5.73	4.78	
2855	S	5.38	4.74	
2950	S	5.62	4.62	
2951	S	5.55	4.70	
2952	S	5.54	4.18	
3050	S	5.09	3.87	
3051	S	5.04	4.05	
3052	S	5.19	3.84	
3150	S	9.85	8.74	
3152	S	0.95	0.00	
3153	S	0.99	3.82	
3155	S	9.92	8.81	
3156	S	10.00	8.89	
3250	S	3.69	2.37	
3251	S	4.21	2.71	
3252	S	3.50	2.60	
3350	S	0.00	0.00	
3351	S	2.92	2.24	
3450	S	0.00	0.00	
3451	S	2.86	1.15	
3452	S	2.91	1.71	
3650	S	7.02	5.15	
3651	S	6.76	4.92	
3652	S	6.17	4.68	
3653	S	6.16	4.65	
3750	S	5.29	4.48	
3751	S	5.76	4.37	
3752	S	5.87	4.12	
3753	S	5.91	3.76	
3850	S	5.99	3.74	
3851	S	5.16	4.10	
3852	S	5.36	4.19	
3853	S	5.30	4.21	
3854	S	5.11	4.26	
3951	S	4.92	3.98	
3952	S	5.11	3.83	
4050	S	5.54	4.44	
4051	S	5.43	4.64	
4052	S	5.49	0.00	
4053	S	5.25	4.58	
4054	S	5.48	4.86	
4150	S	4.80	3.54	
4250	S	4.92	3.29	
4251	S	4.67	3.11	
4252	S	4.66	0.00	
4254	S	4.91	3.01	
4350	S	4.65	3.26	
4351	S	4.79	3.19	
4352	S	5.02	3.28	
4354	S	5.06	3.56	
4450	S	6.75	0.00	
4451	S	6.88	5.92	
4452	S	6.72	5.29	
4453	S	6.90	6.16	
4454	S	6.73	5.60	
4455	S	6.72	5.46	
4456	S	6.77	5.29	
4457	S	0.00	0.00	
4548	S	6.76	4.64	
4550	S	6.68	5.61	
4551	S	6.83	5.48	
4552	S	6.92	5.63	
4553	S	7.04	6.23	
4555	S	7.16	6.38	
4556	S	6.88	0.00	
4557	S	6.39	3.98	
4652	S	6.13	4.96	
4653	S	6.38	4.17	
4654	S	6.64	4.28	
4655	S	6.73	4.39	
4656	S	6.68	5.22	
4657	S	6.48	4.51	
4750	S	6.35	4.25	
4751	S	5.57	4.31	
4752	S	5.77	4.47	
4753	S	5.72	4.57	
4754	S	5.96	0.00	
4755	S	6.06	3.38	
4756	S	5.91	4.66	
4757	S	6.17	3.44	
4758	S	6.31	3.49	
4759	S	6.40	3.51	
4760	S	6.15	3.59	
4761	S	6.09	3.50	
4763	S	6.05	3.24	
4764	S	5.97	3.23	
4765	S	5.91	3.22	
4850	S	5.82	4.64	
4851	S	5.47	4.34	
4852	S	0.00	0.00	
4853	S	5.67	4.53	
4950	S	5.79	4.92	
4951	S	0.00	0.00	
4952	S	5.29	3.71	
4953	S	0.00	4.12	
4954	S	0.00	0.00	
5050	S	5.33	4.55	
5051	S	5.48	4.48	
5052	S	5.58	4.97	
5053	S	5.84	5.05	
5150	S	5.40	4.47	
5151	S	5.47	4.89	
5152	S	5.43	4.79	
5350	S	4.72	3.66	
5351	S	4.90	3.59	
5353	S	5.30	3.75	
5354	S	5.20	3.67	
5355	S	5.27	0.00	
5356	S	5.28	0.00	
5357	S	5.25	3.74	
5358	S	5.26	3.84	
5359	S	5.38	3.67	
5360	S	5.38	3.58	
5361	S	5.37	3.91	
5362	S	5.23	3.97	
5363	S	5.31	3.47	

Appendix D

Magic Map Geology Information

Table of Contents

- ☐ Access
- ☐ Administrative Geographies
- ☐ Countryside Stewardship Targeting & Scoring Layers
- ☐ Designations
- ☐ Habitats and Species
- ☐ Land Based Schemes
- ☒ Landscape

☒ Geology and Soils☒ Aquifer Designation Map (Bedrock) (England)

- Principal
- Secondary A
- Secondary B
- Secondary (undifferentiated)
- Unproductive

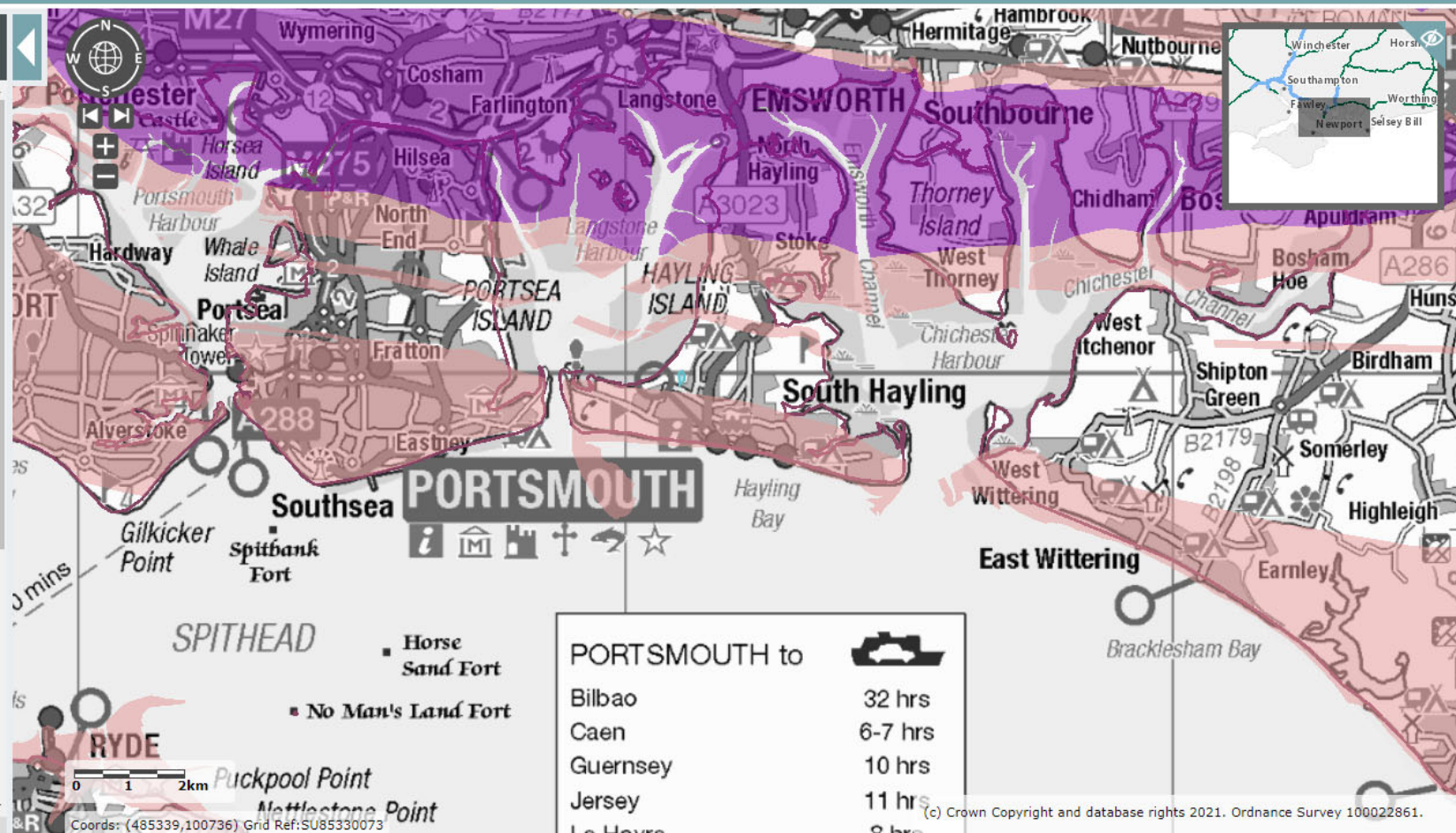
☐ Aquifer Designation Map (Superficial Drift) (England)☐ Groundwater Vulnerability Map (England)☐ Geological Places to Visit (England)☐ Geological Descriptions

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- ☐ Access
- ☐ Administrative Geographies
- ☐ Countryside Stewardship Targeting & Scoring Layers
- ☐ Designations
- ☐ Habitats and Species
- ☐ Land Based Schemes
- ☒ Landscape
- ☒ Geology and Soils
 - ☐ Aquifer Designation Map (Bedrock) (England)
 - ☒ Aquifer Designation Map (Superficial Drift) (England)
 - ☐ Principal
 - ☐ Secondary A
 - ☐ Secondary B
 - ☐ Secondary (undifferentiated)
 - ☐ Unknown (lakes+landslip)
 - ☐ Unproductive
 - ☐ Groundwater Vulnerability Map (England)
 - ☐ Geological Places to Visit (England)

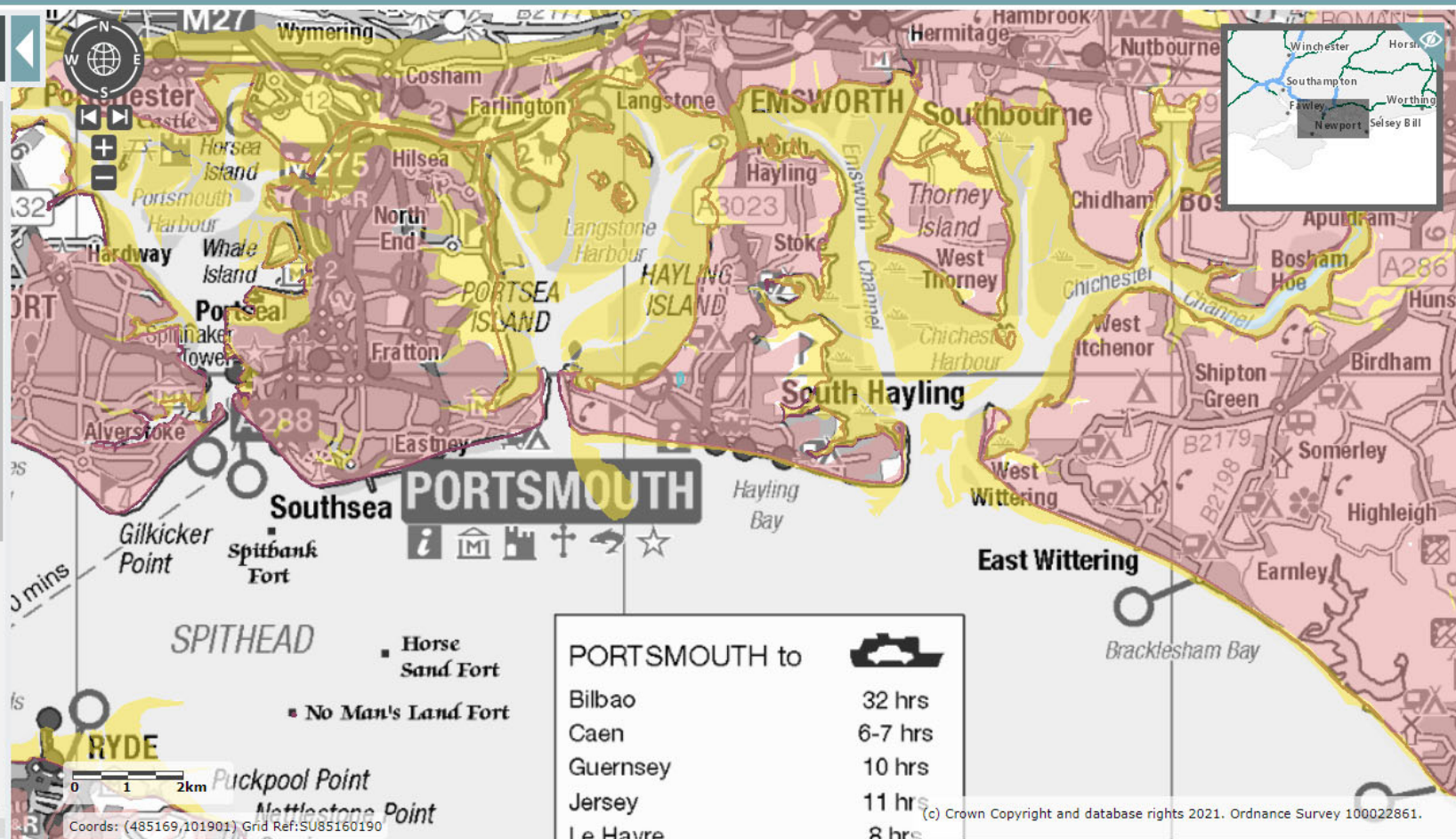


Table of Contents

☐ + Countryside Stewardship Targeting & Scoring Layers☐ + Designations☐ + Habitats and Species☐ + Land Based Schemes☒ - Landscape☒ Geology and Soils☐ + Aquifer Designation Map (Bedrock) (England)☐ + Aquifer Designation Map (Superficial Drift) (England)☒ Groundwater Vulnerability Map (England)

Local Information

Soluble Rock Risk

High

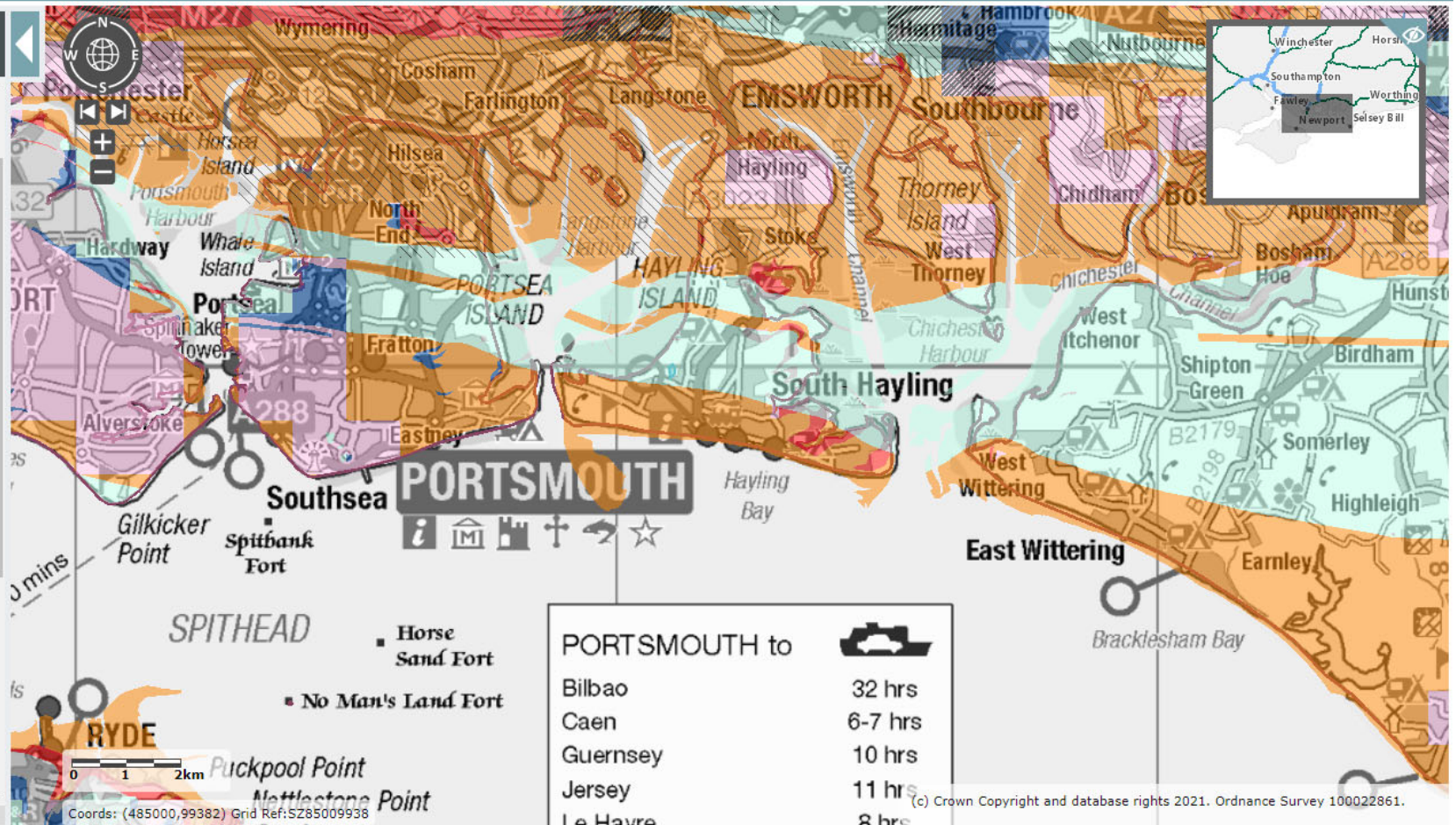
Medium - High

Medium

Medium - Low

Low

Unproductive

☐ ● Geological Places to Visit (England)☐ □ Geological Descriptions (England)

Appendix E

Greenfield Run-Off

Patrick Parsons Limited		Page 1
Waterloo House Thornton Street Newcastle Upon Tyne, NE1 4AP	Saltmarsh Lane	
Date 31/03/2021 09:43 File	Designed by A Johnson Checked by D Brooke	
Innovyze Source Control 2020.1		

ICP SUDS Mean Annual Flood

Input

Return Period (years)	1	Soil	0.400
Area (ha)	2.480	Urban	0.000
SAAR (mm)	700	Region Number	Region 7

Results l/s

QBAR Rural	8.4
QBAR Urban	8.4
Q1 year	7.2
Q1 year	7.2
Q30 years	19.1
Q100 years	26.9

©1982-2020 Innovyze

Appendix F

Site Plan

05 Site Layout

The Land to the South of the Saltmarsh Lane provides an opportunity to create a new, high-quality neighbourhood of up to 62 homes.

Proposed mix

2 bed - 34%
3 bed - 52%
4 bed - 13%

Density: 35 dwellings per hectare

Parking Standards

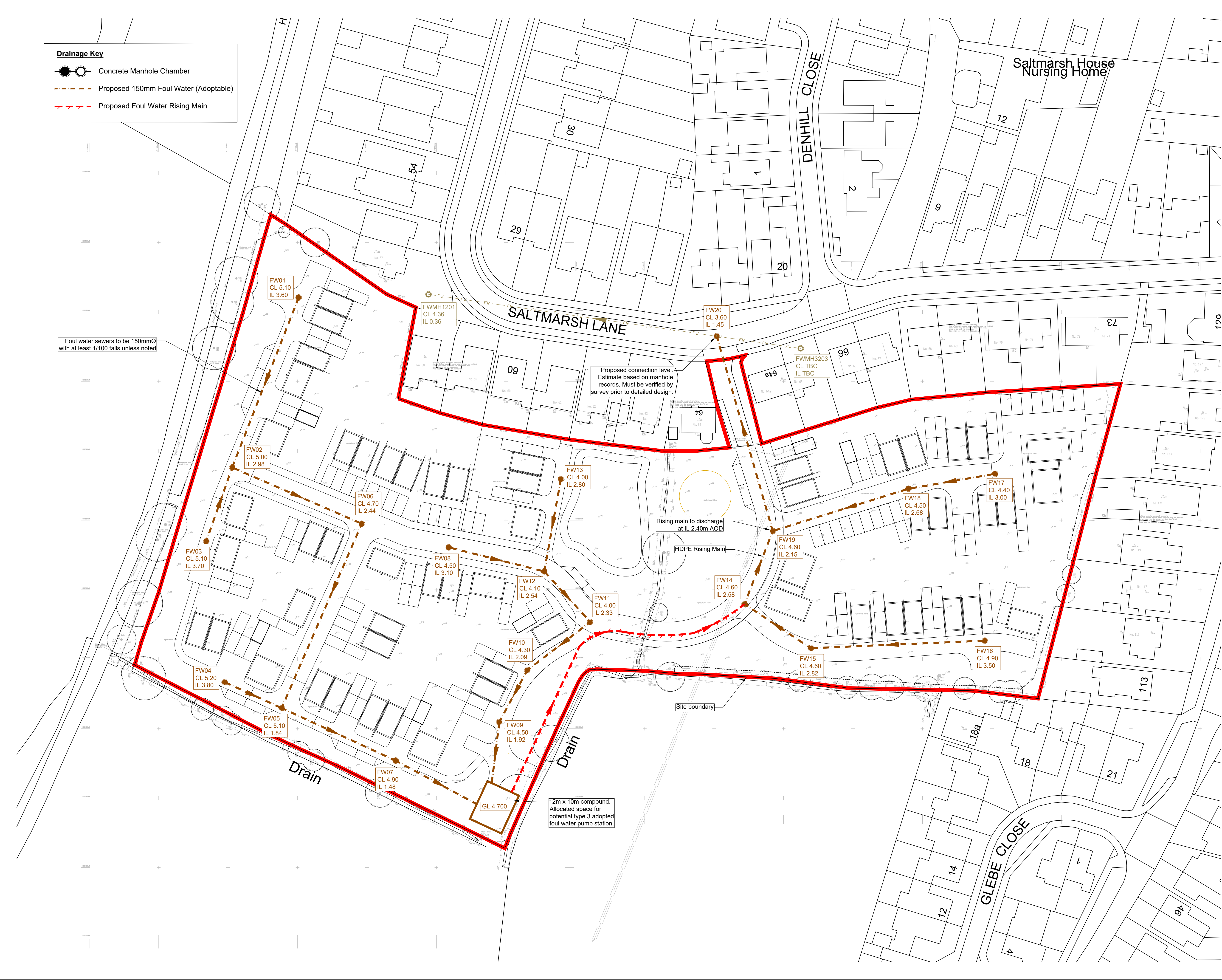
Car parking will be set out in accordance with the highway authorities standards.

- ① Proposed vehicular access
- ② Proposed pedestrian access
- ③ Sustainable drainage system infiltration pond
- ④ Existing tree planting
- ⑤ Proposed vegetation



Appendix G

Drainage Layouts



Drainage Key

- Concrete Manhole Chamber
- Proposed 150mm Foul Water (Adoptable)
- Proposed Foul Water Rising Main

Foul water sewers to be 150mmØ with at least 1/100 falls unless noted

Proposed connection level. Estimate based on manhole records. Must be verified by survey prior to detailed design.

Rising main to discharge at IL 2.40m AOD.
HDPE Rising Main

12m x 10m compound. Allocated space for potential type 3 adopted foul water pump station.

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Drainage Construction Notes

- All materials and workmanship related to private sewers shall be in accordance with Part H of the Building Regulations and BS EN752 and best practice
- All materials and workmanship related to adoptable sewers shall be in accordance with the Design and Construction Guidance 2020 as published by the Water Services Association and any subsequent revisions shown by the water authority
- All sustainable drainage systems to be designed and maintained in accordance with CIRIA C753 The SuDS Manual and best practice guidance.

P3	SITE LAYOUT UPDATED					
HS	18.10.21	DB	18.10.21	DB	18.10.21	
P2	DRAINAGE RUN AMENDMENTS					
HS	01.10.21	DB	01.10.21	DB	01.10.21	
P1	INITIAL ISSUE.					
AJ	29.07.21	DB	29.07.21	DB	29.07.21	
REV.	REVISION NOTE/COMMENT					
DRW BY	DATE	CHK BY	DATE	APP BY	DATE	

Revisions

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Client
Hayling Island Builders

Project
Land South of Saltmarsh Lane

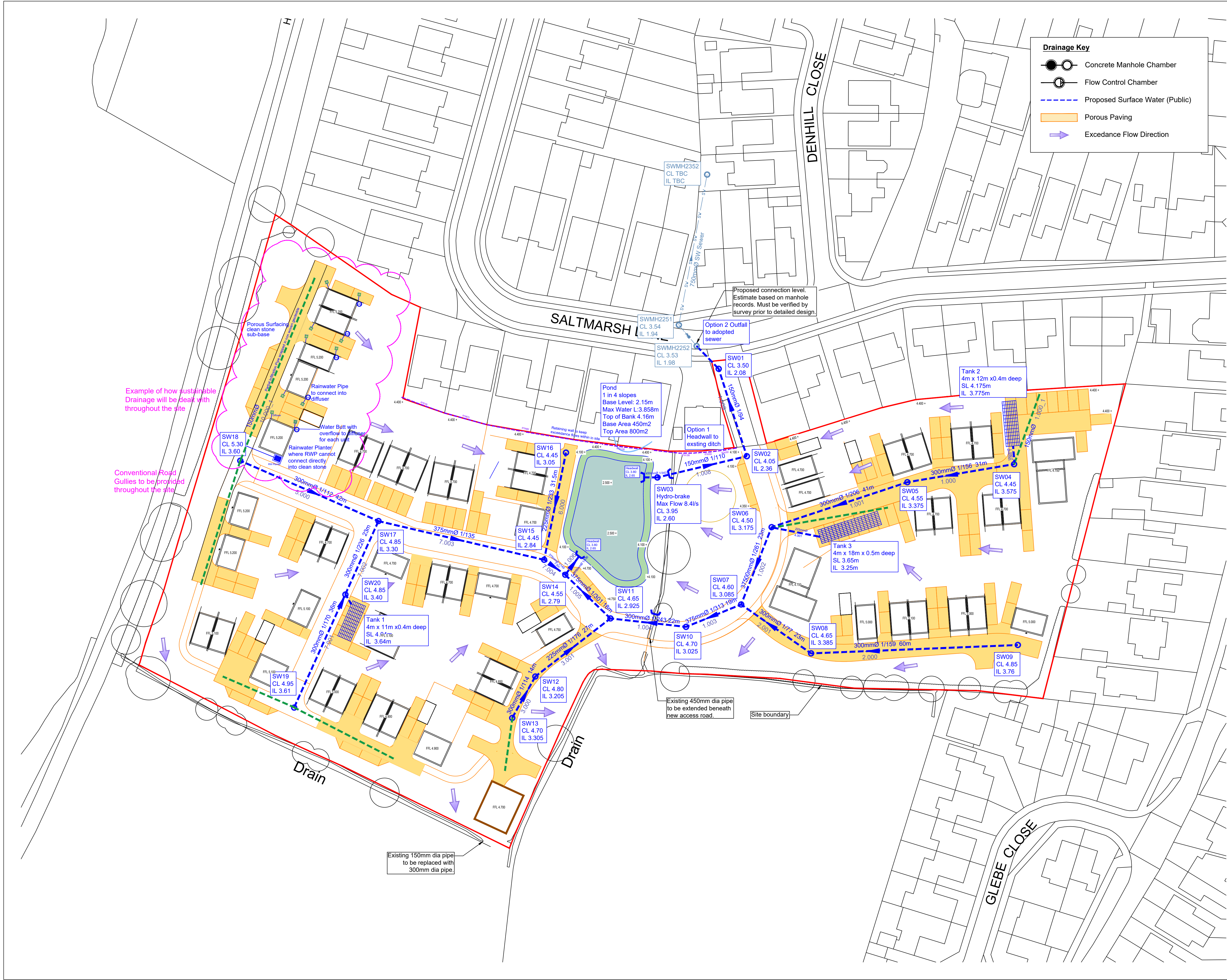
Drawing
**Drainage Strategy Plan
Foul Water**

Scales 1:500 At original size A1

Drawn AJ	Checked DB
Date July 2021	

Status **PRELIMINARY**

Drawing No. **A21079/0200** Rev. **P3**



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Drainage Construction Notes

1. All materials and workmanship related to private sewers shall be in accordance with Part H of the Building Regulations and BS EN752 and best practice

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3. All sustainable drainage systems to be designed and maintained in accordance with CIRIA C753 The SuDS Manual and best practice guidance.

P2

UPDATED TO REFLECT LLFA COMMENTS

CV13.10.25DB13.10.25DB13.10.25

P1

SITE LAYOUT UPDATED

CV03.07.25DB03.07.25DB03.07.25

REV.

REVISION NOTE/COMMENT

DRW BYDATECHK BYDATEAPP BYDATE

Revisions

CGV Transport Consultants Ltd

TRANSPORT PLANNING & HIGHWAY ENGINEERING

Website: www.CGVtransportconsultantsltd.co.uk

Email: info@CGVcivil.co.uk

Client

Hayling Island Builders

Project

Land South of Saltmarsh Lane

Drawing

Drainage Strategy Plan

Surface Water

Scales

1:500

At original size

A1

Drawn

CV

Checked

DB

Date

July 2025

Status

PRELIMINARY

Drawing No.

1139-0201

Rev.

P2

Appendix H

Causeway Flow Calculations

Design Settings

Rainfall Methodology	FEH-13	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	5	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
SW04	0.065	5.00	4.450	1375	471364.880	100236.090	1.175	3.275
SW05	0.091	5.00	4.550	1375	471334.234	100230.958	1.475	3.075
SW06	0.103	5.00	4.500	1375	471295.176	100218.069	1.625	2.875
SW07	0.050	5.00	4.600	1375	471288.255	100195.601	1.815	2.785
SW09		5.00	4.850	1200	471366.049	100184.030	1.390	3.460
SW08	0.106	5.00	4.650	1200	471306.533	100181.664	1.565	3.085
SW10	0.014	5.00	4.700	1375	471270.415	100189.302	1.985	2.715
SW11	0.034	5.00	4.650	1375	471248.753	100191.766	2.100	2.550
SW14	0.031	5.00	4.550	1375	471235.765	100204.295	2.135	2.415
SW13	0.025	5.00	4.600	1200	471220.483	100163.057	1.700	2.900
SW12	0.021	5.00	4.800	1200	471227.144	100175.007	2.020	2.780
Car Park 1		5.00	5.300		471148.076	100247.022	0.600	4.700
SW18	0.141	5.00	5.300	1200	471142.202	100237.152	2.000	3.300
SW17	0.169	5.00	4.850	1375	471180.508	100219.767	1.925	2.925
SW15	0.079	5.00	4.450	1375	471229.676	100208.614	1.910	2.540
SW16		5.00	4.450	1200	471235.976	100239.473	1.700	2.750
SW19	0.115	5.00	4.950	1200	471157.529	100166.178	1.640	3.310
SW03			3.950	1500	471262.291	100232.331	1.500	2.450
Car Park 6		5.00	4.450		471373.418	100242.773	0.600	3.850
SW02			4.050	1050	471287.968	100238.504	1.690	2.360
30_OUT			3.500	1050	471279.902	100263.607	1.420	2.080
Pond	0.080	5.00	4.150		471249.645	100220.806	1.500	2.650
Car Park 2		5.00	4.950		471147.130	100170.543	0.500	4.450
Car Park 3		5.00	5.000		471164.308	100163.080	0.550	4.450
Car Park 5		5.00	4.400		471312.971	100216.146	0.600	3.800
Car Park 4		5.00	4.650		471218.647	100158.886	0.550	4.100
Tank 3		5.00	4.500		471304.021	100212.673	1.200	3.300
SW21			4.850	1200	471172.469	100198.604	1.750	3.100
Tank 1		5.00	4.850		471173.591	100190.231	1.200	3.650
Tank 2		5.00	4.400		471365.211	100245.986	0.625	3.775

Links

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)
1.000	SW04	SW05	31.073	0.600	3.575	3.375	0.200	155.4	300	5.64	50.0
1.001	SW05	SW06	41.144	0.600	3.375	3.175	0.200	205.7	300	6.27	50.0
1.002	SW06	SW07	23.466	0.600	3.175	3.085	0.090	260.7	300	6.68	50.0
2.000	SW09	SW08	59.565	0.600	3.760	3.385	0.375	158.8	300	5.80	50.0
2.001	SW08	SW07	22.985	0.600	3.385	3.085	0.300	76.6	300	6.01	50.0
1.003	SW07	SW10	18.805	0.600	3.085	3.025	0.060	313.4	300	7.03	50.0
1.004	SW10	SW11	21.918	0.600	3.015	2.925	0.090	243.5	300	7.39	50.0
1.005	SW11	SW14	18.071	0.600	2.850	2.790	0.060	301.2	375	7.68	50.0
3.000	SW13	SW12	13.681	0.600	3.200	3.080	0.120	114.0	225	5.24	50.0
3.001	SW12	SW11	27.324	0.600	3.080	2.925	0.155	176.3	225	5.70	50.0
1.006	SW14	Pond	21.540	0.600	2.715	2.650	0.065	331.4	450	8.01	50.0
6.000	SW16	SW15	31.496	0.600	3.050	2.915	0.135	233.3	225	5.62	50.0
5.000	SW18	SW17	42.039	0.600	3.600	3.300	0.300	140.1	300	5.73	50.0
7.003	SW17	SW15	50.446	0.600	3.225	2.840	0.385	131.0	375	6.67	50.0
7.004	SW15	SW14	7.465	0.600	2.840	2.790	0.050	149.3	375	6.76	50.0
7.001	SW19	SW21	35.702	0.600	3.610	3.400	0.210	170.0	300	5.78	50.0
1.007	Pond	SW03	17.144	0.600	2.650	2.600	0.050	342.9	450	8.27	50.0
1.008	SW03	SW02	26.452	0.600	2.600	2.360	0.240	110.2	150	8.73	50.0
1.009	SW02	SW01	26.431	0.600	2.360	2.080	0.280	94.4	150	9.16	50.0
10.000_1	Car Park 1	SW18	11.486	0.600	4.700	4.600	0.100	114.9	150	5.20	50.0
1.000_1	Car Park 6	SW04	10.843	0.600	3.850	3.725	0.125	86.7	150	5.17	50.0
7.000	Car Park 2	SW19	11.278	0.600	4.450	4.400	0.050	225.6	150	5.28	50.0
8.000	Car Park 3	SW19	7.453	0.600	4.450	4.400	0.050	149.1	150	5.15	50.0
3.000_1	Car Park 5	SW06	17.927	0.600	3.800	3.700	0.100	179.3	150	5.40	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.259	89.0	12.3	0.575	0.875	0.065	0.0	75	0.894
1.001	1.092	77.2	29.6	0.875	1.025	0.156	0.0	129	1.022
1.002	0.969	68.5	49.1	1.025	1.215	0.259	0.0	188	1.051
2.000	1.245	88.0	0.0	0.790	0.965	0.000	0.0	0	0.000
2.001	1.798	127.1	20.1	0.965	1.215	0.106	0.0	80	1.322
1.003	0.883	62.4	78.7	1.215	1.375	0.415	0.0	300	0.894
1.004	1.003	70.9	81.4	1.385	1.425	0.429	0.0	300	1.016
1.005	1.039	114.7	96.6	1.425	1.385	0.509	0.0	265	1.159
3.000	1.223	48.6	4.7	1.175	1.495	0.025	0.0	47	0.779
3.001	0.981	39.0	8.7	1.495	1.500	0.046	0.0	73	0.796
1.006	1.111	176.7	198.1	1.385	1.050	1.044	0.0	450	1.125
6.000	0.852	33.9	0.0	1.175	1.310	0.000	0.0	0	0.000
5.000	1.326	93.7	26.8	1.400	1.250	0.141	0.0	109	1.148
7.003	1.581	174.6	80.6	1.250	1.235	0.425	0.0	179	1.551
7.004	1.480	163.5	95.6	1.235	1.385	0.504	0.0	206	1.535
7.001	1.203	85.0	21.8	1.040	1.150	0.115	0.0	103	1.012
1.007	1.092	173.7	213.3	1.050	0.900	1.124	0.0	450	1.106
1.008	0.956	16.9	213.3	1.200	1.540	1.124	0.0	150	0.974
1.009				1.540					
10.000_1	0.937	16.5	0.0	0.450	0.550	0.000	0.0	0	0.000
1.000_1	1.080	19.1	0.0	0.450	0.575	0.000	0.0	0	0.000
7.000	0.665	11.7	0.0	0.350	0.400	0.000	0.0	0	0.000
8.000	0.821	14.5	0.0	0.400	0.400	0.000	0.0	0	0.000
3.000_1	0.747	13.2	0.0	0.450	0.650	0.000	0.0	0	0.000

Links

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)
6.000_1	Car Park 4	SW13	4.557	0.600	4.100	4.000	0.100	45.6	150	5.05	50.0
4.001	Tank 3	SW06	10.318	0.600	3.300	3.250	0.050	206.4	225	5.19	50.0
7.002	SW21	SW17	22.628	0.600	3.400	3.300	0.100	226.3	300	6.14	50.0
9.000	Tank 1	SW20	8.461	0.600	3.640	3.590	0.050	169.2	150	5.18	50.0
2.000_1	Tank 2	SW04	9.902	0.600	3.775	3.725	0.050	198.0	150	5.23	50.0
4.000	SW21	Tank	5.748	0.600	3.300	3.225	0.075	76.6	100	5.11	50.0
1.010	SW02	30_OUT	26.440	0.600	2.360	2.080	0.280	94.4	150	9.16	50.0
11.000	Tank 1	SW21	8.461	0.600	3.650	3.582	0.068	124.4	150	5.16	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
6.000_1	1.494	26.4	0.0	0.400	0.450	0.000	0.0	0	0.000
4.001	0.906	36.0	0.0	0.975	1.025	0.000	0.0	0	0.000
7.002	1.041	73.6	21.8	1.150	1.250	0.115	0.0	112	0.910
9.000				1.060					
2.000_1	0.710	12.6	0.0	0.475	0.575	0.000	0.0	0	0.000
4.000				1.450					
1.010	1.034	18.3	213.3	1.540	1.270	1.124	0.0	150	1.054
11.000	0.899	15.9	0.0	1.050	1.118	0.000	0.0	0	0.000

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	31.073	155.4	300	Circular	4.450	3.575	0.575	4.550	3.375	0.875
1.001	41.144	205.7	300	Circular	4.550	3.375	0.875	4.500	3.175	1.025
1.002	23.466	260.7	300	Circular	4.500	3.175	1.025	4.600	3.085	1.215
2.000	59.565	158.8	300	Circular	4.850	3.760	0.790	4.650	3.385	0.965
2.001	22.985	76.6	300	Circular	4.650	3.385	0.965	4.600	3.085	1.215
1.003	18.805	313.4	300	Circular	4.600	3.085	1.215	4.700	3.025	1.375
1.004	21.918	243.5	300	Circular	4.700	3.015	1.385	4.650	2.925	1.425
1.005	18.071	301.2	375	Circular	4.650	2.850	1.425	4.550	2.790	1.385
3.000	13.681	114.0	225	Circular	4.600	3.200	1.175	4.800	3.080	1.495
3.001	27.324	176.3	225	Circular	4.800	3.080	1.495	4.650	2.925	1.500
1.006	21.540	331.4	450	Circular	4.550	2.715	1.385	4.150	2.650	1.050

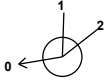
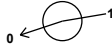
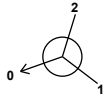
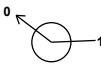
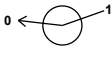
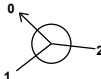
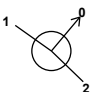
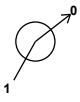
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	SW04	1375	Manhole	Adoptable	SW05	1375	Manhole	Adoptable
1.001	SW05	1375	Manhole	Adoptable	SW06	1375	Manhole	Adoptable
1.002	SW06	1375	Manhole	Adoptable	SW07	1375	Manhole	Adoptable
2.000	SW09	1200	Manhole	Adoptable	SW08	1200	Manhole	Adoptable
2.001	SW08	1200	Manhole	Adoptable	SW07	1375	Manhole	Adoptable
1.003	SW07	1375	Manhole	Adoptable	SW10	1375	Manhole	Adoptable
1.004	SW10	1375	Manhole	Adoptable	SW11	1375	Manhole	Adoptable
1.005	SW11	1375	Manhole	Adoptable	SW14	1375	Manhole	Adoptable
3.000	SW13	1200	Manhole	Adoptable	SW12	1200	Manhole	Adoptable
3.001	SW12	1200	Manhole	Adoptable	SW11	1375	Manhole	Adoptable
1.006	SW14	1375	Manhole	Adoptable	Pond		Junction	

Pipeline Schedule

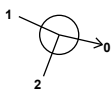
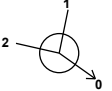
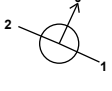
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
6.000	31.496	233.3	225	Circular	4.450	3.050	1.175	4.450	2.915	1.310
5.000	42.039	140.1	300	Circular	5.300	3.600	1.400	4.850	3.300	1.250
7.003	50.446	131.0	375	Circular	4.850	3.225	1.250	4.450	2.840	1.235
7.004	7.465	149.3	375	Circular	4.450	2.840	1.235	4.550	2.790	1.385
7.001	35.702	170.0	300	Circular	4.950	3.610	1.040	4.850	3.400	1.150
1.007	17.144	342.9	450	Circular	4.150	2.650	1.050	3.950	2.600	0.900
1.008	26.452	110.2	150	Circular	3.950	2.600	1.200	4.050	2.360	1.540
1.009	26.431	94.4	150		4.050	2.360	1.540		2.080	
10.000_1	11.486	114.9	150	Circular	5.300	4.700	0.450	5.300	4.600	0.550
1.000_1	10.843	86.7	150	Circular	4.450	3.850	0.450	4.450	3.725	0.575
7.000	11.278	225.6	150	Circular	4.950	4.450	0.350	4.950	4.400	0.400
8.000	7.453	149.1	150	Circular	5.000	4.450	0.400	4.950	4.400	0.400
3.000_1	17.927	179.3	150	Circular	4.400	3.800	0.450	4.500	3.700	0.650
6.000_1	4.557	45.6	150	Circular	4.650	4.100	0.400	4.600	4.000	0.450
4.001	10.318	206.4	225	Circular	4.500	3.300	0.975	4.500	3.250	1.025
7.002	22.628	226.3	300	Circular	4.850	3.400	1.150	4.850	3.300	1.250
9.000	8.461	169.2	150		4.850	3.640	1.060		3.590	
2.000_1	9.902	198.0	150	Circular	4.400	3.775	0.475	4.450	3.725	0.575
4.000	5.748	76.6	100		4.850	3.300	1.450		3.225	
1.010	26.440	94.4	150	Circular	4.050	2.360	1.540	3.500	2.080	1.270
11.000	8.461	124.4	150	Circular	4.850	3.650	1.050	4.850	3.582	1.118

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
6.000	SW16	1200	Manhole	Adoptable	SW15	1375	Manhole	Adoptable
5.000	SW18	1200	Manhole	Adoptable	SW17	1375	Manhole	Adoptable
7.003	SW17	1375	Manhole	Adoptable	SW15	1375	Manhole	Adoptable
7.004	SW15	1375	Manhole	Adoptable	SW14	1375	Manhole	Adoptable
7.001	SW19	1200	Manhole	Adoptable	SW21	1200	Manhole	Adoptable
1.007	Pond		Junction		SW03	1500	Manhole	Adoptable
1.008	SW03	1500	Manhole	Adoptable	SW02	1050	Manhole	Adoptable
1.009	SW02	1050	Manhole	Adoptable				
10.000_1	Car Park 1		Junction		SW18	1200	Manhole	Adoptable
1.000_1	Car Park 6		Junction		SW04	1375	Manhole	Adoptable
7.000	Car Park 2		Junction		SW19	1200	Manhole	Adoptable
8.000	Car Park 3		Junction		SW19	1200	Manhole	Adoptable
3.000_1	Car Park 5		Junction		SW06	1375	Manhole	Adoptable
6.000_1	Car Park 4		Junction		SW13	1200	Manhole	Adoptable
4.001	Tank 3		Junction		SW06	1375	Manhole	Adoptable
7.002	SW21	1200	Manhole	Adoptable	SW17	1375	Manhole	Adoptable
9.000	Tank 1		Junction					
2.000_1	Tank 2		Junction		SW04	1375	Manhole	Adoptable
4.000	SW21	1200	Manhole	Adoptable				
1.010	SW02	1050	Manhole	Adoptable	30_OUT	1050	Manhole	Adoptable
11.000	Tank 1		Junction		SW21	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW04	471364.880	100236.090	4.450	1.175	1375		1 2.000_1 2 1.000_1 0 1.000	3.725 3.725 3.575	150 150 300
SW05	471334.234	100230.958	4.550	1.475	1375		1 1.000 0 1.001	3.375 3.375	300 300
SW06	471295.176	100218.069	4.500	1.625	1375		1 4.001 2 3.000_1 3 1.001 0 1.002	3.250 3.700 3.175 3.175	225 150 300 300
SW07	471288.255	100195.601	4.600	1.815	1375		1 2.001 2 1.002 0 1.003	3.085 3.085 3.085	300 300 300
SW09	471366.049	100184.030	4.850	1.390	1200		0 2.000	3.760	300
SW08	471306.533	100181.664	4.650	1.565	1200		1 2.000 0 2.001	3.385 3.385	300 300
SW10	471270.415	100189.302	4.700	1.985	1375		1 1.003 0 1.004	3.025 3.015	300 300
SW11	471248.753	100191.766	4.650	2.100	1375		1 3.001 2 1.004 0 1.005	2.925 2.925 2.850	225 300 375
SW14	471235.765	100204.295	4.550	2.135	1375		1 7.004 2 1.005 0 1.006	2.790 2.790 2.715	375 375 450
SW13	471220.483	100163.057	4.600	1.700	1200		1 6.000_1 0 3.000	4.000 3.200	150 225
SW12	471227.144	100175.007	4.800	2.020	1200		1 3.000 0 3.001	3.080 3.080	225 225
Car Park 1	471148.076	100247.022	5.300	0.600			0 10.000_1	4.700	150
SW18	471142.202	100237.152	5.300	2.000	1200		1 10.000_1 0 5.000	4.600 3.600	150 300

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW17	471180.508	100219.767	4.850	1.925	1375		1 5.000 2 7.002 0 7.003	3.300 3.300 3.225	300 300 375
SW15	471229.676	100208.614	4.450	1.910	1375		1 6.000 2 7.003 0 7.004	2.915 2.840 2.840	225 375 375
SW16	471235.976	100239.473	4.450	1.700	1200		0 6.000	3.050	225
SW19	471157.529	100166.178	4.950	1.640	1200		1 8.000 2 7.000 0 7.001	4.400 4.400 3.610	150 150 300
SW03	471262.291	100232.331	3.950	1.500	1500		1 1.007 0 1.008	2.600 2.600	450 150
Car Park 6	471373.418	100242.773	4.450	0.600			0 1.000_1	3.850	150
SW02	471287.968	100238.504	4.050	1.690	1050		1 1.008 0 1.010	2.360 2.360	150 150
30_OUT	471279.902	100263.607	3.500	1.420	1050		1 1.010	2.080	150
Pond	471249.645	100220.806	4.150	1.500			1 1.006 0 1.007	2.650 2.650	450 450
Car Park 2	471147.130	100170.543	4.950	0.500			0 7.000	4.450	150
Car Park 3	471164.308	100163.080	5.000	0.550			0 8.000	4.450	150
Car Park 5	471312.971	100216.146	4.400	0.600			0 3.000_1	3.800	150
Car Park 4	471218.647	100158.886	4.650	0.550			0 6.000_1	4.100	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
Tank 3	471304.021	100212.673	4.500	1.200			0	4.001	3.300	225
SW21	471172.469	100198.604	4.850	1.750	1200		1 2 0	11.000 7.001 7.002	3.582 3.400 3.400	150 300 300
Tank 1	471173.591	100190.231	4.850	1.200			0	11.000	3.650	150
Tank 2	471365.211	100245.986	4.400	0.625			0	2.000 1	3.775	150

Simulation Settings

Rainfall Methodology	FEH-13	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	20.0		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	40	0	0
100	45	0	0

Node SW03 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	0.000	Product Number	CTL-SHE-0127-8400-1500-8400
Design Depth (m)	1.500	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	8.4	Min Node Diameter (mm)	1500

Node Pond Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.650
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	450.0	0.0	1.500	800.0	0.0	1.501	0.0	0.0

Node Car Park 1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.700	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.350
Safety Factor	2.0	Width (m)	10.000	Inf Depth (m)	
Porosity	0.30	Length (m)	60.000		

Node Car Park 6 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	3.850	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.350
Safety Factor	2.0	Width (m)	10.000	Inf Depth (m)	
Porosity	0.30	Length (m)	50.000		

Node Car Park 2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.450	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.350
Safety Factor	2.0	Width (m)	20.000	Inf Depth (m)	
Porosity	0.30	Length (m)	11.000		

Node Car Park 3 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.450	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	2	Depth (m)	0.350
Safety Factor	2.0	Width (m)	10.000	Inf Depth (m)	
Porosity	0.30	Length (m)	3.400		

Node Car Park 5 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	3.800	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.350
Safety Factor	2.0	Width (m)	10.000	Inf Depth (m)	
Porosity	0.30	Length (m)	48.000		

Node Car Park 4 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.100	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.350
Safety Factor	2.0	Width (m)	10.000	Inf Depth (m)	
Porosity	0.30	Length (m)	25.000		

Node Tank 3 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	3.300
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	15

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	68.0	0.0	0.500	68.0	0.0	0.501	0.0	0.0

Node Tank 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	3.575
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	10

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	52.0	0.0	0.400	52.0	0.0	0.401	0.0	0.0

Node Tank 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	3.540
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	6

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	44.0	0.0	0.400	44.0	0.0	0.401	0.0	0.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 96.79%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW04	10	3.645	0.070	11.1	0.2083	0.0000	OK
15 minute summer	SW05	11	3.493	0.118	26.4	0.3587	0.0000	OK
15 minute summer	SW06	11	3.367	0.192	42.7	0.5826	0.0000	OK
15 minute summer	SW07	11	3.339	0.254	62.1	0.5444	0.0000	OK
15 minute summer	SW09	1	3.760	0.000	0.0	0.0000	0.0000	OK
15 minute summer	SW08	11	3.460	0.075	18.1	0.2099	0.0000	OK
15 minute summer	SW10	12	3.246	0.231	63.2	0.3820	0.0000	OK
15 minute summer	SW11	12	3.092	0.242	75.3	0.4508	0.0000	OK
15 minute summer	SW14	11	3.013	0.298	159.2	0.5437	0.0000	OK
15 minute summer	SW13	10	3.245	0.045	4.3	0.0665	0.0000	OK
15 minute summer	SW12	11	3.147	0.067	7.8	0.0923	0.0000	OK
15 minute summer	Car Park 1	1	4.700	0.000	0.0	0.0000	0.0000	OK
15 minute summer	SW18	11	3.704	0.104	24.1	0.2909	0.0000	OK
15 minute summer	SW17	11	3.392	0.167	70.5	0.5964	0.0000	OK
15 minute summer	SW15	11	3.073	0.233	84.7	0.5735	0.0000	OK
15 minute summer	SW16	12	3.081	0.031	1.4	0.0350	0.0000	OK
15 minute summer	SW19	10	3.709	0.099	19.7	0.2831	0.0000	OK
240 minute summer	SW03	208	2.990	0.390	26.6	0.6894	0.0000	SURCHARGED
15 minute summer	Car Park 6	1	3.850	0.000	0.0	0.0000	0.0000	OK
30 minute winter	SW02	30	2.433	0.073	8.4	0.0635	0.0000	OK
120 minute summer	30_OUT	222	2.151	0.071	8.4	0.0000	0.0000	OK
360 minute summer	Pond	264	2.971	0.321	48.9	156.8868	0.0000	OK
15 minute summer	Car Park 2	1	4.450	0.000	0.0	0.0000	0.0000	OK
15 minute summer	Car Park 3	1	4.450	0.000	0.0	0.0000	0.0000	OK
15 minute summer	Car Park 5	1	3.800	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW04	1.000	SW05	10.8	0.583	0.122	0.5934	
15 minute summer	SW05	1.001	SW06	25.9	0.735	0.336	1.5077	
15 minute summer	SW06	1.002	SW07	36.3	0.705	0.531	1.3033	
15 minute summer	SW07	1.003	SW10	60.9	1.019	0.976	1.1207	
15 minute summer	SW09	2.000	SW08	0.0	0.000	0.000	0.4077	
15 minute summer	SW08	2.001	SW07	17.6	0.514	0.138	0.8878	
15 minute summer	SW10	1.004	SW11	62.9	1.174	0.888	1.1723	
15 minute summer	SW11	1.005	SW14	75.6	1.070	0.659	1.2967	
15 minute summer	SW14	1.006	Pond	166.9	2.901	0.944	1.4212	
15 minute summer	SW13	3.000	SW12	4.2	0.555	0.087	0.1055	
15 minute summer	SW12	3.001	SW11	7.7	0.586	0.197	0.5646	
15 minute summer	Car Park 1	10.000_1	SW18	0.0	0.000	0.000	0.0000	
15 minute summer	SW18	5.000	SW17	23.5	1.103	0.251	0.8974	
15 minute summer	SW17	7.003	SW15	71.7	1.221	0.411	3.0094	
15 minute summer	SW15	7.004	SW14	80.5	1.251	0.493	0.5231	
15 minute summer	SW16	6.000	SW15	-1.4	0.199	-0.042	0.5080	
15 minute summer	SW19	7.001	SW21	19.4	0.917	0.228	0.7673	
240 minute summer	SW03	Hydro-Brake®	SW02	8.4				
15 minute summer	Car Park 6	1.000_1	SW04	0.0	0.000	0.000	0.0000	
30 minute winter	SW02	1.010	30_OUT	8.4	1.000	0.459	0.2218	92.8
360 minute summer	Pond	1.007	SW03	23.3	0.586	0.134	2.2727	
15 minute summer	Car Park 2	7.000	SW19	0.0	0.000	0.000	0.0000	
15 minute summer	Car Park 3	8.000	SW19	0.0	0.000	0.000	0.0000	
15 minute summer	Car Park 5	3.000_1	SW06	0.0	0.000	0.000	0.0000	

Results for 2 year Critical Storm Duration. Lowest mass balance: 96.79%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Car Park 4	1	4.100	0.000	0.0	0.0000	0.0000	OK
15 minute summer	Tank 3	14	3.315	0.015	6.0	0.9899	0.0000	OK
15 minute summer	SW21	11	3.509	0.109	19.4	0.1230	0.0000	OK
15 minute summer	Tank 1	1	3.650	0.000	0.0	0.0000	0.0000	OK
15 minute summer	Tank 2	1	3.775	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	Car Park 4	6.000_1	SW13	0.0	0.000	0.000	0.0000	
15 minute summer	Tank 3	4.001	SW06	-6.0	-0.694	-0.167	0.1082	
15 minute summer	SW21	7.002	SW17	19.3	0.866	0.263	0.5047	
15 minute summer	Tank 1	11.000	SW21	0.0	0.000	0.000	0.0000	
15 minute summer	Tank 2	2.000_1	SW04	0.0	0.000	0.000	0.0000	

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.11%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW04	11	4.011	0.436	40.0	1.2955	0.0000	SURCHARGED
15 minute summer	SW05	11	4.012	0.637	71.1	1.9313	0.0000	SURCHARGED
15 minute summer	SW06	11	3.886	0.711	128.1	2.1604	0.0000	SURCHARGED
15 minute summer	SW07	12	3.876	0.791	99.7	1.6969	0.0000	SURCHARGED
15 minute summer	SW09	12	3.971	0.211	20.2	0.2387	0.0000	OK
15 minute summer	SW08	12	3.932	0.547	65.2	1.5363	0.0000	SURCHARGED
15 minute summer	SW10	12	3.704	0.689	102.1	1.1367	0.0000	SURCHARGED
360 minute winter	SW11	352	3.639	0.789	37.9	1.4696	0.0000	SURCHARGED
360 minute winter	SW14	352	3.639	0.924	78.9	1.6839	0.0000	SURCHARGED
360 minute winter	SW13	352	3.639	0.439	2.0	0.6528	0.0000	SURCHARGED
360 minute winter	SW12	352	3.639	0.559	3.7	0.7683	0.0000	SURCHARGED
15 minute summer	Car Park 1	1	4.700	0.000	0.0	0.0000	0.0000	OK
15 minute summer	SW18	11	4.422	0.822	86.8	2.2941	0.0000	SURCHARGED
15 minute summer	SW17	11	4.172	0.947	204.1	3.3768	0.0000	SURCHARGED
360 minute winter	SW15	352	3.639	0.799	40.8	1.9702	0.0000	SURCHARGED
360 minute winter	SW16	352	3.638	0.588	0.6	0.6655	0.0000	SURCHARGED
15 minute summer	SW19	11	4.329	0.719	70.8	2.0475	0.0000	SURCHARGED
360 minute winter	SW03	352	3.638	1.038	27.4	1.8358	0.0000	SURCHARGED
15 minute summer	Car Park 6	14	3.889	0.039	13.6	2.2775	0.0000	OK
30 minute winter	SW02	14	2.434	0.074	8.4	0.0637	0.0000	OK
15 minute summer	30_OUT	11	2.151	0.071	8.4	0.0000	0.0000	OK
360 minute winter	Pond	352	3.639	0.989	85.2	559.9232	0.0000	SURCHARGED
15 minute summer	Car Park 2	1	4.450	0.000	0.0	0.0000	0.0000	OK
15 minute summer	Car Park 3	1	4.450	0.000	0.0	0.0000	0.0000	OK
15 minute summer	Car Park 5	14	3.823	0.023	5.4	0.7660	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW04	1.000	SW05	27.7	0.742	0.311	2.1881	
15 minute summer	SW05	1.001	SW06	64.7	0.919	0.838	2.8973	
15 minute summer	SW06	1.002	SW07	65.8	0.939	0.960	1.6525	
15 minute summer	SW07	1.003	SW10	93.6	1.329	1.500	1.3242	
15 minute summer	SW09	2.000	SW08	-20.2	-0.362	-0.229	3.6744	
15 minute summer	SW08	2.001	SW07	56.1	0.796	0.441	1.6186	
15 minute summer	SW10	1.004	SW11	99.4	1.412	1.403	1.5435	
360 minute winter	SW11	1.005	SW14	37.0	0.802	0.323	1.9932	
360 minute winter	SW14	1.006	Pond	78.7	1.351	0.445	3.4129	
360 minute winter	SW13	3.000	SW12	2.0	0.435	0.041	0.5441	
360 minute winter	SW12	3.001	SW11	3.5	0.488	0.089	1.0867	
15 minute summer	Car Park 1	10.000_1	SW18	0.0	0.000	0.000	0.0000	
15 minute summer	SW18	5.000	SW17	78.3	1.199	0.835	2.9604	
15 minute summer	SW17	7.003	SW15	198.4	1.799	1.136	5.5640	
360 minute winter	SW15	7.004	SW14	39.4	0.963	0.241	0.8234	
360 minute winter	SW16	6.000	SW15	-0.6	-0.026	-0.018	1.2526	
15 minute summer	SW19	7.001	SW21	64.8	1.133	0.762	2.5141	
360 minute winter	SW03	Hydro-Brake®	SW02	8.4				
15 minute summer	Car Park 6	1.000_1	SW04	-13.6	-1.168	-0.714	0.1149	
30 minute winter	SW02	1.010	30_OUT	8.4	1.000	0.459	0.2223	115.7
360 minute winter	Pond	1.007	SW03	27.4	0.572	0.158	2.7164	
15 minute summer	Car Park 2	7.000	SW19	0.0	0.000	0.000	0.0000	
15 minute summer	Car Park 3	8.000	SW19	0.0	0.000	0.000	0.0000	
15 minute summer	Car Park 5	3.000_1	SW06	-5.4	-0.485	-0.413	0.1684	

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.11%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Car Park 4	1	4.100	0.000	0.0	0.0000	0.0000	OK
30 minute summer	Tank 3	23	3.775	0.475	82.2	30.6918	0.0000	SURCHARGED
15 minute summer	SW21	11	4.189	0.789	64.8	0.8924	0.0000	SURCHARGED
15 minute summer	Tank 1	14	3.822	0.172	35.1	7.1817	0.0000	SURCHARGED
15 minute summer	Tank 2	14	3.848	0.073	17.9	3.5900	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	Car Park 4	6.000_1	SW13	0.0	0.000	0.000	0.0000	
30 minute summer	Tank 3	4.001	SW06	-82.2	-2.068	-2.282	0.4104	
15 minute summer	SW21	7.002	SW17	55.5	1.031	0.754	1.5934	
15 minute summer	Tank 1	11.000	SW21	-35.1	-1.993	-2.207	0.1490	
15 minute summer	Tank 2	2.000_1	SW04	-17.9	-1.028	-1.422	0.1637	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.17%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW04	12	4.306	0.731	62.2	2.1732	0.0000	FLOOD RISK
15 minute summer	SW05	12	4.314	0.939	88.0	2.8494	0.0000	FLOOD RISK
30 minute summer	SW06	21	4.243	1.068	135.8	3.2469	0.0000	FLOOD RISK
15 minute summer	SW07	11	4.237	1.152	120.9	2.4713	0.0000	SURCHARGED
15 minute summer	SW09	12	4.361	0.601	41.3	0.6798	0.0000	SURCHARGED
15 minute summer	SW08	11	4.398	1.013	85.8	2.8444	0.0000	FLOOD RISK
15 minute summer	SW10	12	4.018	1.003	113.7	1.6556	0.0000	SURCHARGED
480 minute winter	SW11	472	3.863	1.013	34.5	1.8865	0.0000	SURCHARGED
480 minute winter	SW14	464	3.862	1.147	75.1	2.0915	0.0000	SURCHARGED
15 minute summer	SW13	12	3.870	0.670	20.3	0.9963	0.0000	SURCHARGED
480 minute winter	SW12	472	3.863	0.783	3.6	1.0761	0.0000	SURCHARGED
15 minute summer	Car Park 1	13	4.738	0.038	16.9	2.1441	0.0000	OK
15 minute summer	SW18	11	4.938	1.338	114.0	3.7332	0.0000	SURCHARGED
15 minute summer	SW17	11	4.591	1.366	236.7	4.8686	0.0000	FLOOD RISK
480 minute winter	SW15	472	3.863	1.023	39.5	2.5216	0.0000	SURCHARGED
480 minute winter	SW16	472	3.862	0.812	0.5	0.9189	0.0000	SURCHARGED
15 minute summer	SW19	11	4.691	1.081	93.0	3.0777	0.0000	FLOOD RISK
480 minute winter	SW03	472	3.862	1.262	25.9	2.2313	0.0000	FLOOD RISK
30 minute summer	Car Park 6	25	3.946	0.096	29.3	10.6313	0.0000	OK
15 minute summer	SW02	10	2.434	0.074	8.4	0.0639	0.0000	OK
15 minute winter	30_OUT	10	2.151	0.071	8.5	0.0000	0.0000	OK
480 minute winter	Pond	472	3.862	1.212	81.2	718.3647	0.0000	FLOOD RISK
15 minute summer	Car Park 2	13	4.500	0.050	17.0	2.9620	0.0000	OK
15 minute summer	Car Park 3	12	4.678	0.228	18.3	2.1274	0.0000	SURCHARGED
30 minute summer	Car Park 5	26	3.880	0.080	22.6	8.0775	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW04	1.000	SW05	30.6	0.729	0.343	2.1881	
15 minute summer	SW05	1.001	SW06	65.1	0.925	0.844	2.8973	
30 minute summer	SW06	1.002	SW07	58.0	0.823	0.847	1.6525	
15 minute summer	SW07	1.003	SW10	102.9	1.461	1.649	1.3242	
15 minute summer	SW09	2.000	SW08	-41.3	-0.636	-0.470	4.1945	
15 minute summer	SW08	2.001	SW07	82.2	1.168	0.647	1.6186	
15 minute summer	SW10	1.004	SW11	111.8	1.588	1.577	1.5435	
480 minute winter	SW11	1.005	SW14	34.2	0.764	0.298	1.9932	
480 minute winter	SW14	1.006	Pond	74.9	1.284	0.424	3.4129	
15 minute summer	SW13	3.000	SW12	17.6	0.694	0.363	0.5441	
480 minute winter	SW12	3.001	SW11	3.4	0.491	0.088	1.0867	
15 minute summer	Car Park 1	10.000_1	SW18	-16.9	-1.436	-1.024	0.1196	
15 minute summer	SW18	5.000	SW17	92.9	1.319	0.991	2.9604	
15 minute summer	SW17	7.003	SW15	223.1	2.023	1.278	5.5640	
480 minute winter	SW15	7.004	SW14	38.5	0.898	0.236	0.8234	
480 minute winter	SW16	6.000	SW15	-0.5	-0.023	-0.015	1.2526	
15 minute summer	SW19	7.001	SW21	67.8	1.176	0.798	2.5141	
480 minute winter	SW03	Hydro-Brake®	SW02	8.4				
30 minute summer	Car Park 6	1.000_1	SW04	-29.3	-2.001	-1.537	0.1599	
15 minute summer	SW02	1.010	30_OUT	8.4	0.999	0.461	0.2231	111.3
480 minute winter	Pond	1.007	SW03	25.9	0.592	0.149	2.7164	
15 minute summer	Car Park 2	7.000	SW19	-17.0	-1.448	-1.446	0.1186	
15 minute summer	Car Park 3	8.000	SW19	-18.3	-1.288	-1.264	0.1312	
30 minute summer	Car Park 5	3.000_1	SW06	-22.6	-1.629	-1.710	0.2435	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.17%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Car Park 4	1	4.100	0.000	0.0	0.0000	0.0000	OK
30 minute summer	Tank 3	20	4.384	1.084	99.4	32.3323	0.0000	FLOOD RISK
15 minute summer	SW21	11	4.592	1.192	67.8	1.3483	0.0000	FLOOD RISK
30 minute summer	Tank 1	21	4.450	0.800	47.4	12.1220	0.0000	SURCHARGED
30 minute summer	Tank 2	23	4.064	0.289	31.3	9.8800	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	Car Park 4	6.000_1	SW13	0.0	0.000	0.000	0.0000	
30 minute summer	Tank 3	4.001	SW06	-99.4	-2.500	-2.759	0.4104	
15 minute summer	SW21	7.002	SW17	70.6	1.038	0.960	1.5934	
30 minute summer	Tank 1	11.000	SW21	-47.4	-2.690	-2.980	0.1490	
30 minute summer	Tank 2	2.000_1	SW04	-31.3	-1.777	-2.493	0.1743	