Drainage Strategy

Land South of Saltmarsh Lane

Hayling Island, PO11 0JT

for

Hayling Island Builders Ltd

1139

July 2025

Drainage Strategy

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for

Hayling Island Builders Ltd

Revision	Date of issue	Comments	Prepared By	Checked By
1.0	22.10.21	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: Greenfield: Brownfield: Mixed Green and Brownfield: Existing Runoff Location: Ground Conditions: Method of Study: Ground Infiltration Potential:	24,800m² (2.48 Ha) YES NO NO Ground and existing ditches. Clay Desk Investigation Low
Drainage Strategy / SuDS	
Infiltration Viable: Discharge Point (SW): Flow Control: Storage Provided: Discharge Point (FW):	NO Watercourse 8.4 l/s 1 in 100 Year + 40% Climate Change Sewer
SuDS Elements: Water Quality Measures: Exceedance flows:	Porous Surfacing, Swales, Rainwater planters, water butts and a Pond Catchpits, Geotextiles, clean stone 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.	

Contents

Appendices

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 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.

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).

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 shown on 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 points for discharge 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.

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 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.

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 does not make an allowance for every permeable parking area but shows that any storm event can be accommodated.

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

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	Regular inspection and maintenance of the surface mounted SuDS should be undertaken in line with the findings of this report. The high

	SuDS devices (and amenity/biodiversity benefits)	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. form 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 protected[1] 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 ≥ 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	Hydro-carbons
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

	Mitigation indices[1]		
Type of SuDS component	**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	0.6
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	✓	✓	✓
Propriatory 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 item 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 reseeding	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 glyphospate 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.

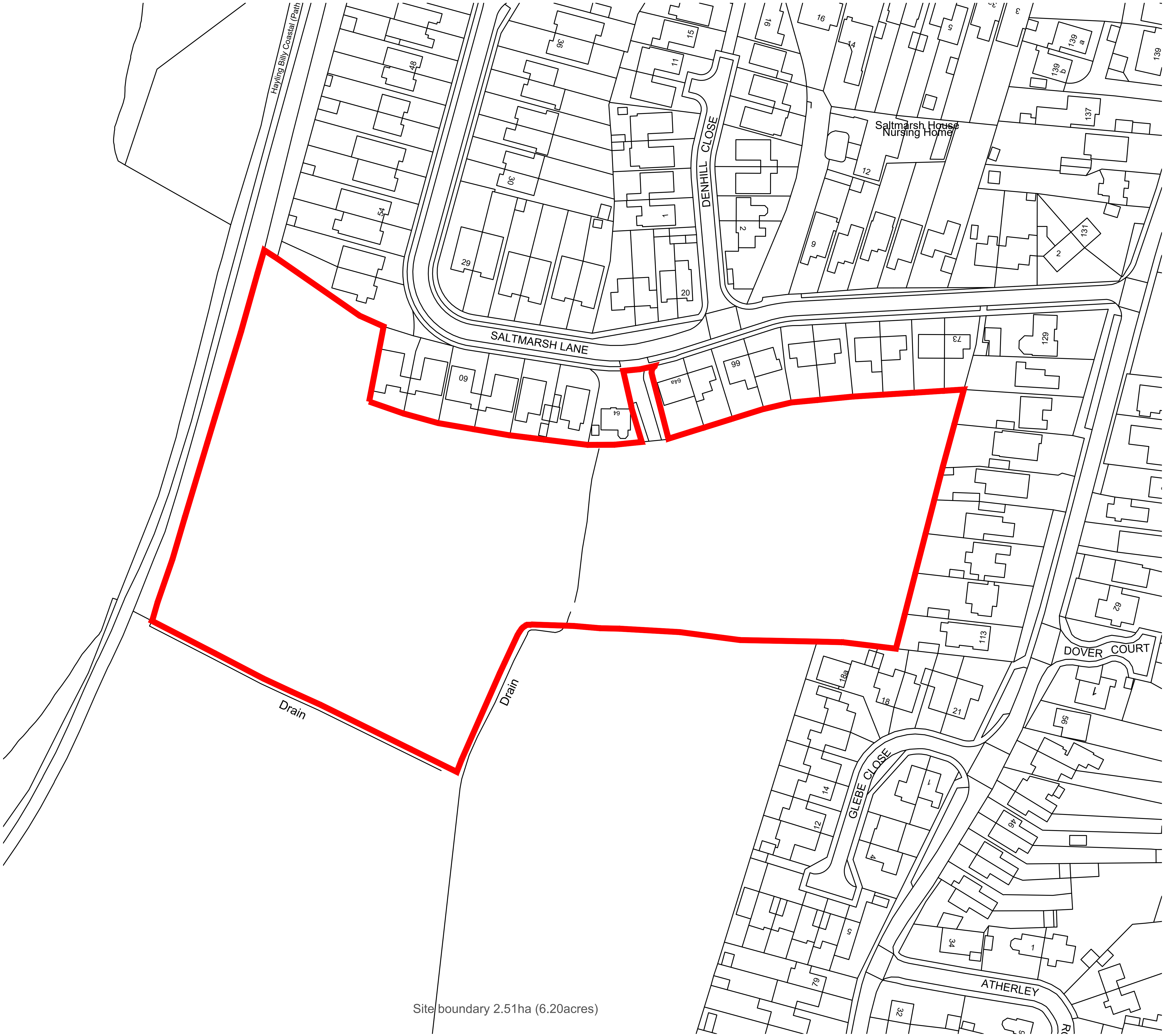
12.1.2 CGV Transport Consultants has been instructed by Hayling Island Builders Ltd, to produce a Drainage Strategy to support the Planning Application.

12.1.3 The surface water system will discharge into the existing watercourse at a restricted rate.

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



N

0 metres 50
(1:1,250)

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	-

Mosaic

Appendix B

Topographical Survey

Notes

1. The survey grid is a local grid, coincident with Ordnance Survey National Grid at 3STN.
2. Surveyed boundary features are not necessarily legal boundaries.
3. Dimensions should not be scaled. All dimensions should be checked on site before any fabrication / construction.
4. Copyright of all data produced by Technics Group shall remain with Technics Group unless otherwise specifically agreed.
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7. 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.
8. 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.
9. External eaves levels are surveyed to lowest tile position.

Level Datum

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

Topo Key

STREET FURNITURE
- BB Belisha Beacon
- BL Basement Light
- Bin Litter Bin
- BO Bollard
- BS Bus Stop
- CPO Concrete Post
- ECP Electric Charging Point
- EP Electric Pole
- FB Flower Bed
- FHM Fire Hydrant Marker
- FL Flood Light
- FP Flag Pole
- FPO Fence Post
- JB Junction Box
- GB Grit Box
- GMK Gas Marker Post
- GPO Gate Post
- IBO Illuminating Bollard
- LH Lamp Hole
- LP Lamp Post
- LPO Lockable Post
- MK Marker
- MPO Metal Post
- NP Name Plate
- PB Post Box
- PM Parking Meter
- RPO Reflector Post
- RS Road Sign
- SI Sign
- STN Survey Station
- Tap Water Tap
- TCB Telephone Call Box
- TL Traffic Light
- TLCB Traffic Light Control Box
- TP Telegraph Post
- TPO Timber Post

PIPES & SERVICES
- ACU Air Condition Unit
- DP Down Pipe
- FWP Foul Water Pipe
- GP Gas Pipe
- RWP Rain Water Pipe
- SP Stand Pipe
- SVP Soil Vent Pipe
- VP Vent Pipe
- WP Waste Pipe

LEVELS & DEPTHS
- A Approximate
- BD Back Drop Depth
- BDL Back Drop Level
- CD Chamber Depth
- DHL Door Head Level
- DSL Door Sill Level
- DPC Damp Proof Course
- EL Eaves Level
- FFL Finished Floor Level
- FRL Flat Roof Level
- ICL Cover Level
- ID Invert Depth
- IL Invert Level
- OD Outlet Depth
- OL Outlet Level
- PWL Parapet Wall Level
- RL Ridge Level
- SD Sump Depth
- SFD Soffit Depth
- SFL Soffit Level
- SiltL Silt Level
- SL Sump Level
- SSL Structural Slab Level
- TFL Top of Fence Level
- THL Threshold Level
- TPL Top of Pipe Level
- TWL Top of Wall Level
- USL Underside Level
- WL Water Level
- WHL Window Head Level
- WSL Window Sill Level

FENCES & WALLS
- BW Block Wall
- BRP Brick Pier
- BRTW Brick Retaining Wall
- BRW Brick Wall
- BWF Barbed Wire Fence
- CBF Close Board Fence
- CIF Corrugated Iron Fence
- CLF Chain Link Fence
- CPF Chestnut Pailing Fence
- CRW Concrete Retaining Wall
- CW Concrete Wall
- CWF Chicken Wire Fence
- Dil Dilapidated
- HR Handrail
- IWF Interwoven Fence
- LF Lattice Fence
- MF Miscellaneous Fence
- MRF Metal Railing Fence
- OBF Open Board Fence
- PCF Post & Chain Fence
- PNF Panel Fence
- PRF Post & Rail Fence
- PWF Post & Wire Fence
- RTW Retaining Wall
- STW Stone Wall
- SRTW Stone Retaining Wall
- WMF Wire Mesh Fence

INSPECTION CHAMBERS
- BH Borehole
- CATV Cable Television
- CDC Concrete Drainage Channel
- EIC Electric Inspection Cover
- ER Earth Rod
- FH Fire Hydrant
- FWIC Foul Water Inspection Cover
- GIC Gas Inspection Cover
- GM Gas Meter
- GV Gas Valve
- G Gully
- IC Inspection Cover
- KI Kerb Inlet
- LHP London Hydraulic Power
- MDC Metal Drainage Channel
- MW Monitoring Well
- NFI No Further Information
- RE Rodding Eye
- SDIC Service Duct Inspection Cover
- SV Stop Valve
- SWCP Storm Water Catch Pit
- SWIC Storm Water Inspection Cover
- TCIC Traffic Control Inspection Cover
- TIC Telecom Inspection Cover
- UIC Unidentified Inspectional Cover
- UTR Unable to Raise
- WIC Water Inspection Cover
- WM Water Meter
- WWO Water Wash Out
- WSV Water Stop Valve

SURFACES
- BPav Brick Paving
- Conc Concrete
- CPav Crazy Paving
- CPS Concrete Paving Slabs
- FB Flower\Shrub Border
- KFC Kidney Flint Cobbles
- SPS Stone Paving Slabs
- T Tiles
- Tmac Tarmac
- TPav Tactile Paving
- TS Trench Scar

MEASUREMENTS
- d Depth(m)
- Ø Diameter (mm)
- Ext. Ø External Diameter (mm)
- H Object Height (m)

Symbology

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

Linetypes

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

Trees

SPECIES ABBREVIATION

- AL Alder
- BE Beech
- CE Cedar
- CH Cherry
- CON Coniferous
- CY Cypress
- DE Dead
- DEC Deciduous
- ED Elder
- EU Eucalyptus
- FR Fruit
- HA Hawthorn
- HB Hornbeam
- HC Horse Chestnut
- HL Hemlock
- HO Holly
- HZ Hazel
- LA Larch
- LB Laburnum
- LM Lime
- LO Locust
- LU Laurel
- MA Maple
- MG Magnolia
- NS Norway Spruce
- PI Pine
- PO Poplar
- PL Plane
- RH Rhododendron
- RO Rowan
- SAP Sapling
- SB Silver Birch
- SCN Sweet Chestnut
- SHR Shrub
- ST Stump
- SY Sycamore
- WB Whitebeam
- WG Wellingtonia
- WI Willow
- WN Walnut

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. Tree 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.

N

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	5.080
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	3 OF 4

Technics
Geospatial Consultant Surveyors

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Notes

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Topo Key

STREET FURNITURE

BB	Belisha Beacon
BL	Basement Light
Bin	Litter Bin
BO	Bollard
BS	Bus Stop
CPO	Concrete Post
ECP	Electric Charging Point
EP	Electric Pole
FB	Flower Bed
FHM	Fire Hydrant Marker
FL	Flood Light
FP	Flag Pole
FPO	Fence Post
JB	Junction Box
GB	Grit Box
GMK	Gas Marker Post
GPO	Gate Post
IBO	Illuminating Bollard
LH	Lamp Hole
LP	Lamp Post
LPO	Lockable Post
MK	Marker
MPO	Metal Post
NP	Name Plate
PB	Post Box
PM	Parking Meter
RPO	Reflector Post
RS	Road Sign
SI	Sign
STN	Survey Station
Tap	Water Tap
TCB	Telephone Call Box
TL	Traffic Light
TLCB	Traffic Light Control Box
TP	Telegraph Post
TPO	Timber Post

PIPES & SERVICES

ACU	Air Condition Unit
DP	Down Pipe
FWP	Foul Water Pipe
GP	Gas Pipe
RWP	Rain Water Pipe
SP	Stand Pipe
SVP	Soil Vent Pipe
VP	Vent Pipe
WP	Waste Pipe

LEVELS & DEPTHS

A	Approximate
BD	Back Drop Depth
BDL	Back Drop Level
CD	Chamber Depth
DHL	Door Head Level
DSL	Door Sill Level
DPC	Damp Proof Course
EL	Eaves Level
FFL	Finished Floor Level
FRL	Flat Roof Level
ICL	Cover Level
ID	Invert Depth
IL	Invert Level
OD	Outlet Depth
OL	Outlet Level
PWL	Parapet Wall Level
RL	Ridge Level
SD	Sump Depth
SFD	Soffit Depth
SFL	Soffit Level
SiltL	Silt Level
SL	Sump Level
SSL	Structural Slab Level
TFL	Top of Fence Level
THL	Threshold Level
TPL	Top of Pipe Level
TWL	Top of Wall Level
USL	Underside Level
WL	Water Level
WHL	Window Head Level
WTL	Water Level

FENCES & WALLS

BW	Block Wall
BRP	Brick Pier
BRTW	Brick Retaining Wall
BRW	Brick Wall
BWF	Barbed Wire Fence
CBF	Close Board Fence
CIF	Corrugated Iron Fence
CLF	Chain Link Fence
CPF	Chestnut Pailing Fence
CRW	Concrete Retaining Wall
CW	Concrete Wall
CWF	Chicken Wire Fence
Dil	Dilapidated
HR	Handrail
IWF	Interwoven Fence
LF	Lattice Fence
MF	Miscellaneous Fence
MRF	Metal Railing Fence
OBF	Open Board Fence
PCF	Post & Chain Fence
PNF	Panel Fence
PRF	Post & Rail Fence
PWF	Post & Wire Fence
RTW	Retaining Wall
STW	Stone Wall
SRTW	Stone Retaining Wall
WMF	Wire Mesh Fence

INSPECTION CHAMBERS

BH	Borehole
CATV	Cable Television
CDC	Concrete Drainage Channel
EIC	Electric Inspection Cover
ER	Earth Rod
FH	Fire Hydrant
FWIC	Foul Water Inspection Cover
GIC	Gas Inspection Cover
GM	Gas Meter
GV	Gas Valve
G	Gully
IC	Inspection Cover
KI	Kerb Inlet
LHP	London Hydraulic Power
MDC	Metal Drainage Channel
MW	Monitoring Well
NFI	No Further Information
RE	Rodding Eye
SDIC	Service Duct Inspection Cover
SV	Stop Valve
SWCP	Storm Water Catch Pit
SWIC	Storm Water Inspection Cover
TCIC	Traffic Control Inspection Cover
TIC	Telecom Inspection Cover
UIC	Unidentified Inspectional Cover
UTR	Unable to Raise
WIC	Water Inspection Cover
WM	Water Meter
WWO	Water Wash Out
WSV	Water Stop Valve

SURFACES

BPav	Brick Paving
Conc	Concrete
CPav	Crazy Paving
CPS	Concrete Paving Slabs
FB	Flower\Shrub Border
KFC	Kidney Flint Cobbles
SPS	Stone Paving Slabs
T	Tiles
Tmac	Tarmac
TPav	Tactile Paving
TS	Trench Scar

MEASUREMENTS

d	Depth(m)
Ø	Diameter (mm)
Ext. Ø	External Diameter (mm)
H	Object Height (m)

Symbology

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

Linetypes

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

Trees

SPECIES ABBREVIATION

AL	Alder
BE	Beech
CE	Cedar
CH	Cherry
CON	Coniferous
CY	Cypress
DE	Dead
DEC	Deciduous
ED	Elder
EU	Eucalyptus
FR	Fruit
HA	Hawthorn
HB	Hornbeam
HC	Horse Chestnut
HL	Hemlock
HO	Holly
HZ	Hazel
LA	Larch
LB	Laburnum
LM	Lime
LO	Locust
LU	Laurel
MA	Maple
MG	Magnolia
NS	Norway Spruce
PI	Pine
PO	Poplar
PL	Plane
RH	Rhododendron
RO	Rowan
SAP	Sapling
SB	Silver Birch
SCN	Sweet Chestnut
SHR	Shrub
ST	Stump
SY	Sycamore
WB	Whitebeam
WG	Wellingtonia
WI	Willow
WN	Walnut

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. Tree 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.

N

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	5.080
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

Geospatial Consultant Surveyors

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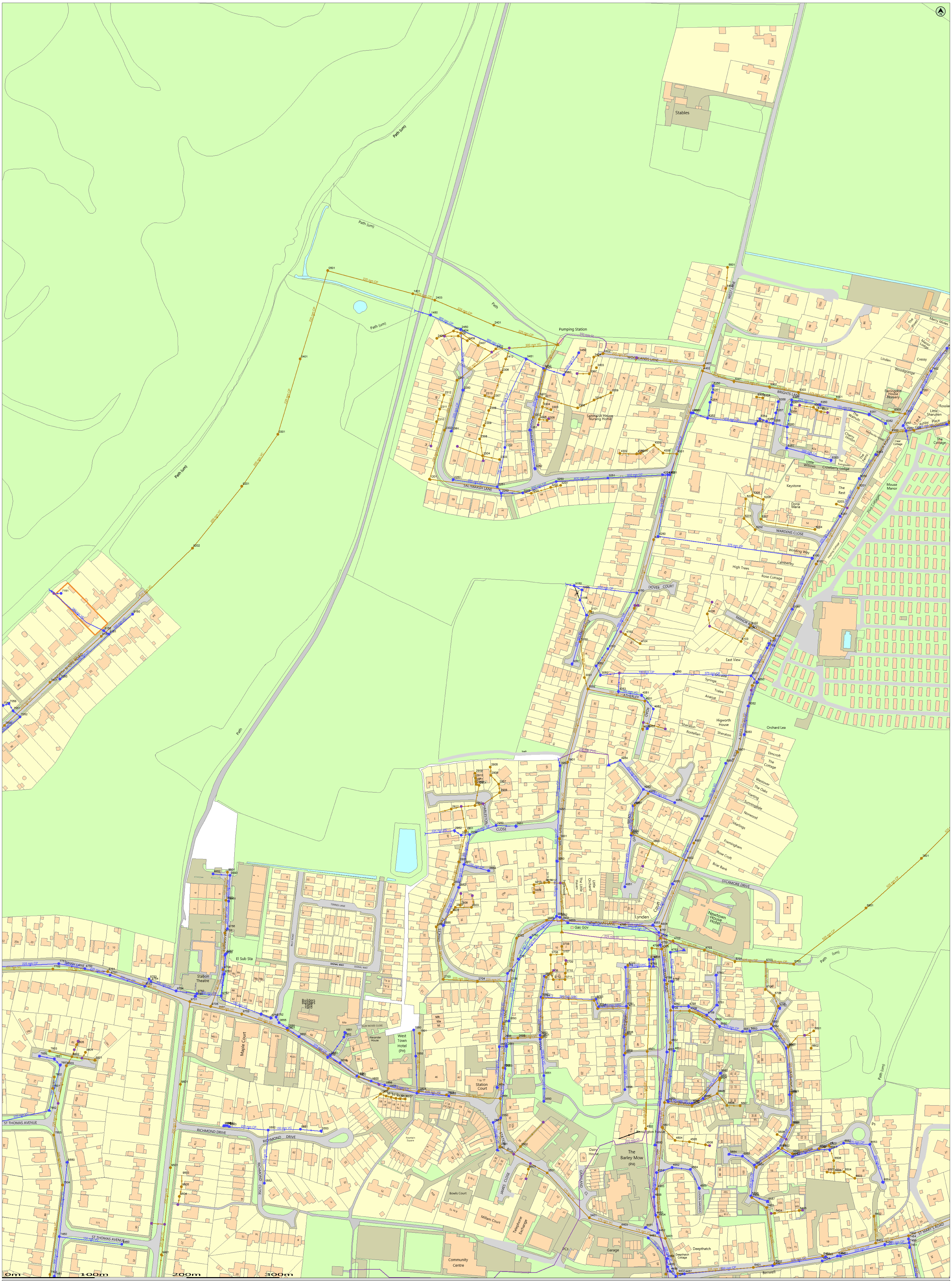
Appendix C

Southern Water Sewer Records



Data updated: 15/03/21

Scale: 1:1250
Map Centre: 471247,100110

Date: 31/03/21
Our Ref: 531819 - 1

Wastewater Plan A0
Powered by digdat

andy.johnson@patrickparsons.co.uk

A21078

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2021 Ordnance Survey 100031673 .This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

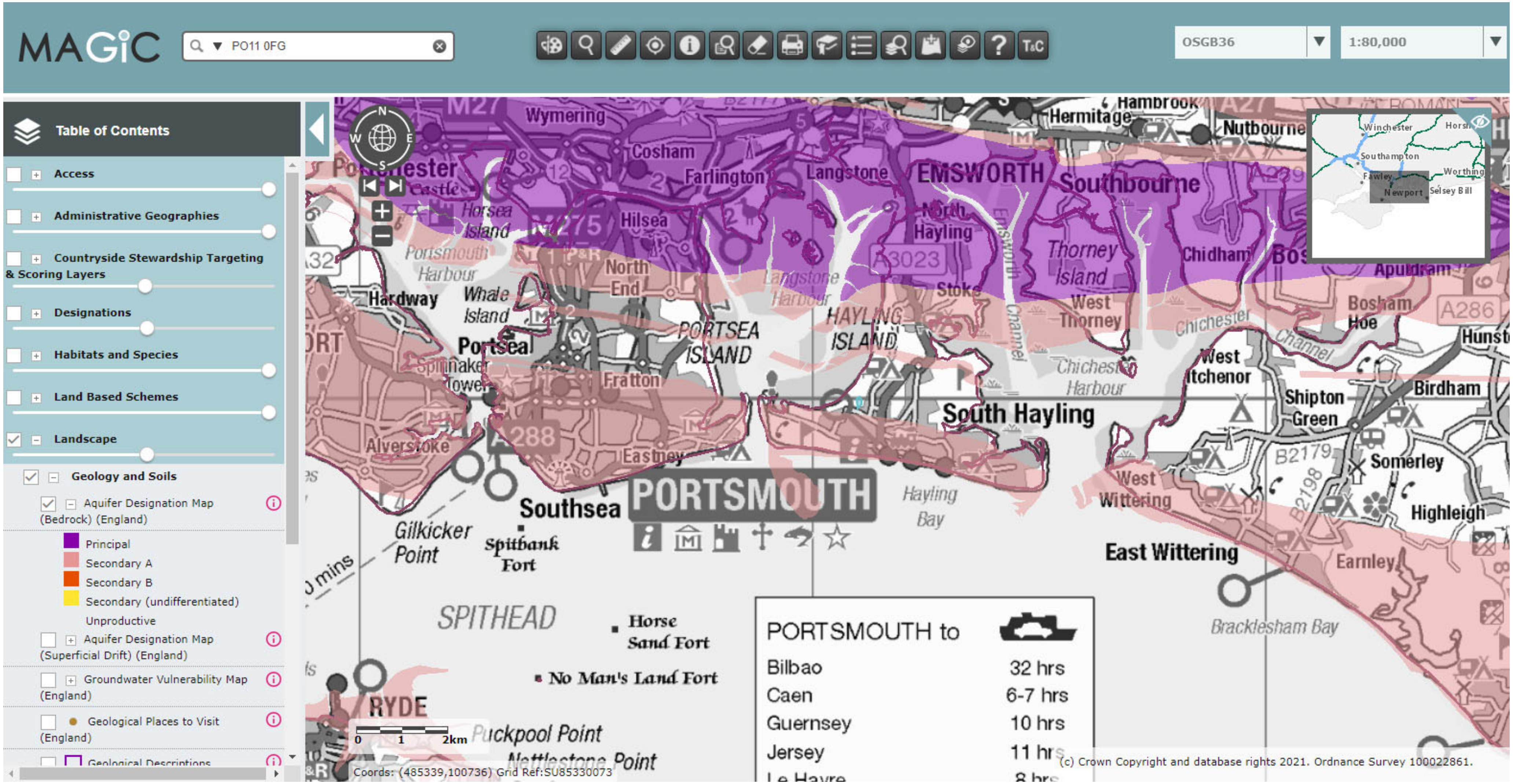
WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

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

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
0301	F	5.08	0.00	
0401	F	4.38	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	
1602	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	6.86	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	5.20	
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	
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	
2650	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	
2751	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	4.95	0.00	
3153	S	5.09	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	
3754	S	5.99	3.74	
3850	S	5.16	4.10	
3851	S	5.36	4.19	
3852	S	5.30	4.21	
3853	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	
4458	S	6.76	4.64	
4550	S	6.68	5.61	
4552	S	6.83	5.95	
4553	S	6.92	5.63	
4554	S	7.04	6.23	
4555	S	7.16	6.38	
4556	S	6.88	0.00	
4651	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	
4658	S	6.35	4.25	
4750	S	5.57	4.31	
4751	S	5.77	4.47	
4752	S	5.72	4.57	
4753	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	
4761	S	6.15	3.59	
4762	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	0.00	
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	
5450	S	6.34	4.92	
5550	S	7.15	4.52	
5551	S	7.26	4.61	
5552	S	7.36	4.82	
5553	S	7.32	4.74	
5554	S	7.17	5.17	
5555	S	7.25	5.04	
5556	S	7.01	4.87	
5557	S	7.01	5.13	
5650	S	6.46	3.58	
5651	S	6.18	3.60	
5652	S	6.36	4.58	
5653	S	6.15	3.67	
5654	S	6.33	4.19	
5655	S	6.71	4.21	
5656	S	6.92	4.36	
5750	S	6.01	4.95	
5751	S	6.22	4.30	
5752	S	6.50	5.11	
5950	S	5.86	5.11	
6150	S	5.63	4.28	
6250	S	5.64	4.88	
6251	S	5.59	4.77	
6350	S	5.14	4.17	
6351	S	5.52	4.48	
6352	S	5.67	4.81	
6353	S	5.31	3.93	
6354	S	5.64	5.15	
6450	S	6.13	5.35	
6451	S	6.11	5.47	
6452	S	6.11	5.49	
6453	S	6.21	5.21	
6454	S	6.15	5.43	
6550	S	7.15	4.89	
6551	S	7.20	4.98	
6552	S	7.41	5.03	
6553	S	7.20	5.11	
6554	S	6.65	5.29	
7050	S	5.29	4.49	
7051	S	5.43	4.40	
7052	S	5.54	4.56	
7055	S	0.00	0.00	
7058	S	0.00	0.00	
7151	S	0.00	0.00	
7350	S	5.57	4.95	
7351	S	5.85	5.13	
7352	S	5.56	4.69	
7353	S	5.81	5.01	
7450	S	0.00	0.00	
7450	S	6.21	5.12	
7450	S	5.99	5.44	
7451	S	0.00	0.00	
7451	S	6.15	5.11	
7452	S	5.91	5.24	
7454	S	6.28	5.18	
7650	S	7.24	6.50	
7651	S	7.42	6.44	
7652	S	7.50	6.11	
7653	S	7.39	6.26	
7751	S	5.94	5.16	
8150	S	5.36	4.55	
8151	S	5.19	4.06	
8152	S	5.18	3.95	
8450	S	6.84	5.88	
8550	S	7.12	6.40	
8750	S	5.91	4.97	
8751	S	6.03	4.65	
8752	S	5.99	4.54	
8753	S	6.16	0.00	
8754	S	6.16	5.09	
9550	S	6.55	5.33	
9551	S	6.53	5.29	
9552	S	6.53	5.27	
9553	S	6.50	4.11	
9750	S	6.41	5.01	
9751	S	6.22	4.76	
9752	S	6.35	4.88	
9753	S	6.43	4.70	
9754	S	6.07	5.07	
9755	S	6.13	5.58	
9756	S	6.24	5.06	
9757	S	6.53	4.53	
9850	S	5.82	0.00	
9851	S	5.94	4.92	
9852	S	5.72	4.82	

Appendix D

Magic Map Geology Information



MAGIC
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Designations
Habitats and Species
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Principal
Secondary A
Secondary B
Secondary (undifferentiated)
Unproductive
Aquifer Designation Map (Superficial Drift) (England)
Groundwater Vulnerability Map (England)
Geological Places to Visit (England)
Wymering
Cosham
Farlington
Langstone
EMSWORTH
Southbourne
Hermitage
Hambrook
Nutbourne
Hilsea
North Hayling
Thorney Island
Chidham
North End
Portsmouth Harbour
Whale Island
Hardway
Portsea
Fratton
PORTSEA ISLAND
HAYLING ISLAND
West Thorney
Chichester Harbour
West Itchenor
Bosham Hoe
Shipton Green
Birdham
South Hayling
Somerley
Highleigh
Alverstoke
Eastney
Southsea
PORTSMOUTH
Gilkicker Point
Spitbank Fort
Hayling Bay
West Wittering
East Wittering
Earnley
Bracklesham Bay
SPITHEAD
Horse Sand Fort
No Man's Land Fort
RYDE
Puckpool Point
PORTSMOUTH to
Bilbao 32 hrs
Caen 6-7 hrs
Guernsey 10 hrs
Jersey 11 hrs
Winchester
Southampton
Fawley
Newport
Selsey Bill
Worthing
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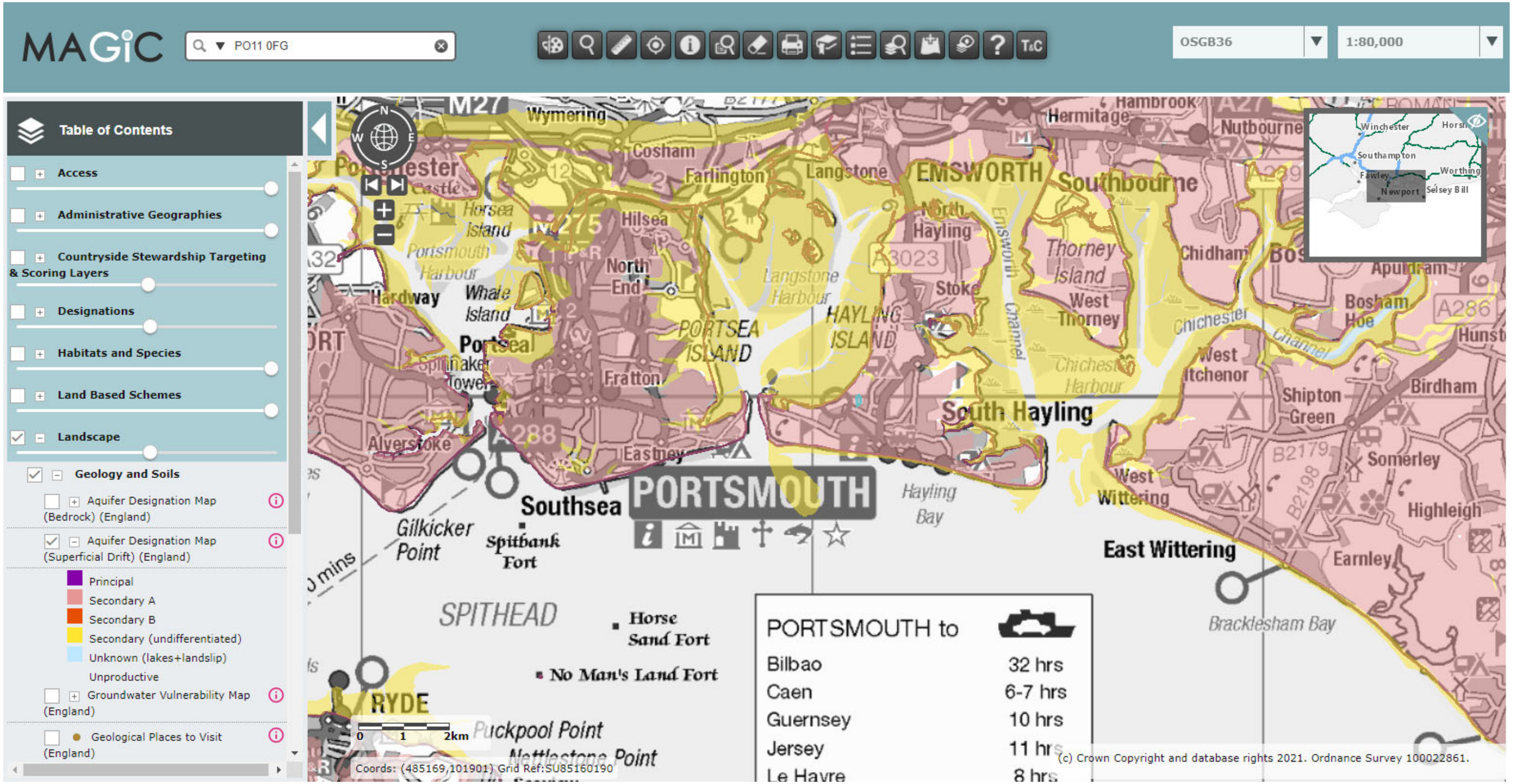
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Habitats and Species
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Aquifer Designation Map (Bedrock) (England)
Aquifer Designation Map (Superficial Drift) (England)
Principal
Secondary A
Secondary B
Secondary (undifferentiated)
Unknown (lakes+landslip)
Unproductive
Groundwater Vulnerability Map (England)
Geological Places to Visit (England)
Cosham
Farlington
Langstone
EMSWORTH
Southbourne
Hermitage
Nutbourne
Hilsea
North Hayling
Thorney Island
Chidham
Bosham Hoe
West Thorney
West Itchenor
PORTSEA ISLAND
HAYLING ISLAND
Langstone Harbour
Chichester Harbour
Whale Island
Fratton
Eastney
Alverstoke
South Hayling
Shipton Green
Birdham
Somerley
Highleigh
Earnley
West Wittering
East Wittering
Bracklesham Bay
PORTSMOUTH
Southsea
Gilkicker Point
Spitbank Fort
SPITHEAD
Horse Sand Fort
No Man's Land Fort
Hayling Bay
RYDE
Puckpool Point
PORTSMOUTH to
Bilbao 32 hrs
Caen 6-7 hrs
Guernsey 10 hrs
Jersey 11 hrs
Le Havre 8 hrs
Winchester
Southampton
Fawley
Newport
Selsey Bill
Worthing
0 1 2km
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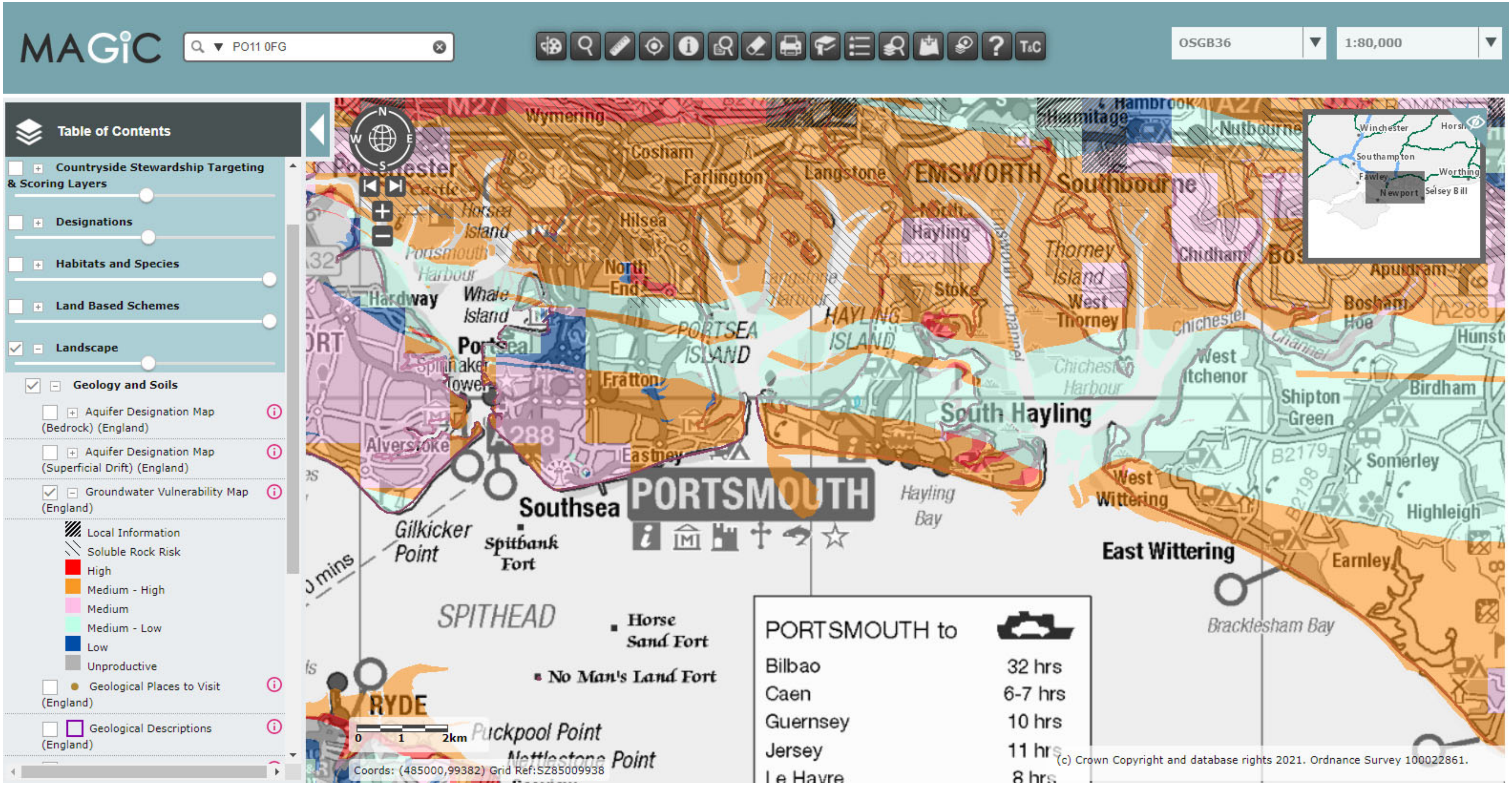
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Medium - High
Medium
Medium - Low
Low
Unproductive
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Wymering
Cosham
Farlington
Langstone
EMSWORTH
Southbourne
Hermitage
Nutbourne
Hilsea
Horsea Island
Portsmouth Harbour
North End
Whale Island
Hardway
Portsea
Spinnaker Tower
Fratton
PORTSEA ISLAND
HAYLING ISLAND
North Hayling
Stoke
Thorney Island
West Thorney
Chidham
Chichester Channel
West Itchenor
Chichester Harbour
Birdham
Shipton Green
Somerley
Highleigh
Earnley
Apuldram
Bosham Hoe
South Hayling
Alverstoke
Southsea
Eastney
PORTSMOUTH
Hayling Bay
West Wittering
East Wittering
Bracklesham Bay
Gilkicker Point
Spitbank Fort
SPITHEAD
Horse Sand Fort
No Man's Land Fort
RYDE
Puckpool Point
Nettlestone Point
PORTSMOUTH to
Bilbao 32 hrs
Caen 6-7 hrs
Guernsey 10 hrs
Jersey 11 hrs
Le Havre 8 hrs
Winchester
Southampton
Fawley
Newport
Worthing
Selsey Bill
0 1 2km
Coords: (485000,99382) Grid Ref:SZ85009938
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Appendix E

Greenfield Run-Off

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

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%

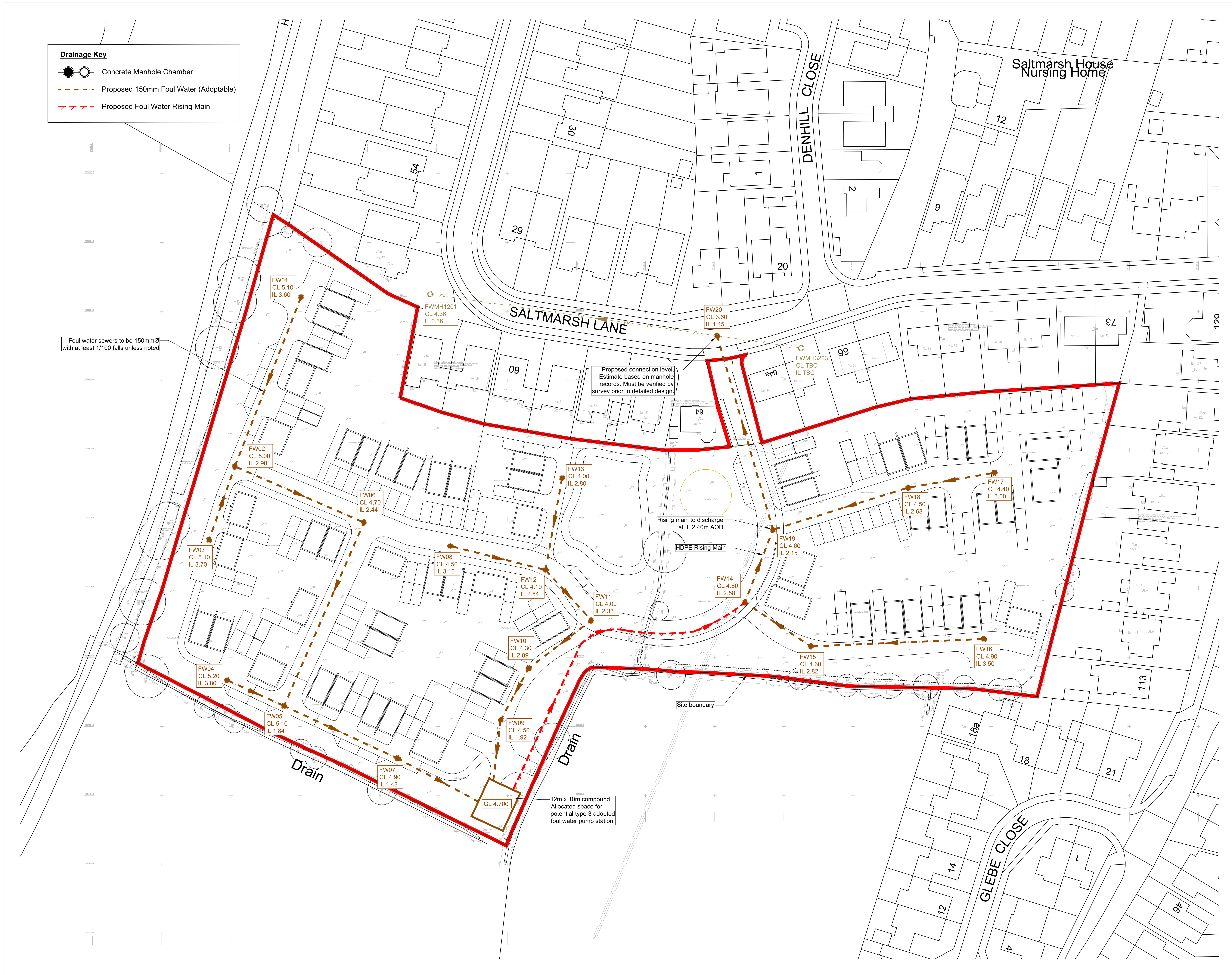
Density: 35 dwellings per hectare

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



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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
2. 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
3. All sustainable drainage systems to be designed and maintained in accordance with CIRIA C753 The SuDS Manual and best practice guidance.

REV.	DRW BY	DATE	CCK BY	DATE	APP BY	DATE
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

REVISION NOTE/COMMENT

Revisions

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Client
Hayling Island Builders

Project
Land South of Saltmarsh Lane

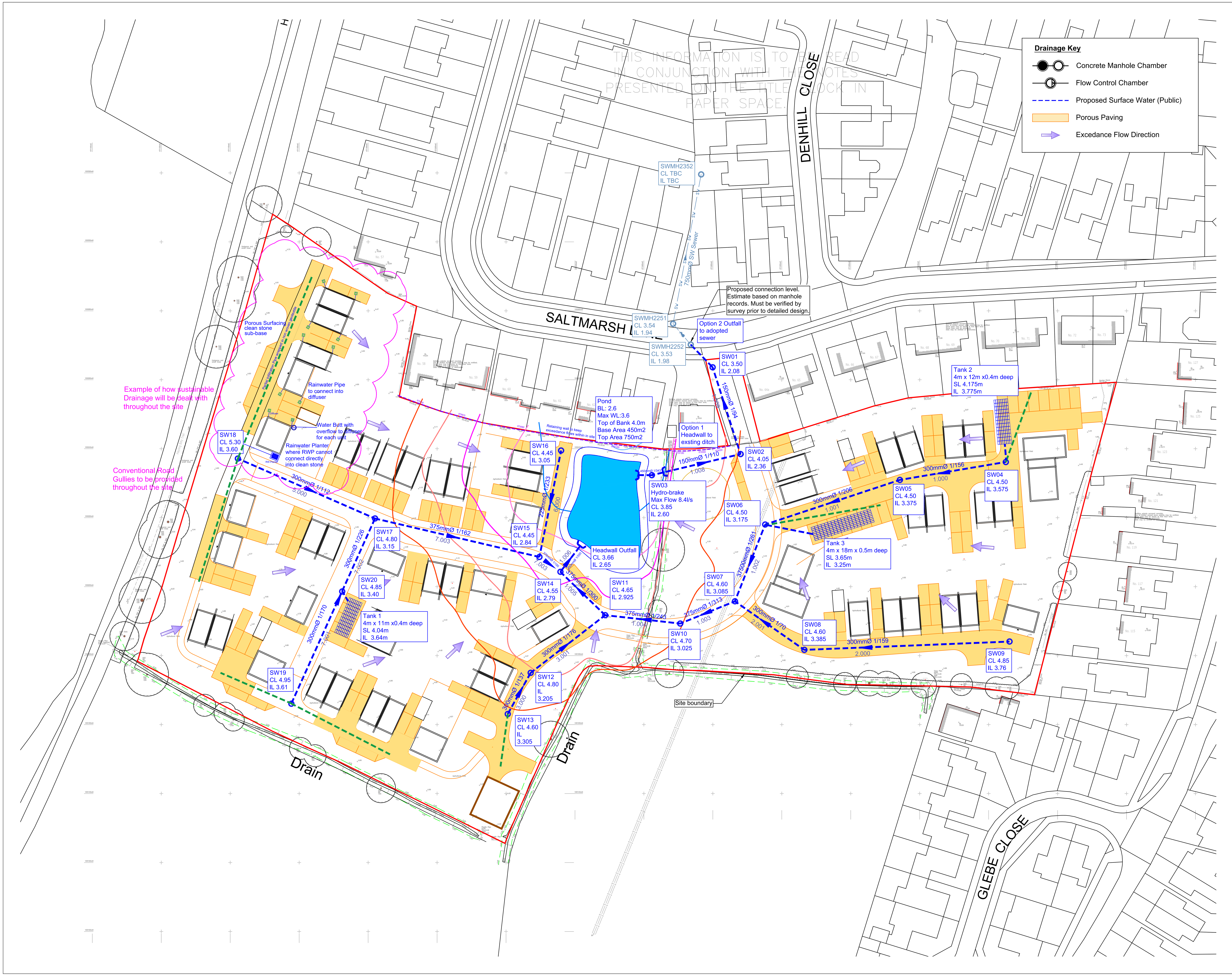
Drawing
Drainage Strategy Plan
Foul Water

Scales 1:500 At original size A1

Drawn AJ
Date July 2021
Checked DB

Status PRELIMINARY

Drawing No. A21079/0200 Rev. P3



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1.4. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.
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Drainage Construction Notes

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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.

REV.	REVISION NOTE/COMMENT					
P1	SITE LAYOUT UPDATED					
	CV	03.07.25	DB	03.07.25	DB	03.07.25
	DRW BY	DATE	CCK BY	DATE	APP BY	DATE

Revisions

CGV Transport Consultants Ltd
TRANSPORT PLANNING & HIGHWAY ENGINEERING
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Email: info@CGVcivils.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
Date July 2025
Checked DB

Status PRELIMINARY

Drawing No. 1139-0201 Rev. P1

Appendix H

Causeway Flow Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	20	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	45.123	0.446	101.2	0.060	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	21.437	0.251	85.5	0.053	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	28.241	0.113	250.0	0.100	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	42.286	0.169	250.0	0.073	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.002	22.460	0.100	225.0	0.066	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	22.003	0.088	250.0	0.043	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	22.394	0.090	250.0	0.026	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.000	18.863	0.126	150.0	0.037	5.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	20.00	5.75	3.770	0.060	0.0	0.0	0.0	1.00	17.7	3.2
1.001	20.00	6.08	3.324	0.113	0.0	0.0	0.0	1.09	19.2	6.1
2.000	20.00	5.57	3.380	0.100	0.0	0.0	0.0	0.82	32.7	5.4
2.001	20.00	6.43	3.267	0.173	0.0	0.0	0.0	0.82	32.7	9.4
2.002	20.00	6.86	3.098	0.239	0.0	0.0	0.0	0.87	34.5	12.9
1.002	20.00	7.31	2.998	0.396	0.0	0.0	0.0	0.82	32.7	21.4
1.003	20.00	7.76	2.910	0.421	0.0	0.0	0.0	0.82	32.7	22.8
3.000	20.00	5.38	3.200	0.037	0.0	0.0	0.0	0.82	14.5	2.0

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
3.001	23.098	0.179	129.3	0.027	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.004	12.988	0.203	64.0	0.038	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.000	40.713	0.353	115.3	0.183	5.00	0.0	0.600	o	150	Pipe/Conduit	
5.000	57.006	0.453	125.9	0.174	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	50.724	0.348	145.7	0.114	0.00	0.0	0.600	o	225	Pipe/Conduit	
6.000	31.441	0.126	249.3	0.050	5.00	0.0	0.600	o	225	Pipe/Conduit	
4.002	8.521	0.206	41.4	0.118	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	18.588	0.074	251.2	0.027	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.006	21.602	0.050	432.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.007	24.883	0.249	99.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.008	26.413	0.264	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.009	8.829	0.088	100.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
3.001	20.00	5.82	3.074	0.064	0.0	0.0	0.0	0.88	15.6	3.5
1.004	20.00	7.87	2.746	0.523	0.0	0.0	0.0	1.97	139.2	28.3
4.000	20.00	5.73	3.600	0.183	0.0	0.0	0.0	0.93	16.5	9.9
5.000	20.00	6.06	3.700	0.174	0.0	0.0	0.0	0.89	15.8	9.4
4.001	20.00	6.84	3.172	0.471	0.0	0.0	0.0	1.08	43.0	25.5
6.000	20.00	5.64	2.950	0.050	0.0	0.0	0.0	0.82	32.7	2.7
4.002	20.00	6.91	2.824	0.639	0.0	0.0	0.0	2.04	81.1	34.6
1.005	20.00	8.18	2.543	1.189	0.0	0.0	0.0	0.99	69.8	64.4
1.006	20.00	8.66	2.469	1.189	0.0	0.0	0.0	0.75	53.0«	64.4
1.007	20.00	9.08	2.419	1.189	0.0	0.0	0.0	1.01	17.8«	64.4
1.008	20.00	9.52	2.170	1.189	0.0	0.0	0.0	1.00	17.8«	64.4
1.009	20.00	9.66	1.906	1.189	0.0	0.0	0.0	1.00	17.7«	64.4

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	10
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.400		

Online Controls for Storm

Hydro-Brake® Optimum Manhole: SW03, DS/PN: 1.007, Volume (m^3): 2.8

Unit Reference	MD-SHE-0134-8400-1000-8400
Design Head (m)	1.000
Design Flow (l/s)	8.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	134
Invert Level (m)	2.419
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	8.4
Flush-Flo™	0.301	8.3
Kick-Flo®	0.662	6.9
Mean Flow over Head Range	-	7.2

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.8	1.200	9.1	3.000	14.1	7.000	21.2
0.200	8.1	1.400	9.8	3.500	15.2	7.500	21.9
0.300	8.3	1.600	10.5	4.000	16.2	8.000	22.6
0.400	8.2	1.800	11.1	4.500	17.1	8.500	23.2
0.500	8.0	2.000	11.6	5.000	18.0	9.000	23.9
0.600	7.5	2.200	12.2	5.500	18.8	9.500	24.5
0.800	7.6	2.400	12.7	6.000	19.6		
1.000	8.4	2.600	13.2	6.500	20.4		

Storage Structures for Storm

Porous Car Park Manhole: SW09, DS/PN: 1.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	18.7
Membrane Percolation (mm/hr)	1000	Length (m)	18.7
Max Percolation (l/s)	97.1	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	4.420	Membrane Depth (mm)	0

Porous Car Park Manhole: SW08, DS/PN: 1.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	18.7
Membrane Percolation (mm/hr)	1000	Length (m)	18.7
Max Percolation (l/s)	97.1	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	4.320	Membrane Depth (mm)	0

Porous Car Park Manhole: SW04, DS/PN: 2.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	26.1
Membrane Percolation (mm/hr)	1000	Length (m)	26.1
Max Percolation (l/s)	189.2	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	3.820	Membrane Depth (mm)	0

Porous Car Park Manhole: SW05, DS/PN: 2.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	26.1
Membrane Percolation (mm/hr)	1000	Length (m)	26.1
Max Percolation (l/s)	189.2	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	3.920	Membrane Depth (mm)	0

Porous Car Park Manhole: SW13, DS/PN: 3.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	13.2
Membrane Percolation (mm/hr)	1000	Length (m)	13.2
Max Percolation (l/s)	48.4	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	3.920	Membrane Depth (mm)	0

Porous Car Park Manhole: SW12, DS/PN: 3.001

Infiltration Coefficient Base (m/hr)	0.00000	Max Percolation (l/s)	48.4
Membrane Percolation (mm/hr)	1000	Safety Factor	2.0

Porous Car Park Manhole: SW12, DS/PN: 3.001

Porosity	0.30	Slope (1:X)	500.0
Invert Level (m)	3.720	Depression Storage (mm)	5
Width (m)	13.2	Evaporation (mm/day)	3
Length (m)	13.2	Membrane Depth (mm)	0

Porous Car Park Manhole: SW18, DS/PN: 4.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	23.4
Membrane Percolation (mm/hr)	1000	Length (m)	23.4
Max Percolation (l/s)	152.1	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	4.420	Membrane Depth (mm)	0

Porous Car Park Manhole: SW19, DS/PN: 5.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	26.0
Membrane Percolation (mm/hr)	1000	Length (m)	26.0
Max Percolation (l/s)	187.8	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	4.520	Membrane Depth (mm)	0

Porous Car Park Manhole: SW16, DS/PN: 6.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	14.0
Membrane Percolation (mm/hr)	1000	Length (m)	14.0
Max Percolation (l/s)	54.4	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	3.120	Membrane Depth (mm)	0

Tank or Pond Manhole: Pond, DS/PN: 1.006

Invert Level (m) 2.469

Depth (m)	**Area (m²)**	**Depth (m)**	**Area (m²)**
0.000	450.0	1.200	750.0

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	10
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.412
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.900	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	SW09	15 Winter	1	+0%	30/15 Summer			
1.001	SW08	15 Winter	1	+0%	30/15 Summer			
2.000	SW04	15 Winter	1	+0%	30/15 Summer			
2.001	SW05	30 Winter	1	+0%	30/15 Summer			
2.002	SW06	30 Winter	1	+0%	30/15 Summer	100/15 Summer		
1.002	SW07	30 Winter	1	+0%	30/15 Summer			
1.003	SW10	30 Winter	1	+0%	30/15 Summer			
3.000	SW13	15 Winter	1	+0%	30/15 Summer			
3.001	SW12	15 Winter	1	+0%	30/15 Summer			
1.004	SW11	30 Winter	1	+0%	30/15 Summer			
4.000	SW18	15 Winter	1	+0%	1/15 Summer			
5.000	SW19	15 Winter	1	+0%	1/15 Summer			
4.001	SW17	15 Winter	1	+0%	1/15 Summer	100/15 Summer		
6.000	SW16	30 Winter	1	+0%	30/15 Summer	100/15 Summer		
4.002	SW15	30 Winter	1	+0%	1/15 Winter			
1.005	SW14	30 Winter	1	+0%	1/15 Summer			
1.006	Pond	240 Winter	1	+0%	30/15 Winter			
1.007	SW03	240 Winter	1	+0%	1/30 Summer	100/30 Summer		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	SW09	3.843	-0.077	0.000	0.44		6	7.5	OK
1.001	SW08	3.421	-0.053	0.000	0.70		7	12.8	OK
2.000	SW04	3.482	-0.123	0.000	0.39		6	11.7	OK
2.001	SW05	3.384	-0.108	0.000	0.49		7	15.1	OK
2.002	SW06	3.246	-0.077	0.000	0.58			18.4	OK
1.002	SW07	3.210	-0.014	0.000	1.00			29.8	OK
1.003	SW10	3.133	-0.002	0.000	1.00			29.9	OK
3.000	SW13	3.264	-0.086	0.000	0.37		6	5.0	OK
3.001	SW12	3.153	-0.071	0.000	0.53		6	7.8	OK
1.004	SW11	2.967	-0.078	0.000	0.33			37.4	OK
4.000	SW18	3.966	0.216	0.000	1.22		4	19.6	SURCHARGED
5.000	SW19	4.056	0.206	0.000	1.13		4	17.5	SURCHARGED
4.001	SW17	3.469	0.072	0.000	1.08			44.5	SURCHARGED
6.000	SW16	3.082	-0.093	0.000	0.16		5	5.1	OK
4.002	SW15	3.075	0.026	0.000	0.82			52.6	SURCHARGED
1.005	SW14	2.924	0.081	0.000	1.51			91.2	SURCHARGED
1.006	Pond	2.695	-0.074	0.000	0.26			12.0	OK
1.007	SW03	2.692	0.123	0.000	0.49			8.3	SURCHARGED

PN	US/MH Name	Level Exceeded
1.000	SW09	
1.001	SW08	
2.000	SW04	
2.001	SW05	
2.002	SW06	2
1.002	SW07	
1.003	SW10	
3.000	SW13	
3.001	SW12	
1.004	SW11	
4.000	SW18	
5.000	SW19	
4.001	SW17	4
6.000	SW16	18
4.002	SW15	
1.005	SW14	
1.006	Pond	
1.007	SW03	20

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.008	SW02	240 Winter	1	+0%					2.244
1.009	SW01	240 Winter	1	+0%					1.984

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.008	SW02	-0.076	0.000	0.49			8.3	OK	
1.009	SW01	-0.072	0.000	0.53			8.3	OK	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Storage Structures 10
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.412
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.900 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	SW09	15 Winter	30	+0%	30/15 Summer			
1.001	SW08	15 Winter	30	+0%	30/15 Summer			
2.000	SW04	30 Winter	30	+0%	30/15 Summer			
2.001	SW05	15 Winter	30	+0%	30/15 Summer			
2.002	SW06	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
1.002	SW07	15 Winter	30	+0%	30/15 Summer			
1.003	SW10	15 Winter	30	+0%	30/15 Summer			
3.000	SW13	15 Winter	30	+0%	30/15 Summer			
3.001	SW12	15 Winter	30	+0%	30/15 Summer			
1.004	SW11	15 Winter	30	+0%	30/15 Summer			
4.000	SW18	15 Winter	30	+0%	1/15 Summer			
5.000	SW19	15 Winter	30	+0%	1/15 Summer			
4.001	SW17	15 Winter	30	+0%	1/15 Summer	100/15 Summer		
6.000	SW16	30 Winter	30	+0%	30/15 Summer	100/15 Summer		
4.002	SW15	15 Winter	30	+0%	1/15 Winter			
1.005	SW14	15 Winter	30	+0%	1/15 Summer			
1.006	Pond	240 Winter	30	+0%	30/15 Winter			
1.007	SW03	180 Winter	30	+0%	1/30 Summer	100/30 Summer		

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	SW09	4.439	0.519	0.000	0.83		3	14.2	SURCHARGED
1.001	SW08	4.319	0.845	0.000	1.24		8	22.5	SURCHARGED
2.000	SW04	3.902	0.297	0.000	0.98		9	29.7	FLOOD RISK
2.001	SW05	3.952	0.460	0.000	1.00		3	31.2	SURCHARGED
2.002	SW06	4.042	0.719	0.000	1.04			32.8	SURCHARGED
1.002	SW07	4.005	0.782	0.000	1.76			52.7	SURCHARGED
1.003	SW10	3.712	0.577	0.000	1.91			57.0	SURCHARGED
3.000	SW13	3.628	0.278	0.000	0.74		4	10.0	SURCHARGED
3.001	SW12	3.563	0.339	0.000	1.05		6	15.5	SURCHARGED
1.004	SW11	3.368	0.322	0.000	0.71			80.3	SURCHARGED
4.000	SW18	4.506	0.756	0.000	1.51		8	24.1	FLOOD RISK
5.000	SW19	4.595	0.745	0.000	1.41		8	21.8	SURCHARGED
4.001	SW17	4.260	0.863	0.000	1.53			63.2	FLOOD RISK
6.000	SW16	3.356	0.181	0.000	0.68		13	21.0	FLOOD RISK
4.002	SW15	3.406	0.357	0.000	1.05			67.2	SURCHARGED
1.005	SW14	3.208	0.365	0.000	2.45			147.6	SURCHARGED
1.006	Pond	3.086	0.317	0.000	0.59			27.5	SURCHARGED
1.007	SW03	3.494	0.925	0.000	0.49			8.3	FLOOD RISK

PN	US/MH Name	Level Exceeded
1.000	SW09	
1.001	SW08	
2.000	SW04	
2.001	SW05	
2.002	SW06	2
1.002	SW07	
1.003	SW10	
3.000	SW13	
3.001	SW12	
1.004	SW11	
4.000	SW18	
5.000	SW19	
4.001	SW17	4
6.000	SW16	18
4.002	SW15	
1.005	SW14	
1.006	Pond	
1.007	SW03	20

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.008	SW02	720 Summer	30	+0%					2.244
1.009	SW01	1440 Summer	30	+0%					1.984

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.008	SW02	-0.076	0.000	0.49			8.3	OK	
1.009	SW01	-0.072	0.000	0.54			8.3	OK	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Storage Structures 10
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.412
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.900 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	SW09	30 Winter	100	+40%	30/15 Summer			
1.001	SW08	15 Winter	100	+40%	30/15 Summer			
2.000	SW04	60 Winter	100	+40%	30/15 Summer			
2.001	SW05	30 Winter	100	+40%	30/15 Summer			
2.002	SW06	15 Summer	100	+40%	30/15 Summer	100/15 Summer		
1.002	SW07	15 Winter	100	+40%	30/15 Summer			
1.003	SW10	15 Summer	100	+40%	30/15 Summer			
3.000	SW13	15 Winter	100	+40%	30/15 Summer			
3.001	SW12	15 Winter	100	+40%	30/15 Summer			
1.004	SW11	15 Winter	100	+40%	30/15 Summer			
4.000	SW18	30 Winter	100	+40%	1/15 Summer			
5.000	SW19	30 Winter	100	+40%	1/15 Summer			
4.001	SW17	15 Winter	100	+40%	1/15 Summer	100/15 Summer		
6.000	SW16	480 Winter	100	+40%	30/15 Summer	100/15 Summer		
4.002	SW15	15 Winter	100	+40%	1/15 Winter			
1.005	SW14	480 Winter	100	+40%	1/15 Summer			
1.006	Pond	480 Winter	100	+40%	30/15 Winter			
1.007	SW03	360 Winter	100	+40%	1/30 Summer	100/30 Summer		

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	SW09	4.514	0.594	0.000	1.03		12	17.7	FLOOD RISK
1.001	SW08	4.401	0.927	0.000	1.47		8	26.6	FLOOD RISK
2.000	SW04	4.025	0.420	0.000	0.95		26	28.9	FLOOD RISK
2.001	SW05	4.029	0.537	0.000	1.04		15	32.5	FLOOD RISK
2.002	SW06	4.400	1.077	0.148	1.07			33.9	FLOOD
1.002	SW07	4.371	1.148	0.000	1.78			53.1	FLOOD RISK
1.003	SW10	4.156	1.020	0.000	2.22			66.3	FLOOD RISK
3.000	SW13	3.952	0.602	0.000	1.16		5	15.8	SURCHARGED
3.001	SW12	3.805	0.581	0.000	1.53		6	22.6	FLOOD RISK
1.004	SW11	3.697	0.651	0.000	0.89			100.7	FLOOD RISK
4.000	SW18	4.684	0.934	0.000	1.50		20	24.0	FLOOD RISK
5.000	SW19	4.730	0.880	0.000	1.37		22	21.2	FLOOD RISK
4.001	SW17	4.505	1.108	4.942	1.64			67.7	FLOOD
6.000	SW16	3.535	0.360	34.915	0.16		121	4.9	FLOOD
4.002	SW15	3.795	0.746	0.000	1.24			79.3	FLOOD RISK
1.005	SW14	3.537	0.694	0.000	1.13			68.2	FLOOD RISK
1.006	Pond	3.527	0.758	0.000	0.57			26.7	FLOOD RISK
1.007	SW03	3.601	1.032	0.552	0.51			8.6	FLOOD

PN	US/MH Name	Level Exceeded
1.000	SW09	
1.001	SW08	
2.000	SW04	
2.001	SW05	
2.002	SW06	2
1.002	SW07	
1.003	SW10	
3.000	SW13	
3.001	SW12	
1.004	SW11	
4.000	SW18	
5.000	SW19	
4.001	SW17	4
6.000	SW16	18
4.002	SW15	
1.005	SW14	
1.006	Pond	
1.007	SW03	20

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.008	SW02	120 Winter	100	+40%					2.247
1.009	SW01	480 Winter	100	+40%					1.986

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.008	SW02	-0.073	0.000	0.50			8.5	OK	
1.009	SW01	-0.070	0.000	0.55			8.6	OK	