

**New Lane, Stanbridge
Road**

Havant

**Flood Risk
Assessment &
Drainage Strategy
Report**

Project Ref: **13383**

Report Ref: **R100**

Second Issue

January 2023

Client:

Hellier Langston

**Baynham Meikle
Partnership Limited**



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REPORT STATUS

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1 Introduction

- 1.1.1 Baynham Meikle Partnership Limited has been commissioned by Hellier Langston to prepare a Flood Risk Assessment and Drainage Strategy to support the full planning application for a new development on the site off of New Lane, Havant.
- 1.1.2 The Flood Risk Assessment will be part of a Full planning application to be made to Havant Council.
- 1.1.3 The proposed development is for a planning application comprising the construction of commercial units with associated yards, car parking and landscaping.
- 1.1.4 The development lies entirely within Flood Zone 1 where there is a low probability of fluvial flooding occurring. New Lane Road, running parallel to the sites north west boundary is identified within Flood Zone 2.
- 1.1.5 A product 4 information pack has been requested from the EA, once received this report will be updated to suit.
- 1.1.6 This Flood Risk Assessment follows government and local guidance on development and flood risk (National Planning Policy Framework NPPF¹) and is undertaken in consultation with the relevant bodies.
- 1.1.7 It is a requirement for development applications to consider the potential risk of flooding to the proposed development over its expected lifetime and any possible impacts on flood risk elsewhere in terms of its effects on flood flows and run off.
- 1.1.8 The following aspects of flood risk should be addressed in all planning applications in flood risk areas:
- The area liable to flooding.
 - The probability of flooding occurring now and over time.
 - The extent and standard of existing flood defences and their effectiveness over time.
 - The rates of flow likely to be involved.
 - The likelihood of impacts to other areas, properties and habitats.
 - The effects of climate change which currently requires designs to include 1 in 100 - year rainfall events + 40% climate change allowance.
 - The nature and current expected lifetime of the development proposed and the extent to which it is designed to deal with flood risk.

¹ Communities and Local Government, July 2021, National Planning Policy Framework (NPPF)

2 Site Location and Description

2.1.1 The development site is located off Stanbridge Road, circa 200m west of the railways lines. The Ordnance Survey National Grid reference to the centre of the site is E472561, N107451.

A site location Plan and aerial view can be found in Appendix A.

The site comprises of commercial units, service yard, carparking and landscaping.

2.1.2 The neighbouring land use is as follows:

- **North** New Lane, beyond which there are residential properties, and Stanbridge Road, with industrial units beyond.
- **East** New Lane, with residential properties beyond.
- **South** Commercial Units
- **West** Commercial unit, with railway line beyond.

2.1.3 The site slopes gradually from the east towards the west from approximately 16.65 mAOD to 15.75 mAOD.

2.1.4 The site is regular in shape and occupies a total area of 0.987Ha.

2.1.5 Access to the site will be via Stanbridge Road.

2.1.6 A Topographical Survey can be found in Appendix B.

3 Development Proposals

- 3.1.1 The proposed application is the Erection of an commercial units together with associated service yards, car parking, landscaping, and other associated works. A copy of the site's layout plan can be found in Appendix B.
- 3.1.2 The proposed development will have a total impermeable area of 0.880ha and permeable area of 0.107ha.
- 3.1.3 The proposed site levels have been designed such that they follow the approved contours of the existing site to prevent the requirement for any new retaining walls and also adhere to best practice and building regulation design standards.
- 3.1.4 The proposed development will also minimise any potential for surface water flooding from the new development drainage network and ensure that should any flooding occur it is controlled and kept within the new development demise and not affect neighbouring properties or highway land.

4 Existing Ground Conditions

4.1 Site Geology and Hydrology

- 4.1.1 At the time of writing the report there was no site-specific investigation report available. To understand the sites ground conditions, ground investigation information was used from the neighbouring site to the east – Velocity, as well as available information on British Geology Survey (BGS) website.

4.2 Ground Conditions

4.2.1 Ground Geology

A phase 1/2 Geo-Environmental Assessment was carried out at the Velocity site in February 2015 by Delta Simons.

The report concluded that the identified ground conditions across the site consisted of Made Ground up to 1.5m bgl overlaid on non-continuous firm / stiff Head Deposits over River Terrace Deposits – at an average depth of 2.0m bgl, and the solid geology comprising of a London Clay Formation.

A copy of the site investigation borehole data is appended to the report.

4.2.2 Hydrogeology

Groundwater Vulnerability Map produced by the MAGIC Map indicates that the site is in a Low Aquifer Zone.

The site is also indicated to be located in a Source Protection Zone, Zone I – Subsurface activity.

Groundwater was recorded as being stuck in all the boreholes. Post investigation monitoring found the water level to be typically 4.0m bgl within the River Terrace Gravels and London Clay Formation. Therefore, this will be considered in terms of positioning the new proposed soakaway units, discussed later in this report.

4.2.3 Soakaway Design

The site-specific soakaway tests have not been carried out at the time of writing this report. However, the neighbouring site to the east (next plot – Velocity) had a full site investigation carried out in February 2015 which confirmed good infiltration rates varying between 3.76×10^{-4} m/s to 6.41×10^{-5} m/s.

The proposed drainage system has been designed to the lowest confirmed infiltration rate of 6.41×10^{-5} m/s (0.23m/hr).

It is expected that the ground conditions at the proposed site development will be the same as Velocity site (BGS information suggests the same), therefore, infiltration rates are likely to be the same.

However, the calculations as well as this report are to be reviewed once a site specific ground investigation has been carried out.

Refer to appended borehole logs and infiltration rates calculations within appendix D.

4.2.4 Hydrology (surface water features)

The nearest watercourse is an unnamed watercourse located to the northwest, west and south west of the site, running to the west of New Lane.

The unnamed watercourse is an EA Statutory Main River.

The unnamed watercourse is approximately 18m northwest and west of the site.



Bridge Lake is located approximately 2.11km south of the site.

There are no surface water abstractions listed within 250m of the site.

5 Consultation and Policy

5.1 Drainage Authority

5.1.1 The sewerage service for the area is provided by Southern Water. There are existing public storm and foul water sewers within Stanbridge Road and New Lane.

5.1.2 Additional note:

Since 1st October 2011 many private sewers have been transferred into the ownership of the water authority as public sewers, where two or more properties in separate ownership are served by those sewers. Most of these former private sewers will not be shown on the public sewer records, therefore a full site survey should be carried out prior to any layout design or construction works to identify where these sewers may be and to avoid later delays and possible added costs.

5.2 Lead Local Flood Authority

5.2.1 The Lead Local Flood Authority (LLFA) is Hampshire County Council.

5.2.2 East Hampshire District have published a Level 1 Strategic Flood Risk Assessment² which define flooding and drainage requirements.

5.2.3 The purpose of the Level 1 SFRA is to collate and analyse the most up to date flood risk information for use by EHDC to inform the development of the Local Plan, and to inform site-specific flood risk assessments. The SFRA will assess the risks now and in the future from all types of flooding in accordance with the NPPF1 and PPG2. The SFRA will build on existing hydraulic modelling and available information.

5.3 Environment Agency

5.3.1 Coastal/Rivers

Tidal or flooding from rivers is considered 'very low' risk for the site. Refer to the EA Map showing the effect of flooding from rivers and the sea in Appendix A of this report. This map shows the possible extent of fluvial flooding for the 1 in 100 year flood (which would have a 1% probability of being exceeded each year). In this scenario there is a less than 0.1% chance of flooding within the site.

5.3.2 Reservoirs

It is considered 'very low' risk for the site. Refer to the EA Map showing the effect of flooding from reservoirs in Appendix A of this report.

² East Hampshire District Council, Level 1 Strategic Flood Risk Assessment, May 2022.

5.3.3 Surface Water

The full extent of the existing site is brownfield and drains into existing drainage on site. Therefore the proposed development will not be increasing the likelihood of flooding from surface water. The attached EA map shows the site to be at 'very low' risk of flooding from surface water. The development incorporates soakaways which will reduce the impact on the public sewers.

5.4 Applicable Policy

5.4.1 Applicable Planning Policy

Planning Practice Guidance to the National Planning Policy Framework (NPPF) was introduced in March 2014 and was most recently updated in July 2021; it deals specifically with development planning zones. All plans should apply a sequential, risk-based approach to the location of the development – taking into account all sources of flood risk and the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property.

The aim of the sequential test is to steer new developments to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding.

6 Flood Risk

- 6.1.1 In line with the latest NPPF guidance an appraisal was made of the site and surrounding areas to assess the potential risk of flooding at the site from the various sources:
- 6.1.2 Sea (Tidal) and River (Fluvial) – The site is not located in the vicinity of the coast, and is therefore not at risk of flooding due to Tidal Flows. There's an EA main river to the north west of the site that is indicated to be a source of flooding. A product 4 data has been requested from the EA and this report will be updated to suit the findings.
- 6.1.3 Surface (Pluvial) – Flood Map Data indicate that the site is in Flood Zone 1 – Low probability of flooding. The buildings ground floor levels will be set 150mm above surrounding ground levels.
- 6.1.4 Sewers – there has not been any historical risk of flooding from sewers located in the vicinity of the site. The proposed drainage will be designed in accordance with best practice and industry guidance; there will be negligible risk of flooding from sewers.
- 6.1.5 Groundwater – the BGS data indicates the site does lie within a ground water Source Protection Zone, Zone I – Subsurface activity.
- 6.1.6 Artificial Sources – There are no major artificial water sources such as canals, reservoirs or water tanks within the vicinity of the site, and therefore there is no flood risk due to artificial sources.

Table 4 – Flood Risk Assessment Summary

Aspects of Flood Risk	Assessment/Comment
Area liable to flooding	The development site lies almost entirely within Flood Zone 1 of the Environment Agency Flood Zone Map.
Probability of flooding occurring	Flooding from surface water at the site will be considered during the level and drainage design.
Standard of existing flood defences and their effectiveness	N/A
Likely depth of flooding	N/A
Rates of flow likely to be involved	N/A
Likelihood of impacts to other areas, properties and habitats	Any increase in the surface area, SuDS will be used for surface water management.
Effects of climate	The effects of climate change on flooding at the site are likely to be limited, due to the use of SuDS techniques and the system will be designed for 1 in 100 year storm event plus 40% climate change.

6.1.7 Sequential Test

The Sequential Test is intended to take into account all sources of flood risk and the current and future impacts of climate change, to avoid flood risk to people and property.

As the development extents of the site are within Flood Zone 1 and is in the Less Vulnerable category, the development can be considered appropriate for the proposed use, and therefore passes the Sequential Test.

6.1.8 Exception Test

The Exception Test is not required as the site is located within Flood Zone 1 and passes the Sequential Test.

7 Sustainable Drainage Proposals

7.1 Storm Water Management and SuDS

- 7.1.1 Sustainable Drainage Systems (SuDS) involve the management of storm water from developments effectively in order to reduce the impact of run-off both to the site in question and properties downstream, and not to exacerbate existing problems. This is achieved by not increasing peak flows that will otherwise result from the development. The philosophy of SuDS is to mimic as closely as possible, the natural drainage from a site before development, and to ensure that storm water runoff is treated so there is no detriment to water quality of the receiving watercourse.
- 7.1.2 Using SuDS may provide water quantity and quality control, as well as increased amenity value. Appropriately designed and maintained schemes may improve the sustainable water management at the site by:
- Reducing peak flows to watercourses or sewers and potentially reducing the risk of flooding downstream.
 - Reducing the volume, rate of discharge, and the frequency of water flowing directly to watercourses or sewers from the developed sites.
 - Improving water quality compared with conventional surface water sewers by removing pollutants.
- 7.1.3 The following section represents the considered views on suitable SuDS options appropriate to this site both as part of the detailed infrastructure scheme and outline illustrative masterplan. CIRIA C753³ The SuDS Manual was consulted to examine the use of SuDS on this site. Conclusions are based on the assessment of the site and the evaluation of the relevant design requirements and regulatory consultation.

7.2 Potential SuDS Techniques Considered for this Site

7.2.1 Green Roofs

Green roofs comprise a multi-layered system that covers the roof of a building or podium structure with vegetation cover, over a drainage layer. They are designed to intercept and retain precipitation, reducing the volume of run-off and attenuating peak flows.

Cost to the structure can be considerable and poor maintenance will leave it looking unsightly.

Not recommended

7.2.2 Soakaways

Soakaways are square or circular excavations either filled with rubble or lined with brickwork, precast concrete or polyethylene rings/perforated storage structures surrounded by granular backfill. They can be grouped and linked together to drain large areas including highways. The supporting structure and backfill can be substituted by modular geocellular units. Soakaways provide storm water attenuation, storm water treatment and groundwater recharge.

Soakaway tests have not been carried out at the time of writing this report. However, ground investigation report has been carried out on the neighbouring plot – Velocity and confirmed good

³ CIRIA, 2016. The SuDS Manual C753

infiltration rates, therefore, we have used the lowest confirmed infiltration rate of 0.23m/hr for design purposes at this stage. Upon receipt of the site-specific ground investigation report and soakaway testing results, the drainage strategy will be reviewed and amended accordingly.

Recommended and proposed for the site.

7.2.3 Swales

Swales are linear vegetated drainage features in which surface water can be stored or conveyed. They can be designed to allow infiltration, where appropriate. They should promote low flow velocities to allow much of the suspended particulate load in the storm water runoff to settle out, thus providing effective pollutant removal. Roadside swales can replace conventional gullies and drainage pipes.

Due to insufficient space on site, swales have not been incorporated into the landscape design.

Not Recommended.

7.2.4 Pervious Pavements

Pervious pavements provide a pavement suitable for pedestrian and/or vehicular traffic, while allowing rainwater to infiltrate through the surface and into the underlying layers. The water is temporarily stored between infiltration to the ground, reuse or discharge to a watercourse or other drainage system. Pavements with aggregate sub-bases can provide good water quality treatment.

Recommended and proposed for the site.

7.2.5 Geo-cellular/Modular Systems

Modular plastic geo-cellular systems with a high void ratio that can be used to create a below ground storage structure.

Modular tanks can be used for runoff attenuation but requires silt trap protection and a suitable means of access for cleaning and inspection.

Recommended and proposed for the site.

7.2.6 Ponds/Infiltration Basin

Ponds can provide both storm water attenuation and treatment. They are designed to support emergent and submerged aquatic vegetation along their shoreline. Run off from each rain event is detained and treated in the pool. The retention time promotes removal through sedimentation and the opportunity for biological uptake mechanisms to reduce nutrient concentrations.

Due to insufficient space on site, Ponds/Infiltration basins have not been incorporated into the landscaping design.

Not Recommended.

7.3 Sustainable Drainage Maintenance

7.3.1 The various SuDS features will remain privately owned and be maintained by the Development's Maintenance team. The exact details of this arrangement will be defined with the future development.

7.3.2 The SuDS operation and maintenance strategy will be in accordance with CIRIA C753 best practice, as tabled below:

Table 5 – SuDS Operation and Maintenance Requirements

Routine maintenance	Inspect flow control chamber for evidence of poor operation.	Monthly for 3 months then annually.
	Remove debris from catchment surface.	Monthly
	Remove sediment from catch-pits, flow control sumps, swales and ponds. Remove oil and silt from interceptors.	Annually, or as required by inspection
Remedial actions	Replace malfunctioning flow control parts.	As required
Monitoring	Inspect all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually
	Survey and clear main attenuation pond.	Annually
	Survey inside of attenuation tanks for sediment build up and remove if necessary.	Every 5 years or as required by inspection.

Suds Maintenance plan has also been appended to this report, refer to Appendix D.

8 Drainage Strategy – Surface Water

8.1 Drainage Strategy

- 8.1.1 In accordance with LLFA guidance, surface water discharge should be via natural means before consideration of discharge to a sewer network. The adjacent stream that run west from the western site boundary, therefore serves as the ideal source of discharge.

8.2 Proposed Surface Water Strategy

- 8.2.1 Taking onboard some of the techniques previously discussed we therefore propose to incorporate the following features within the storm drainage system:

- Provide a gravity pipe drainage system to discharge to suitable sized cellular soakaways / infiltration trenches.
- Cellular infiltration tanks to provide adequate underground storage volume.
- Underground storage is to be designed such that no surcharging occurs at the 1 in 1 year, no flooding at 1 in 30 years storm event and managed flooding for the 100 year plus climate change (if any occurred).
- If required allow external contained landscaping and car parking areas to flood to a maximum depth of 100mm

The above are illustrated on the drainage strategy plan 13383 / 103 within appendix B.

8.2.2 Discharge Rates

Re-charge rates back into the existing ground will be governed by infiltration rates of the natural underlying strata.

8.2.3 Design Analysis

We have carried out a full suite of storm simulations and for different return periods and durations and these are all appended to this report.

The storm return periods that have been simulated are:

1 in 1 year

1 in 30 year

1 in 100 year + 40% for climate change

Duration tested ranged between:

15 minutes through to 1440 minutes for both the winter and summer profiles.

The simulation results show that the design is compliant with the criteria within the drainage system such that no surcharging is observed for 1 in 1 year, no flooding for 1 in 30 and nominal level of flooding for 1 in 100 years storm events + 40% climate change.

The designed nominal level of flooding:

Designed flooding ranges between 0.078m³ – 2.566m³ with the critical storm event being 120min winter duration for the 1 in 100 year plus climate change storm.

For calculations refer to Appendix C.

8.2.4 Design Analysis for Exceedance Storm Event

Furthermore, the Microdrainage calculations have been carried out for the exceedance storm event of 1 in 200 years plus climate change. The calculations have confirmed the approximate volume of flooding on site which would be contained within the proposed access road and new car parking areas. For flood routing plan as well as calculations for exceedance event refer to appendices.

8.3 Treatment and Management Train

A surface water treatment and management train begins with source control and uses surface conveyance wherever possible to link subsequent SUDS components in series. It provides potential for interception losses along its whole length as well as infiltration, evaporation and transpiration through the leaves of vegetation. The management train reduces the rate at which the run off flows though the site and provides treatment as it passes through each SUDS component.

SUDS components within the management train are as follow:

Source control:

Permeable surfaces: a soft landscaping strategy has been incorporated into scheme which contributes to limiting the developments impermeable areas.

Swales: swales have not been incorporated into the drainage strategy due to limited space on site, however, other SuDS features have been introduced which were described in above sections.

Rainwater harvesting: Rainwater harvesting will be disproportionate in terms of cost and function in regards to the proposed development features (Toilet, sinks etc.) Therefore, rainwater harvesting has been disregarded.

Site Controls:

Ponds / Detentions basins: the site layout does not allow the space required for any type of open feature within the surface water drainage system.

Filtration: it is proposed that the runoff from service yards will pass through petrol interceptor prior discharging into the proposed drainage system.

Attenuation: cellular storage tanks as well as porous stone layers underneath the car parking area is proposed as a way to store backed up water on site which will manage the remaining runoff volumes on site.

Regional Controls:

Discharge Control: The drainage strategy includes infiltration into the ground as the discharge method for surface water which will be limited by infiltration rates, which were discussed earlier within this report.

This SUDS Treatment and Management train will be able to deal with required run-off volumes while providing enough water quality treatment.

8.4 SUDS Water Quality

Adequate surface water run-off treatment must be delivered in order to remove pollutants through SUDS devices which are able to provide pollution mitigation. Pollution hazards and the SUDS Mitigation have been indexed and are shown within the Ciria SUDS manual.

The pollution hazard indices are summarised in Table 26.2 – Pollution hazard indices for different land use classifications, and are shown below:

Table 5. SUDS – Pollution Hazard Indices for Different Land Use Classifications

Pollution hazard indices for different land use classifications				
Land use	Pollution hazard level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Other roofs (typically commercial / industrial roofs)	Low	0.3	0.2	0.05
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	Medium	0.7	0.6	0.7

Although run-off from roof areas is considered to be uncontaminated, it is being treated by Porous Stone layers within parking areas and catchpits.

The mitigation indices of the proposed SUDS features are summarized within the Ciria SUDS Manual Table 26.3 and is shown below:

Table 6. SUDS – Indicative SUDS Mitigation Indices for Discharges to Surface Waters

Indicative SUDS Mitigation Indices for Discharges to Surface Waters			
	Mitigation Indices		
Type of SUDS component	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Permeable Pavement	0.7	0.6	0.7
Proprietary Treatment Systems (Petrol Interceptor)	Typically 0.8	Typically 0.6	Typically 0.9

The below table confirms that the surface water treatment provided by the SUDS devices is enough to remove the pollutants before discharging into the existing sewers:

Table 7. SUDS Mitigation Indices Summary Table

Proposed Hazard Treatment					
Land Use	Treatment	Pollution Hazard Level	TSS	Metals	Hydrocarbons
Roofs	Permeable pavement	Low	0.7 > 0.3	0.6 > 0.2	0.7 > 0.05
Commercial Yard / delivery areas	Proprietary Treatment Device	Medium	0.8 > 0.7	0.6 = 0.6	0.9 > 0.7

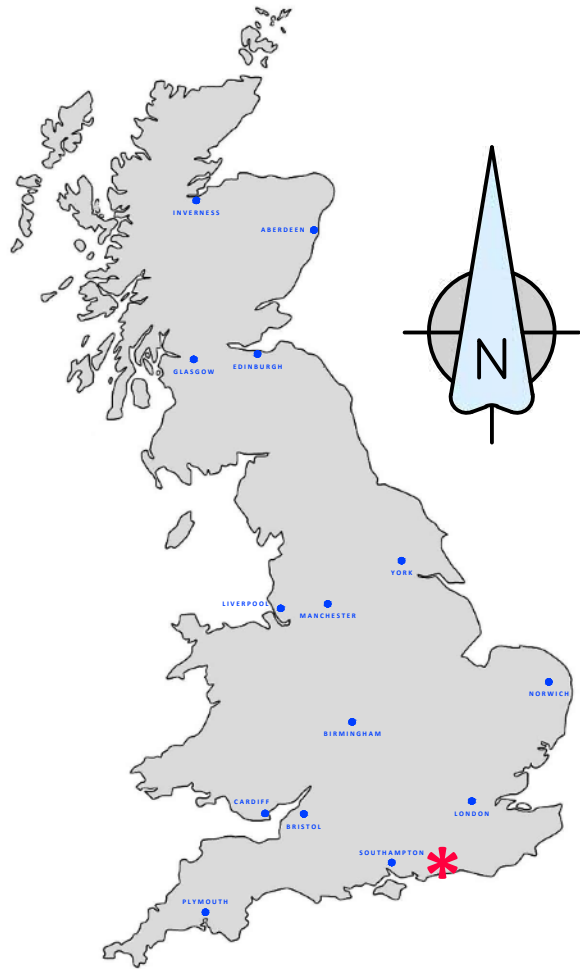
9 Drainage Strategy – Foul Water

- 9.1.1 The proposed foul drainage strategy is to discharge into Southern Water public sewer located on Stanbridge Road.
- 9.1.2 BMP have prepared a foul water strategy drawing which can be found in Appendix B.
- 9.1.3 Southern Water are to be contacted in order to ensure there is available capacity to take proposed foul water from site as well as obtain all approvals to discharge.

10 Conclusion

- 10.1.1 BMP was commissioned by Hellier Langston to prepare a Flood Risk Assessment for the Full planning application for the new development site off of New Lane, Havant.
- 10.1.2 The new development will be submitted for a full planning application comprising the construction of commercial units with associated yards, car parking and landscaping.
- 10.1.3 Foul water will discharge into Southern Water existing Foul sewer in Stanbridge Road.
- 10.1.4 Surface water will be designed to cater for storm events up to 1 in 100 plus 40% climate change. The site is proposed to soakaway at infiltration rate of 0.23m/hr. Some storage of exceedance flows at the surface in events in excess of the 30 - year event is considered providing they are safely contained within the site.
- 10.1.5 The use of sustainable drainage systems (SuDS) has been considered and can be incorporated within the design. Surface water discharge will be attenuated on site via underground cellular tanks and permeable paving.
- 10.1.6 The development is classified as Less Vulnerable usage; the area of the site to be developed is in Flood Zone 1 and meets the Sequential Test. The Exception Test is not therefore required.
- 10.1.7 The site does not pose any increased flood risk to the site itself or adjacent developments and is not susceptible to flooding by other techniques.
- 10.1.8 This report has been prepared to meet the requirements of National Planning Policy Framework (NPPF) for a site not at risk from flooding.
- 10.1.9 The hydraulic modelling indicates no flooding in the 1 in 1 and 1 in 30-year storm events and potential flood risk (controlled flooding) in the 1 in 100-year, 120-minute winter storm events, which will be contained on site without affecting any neighbouring properties.

Appendix A



SITE DETAILS		
Address:	New Lane, Stanbridge Road	
Nearest Postcode:	PO9 2JL	
Grid Co-Ordinates:	E: 472561	N: 107451

FOR INFORMATION

—	20/07/2022	FIRST ISSUE.	AB	AB
Rev	Date	Description	By	Chkd

Revision Schedule

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Project Title	Drawn by	Checked by	Project Engineer
NEW LANE, STANBRIDGE ROAD HAVANT	AB	AB	NSB
Drawing Title	Date	Scale @ A3	
SITE LOCATION PLAN	JULY 2022	NTS	
	Project No.	Drawing No.	Rev
	13383	100	—



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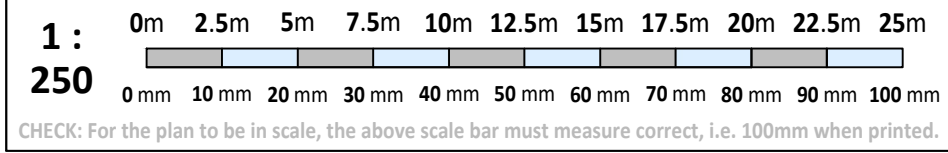
Revision Schedule

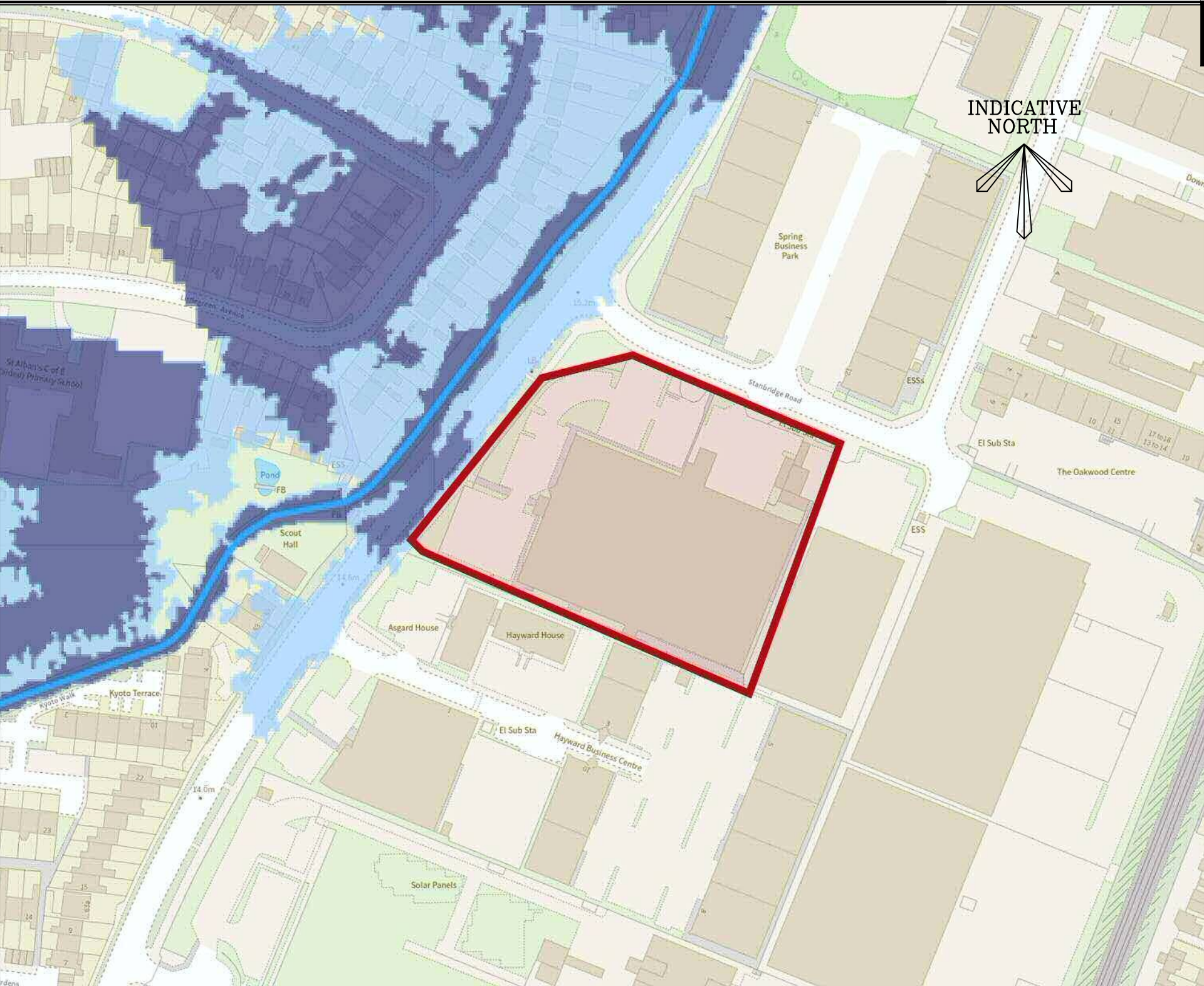
Project Title
NEW LANE HAVANT
Drawing Title
TOPOGRAPHICAL SURVEY PLAN

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Date	Scale @ A1	Project No.	Drawing No.	Rev
JAN 2023	1 : 250	13383	106	-

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NOTES

A3

Selected area

Flood zone 3

Flood zone 2

Flood zone 1

Flood defence

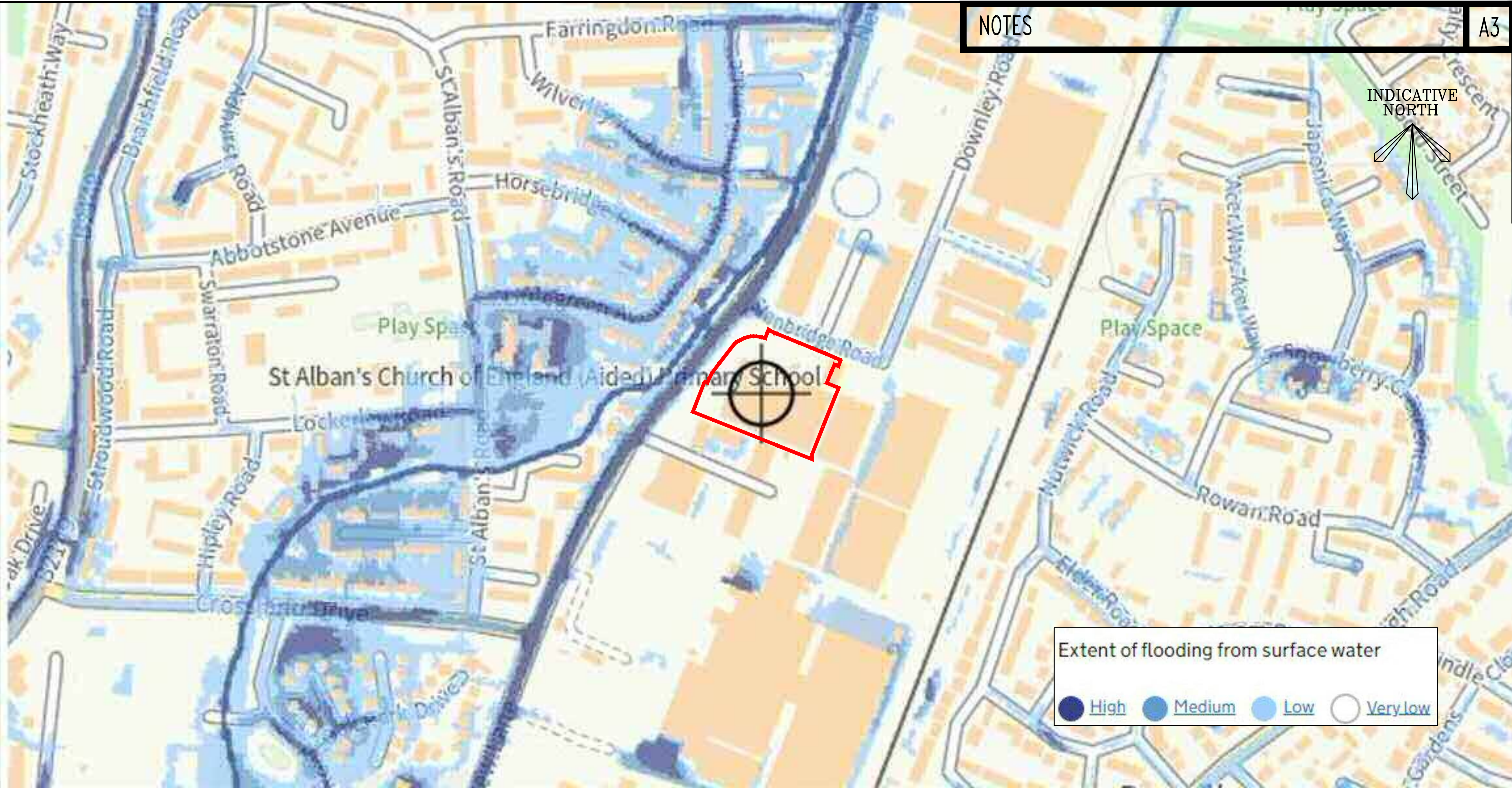
Main river

Water storage area

FOR INFORMATION

Rev			Date	Description	By	Chkd By
Revision Schedule						
BAYNHAM MEIKLE Consulting Structural & Civil Engineers 8 Meadow Road, Edgbaston, Birmingham B17 8BU Tel: 0121 434 4100 Fax: 0121 434 4073 Email: admin@bm-p.co.uk BM						

Drawn by EB	Checked by NSB	Project Engineer NSB	Project Title NEW LANE, HAVANT			
Date JAN 2023		Scale NTS	Drawing Title EA FLOOD MAP			
Project No 13383	Drawing No SK101	Rev -				



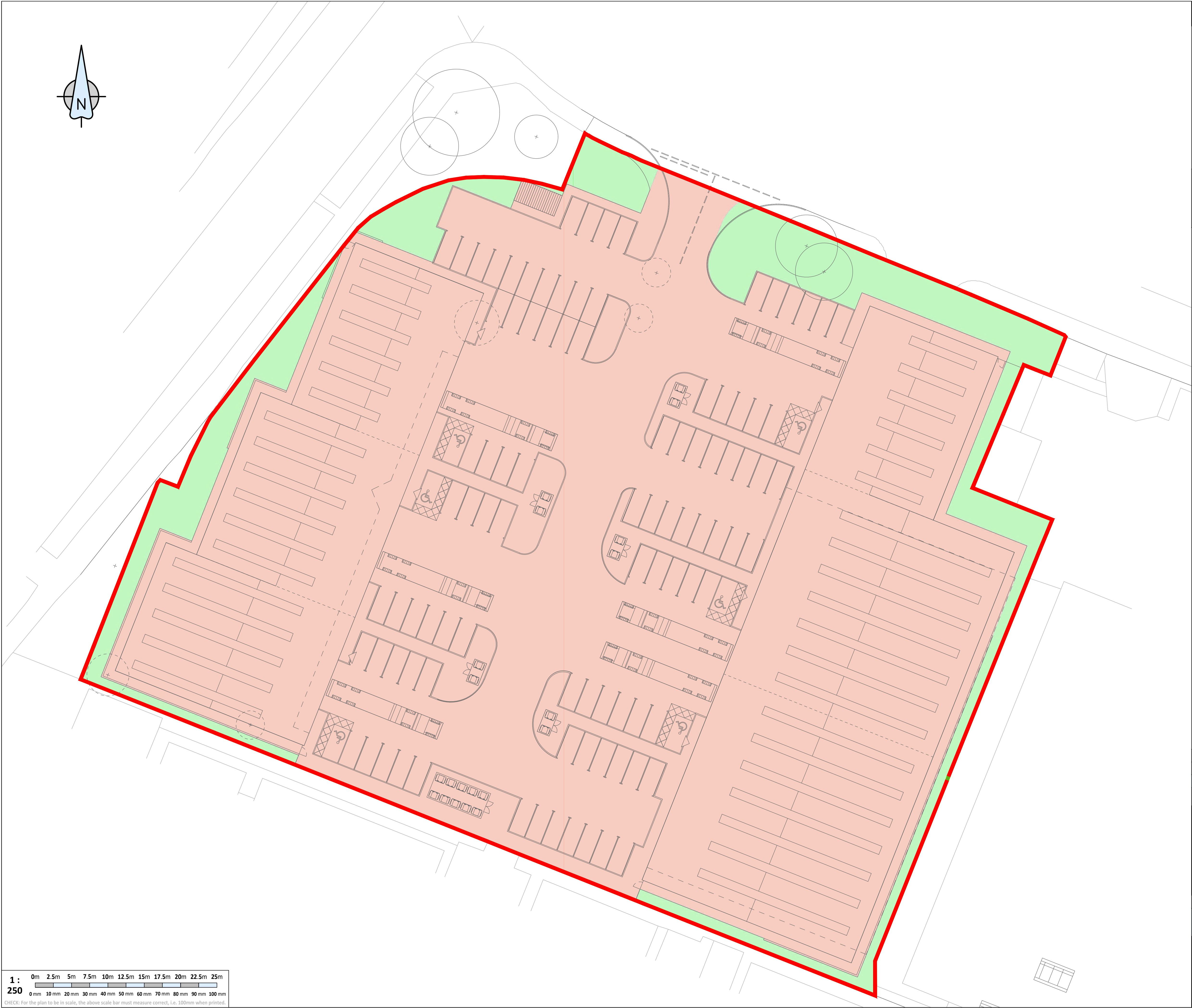
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Date JAN 2023		Scale NTS							
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Drawn by EB	Checked by NSB	Project Engineer NSB	Project Title NEW LANE, HAVANT			Revision Schedule			
Date JAN 2023		Scale NTS							
Project No 13383	Drawing No SK103	Rev —	Drawing Title EA FLOOD MAP RESERVOIRS			BAYNHAM MEIKLE Consulting Structural & Civil Engineers 8 Meadow Road, Edgbaston, Birmingham B17 8BU Tel: 0121 434 4100 Fax: 0121 434 4073 Email: admin@bm-p.co.uk			
									

Appendix B



- General:
1. This drawing is to be read in conjunction with all relevant Architects, Engineers and Specialists drawings and specifications.
 2. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
 3. The contractor is to check and verify all dimensions and levels before commencing work.
 4. Any discrepancies noted on site are to be reported to the Engineer immediately.
 5. Background plan based on topographic survey data created by others and supplied for the purpose of carrying out engineering works. We cannot be held responsible for the content, completeness and accuracy provided to us by others. Topographical survey taken from plan reference:
 - ENC/280422/SVV2/T
 6. Architectural layout taken from plan reference:
 - 22-015_HGP_XX_00_A_0011 - Proposed Site Plan

KEY	
	Proposed Permeable Area: 0.107 ha
	Proposed Impermeable Area: 0.880Ha

FOR INFORMATION

A	17/01/2023	UPDATED TO SUIT LATEST SITE LAYOUT.	EB	NSB
—	19/08/2022	FIRST ISSUE.	FJ	FJ
Rev	Date	Description	By	Chkd

Revision Schedule

Project Title
NEW LANE HAVANT
Drawing Title
PROPOSED IMPERMEABLE & PERMEABLE AREAS PLAN

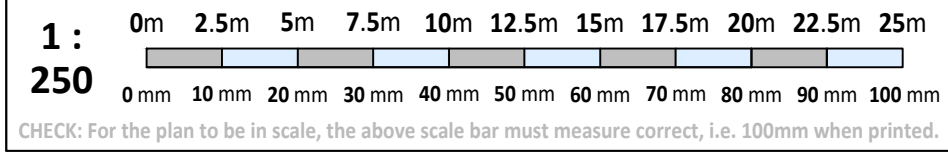
Drawn by	Ferdi Jafar	Checked by	A.B.	Project Engineer	N.B.
Date	AUG 2022	Scale @ A1	1 : 250	Project No.	13383
				Drawing No.	101
				Rev	A

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Consulting Structural & Civil Engineers

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- General:
1. This drawing is to be read in conjunction with all relevant Architects, Engineers and Specialists drawings and specifications.
 2. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
 3. The contractor is to check and verify all dimensions and levels before commencing work.
 4. Any discrepancies noted on site are to be reported to the Engineer immediately.
 5. Background plan based on topographic survey data created by others and supplied for the purpose of carrying out our engineering works. We cannot be held responsible for the content, completeness and accuracy provided to us by others. Topographical survey taken from plan reference:
 - ENC/280422/SVV2/T
 6. Architectural layout taken from plan reference:
 - 22.015_HGP_XX_00_DR_A
 7. This drawing is for planning purposes only and subjected to developed design.

KEY	
	Application Boundary
	Proposed Levels
	Existing Levels
	Proposed Gradients
	Proposed Retaining Wall
	Proposed Drainage Channel

FOR PLANNING

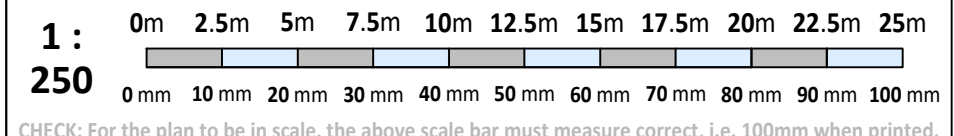
B	17/01/2023	LEVELS UPDATED.	EB	NB
A	09/11/2022	AMENDED TO SUIT SITE LAYOUT	AG	NB
—	24/08/2022	First Issue - Preliminary	FJ	AB
Rev	Date	Description	By	Chkd

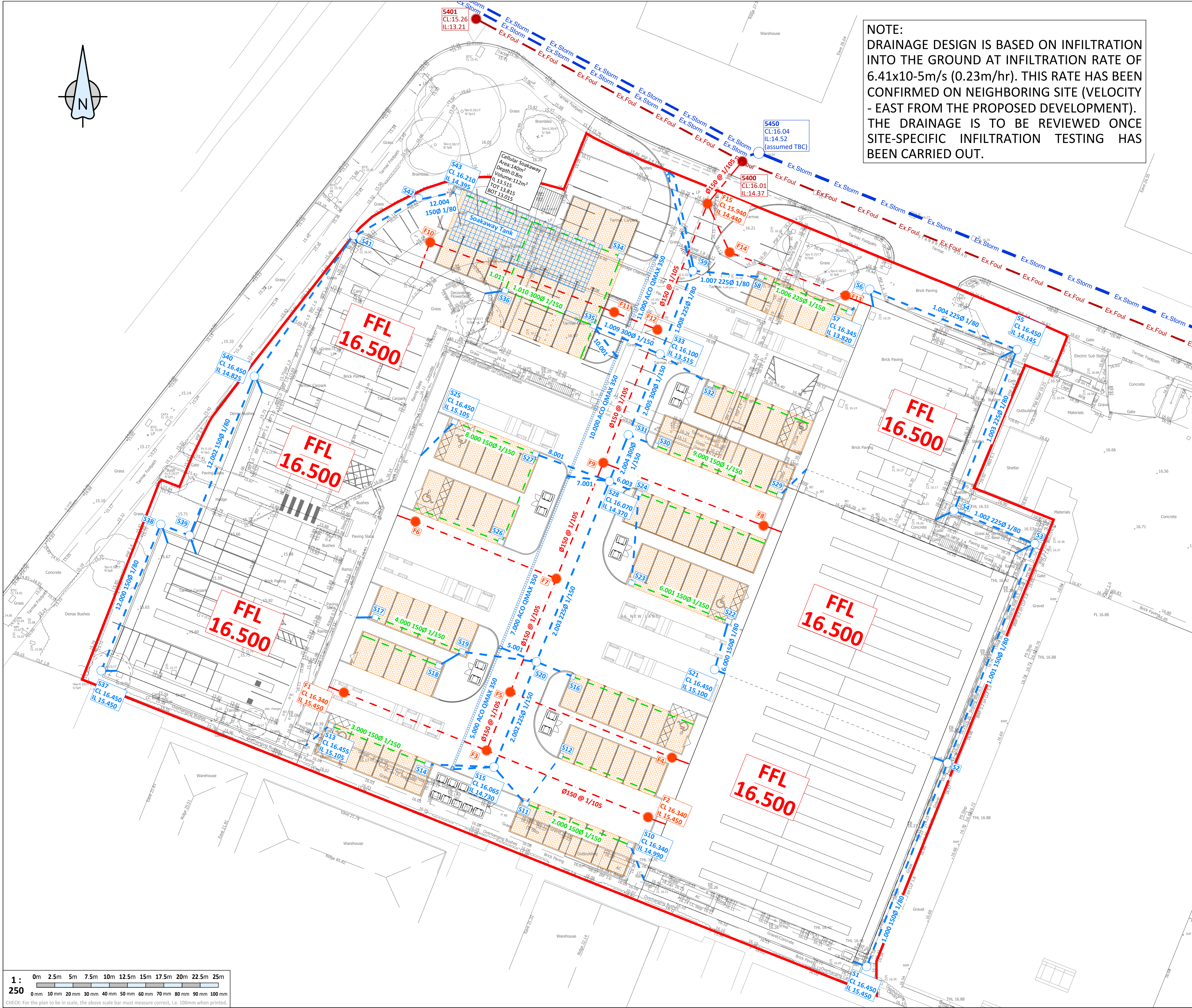
Revision Schedule

Project Title
NEW LANE HAVANT
Drawing Title
PROPOSED LEVELS STRATEGY PLAN

Drawn by	A.G.	Checked by	A.G.	Project Engineer	N.B.
Date	NOV 2022	Scale @ A1	1 : 250	Project No.	13383
				Drawing No.	102
				Rev	B

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NOTE:
DRAINAGE DESIGN IS BASED ON INFILTRATION INTO THE GROUND AT INFILTRATION RATE OF 6.41x10-5m/s (0.23m/hr). THIS RATE HAS BEEN CONFIRMED ON NEIGHBORING SITE (VELOCITY - EAST FROM THE PROPOSED DEVELOPMENT). THE DRAINAGE IS TO BE REVIEWED ONCE SITE-SPECIFIC INFILTRATION TESTING HAS BEEN CARRIED OUT.

NOTES A1

1. Do not scale this drawing. All dimensions must be checked / verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant Architects, Engineers and Specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the Engineer immediately.
5. The base specification for drainage works shall be the Water Authority Association 'Sewers for Adoption (7th Edition).
6. For details of ground conditions refer to the Ground Investigation Report.
7. The following pipe strengths shall be adopted unless noted otherwise:
 - Pipes 150mm diameter up to and including 225mm to be clayware to BS EN 295 Class 160.
 - Pipes over 300mm diameter to be concrete to BS 5911 Class M.
8. All pipe runs to be laid with flexible joints.
9. All pipes entering and exiting manholes are to be connected with pipe soffits level unless noted otherwise.
10. Bedding and surround to be as follows :-

Location	Cover to Soffit	Bedding
Roads	>1.2m	Class 'S' granular bed and surround.
	<1.2m	Class 'X' Concrete surround.
Hard and soft landscaping	>0.6m	Class 'S' granular bed and surround.
	<0.6m	Class 'X' Concrete surround.

12. The following concrete mixes are to be used (all in accordance with BS 5800):

Location	Mix Reference.
Concrete surround to pipes	ST4
Concrete base and surround to manholes	ST4

The above concrete mixes have been selected for BS 5800 Class 2 Sulphates.

13. All precast concrete products (ie pipes, manholes rings etc.) shall be of suitable concrete mix to cater for Class 2 sulphates.
14. Pre-formed channels are to be used in manholes where applicable.
15. Granolithic concrete bedding to be steel trowelled to a dense smooth face neatly shaped and finished to all branch connections and laid in accordance with the Specification.
16. All connections to be turned in direction of flow using pipe bends.
17. Manhole covers and frames to be ductile iron medium duty Grade D400 circular or rectangular to BS EN124 positions inside vehicular trafficked areas.
18. First flexible joint in pipes adjacent to a manhole shall be a maximum of 600mm from inside face of manhole, connecting to rocker pipe.
The length of rocker pipe is as follows:-

Pipe Diameter	Length of Rocker pipe
150mm-600mm	600mm
19. Manholes with outgoing pipes greater than 600mm diameter shall be fitted with guard bars, safety chains or other safety devices.
20. The Principle Contractor shall be responsible for checking the existing line and invert levels of any connection points for both the foul and surface water systems, prior to undertaking installation of any new drainage works. Any deviation to the levels and positions indicated on the drawing should be brought to the immediate attention of the Project Engineer.
21. All inverts specified are outgoing (except backdrop). All pipe are to be laid soffits levels U.N.O.
22. All foul pipes to be 100mm Diameter & Storm to 150mm Diameter unless marked otherwise.
23. All connections to be made by purpose made junctions as far as practicable.
24. Manhole covers in block paved areas to be recessed to receive required surface finish.
25. The contractor is to protect existing and new buried pipes (particularly shallow pipes) and tree roots from damage caused by loads imposed by construction plant.
26. This drawing is subject to detail design.

KEY

Ex.Foul	Ex.Foul	EXISTING FOUL SEWER
Ex.Storm	Ex.Storm	EXISTING STORM SEWER
Proposed Private Storm	Proposed Private Storm	PROPOSED PRIVATE STORM
Proposed Perforated Pipe	Proposed Perforated Pipe	PROPOSED PERFORATED PIPE
Proposed Drainage Channel	Proposed Drainage Channel	PROPOSED DRAINAGE CHANNEL
Proposed Gully	Proposed Gully	PROPOSED GULLY
Proposed Cellular Soakaway	Proposed Cellular Soakaway	PROPOSED CELLULAR SOAKAWAY
Proposed Permeable Surface (Min 450mm Deep)	Proposed Permeable Surface (Min 450mm Deep)	PROPOSED PERMEABLE SURFACE (MIN 450mm DEEP)
Proposed Private Foul	Proposed Private Foul	PROPOSED PRIVATE FOUL
Proposed By-Pass Petrol Interceptor	Proposed By-Pass Petrol Interceptor	PROPOSED BY-PASS PETROL INTERCEPTOR

FOR PLANNING

B	17/01/2023	DRAINAGE UPDATED.	E.B.	N.B.
A	09/11/2022	AMENDED TO SUIT SITE LAYOUT	A.G.	N.B.
-	23/08/2022	FIRST ISSUE.	AB	-
Rev	Date	Description	By	Chkd

Revision Schedule

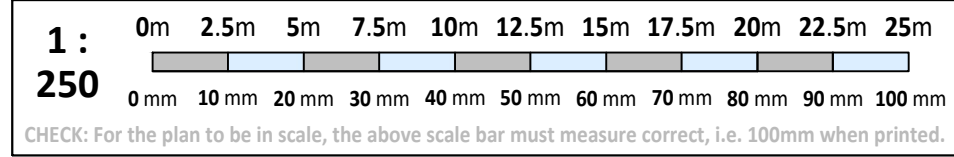
Project Title
NEW LANE HAVANT

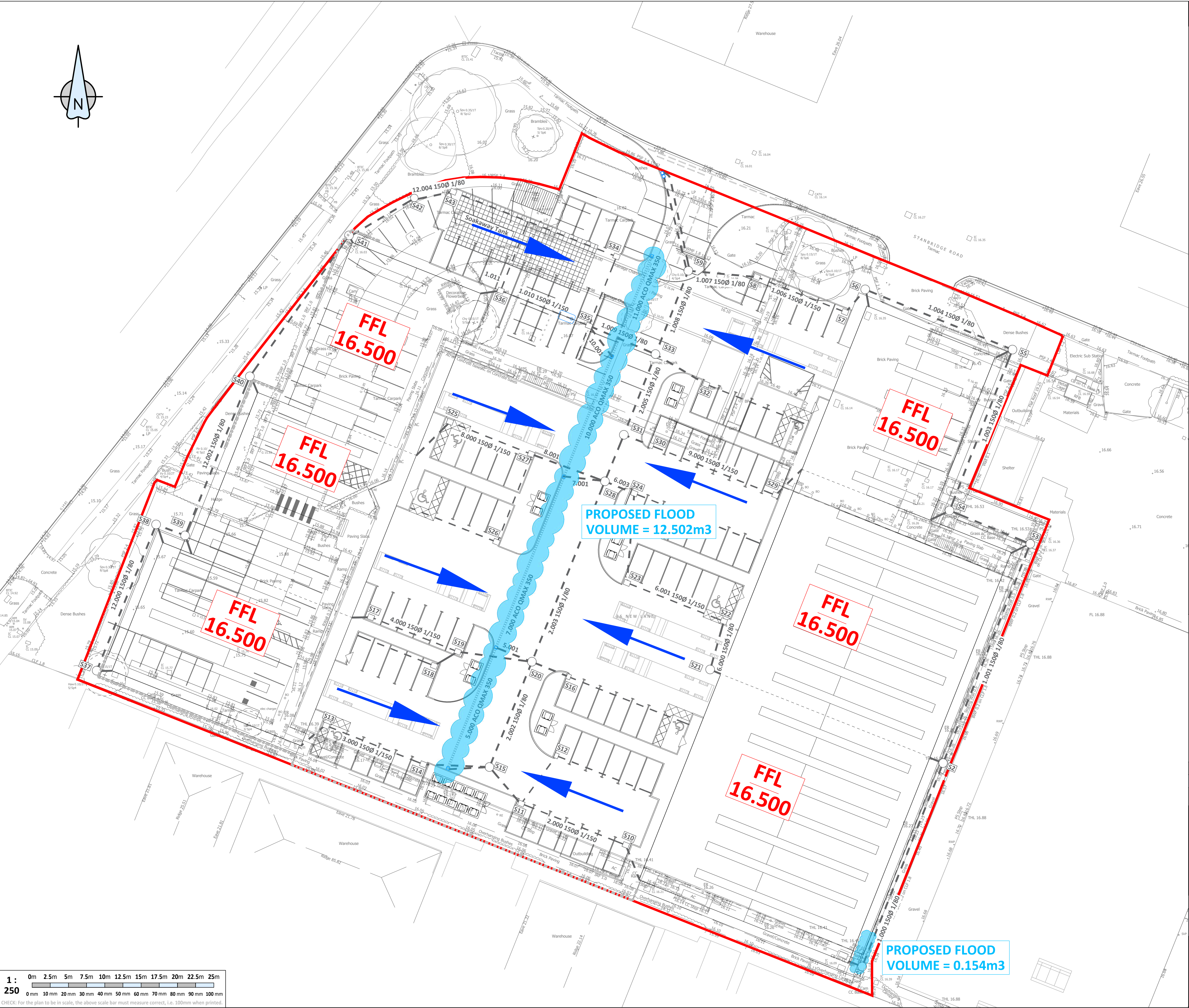
Drawing Title
PROPOSED DRAINAGE STRATEGY PLAN

Drawn by	A.G.	Checked by	A.G.	Project Engineer	N.B.
Date	NOV 2022	Scale @ A1	1 : 250	Project No.	13383
				Drawing No.	103
				Rev	B

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KEY

Application Boundary

Proposed Surface Water Drainage

Proposed Retaining Wall

Proposed Flood Areas

Proposed Flood Direction

FOR PLANNING

—	2023.01.18	FIRST ISSUE.	EB	NSB
Rev	Date	Description	By	Chkd
Revision Schedule				
Project Title				
NEW LANE HAVANT				
Drawing Title				
PROPOSED FLOOD ROUTING PLAN 100 YEAR STORM EVENT + 40% CLIMATE CHANGE				
Drawn by A.G.		Checked by A.G.	Project Engineer N.B.	
Date	Scale @ A1	Project No.	Drawing No.	Rev
NOV 2022	1 : 250	13383	104	-

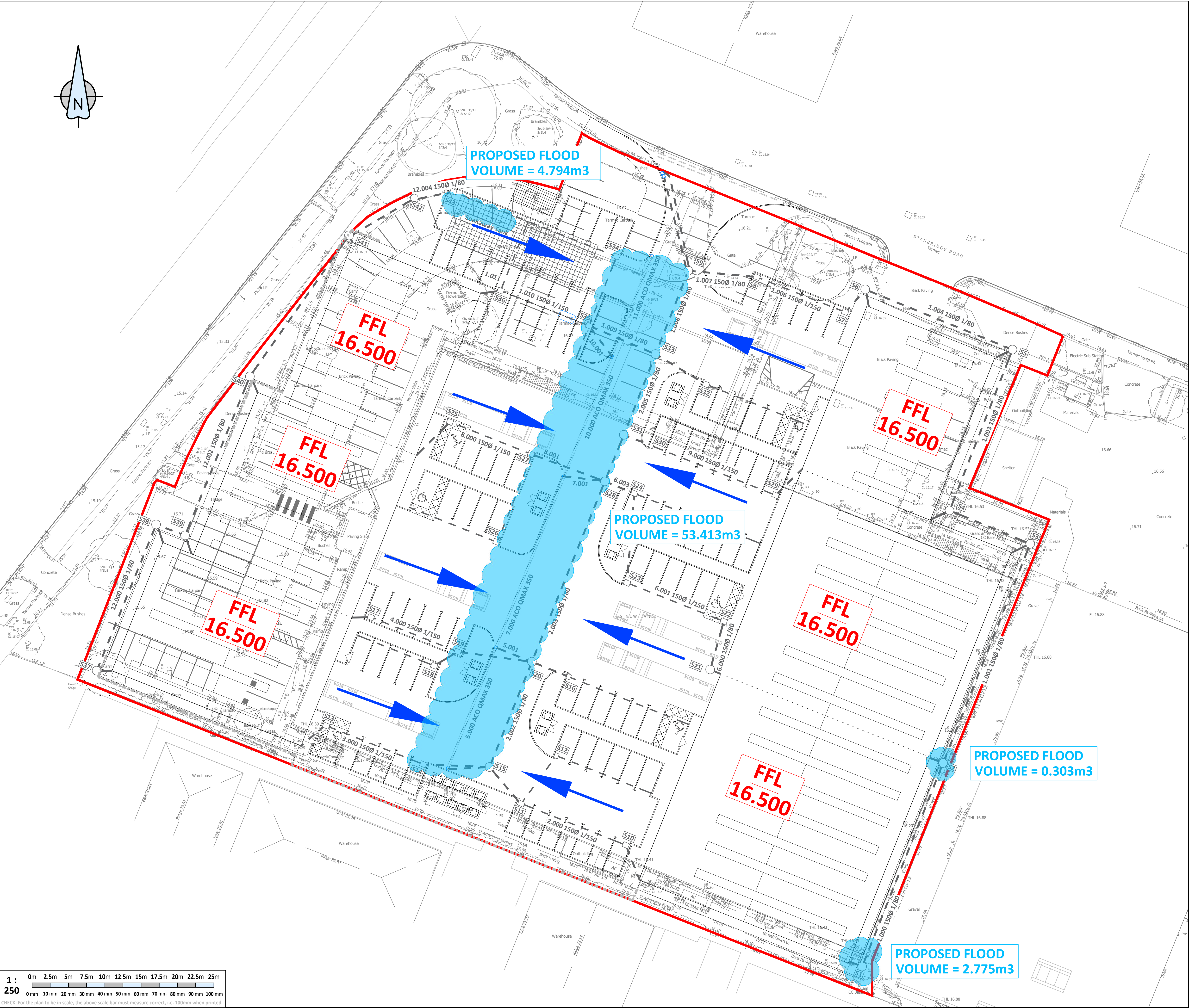
BAYNHAM MEIKLE

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B

M



- KEY
- Application Boundary
 - Proposed Surface Water Drainage
 - Proposed Retaining Wall
 - Proposed Flood Areas
 - Proposed Flood Direction

FOR PLANNING

—	2023.01.18	FIRST ISSUE.	EB	NSB
Rev	Date	Description	By	Chkd

Revision Schedule

Project Title	NEW LANE HAVANT			
Drawing Title	PROPOSED FLOOD ROUTING PLAN - EXCEEDANCE EVENT 200 YEAR STORM EVENT + 40% CLIMATE CHANGE			

Drawn by	A.G.	Checked by	A.G.	Project Engineer	N.B.
Date	NOV 2022	Scale @ A1	1 : 250	Project No.	13383
				Drawing No.	105
				Rev	-

BAYNHAM MEIKLE

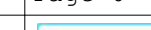
Consulting Structural & Civil Engineers

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Appendix C

Baynham Meikle Partnership		Page 0
8 Meadow Road Edgbaston, Birmingham B 17 8BU	NEW LANE, HAVANT	
Date 18/01/2023 12:54 File 2023.01.18_drainage netw...	Designed by EB Checked by NSB	
Micro Drainage Network 2020.1.3		

STORM SEWER DESIGN by the Modified Rational Method

Pipe Sizes STANDARD Manhole Sizes STANDARD

Designed with Level Soffits

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.511	4-8	0.324	8-12	0.001

Total Pipe Volume (m³) = 20.869

« - Indicates pipe capacity < flow

Network Results Table

Baynham Meikle Partnership

8 Meadow Road
Edgbaston, Birmingham
B 17 8BU

Date 18/01/2023 12:54
File 2023.01.18_drainage netw...

Micro Drainage

NEW LANE, HAVANT

Designed by EB
Checked by NSB

Network 2020.1.3

Page 1

Micro Drainage

Network Design Table for 2023.01.18_DRAINAGE.SWS

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
1.003	23.755	0.300	79.2	0.011	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	21.886	0.275	79.6	0.011	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	4.172	0.050	83.4	0.011	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.006	13.058	0.085	153.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.007	9.466	0.065	145.6	0.007	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.008	12.339	0.080	154.2	0.016	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	15.476	0.105	147.4	0.031	5.00	0.0	0.600	o	150	Pipe/Conduit	
2.001	6.659	0.080	83.2	0.015	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.000	14.388	0.100	143.9	0.016	5.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	9.119	0.200	45.6	0.008	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.002	15.614	0.105	148.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.000	12.849	0.085	151.2	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	10.298	0.215	47.9	0.013	0.00	0.0	0.600	o	150	Pipe/Conduit	
5.000	12.419	0.000	0.0	0.050	5.00	0.0	0.600	Q35	-3	Pipe/Conduit	
5.001	6.125	0.755	8.1	0.050	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	45.00	6.33	14.445	0.104	0.0	0.0	0.0	1.47	58.5	12.7
1.004	44.20	6.58	14.145	0.115	0.0	0.0	0.0	1.47	58.3	13.8
1.005	44.05	6.63	13.870	0.126	0.0	0.0	0.0	1.43	57.0	15.0
1.006	43.42	6.84	13.820	0.126	0.0	0.0	0.0	1.05	41.8	15.0
1.007	42.99	6.98	13.735	0.133	0.0	0.0	0.0	1.08	43.0	15.5
1.008	42.42	7.18	13.670	0.149	0.0	0.0	0.0	1.05	41.8	17.1
2.000	48.64	5.31	14.990	0.031	0.0	0.0	0.0	0.83	14.6	4.1
2.001	48.25	5.41	14.885	0.046	0.0	0.0	0.0	1.10	19.5	6.0
3.000	48.74	5.29	15.105	0.016	0.0	0.0	0.0	0.84	14.8	2.1
3.001	48.35	5.39	15.005	0.024	0.0	0.0	0.0	1.49	26.4	3.1
2.002	47.34	5.66	14.730	0.070	0.0	0.0	0.0	1.07	42.5	9.0
4.000	48.84	5.26	15.000	0.015	0.0	0.0	0.0	0.81	14.4	2.0
4.001	48.38	5.38	14.915	0.028	0.0	0.0	0.0	1.46	25.8	3.7
5.000	45.25	6.26	15.455	0.050	0.0	0.0	0.0	0.16	15.8	6.1
5.001	45.16	6.28	15.455	0.100	0.0	0.0	0.0	3.56	62.9	12.2

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Baynham Meikle Partnership

8 Meadow Road
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Date 18/01/2023 12:54
File 2023.01.18_drainage netw...

Micro Drainage

NEW LANE, HAVANT

Designed by EB
Checked by NSB

Network 2020.1.3

Page 2



Network Design Table for 2023.01.18_DRAINAGE.SWS

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
2.003	26.784	0.180	148.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit		
6.000	6.898	0.090	76.6	0.031	5.00	0.0	0.600	o	150	Pipe/Conduit		
6.001	14.328	0.100	143.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit		
6.002	12.351	0.150	82.3	0.009	0.00	0.0	0.600	o	150	Pipe/Conduit		
6.003	4.352	0.240	18.1	0.009	0.00	0.0	0.600	o	150	Pipe/Conduit		
7.000	23.140	0.000	0.0	0.050	5.00	0.0	0.600	Q35	-3	Pipe/Conduit		
7.001	6.084	0.935	6.5	0.050	0.00	0.0	0.600	o	150	Pipe/Conduit		
8.000	12.007	0.080	150.1	0.030	5.00	0.0	0.600	o	150	Pipe/Conduit		
8.001	10.844	0.135	80.3	0.016	0.00	0.0	0.600	o	150	Pipe/Conduit		
2.004	6.916	0.045	153.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit		
9.000	18.396	0.125	147.2	0.043	5.00	0.0	0.600	o	150	Pipe/Conduit		
9.001	4.051	0.050	81.0	0.009	0.00	0.0	0.600	o	150	Pipe/Conduit		
2.005	11.918	0.080	149.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit		

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
2.003	43.83	6.70	14.625	0.198	0.0	0.0	0.0	1.07	42.5	23.5
6.000	49.49	5.10	15.100	0.031	0.0	0.0	0.0	1.15	20.3	4.2
6.001	48.36	5.39	15.010	0.031	0.0	0.0	0.0	0.84	14.8	4.2
6.002	47.66	5.57	14.910	0.040	0.0	0.0	0.0	1.11	19.6	5.2
6.003	47.54	5.60	14.760	0.049	0.0	0.0	0.0	2.38	42.0	6.3
7.000	41.97	7.34	15.455	0.050	0.0	0.0	0.0	0.16	15.8	5.7
7.001	41.90	7.37	15.455	0.100	0.0	0.0	0.0	3.98	70.3	11.3
8.000	48.91	5.24	15.105	0.030	0.0	0.0	0.0	0.82	14.5	4.0
8.001	48.28	5.41	15.025	0.046	0.0	0.0	0.0	1.12	19.8	6.0
2.004	41.65	7.46	14.370	0.393	0.0	0.0	0.0	1.27	89.5	44.3
9.000	48.42	5.37	15.005	0.043	0.0	0.0	0.0	0.83	14.6	5.6
9.001	48.18	5.43	14.880	0.052	0.0	0.0	0.0	1.12	19.8	6.8
2.005	41.24	7.61	14.325	0.445	0.0	0.0	0.0	1.29	90.9	49.7

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Baynham Meikle Partnership								Page 5			
8 Meadow Road Edgbaston, Birmingham B 17 8BU					NEW LANE, HAVANT						
Date 18/01/2023 12:54 File 2023.01.18_drainage netw...					Designed by EB Checked by NSB						
Micro Drainage					Network 2020.1.3						
Manhole Schedules for 2023.01.18_DRAINAGE.SWS											
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	B
1	16.450	1.000	Open Manhole	1200	1.000	15.450	150				
2	16.450	1.380	Open Manhole	1200	1.001	15.070	150	1.000	15.070	150	
3	16.450	1.855	Open Manhole	1200	1.002	14.595	225	1.001	14.670	150	
4	16.450	2.005	Open Manhole	1200	1.003	14.445	225	1.002	14.445	225	
5	16.450	2.305	Open Manhole	1200	1.004	14.145	225	1.003	14.145	225	
6	16.450	2.580	Open Manhole	1200	1.005	13.870	225	1.004	13.870	225	
7	16.345	2.525	Open Manhole	1200	1.006	13.820	225	1.005	13.820	225	
8	16.200	2.465	Open Manhole	1200	1.007	13.735	225	1.006	13.735	225	
9	16.120	2.450	Open Manhole	1200	1.008	13.670	225	1.007	13.670	225	
15	16.340	1.350	Open Manhole	1200	2.000	14.990	150				
16	16.130	1.245	Open Manhole	1200	2.001	14.885	150	2.000	14.885	150	
21	16.455	1.350	Open Manhole	1200	3.000	15.105	150				
22	16.065	1.060	Open Manhole	1200	3.001	15.005	150	3.000	15.005	150	
17	16.065	1.335	Open Manhole	1200	2.002	14.730	225	2.001	14.805	150	
								3.001	14.805	150	
23	16.350	1.350	Open Manhole	1200	4.000	15.000	150				
24	16.050	1.135	Open Manhole	1200	4.001	14.915	150	4.000	14.915	150	
25	16.005	0.550	Junction		5.000	15.455	-3				
26	16.005	0.550	Open Manhole	450	5.001	15.455	150	5.000	15.455	-3	
18	16.100	1.475	Open Manhole	1200	2.003	14.625	225	2.002	14.625	225	
								4.001	14.700	150	
								5.001	14.700	150	
27	16.450	1.350	Open Manhole	1200	6.000	15.100	150				
28	16.475	1.465	Open Manhole	1200	6.001	15.010	150	6.000	15.010	150	
29	16.215	1.305	Open Manhole	1200	6.002	14.910	150	6.001	14.910	150	
30	16.120	1.360	Open Manhole	1200	6.003	14.760	150	6.002	14.760	150	
31	16.005	0.550	Junction		7.000	15.455	-3				
32	16.005	0.550	Open Manhole	450	7.001	15.455	150	7.000	15.455	-3	
33	16.455	1.350	Open Manhole	1200	8.000	15.105	150				
34	16.105	1.080	Open Manhole	1200	8.001	15.025	150	8.000	15.025	150	
19	16.070	1.700	Open Manhole	1200	2.004	14.370	300	2.003	14.445	225	
								6.003	14.520	150	
								7.001	14.520	150	
								8.001	14.890	150	
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Micro Drainage					Network 2020.1.3						
<u>Manhole Schedules for 2023.01.18_DRAINAGE.SWS</u>											
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
35	16.355	1.350	Open Manhole	1200	9.000	15.005	150				
36	16.120	1.240	Open Manhole	1200	9.001	14.880	150	9.000	14.880	150	
20	16.070	1.745	Open Manhole	1200	2.005	14.325	300	2.004	14.325	300	
								9.001	14.830	150	355
10	16.100	2.585	Open Manhole	1200	1.009	13.515	300	1.008	13.590	225	
								2.005	14.245	300	730
37	16.005	0.550	Junction		10.000	15.455	-3				
38	16.005	0.550	Open Manhole	450	10.001	15.455	150	10.000	15.455	-3	
39	16.060	0.550	Junction		11.000	15.510	-3				
40	16.005	0.550	Open Manhole	450	11.001	15.455	150	11.000	15.455	-3	
11	16.085	2.635	Open Manhole	1200	1.010	13.450	300	1.009	13.450	300	
								10.001	13.600	150	
								11.001	13.600	150	
12	16.345	2.980	Open Manhole	1200	1.011	13.365	300	1.010	13.365	300	
41	16.450	1.000	Open Manhole	1200	12.000	15.450	150				
42	16.450	1.270	Open Manhole	1200	12.001	15.180	150	12.000	15.180	150	
43	16.450	1.325	Open Manhole	1200	12.002	15.125	150	12.001	15.125	150	
44	16.450	1.625	Open Manhole	1200	12.003	14.825	150	12.002	14.825	150	
45	16.100	1.575	Open Manhole	1200	12.004	14.525	150	12.003	14.525	150	
46	16.210	1.815	Open Manhole	1200	12.005	14.395	150	12.004	14.395	150	
47	16.340	2.025	Open Manhole	1200	12.006	14.315	150	12.005	14.315	150	
13	16.100	3.085	Open Manhole	1200	1.012	13.015	100	1.011	13.315	300	500
								12.006	14.190	150	1225
14	16.300	3.322	Open Manhole	0		OUTFALL		1.012	12.978	100	
MH Name Manhole Easting (m) Manhole Northing (m) Intersection Easting (m) Intersection Northing (m) Manhole Access Layout (North) 1 472607.919 107360.190 472607.919 107360.190 Required 2 472619.047 107388.194 472619.047 107388.194 Required											
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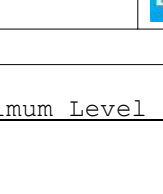
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Micro Drainage	Network 2020.1.3	
<u>Storage Structures for 2023.01.18_DRAINAGE.SWS</u>		
<u>Porous Car Park Manhole: 8, DS/PN: 1.007</u>		
Infiltration Coefficient Base (m/hr)	0.23000	Width (m) 5.0
Membrane Percolation (mm/hr)	1000	Length (m) 14.0
Max Percolation (l/s)	19.4	Slope (1:X) 60.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	15.650	Cap Volume Depth (m) 0.450
<u>Porous Car Park Manhole: 16, DS/PN: 2.001</u>		
Infiltration Coefficient Base (m/hr)	0.23000	Width (m) 10.0
Membrane Percolation (mm/hr)	1000	Length (m) 15.0
Max Percolation (l/s)	41.7	Slope (1:X) 60.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	15.580	Cap Volume Depth (m) 0.450
<u>Porous Car Park Manhole: 22, DS/PN: 3.001</u>		
Infiltration Coefficient Base (m/hr)	0.23000	Width (m) 5.0
Membrane Percolation (mm/hr)	1000	Length (m) 15.0
Max Percolation (l/s)	20.8	Slope (1:X) 40.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	15.515	Cap Volume Depth (m) 0.450
<u>Porous Car Park Manhole: 24, DS/PN: 4.001</u>		
Infiltration Coefficient Base (m/hr)	0.23000	Width (m) 10.0
Membrane Percolation (mm/hr)	1000	Length (m) 12.0
Max Percolation (l/s)	33.3	Slope (1:X) 40.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	15.500	Cap Volume Depth (m) 0.450
<u>Porous Car Park Manhole: 30, DS/PN: 6.003</u>		
Infiltration Coefficient Base (m/hr)	0.23000	Width (m) 10.0
Membrane Percolation (mm/hr)	1000	Length (m) 15.0
Max Percolation (l/s)	41.7	Slope (1:X) 60.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	15.570	Cap Volume Depth (m) 0.450
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Baynham Meikle Partnership		Page 12																																																																																																																								
8 Meadow Road Edgbaston, Birmingham B 17 8BU	NEW LANE, HAVANT																																																																																																																									
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Micro Drainage Network 2020.1.3																																																																																																																										
<u>Porous Car Park Manhole: 34, DS/PN: 8.001</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.23000</td><td>Width (m)</td><td>10.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>13.0</td></tr><tr><td>Max Percolation (l/s)</td><td>36.1</td><td>Slope (1:X)</td><td>40.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>15.555</td><td>Cap Volume Depth (m)</td><td>0.450</td></tr></table> <u>Porous Car Park Manhole: 36, DS/PN: 9.001</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.23000</td><td>Width (m)</td><td>10.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>15.0</td></tr><tr><td>Max Percolation (l/s)</td><td>41.7</td><td>Slope (1:X)</td><td>60.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>15.570</td><td>Cap Volume Depth (m)</td><td>0.450</td></tr></table> <u>Porous Car Park Manhole: 11, DS/PN: 1.010</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.23000</td><td>Width (m)</td><td>10.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>15.0</td></tr><tr><td>Max Percolation (l/s)</td><td>41.7</td><td>Slope (1:X)</td><td>60.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>15.535</td><td>Cap Volume Depth (m)</td><td>0.450</td></tr></table> <u>Porous Car Park Manhole: 12, DS/PN: 1.011</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.23000</td><td>Width (m)</td><td>5.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>14.0</td></tr><tr><td>Max Percolation (l/s)</td><td>19.4</td><td>Slope (1:X)</td><td>40.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>15.795</td><td>Cap Volume Depth (m)</td><td>0.450</td></tr></table> <u>Complex Manhole: 13, DS/PN: 1.012</u> <u>Cellular Storage</u> <table><tr><td>Invert Level (m)</td><td>13.015</td><td>Safety Factor</td><td>2.0</td></tr><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.23000</td><td>Porosity</td><td>0.95</td></tr><tr><td>Infiltration Coefficient Side (m/hr)</td><td>0.23000</td><td></td><td></td></tr></table> <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>140.0</td><td>140.0</td><td>0.800</td><td>140.0</td><td>183.2</td></tr></table>			Infiltration Coefficient Base (m/hr)	0.23000	Width (m)	10.0	Membrane Percolation (mm/hr)	1000	Length (m)	13.0	Max Percolation (l/s)	36.1	Slope (1:X)	40.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	15.555	Cap Volume Depth (m)	0.450	Infiltration Coefficient Base (m/hr)	0.23000	Width (m)	10.0	Membrane Percolation (mm/hr)	1000	Length (m)	15.0	Max Percolation (l/s)	41.7	Slope (1:X)	60.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	15.570	Cap Volume Depth (m)	0.450	Infiltration Coefficient Base (m/hr)	0.23000	Width (m)	10.0	Membrane Percolation (mm/hr)	1000	Length (m)	15.0	Max Percolation (l/s)	41.7	Slope (1:X)	60.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	15.535	Cap Volume Depth (m)	0.450	Infiltration Coefficient Base (m/hr)	0.23000	Width (m)	5.0	Membrane Percolation (mm/hr)	1000	Length (m)	14.0	Max Percolation (l/s)	19.4	Slope (1:X)	40.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	15.795	Cap Volume Depth (m)	0.450	Invert Level (m)	13.015	Safety Factor	2.0	Infiltration Coefficient Base (m/hr)	0.23000	Porosity	0.95	Infiltration Coefficient Side (m/hr)	0.23000			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	140.0	140.0	0.800	140.0	183.2
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Cellular Storage <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr></thead><tbody><tr><td>0.900</td><td>0.0</td><td>183.2</td><td></td><td></td><td></td></tr></tbody></table> Porous Car Park <table><tbody><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.23000</td><td>Width (m)</td><td>15.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>11.0</td></tr><tr><td>Max Percolation (l/s)</td><td>45.8</td><td>Slope (1:X)</td><td>60.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>15.100</td><td>Cap Volume Depth (m)</td><td>0.450</td></tr></tbody></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.900	0.0	183.2				Infiltration Coefficient Base (m/hr)	0.23000	Width (m)	15.0	Membrane Percolation (mm/hr)	1000	Length (m)	11.0	Max Percolation (l/s)	45.8	Slope (1:X)	60.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	15.100	Cap Volume Depth (m)	0.450
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Micro Drainage			Network 2020.1.3						
<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for</u> <u>2023.01.18_DRAINAGE.SWS</u>									
<u>Simulation Criteria</u>									
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 Coefficient 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									
<u>Synthetic Rainfall Details</u>									
Rainfall Model FSR Ratio R 0.350 Region England and Wales Cv (Summer) 0.750 M5-60 (mm) 19.600 Cv (Winter) 0.840									
Margin for Flood Risk Warning (mm) 300.0 Analysis Timestep 2.5 Second Increment (Extended) DTS Status OFF 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.	Water Level (m)
1.000	1 15 Winter		1	+0%	30/120 Winter	100/15 Winter			15.497
1.001	2 15 Winter		1	+0%	30/15 Winter				15.135
1.002	3 15 Winter		1	+0%	30/15 Summer				14.666
1.003	4 15 Winter		1	+0%	30/15 Summer				14.517
1.004	5 15 Winter		1	+0%	30/15 Summer				14.221
1.005	6 15 Winter		1	+0%	30/15 Summer				13.976
1.006	7 15 Winter		1	+0%	30/15 Summer				13.936
1.007	8 15 Winter		1	+0%	30/15 Summer				13.914
1.008	9 15 Winter		1	+0%	1/15 Winter				13.896
2.000	15 15 Winter		1	+0%	30/15 Summer				15.046
2.001	16 30 Winter		1	+0%	30/15 Summer				14.936
3.000	21 15 Winter		1	+0%	30/15 Winter				15.144
3.001	22 30 Winter		1	+0%	30/15 Summer				15.036
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<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for</u> <u>2023.01.18_DRAINAGE.SWS</u>										
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	Level Exceeded
5.001	26	15.504	-0.101	0.000	0.23			11.9	OK	5
2.003	18	14.738	-0.112	0.000	0.50			19.6	OK	
6.000	27	15.149	-0.101	0.000	0.23			4.0	OK	
6.001	28	15.066	-0.094	0.000	0.30			4.0	OK	
6.002	29	14.964	-0.096	0.000	0.28			5.0	OK	
6.003	30	14.800	-0.110	0.000	0.16		6	5.0	OK	
7.000	31	15.539	-0.266	0.000	0.18			6.4	OK	4
7.001	32	15.501	-0.104	0.000	0.20			11.9	OK	2
8.000	33	15.161	-0.094	0.000	0.30			3.9	OK	
8.001	34	15.077	-0.098	0.000	0.24		7	4.3	OK	
2.004	19	14.548	-0.122	0.000	0.65			39.9	OK	
9.000	35	15.072	-0.083	0.000	0.40			5.5	OK	
9.001	36	14.946	-0.084	0.000	0.40		7	5.6	OK	
2.005	20	14.502	-0.123	0.000	0.64			45.7	OK	
1.009	10	13.868	0.053	0.000	0.88			56.1	SURCHARGED	
10.000	37	15.515	-0.290	0.000	0.11			4.2	OK	3
10.001	38	15.486	-0.119	0.000	0.09			7.9	OK	3
11.000	39	15.546	-0.314	0.000	0.03			2.6	OK	
11.001	40	15.478	-0.127	0.000	0.06			4.8	OK	2
1.010	11	13.780	0.030	0.000	0.92		5	67.5	SURCHARGED	
1.011	12	13.680	0.015	0.000	1.12		5	68.9	SURCHARGED	
12.000	41	15.483	-0.117	0.000	0.11			2.0	OK	
12.001	42	15.231	-0.099	0.000	0.25			3.7	OK	
12.002	43	15.178	-0.097	0.000	0.27			5.1	OK	
12.003	44	14.888	-0.087	0.000	0.36			6.9	OK	
12.004	45	14.599	-0.076	0.000	0.47			8.4	OK	
12.005	46	14.472	-0.073	0.000	0.51			8.5	OK	
12.006	47	14.397	-0.068	0.000	0.57			10.0	OK	
1.012	13	13.593	0.478	0.000	0.00		170	0.0	SURCHARGED	
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Micro Drainage Network 2020.1.3		

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 2023.01.18_DRAINAGE.SWS

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 Coefficient	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	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.600	Cv (Winter)	0.840

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

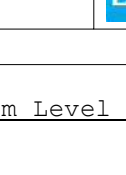
Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

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

PN	US/MH		Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
	Name	Storm							
1.000	1	240	Winter	30	+0%	30/120	Winter		15.661
1.001	2	240	Winter	30	+0%	30/15	Winter		15.656
1.002	3	240	Winter	30	+0%	30/15	Summer		15.647
1.003	4	240	Winter	30	+0%	30/15	Summer		15.643
1.004	5	240	Winter	30	+0%	30/15	Summer		15.638
1.005	6	240	Winter	30	+0%	30/15	Summer		15.632
1.006	7	240	Winter	30	+0%	30/15	Summer		15.630
1.007	8	240	Winter	30	+0%	30/15	Summer		15.625
1.008	9	240	Winter	30	+0%	1/15	Winter		15.621
2.000	15	240	Winter	30	+0%	30/15	Summer		15.628

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Micro Drainage				Network 2020.1.3					
<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for 2023.01.18_DRAINAGE.SWS</u>									
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
3.000	21	15.624	0.369	0.000	0.08		1.1	SURCHARGED	
3.001	22	15.623	0.468	0.000	0.07	95	1.6	SURCHARGED	
2.002	17	15.624	0.669	0.000	0.12		4.6	SURCHARGED	
4.000	23	15.618	0.468	0.000	0.08		1.0	SURCHARGED	
4.001	24	15.617	0.552	0.000	0.08	68	1.9	SURCHARGED	
5.000	25	15.630	-0.175	0.000	0.07		3.3	OK	6
5.001	26	15.629	0.024	0.000	0.13		6.6	SURCHARGED	5
2.003	18	15.624	0.774	0.000	0.33		13.1	SURCHARGED	
6.000	27	15.629	0.379	0.000	0.12		2.1	SURCHARGED	
6.001	28	15.627	0.467	0.000	0.15		2.1	SURCHARGED	
6.002	29	15.624	0.564	0.000	0.15		2.7	SURCHARGED	
6.003	30	15.621	0.711	0.000	0.11	118	3.2	SURCHARGED	
7.000	31	15.627	-0.178	0.000	0.09		3.3	OK	4
7.001	32	15.626	0.021	0.000	0.11		6.6	SURCHARGED	2
8.000	33	15.624	0.369	0.000	0.15		2.0	SURCHARGED	
8.001	34	15.621	0.446	0.000	0.17	95	3.1	SURCHARGED	
2.004	19	15.621	0.951	0.000	0.42		26.0	SURCHARGED	
9.000	35	15.624	0.469	0.000	0.21		2.9	SURCHARGED	
9.001	36	15.619	0.589	0.000	0.25	117	3.4	SURCHARGED	
2.005	20	15.619	0.994	0.000	0.42		29.5	SURCHARGED	
1.009	10	15.616	1.801	0.000	0.58		36.7	SURCHARGED	
10.000	37	15.614	-0.191	0.000	0.06		2.2	OK	3
10.001	38	15.614	0.009	0.000	0.05		4.4	SURCHARGED	3
11.000	39	15.612	-0.248	0.000	0.01		1.3	OK	
11.001	40	15.612	0.007	0.000	0.03		2.7	SURCHARGED	2
1.010	11	15.611	1.861	0.000	0.61	195	44.8	SURCHARGED	
1.011	12	15.603	1.938	0.000	0.74	215	45.3	SURCHARGED	
12.000	41	15.630	0.030	0.000	0.06		1.1	SURCHARGED	
12.001	42	15.629	0.299	0.000	0.14		2.1	SURCHARGED	
12.002	43	15.627	0.352	0.000	0.15		2.9	SURCHARGED	
12.003	44	15.622	0.647	0.000	0.21		4.0	SURCHARGED	
12.004	45	15.615	0.940	0.000	0.28		5.0	SURCHARGED	
12.005	46	15.609	1.064	0.000	0.30		5.0	SURCHARGED	
12.006	47	15.605	1.140	0.000	0.34		6.0	SURCHARGED	
1.012	13	15.598	2.483	0.000	0.00		0.0	SURCHARGED	
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Micro Drainage Network 2020.1.3		

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 2023.01.18_DRAINAGE.SWS

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 Coefficient	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	0.350
Region England and Wales	Cv (Summer)		0.750
M5-60 (mm)	19.600	Cv (Winter)	0.840

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

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	100	+40%	30/120 Winter	100/15 Winter			16.450
1.001	2	15 Winter	100	+40%	30/15 Winter				16.379
1.002	3	60 Winter	100	+40%	30/15 Summer				16.183
1.003	4	60 Winter	100	+40%	30/15 Summer				16.160
1.004	5	60 Winter	100	+40%	30/15 Summer				16.124
1.005	6	60 Winter	100	+40%	30/15 Summer				16.088
1.006	7	120 Winter	100	+40%	30/15 Summer				16.074
1.007	8	120 Winter	100	+40%	30/15 Summer				16.050
1.008	9	120 Winter	100	+40%	1/15 Winter				16.034
2.000	15	180 Winter	100	+40%	30/15 Summer				15.965

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Micro Drainage					Network 2020.1.3					
<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for 2023.01.18_DRAINAGE.SWS</u>										
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.		
2.001	16	180 Winter	100	+40%	30/15 Summer					
3.000	21	180 Winter	100	+40%	30/15 Winter					
3.001	22	180 Winter	100	+40%	30/15 Summer					
2.002	17	180 Winter	100	+40%	30/15 Summer					
4.000	23	180 Winter	100	+40%	30/15 Summer					
4.001	24	180 Winter	100	+40%	30/15 Summer					
5.000	25	15 Winter	100	+40%	100/15 Summer	100/15 Summer				
5.001	26	15 Winter	100	+40%	30/120 Winter	100/15 Summer				
2.003	18	180 Winter	100	+40%	30/15 Summer					
6.000	27	180 Winter	100	+40%	30/60 Summer					
6.001	28	180 Winter	100	+40%	30/60 Summer					
6.002	29	180 Winter	100	+40%	30/15 Winter					
6.003	30	180 Winter	100	+40%	30/15 Summer					
7.000	31	180 Winter	100	+40%	100/15 Summer	100/15 Winter				
7.001	32	180 Winter	100	+40%	30/180 Winter	100/120 Winter				
8.000	33	180 Winter	100	+40%	30/60 Summer					
8.001	34	180 Winter	100	+40%	30/60 Summer					
2.004	19	180 Winter	100	+40%	30/15 Summer					
9.000	35	120 Winter	100	+40%	30/30 Winter					
9.001	36	120 Winter	100	+40%	30/15 Winter					
2.005	20	120 Winter	100	+40%	30/15 Summer					
1.009	10	120 Winter	100	+40%	1/15 Summer					
10.000	37	120 Winter	100	+40%	100/30 Winter	100/120 Winter				
10.001	38	120 Winter	100	+40%	30/180 Winter	100/120 Winter				
11.000	39	120 Winter	100	+40%	100/60 Summer					
11.001	40	120 Winter	100	+40%	30/180 Winter	100/120 Winter				
1.010	11	120 Winter	100	+40%	1/15 Summer					
1.011	12	120 Winter	100	+40%	1/15 Winter					
12.000	41	120 Winter	100	+40%	30/120 Winter					
12.001	42	120 Winter	100	+40%	30/60 Winter					
12.002	43	120 Winter	100	+40%	30/60 Summer					
12.003	44	120 Winter	100	+40%	30/15 Summer					
12.004	45	120 Winter	100	+40%	30/15 Summer					
12.005	46	120 Winter	100	+40%	30/15 Summer					
12.006	47	120 Winter	100	+40%	30/15 Summer					
1.012	13	120 Winter	100	+40%	1/15 Summer					
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	Level Exceeded
2.001	16	15.959	0.924	0.000	0.31		54	5.2	FLOOD RISK	
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<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for 2023.01.18_DRAINAGE.SWS</u>											
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap.	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded		
3.000	21	15.970	0.715	0.000	0.15		2.1	SURCHARGED			
3.001	22	15.967	0.812	0.000	0.12	57	2.8	FLOOD RISK			
2.002	17	15.977	1.022	0.000	0.21		7.8	FLOOD RISK			
4.000	23	15.975	0.825	0.000	0.15		1.9	SURCHARGED			
4.001	24	15.972	0.907	0.000	0.14	59	3.2	FLOOD RISK			
5.000	25	16.007	0.202	1.978	0.50		22.8	FLOOD	6		
5.001	26	16.005	0.400	0.078	0.74		39.0	FLOOD	5		
2.003	18	15.992	1.142	0.000	0.55		21.5	FLOOD RISK			
6.000	27	16.011	0.761	0.000	0.25		4.3	SURCHARGED			
6.001	28	16.005	0.845	0.000	0.30		4.1	SURCHARGED			
6.002	29	15.997	0.937	0.000	0.29		5.1	FLOOD RISK			
6.003	30	15.988	1.078	0.000	0.18	58	5.4	FLOOD RISK			
7.000	31	16.007	0.202	2.174	0.19		6.7	FLOOD	4		
7.001	32	16.006	0.401	0.980	0.22		13.0	FLOOD	2		
8.000	33	15.993	0.738	0.000	0.31		4.1	SURCHARGED			
8.001	34	15.986	0.811	0.000	0.31	57	5.5	FLOOD RISK			
2.004	19	15.998	1.328	0.000	0.68		41.9	FLOOD RISK			
9.000	35	16.007	0.852	0.000	0.58		7.9	SURCHARGED			
9.001	36	15.994	0.964	0.000	0.59	50	8.2	FLOOD RISK			
2.005	20	16.002	1.377	0.000	0.92		65.2	FLOOD RISK			
1.009	10	16.013	2.198	0.000	1.20		76.8	FLOOD RISK			
10.000	37	16.008	0.203	2.566	0.18		7.0	FLOOD	3		
10.001	38	16.007	0.402	2.259	0.14		12.1	FLOOD	3		
11.000	39	16.008	0.148	0.000	0.04		3.8	FLOOD RISK*			
11.001	40	16.007	0.402	2.467	0.09		7.6	FLOOD	2		
1.010	11	16.009	2.259	0.000	1.30	59	94.7	FLOOD RISK			
1.011	12	16.007	2.342	0.000	1.55		95.4	SURCHARGED			
12.000	41	16.182	0.582	0.000	0.16		3.0	FLOOD RISK			
12.001	42	16.172	0.842	0.000	0.36		5.3	FLOOD RISK			
12.002	43	16.166	0.891	0.000	0.40		7.5	FLOOD RISK			
12.003	44	16.140	1.165	0.000	0.51		9.6	SURCHARGED			
12.004	45	16.099	1.424	0.000	0.66		11.8	FLOOD RISK			
12.005	46	16.069	1.524	0.000	0.68		11.3	FLOOD RISK			
12.006	47	16.047	1.582	0.000	0.76		13.5	FLOOD RISK			
1.012	13	16.006	2.891	0.000	0.00		0.0	FLOOD RISK			
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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 2023.01.18_DRAINAGE.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	PIMP (%)	100
M5-60 (mm)	19.500	Add Flow / Climate Change (%)	0
Ratio R	0.350	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
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)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for 2023.01.18_DRAINAGE.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.511	4-8	0.324	8-12	0.001

Total Area Contributing (ha) = 0.836

Total Pipe Volume (m³) = 20.869

Network Design Table for 2023.01.18_DRAINAGE.SWS

« - 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	30.135	0.380	79.3	0.031	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	32.459	0.400	81.1	0.031	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	11.996	0.150	80.0	0.031	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	48.13	5.44	15.450	0.031	0.0	0.0	0.0	1.13	20.0	4.0
1.001	46.37	5.93	15.070	0.062	0.0	0.0	0.0	1.12	19.7	7.8
1.002	45.89	6.07	14.595	0.093	0.0	0.0	0.0	1.46	58.2	11.6

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Micro Drainage

NEW LANE, HAVANT
EXCEEDANCE EVENT

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Network 2020.1.3

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Network Design Table for 2023.01.18_DRAINAGE.SWS

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
1.003	23.755	0.300	79.2	0.011	0.00	0.0	0.600	o	225	Pipe/Conduit		
1.004	21.886	0.275	79.6	0.011	0.00	0.0	0.600	o	225	Pipe/Conduit		
1.005	4.172	0.050	83.4	0.011	0.00	0.0	0.600	o	225	Pipe/Conduit		
1.006	13.058	0.085	153.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit		
1.007	9.466	0.065	145.6	0.007	0.00	0.0	0.600	o	225	Pipe/Conduit		
1.008	12.339	0.080	154.2	0.016	0.00	0.0	0.600	o	225	Pipe/Conduit		
2.000	15.476	0.105	147.4	0.031	5.00	0.0	0.600	o	150	Pipe/Conduit		
2.001	6.659	0.080	83.2	0.015	0.00	0.0	0.600	o	150	Pipe/Conduit		
3.000	14.388	0.100	143.9	0.016	5.00	0.0	0.600	o	150	Pipe/Conduit		
3.001	9.119	0.200	45.6	0.008	0.00	0.0	0.600	o	150	Pipe/Conduit		
2.002	15.614	0.105	148.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit		
4.000	12.849	0.085	151.2	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit		
4.001	10.298	0.215	47.9	0.013	0.00	0.0	0.600	o	150	Pipe/Conduit		
5.000	12.419	0.000	0.0	0.050	5.00	0.0	0.600	Q35	-3	Pipe/Conduit		
5.001	6.125	0.755	8.1	0.050	0.00	0.0	0.600	o	150	Pipe/Conduit		

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	45.00	6.33	14.445	0.104	0.0	0.0	0.0	1.47	58.5	12.7
1.004	44.20	6.58	14.145	0.115	0.0	0.0	0.0	1.47	58.3	13.8
1.005	44.05	6.63	13.870	0.126	0.0	0.0	0.0	1.43	57.0	15.0
1.006	43.42	6.84	13.820	0.126	0.0	0.0	0.0	1.05	41.8	15.0
1.007	42.99	6.98	13.735	0.133	0.0	0.0	0.0	1.08	43.0	15.5
1.008	42.42	7.18	13.670	0.149	0.0	0.0	0.0	1.05	41.8	17.1
2.000	48.64	5.31	14.990	0.031	0.0	0.0	0.0	0.83	14.6	4.1
2.001	48.25	5.41	14.885	0.046	0.0	0.0	0.0	1.10	19.5	6.0
3.000	48.74	5.29	15.105	0.016	0.0	0.0	0.0	0.84	14.8	2.1
3.001	48.35	5.39	15.005	0.024	0.0	0.0	0.0	1.49	26.4	3.1
2.002	47.34	5.66	14.730	0.070	0.0	0.0	0.0	1.07	42.5	9.0
4.000	48.84	5.26	15.000	0.015	0.0	0.0	0.0	0.81	14.4	2.0
4.001	48.38	5.38	14.915	0.028	0.0	0.0	0.0	1.46	25.8	3.7
5.000	45.25	6.26	15.455	0.050	0.0	0.0	0.0	0.16	15.8	6.1
5.001	45.16	6.28	15.455	0.100	0.0	0.0	0.0	3.56	62.9	12.2

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Page 2

8 Meadow Road
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B 17 8BU

NEW LANE, HAVANT
EXCEEDANCE EVENT

Date 18/01/2023 12:58
File 2023.01.18_drainage netw...

Designed by EB
Checked by NSB

Micro Drainage

Network 2020.1.3

Micro Drainage

Network Design Table for 2023.01.18_DRAINAGE.SWS

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
2.003	26.784	0.180	148.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
6.000	6.898	0.090	76.6	0.031	5.00	0.0	0.600	o	150	Pipe/Conduit	
6.001	14.328	0.100	143.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
6.002	12.351	0.150	82.3	0.009	0.00	0.0	0.600	o	150	Pipe/Conduit	
6.003	4.352	0.240	18.1	0.009	0.00	0.0	0.600	o	150	Pipe/Conduit	
7.000	23.140	0.000	0.0	0.050	5.00	0.0	0.600	Q35	-3	Pipe/Conduit	
7.001	6.084	0.935	6.5	0.050	0.00	0.0	0.600	o	150	Pipe/Conduit	
8.000	12.007	0.080	150.1	0.030	5.00	0.0	0.600	o	150	Pipe/Conduit	
8.001	10.844	0.135	80.3	0.016	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.004	6.916	0.045	153.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.000	18.396	0.125	147.2	0.043	5.00	0.0	0.600	o	150	Pipe/Conduit	
9.001	4.051	0.050	81.0	0.009	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.005	11.918	0.080	149.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

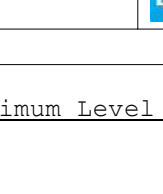
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
2.003	43.83	6.70	14.625	0.198	0.0	0.0	0.0	1.07	42.5	23.5
6.000	49.49	5.10	15.100	0.031	0.0	0.0	0.0	1.15	20.3	4.2
6.001	48.36	5.39	15.010	0.031	0.0	0.0	0.0	0.84	14.8	4.2
6.002	47.66	5.57	14.910	0.040	0.0	0.0	0.0	1.11	19.6	5.2
6.003	47.54	5.60	14.760	0.049	0.0	0.0	0.0	2.38	42.0	6.3
7.000	41.97	7.34	15.455	0.050	0.0	0.0	0.0	0.16	15.8	5.7
7.001	41.90	7.37	15.455	0.100	0.0	0.0	0.0	3.98	70.3	11.3
8.000	48.91	5.24	15.105	0.030	0.0	0.0	0.0	0.82	14.5	4.0
8.001	48.28	5.41	15.025	0.046	0.0	0.0	0.0	1.12	19.8	6.0
2.004	41.65	7.46	14.370	0.393	0.0	0.0	0.0	1.27	89.5	44.3
9.000	48.42	5.37	15.005	0.043	0.0	0.0	0.0	0.83	14.6	5.6
9.001	48.18	5.43	14.880	0.052	0.0	0.0	0.0	1.12	19.8	6.8
2.005	41.24	7.61	14.325	0.445	0.0	0.0	0.0	1.29	90.9	49.7

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8 Meadow Road Edgbaston, Birmingham B 17 8BU	NEW LANE, HAVANT EXCEEDANCE EVENT																																																																																																																									
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Micro Drainage Network 2020.1.3																																																																																																																										
<u>Storage Structures for 2023.01.18_DRAINAGE.SWS</u> <u>Porous Car Park Manhole: 8, DS/PN: 1.007</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.23000</td><td>Width (m)</td><td>5.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>14.0</td></tr><tr><td>Max Percolation (l/s)</td><td>19.4</td><td>Slope (1:X)</td><td>60.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>15.650</td><td>Cap Volume Depth (m)</td><td>0.450</td></tr></table> <u>Porous Car Park Manhole: 16, DS/PN: 2.001</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.23000</td><td>Width (m)</td><td>10.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>15.0</td></tr><tr><td>Max Percolation (l/s)</td><td>41.7</td><td>Slope (1:X)</td><td>60.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>15.580</td><td>Cap Volume Depth (m)</td><td>0.450</td></tr></table> <u>Porous Car Park Manhole: 22, DS/PN: 3.001</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.23000</td><td>Width (m)</td><td>5.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>15.0</td></tr><tr><td>Max Percolation (l/s)</td><td>20.8</td><td>Slope (1:X)</td><td>40.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>15.515</td><td>Cap Volume Depth (m)</td><td>0.450</td></tr></table> <u>Porous Car Park Manhole: 24, DS/PN: 4.001</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.23000</td><td>Width (m)</td><td>10.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>12.0</td></tr><tr><td>Max Percolation (l/s)</td><td>33.3</td><td>Slope (1:X)</td><td>40.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>15.500</td><td>Cap Volume Depth (m)</td><td>0.450</td></tr></table> <u>Porous Car Park Manhole: 30, DS/PN: 6.003</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.23000</td><td>Width (m)</td><td>10.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>15.0</td></tr><tr><td>Max Percolation (l/s)</td><td>41.7</td><td>Slope (1:X)</td><td>60.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>15.570</td><td>Cap Volume Depth (m)</td><td>0.450</td></tr></table>			Infiltration Coefficient Base (m/hr)	0.23000	Width (m)	5.0	Membrane Percolation (mm/hr)	1000	Length (m)	14.0	Max Percolation (l/s)	19.4	Slope (1:X)	60.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	15.650	Cap Volume Depth (m)	0.450	Infiltration Coefficient Base (m/hr)	0.23000	Width (m)	10.0	Membrane Percolation (mm/hr)	1000	Length (m)	15.0	Max Percolation (l/s)	41.7	Slope (1:X)	60.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	15.580	Cap Volume Depth (m)	0.450	Infiltration Coefficient Base (m/hr)	0.23000	Width (m)	5.0	Membrane Percolation (mm/hr)	1000	Length (m)	15.0	Max Percolation (l/s)	20.8	Slope (1:X)	40.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	15.515	Cap Volume Depth (m)	0.450	Infiltration Coefficient Base (m/hr)	0.23000	Width (m)	10.0	Membrane Percolation (mm/hr)	1000	Length (m)	12.0	Max Percolation (l/s)	33.3	Slope (1:X)	40.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	15.500	Cap Volume Depth (m)	0.450	Infiltration Coefficient Base (m/hr)	0.23000	Width (m)	10.0	Membrane Percolation (mm/hr)	1000	Length (m)	15.0	Max Percolation (l/s)	41.7	Slope (1:X)	60.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	15.570	Cap Volume Depth (m)	0.450
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<u>Porous Car Park Manhole: 34, DS/PN: 8.001</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.23000</td><td>Width (m)</td><td>10.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>13.0</td></tr><tr><td>Max Percolation (l/s)</td><td>36.1</td><td>Slope (1:X)</td><td>40.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>15.555</td><td>Cap Volume Depth (m)</td><td>0.450</td></tr></table> <u>Porous Car Park Manhole: 36, DS/PN: 9.001</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.23000</td><td>Width (m)</td><td>10.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>15.0</td></tr><tr><td>Max Percolation (l/s)</td><td>41.7</td><td>Slope (1:X)</td><td>60.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>15.570</td><td>Cap Volume Depth (m)</td><td>0.450</td></tr></table> <u>Porous Car Park Manhole: 11, DS/PN: 1.010</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.23000</td><td>Width (m)</td><td>10.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>15.0</td></tr><tr><td>Max Percolation (l/s)</td><td>41.7</td><td>Slope (1:X)</td><td>60.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>15.535</td><td>Cap Volume Depth (m)</td><td>0.450</td></tr></table> <u>Porous Car Park Manhole: 12, DS/PN: 1.011</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.23000</td><td>Width (m)</td><td>5.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>14.0</td></tr><tr><td>Max Percolation (l/s)</td><td>19.4</td><td>Slope (1:X)</td><td>40.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>15.795</td><td>Cap Volume Depth (m)</td><td>0.450</td></tr></table> <u>Complex Manhole: 13, DS/PN: 1.012</u> <u>Cellular Storage</u> <table><tr><td>Invert Level (m)</td><td>13.015</td><td>Safety Factor</td><td>2.0</td></tr><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.23000</td><td>Porosity</td><td>0.95</td></tr><tr><td>Infiltration Coefficient Side (m/hr)</td><td>0.23000</td><td></td><td></td></tr></table> <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>140.0</td><td>140.0</td><td>0.800</td><td>140.0</td><td>183.2</td></tr></table>			Infiltration Coefficient Base (m/hr)	0.23000	Width (m)	10.0	Membrane Percolation (mm/hr)	1000	Length (m)	13.0	Max Percolation (l/s)	36.1	Slope (1:X)	40.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	15.555	Cap Volume Depth (m)	0.450	Infiltration Coefficient Base (m/hr)	0.23000	Width (m)	10.0	Membrane Percolation (mm/hr)	1000	Length (m)	15.0	Max Percolation (l/s)	41.7	Slope (1:X)	60.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	15.570	Cap Volume Depth (m)	0.450	Infiltration Coefficient Base (m/hr)	0.23000	Width (m)	10.0	Membrane Percolation (mm/hr)	1000	Length (m)	15.0	Max Percolation (l/s)	41.7	Slope (1:X)	60.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	15.535	Cap Volume Depth (m)	0.450	Infiltration Coefficient Base (m/hr)	0.23000	Width (m)	5.0	Membrane Percolation (mm/hr)	1000	Length (m)	14.0	Max Percolation (l/s)	19.4	Slope (1:X)	40.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	15.795	Cap Volume Depth (m)	0.450	Invert Level (m)	13.015	Safety Factor	2.0	Infiltration Coefficient Base (m/hr)	0.23000	Porosity	0.95	Infiltration Coefficient Side (m/hr)	0.23000			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	140.0	140.0	0.800	140.0	183.2
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Invert Level (m)	15.570	Cap Volume Depth (m)	0.450																																																																																																																							
Infiltration Coefficient Base (m/hr)	0.23000	Width (m)	10.0																																																																																																																							
Membrane Percolation (mm/hr)	1000	Length (m)	15.0																																																																																																																							
Max Percolation (l/s)	41.7	Slope (1:X)	60.0																																																																																																																							
Safety Factor	2.0	Depression Storage (mm)	5																																																																																																																							
Porosity	0.30	Evaporation (mm/day)	3																																																																																																																							
Invert Level (m)	15.535	Cap Volume Depth (m)	0.450																																																																																																																							
Infiltration Coefficient Base (m/hr)	0.23000	Width (m)	5.0																																																																																																																							
Membrane Percolation (mm/hr)	1000	Length (m)	14.0																																																																																																																							
Max Percolation (l/s)	19.4	Slope (1:X)	40.0																																																																																																																							
Safety Factor	2.0	Depression Storage (mm)	5																																																																																																																							
Porosity	0.30	Evaporation (mm/day)	3																																																																																																																							
Invert Level (m)	15.795	Cap Volume Depth (m)	0.450																																																																																																																							
Invert Level (m)	13.015	Safety Factor	2.0																																																																																																																							
Infiltration Coefficient Base (m/hr)	0.23000	Porosity	0.95																																																																																																																							
Infiltration Coefficient Side (m/hr)	0.23000																																																																																																																									
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)																																																																																																																					
0.000	140.0	140.0	0.800	140.0	183.2																																																																																																																					
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Baynham Meikle Partnership		Page 7																																				
8 Meadow Road Edgbaston, Birmingham B 17 8BU	NEW LANE, HAVANT EXCEEDANCE EVENT																																					
Date 18/01/2023 12:58 File 2023.01.18_drainage netw...	Designed by EB Checked by NSB																																					
Micro Drainage Network 2020.1.3																																						
<u>Cellular Storage</u> <table> <thead> <tr> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> </tr> </thead> <tbody> <tr> <td>0.900</td> <td>0.0</td> <td>183.2</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <u>Porous Car Park</u> <table> <tbody> <tr> <td>Infiltration Coefficient Base (m/hr)</td> <td>0.23000</td> <td>Width (m)</td> <td>15.0</td> </tr> <tr> <td>Membrane Percolation (mm/hr)</td> <td>1000</td> <td>Length (m)</td> <td>11.0</td> </tr> <tr> <td>Max Percolation (l/s)</td> <td>45.8</td> <td>Slope (1:X)</td> <td>60.0</td> </tr> <tr> <td>Safety Factor</td> <td>2.0</td> <td>Depression Storage (mm)</td> <td>5</td> </tr> <tr> <td>Porosity</td> <td>0.30</td> <td>Evaporation (mm/day)</td> <td>3</td> </tr> <tr> <td>Invert Level (m)</td> <td>15.100</td> <td>Cap Volume Depth (m)</td> <td>0.450</td> </tr> </tbody> </table>			Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	0.900	0.0	183.2				Infiltration Coefficient Base (m/hr)	0.23000	Width (m)	15.0	Membrane Percolation (mm/hr)	1000	Length (m)	11.0	Max Percolation (l/s)	45.8	Slope (1:X)	60.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	15.100	Cap Volume Depth (m)	0.450
Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)																																	
0.900	0.0	183.2																																				
Infiltration Coefficient Base (m/hr)	0.23000	Width (m)	15.0																																			
Membrane Percolation (mm/hr)	1000	Length (m)	11.0																																			
Max Percolation (l/s)	45.8	Slope (1:X)	60.0																																			
Safety Factor	2.0	Depression Storage (mm)	5																																			
Porosity	0.30	Evaporation (mm/day)	3																																			
Invert Level (m)	15.100	Cap Volume Depth (m)	0.450																																			
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Baynham Meikle Partnership		Page 8
8 Meadow Road Edgbaston, Birmingham B 17 8BU		
Date 18/01/2023 12:58 File 2023.01.18_drainage netw...		
NEW LANE, HAVANT EXCEEDANCE EVENT		
Designed by EB Checked by NSB		
Micro Drainage		Network 2020.1.3

200 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 2023.01.18_DRAINAGE.SWS

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 Coefficient	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	0.350
Region England and Wales	Cv (Summer)		0.750
M5-60 (mm)	19.600	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
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)	200
Climate Change (%)	40

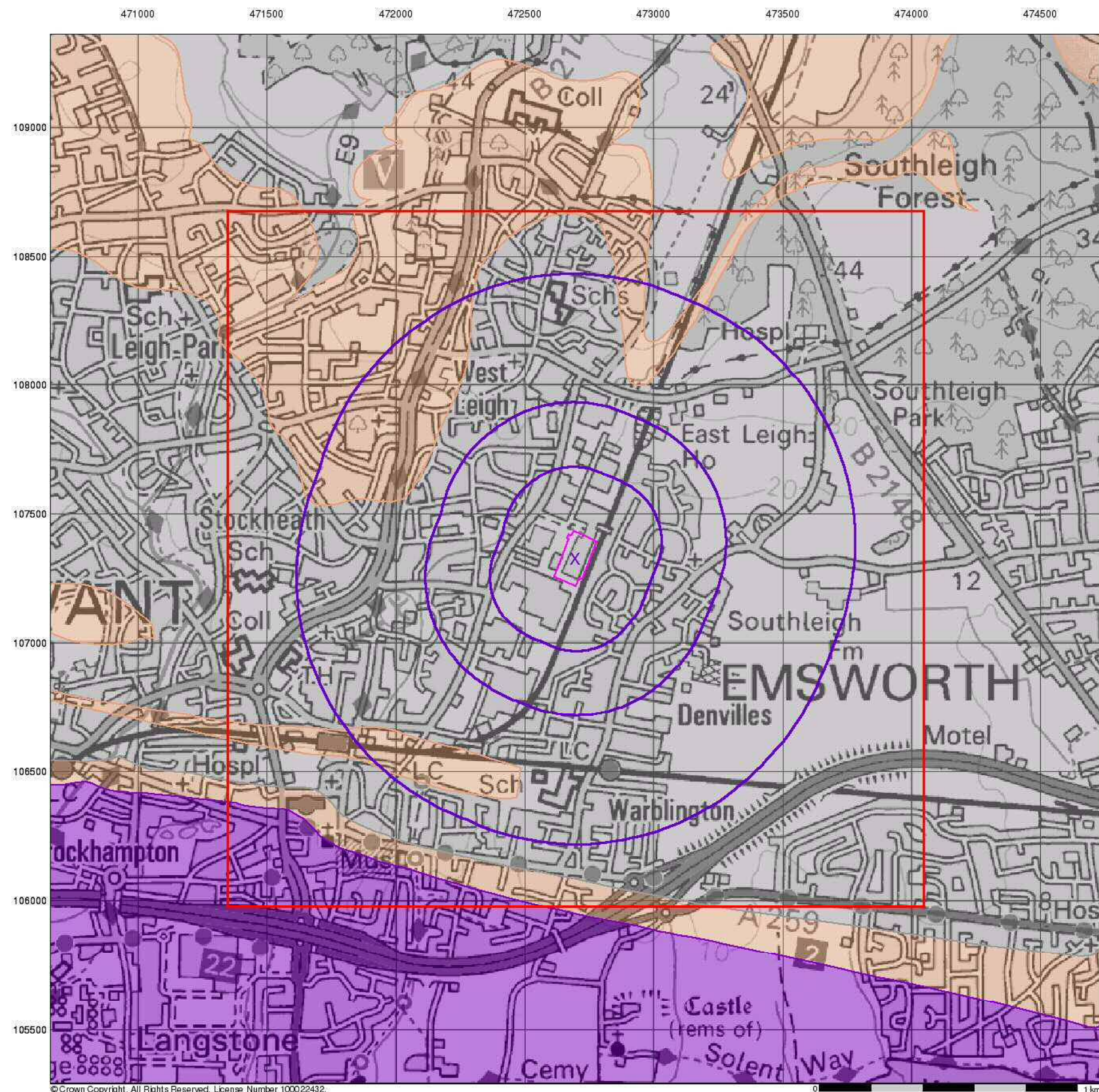
WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1 30 Winter	200	+40%	200/15 Summer	200/15 Summer				16.453
1.001	2 15 Winter	200	+40%	200/15 Summer	200/15 Summer				16.450
1.002	3 120 Winter	200	+40%	200/15 Summer					16.325
1.003	4 120 Winter	200	+40%	200/15 Summer					16.302
1.004	5 120 Winter	200	+40%	200/15 Summer					16.265
1.005	6 120 Winter	200	+40%	200/15 Summer					16.227
1.006	7 120 Winter	200	+40%	200/15 Summer					16.177
1.007	8 120 Winter	200	+40%	200/15 Summer					16.122
1.008	9 120 Winter	200	+40%	200/15 Summer					16.098
2.000	15 180 Winter	200	+40%	200/15 Summer					16.007

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Baynham Meikle Partnership								Page 10	
8 Meadow Road Edgbaston, Birmingham B 17 8BU					NEW LANE, HAVANT EXCEEDANCE EVENT				
Date 18/01/2023 12:58 File 2023.01.18_drainage netw...					Designed by EB Checked by NSB				
Micro Drainage					Network 2020.1.3				
<u>200 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for 2023.01.18_DRAINAGE.SWS</u>									
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
2.001	16 180	Winter	200	+40%	200/15 Summer				15.996
3.000	21 180	Winter	200	+40%	200/15 Summer				16.006
3.001	22 180	Winter	200	+40%	200/15 Summer				16.001
2.002	17 180	Winter	200	+40%	200/15 Summer				16.004
4.000	23 180	Winter	200	+40%	200/15 Summer				16.003
4.001	24 180	Winter	200	+40%	200/15 Summer				15.998
5.000	25 180	Winter	200	+40%	200/15 Summer	200/15 Summer			16.013
5.001	26 180	Winter	200	+40%	200/15 Summer	200/15 Summer			16.012
2.003	18 120	Winter	200	+40%	200/15 Summer				16.010
6.000	27 120	Winter	200	+40%	200/15 Summer				16.062
6.001	28 120	Winter	200	+40%	200/15 Summer				16.052
6.002	29 120	Winter	200	+40%	200/15 Summer				16.039
6.003	30 120	Winter	200	+40%	200/15 Summer				16.024
7.000	31 180	Winter	200	+40%	200/15 Summer	200/15 Summer			16.016
7.001	32 180	Winter	200	+40%	200/15 Summer	200/15 Summer			16.016
8.000	33 120	Winter	200	+40%	200/15 Summer				16.036
8.001	34 120	Winter	200	+40%	200/15 Summer				16.025
2.004	19 120	Winter	200	+40%	200/15 Summer				16.026
9.000	35 15	Winter	200	+40%	200/15 Summer				16.060
9.001	36 120	Winter	200	+40%	200/15 Summer				16.034
2.005	20 120	Winter	200	+40%	200/15 Summer				16.034
1.009	10 120	Winter	200	+40%	200/15 Summer				16.043
10.000	37 180	Winter	200	+40%	200/30 Summer	200/60 Summer			16.015
10.001	38 180	Winter	200	+40%	200/15 Winter	200/60 Summer			16.015
11.000	39 180	Winter	200	+40%	200/30 Summer				16.018
11.001	40 180	Winter	200	+40%	200/15 Winter	200/60 Summer			16.017
1.010	11 120	Winter	200	+40%	200/15 Summer				16.034
1.011	12 120	Winter	200	+40%	200/15 Summer				16.033
12.000	41 60	Winter	200	+40%	200/15 Summer				16.361
12.001	42 60	Winter	200	+40%	200/15 Summer				16.343
12.002	43 60	Winter	200	+40%	200/15 Summer				16.331
12.003	44 60	Winter	200	+40%	200/15 Summer				16.252
12.004	45 120	Winter	200	+40%	200/15 Summer	200/60 Summer			16.105
12.005	46 120	Winter	200	+40%	200/15 Summer				16.080
12.006	47 120	Winter	200	+40%	200/15 Summer				16.062
1.012	13 120	Winter	200	+40%	200/15 Summer				16.035
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
2.001	16	0.961	0.000	0.32		90	5.3	FLOOD RISK	
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Appendix D



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0 1 km



Bedrock Aquifer Designation

General

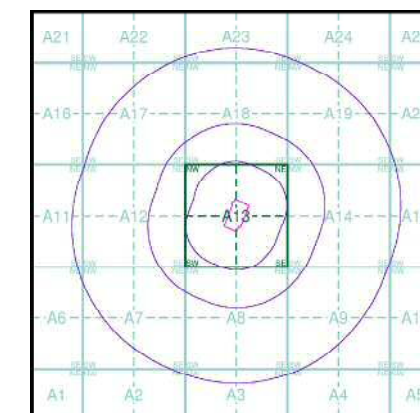
- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown

Site Sensitivity Context Map - Slice A



Order Details

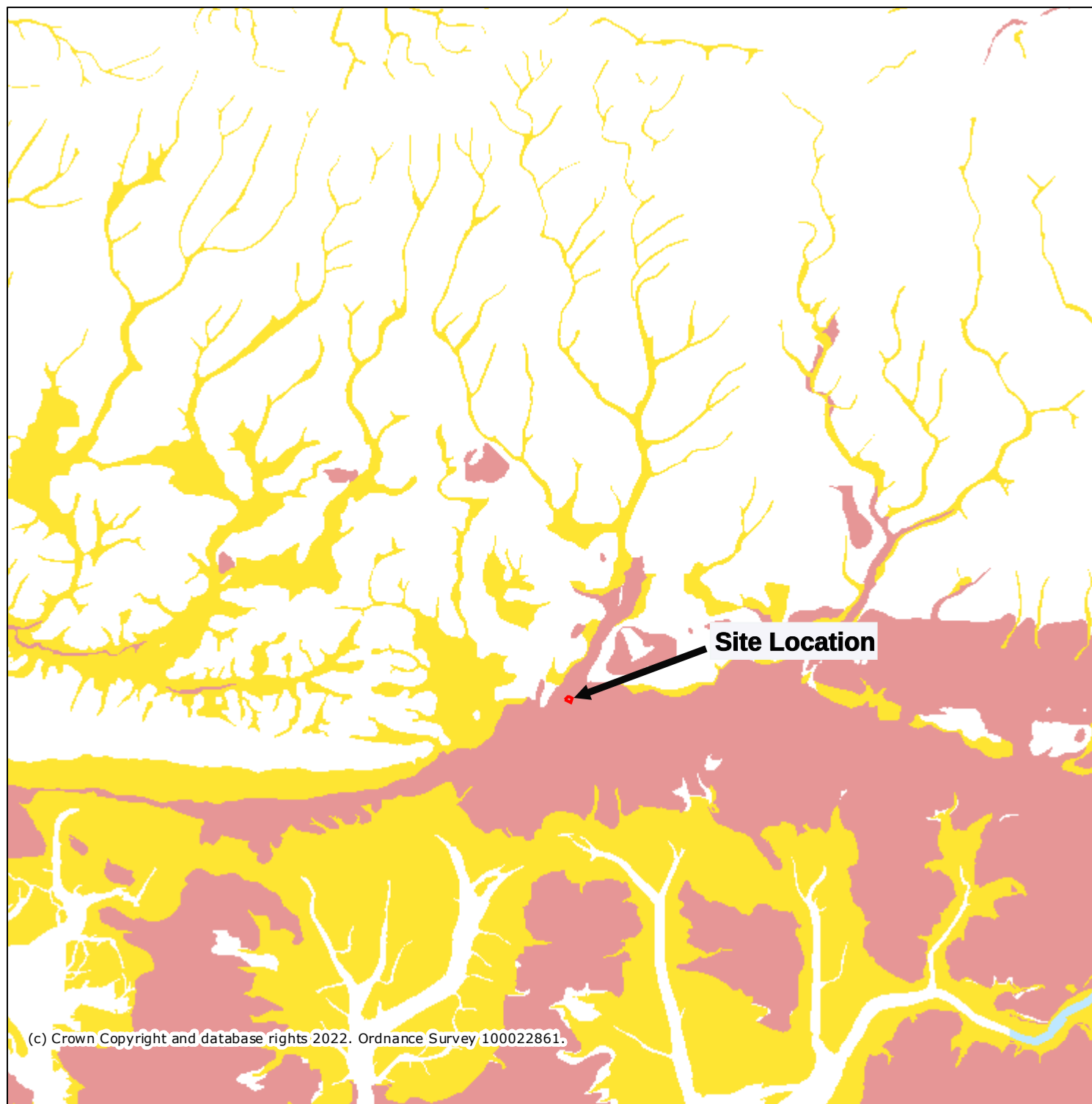
Order Number: 62539150_1_1
 Customer Ref: 13-0646.01
 National Grid Reference: 472700, 107330
 Slice: A
 Site Area (Ha): 1.99
 Search Buffer (m): 1000

Site Details

Stanbridge Road, Havant, PO9 2NL



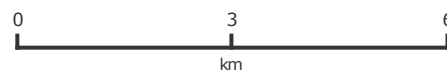
Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



Legend

Aquifer Designation Map (Superficial Drift) (England)

- Principal
- Secondary A
- Secondary B
- Secondary (undifferentiated)
- Unknown (lakes+landslip)
- Unproductive



Projection = OSGB36

xmin = 445600

ymin = 95310

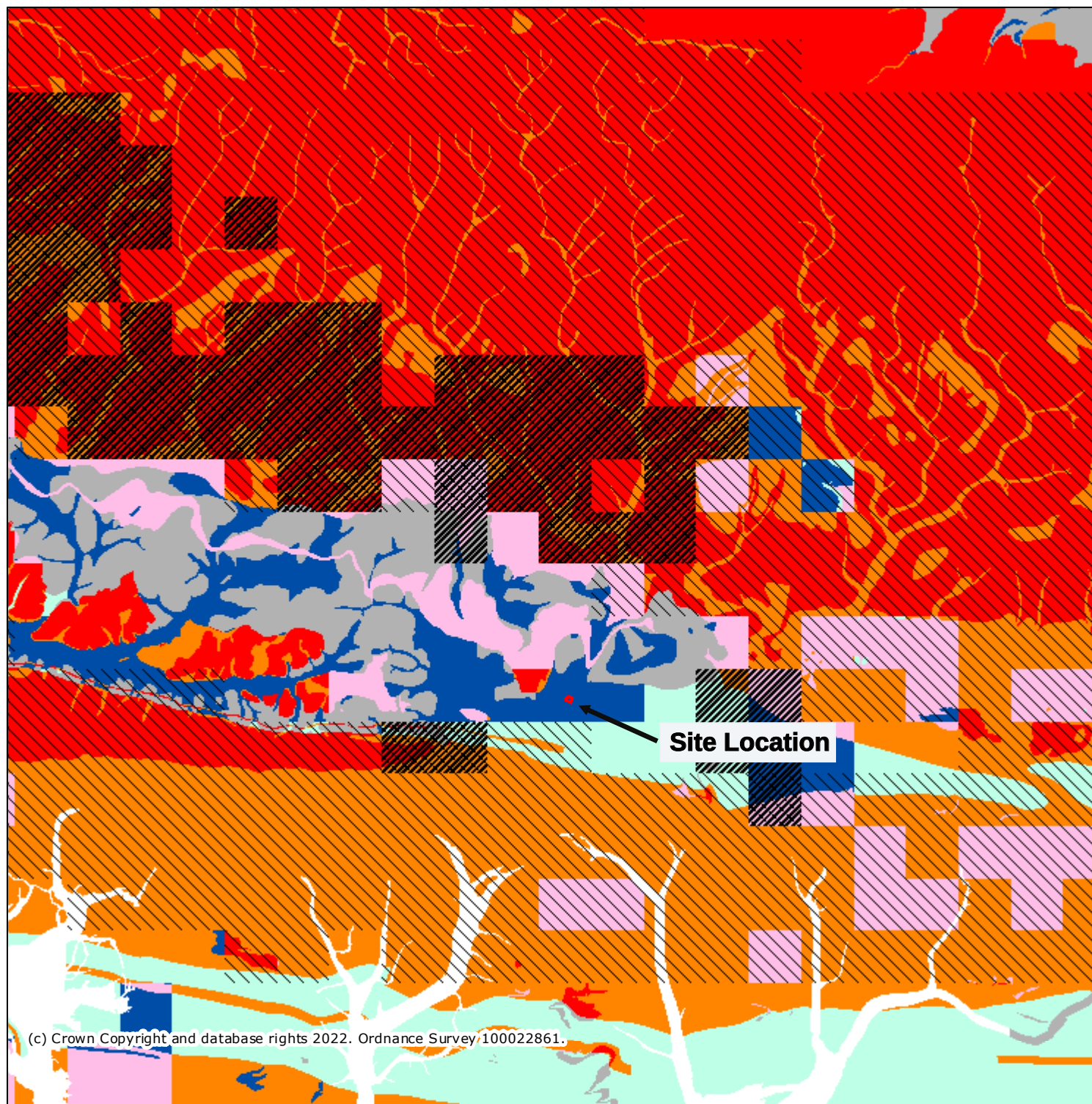
xmax = 498900

ymax = 124900

Map produced by MAGiC on 21 July, 2022.

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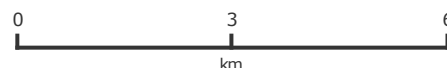
MAGiC groundwater Vulnerability Map



Legend

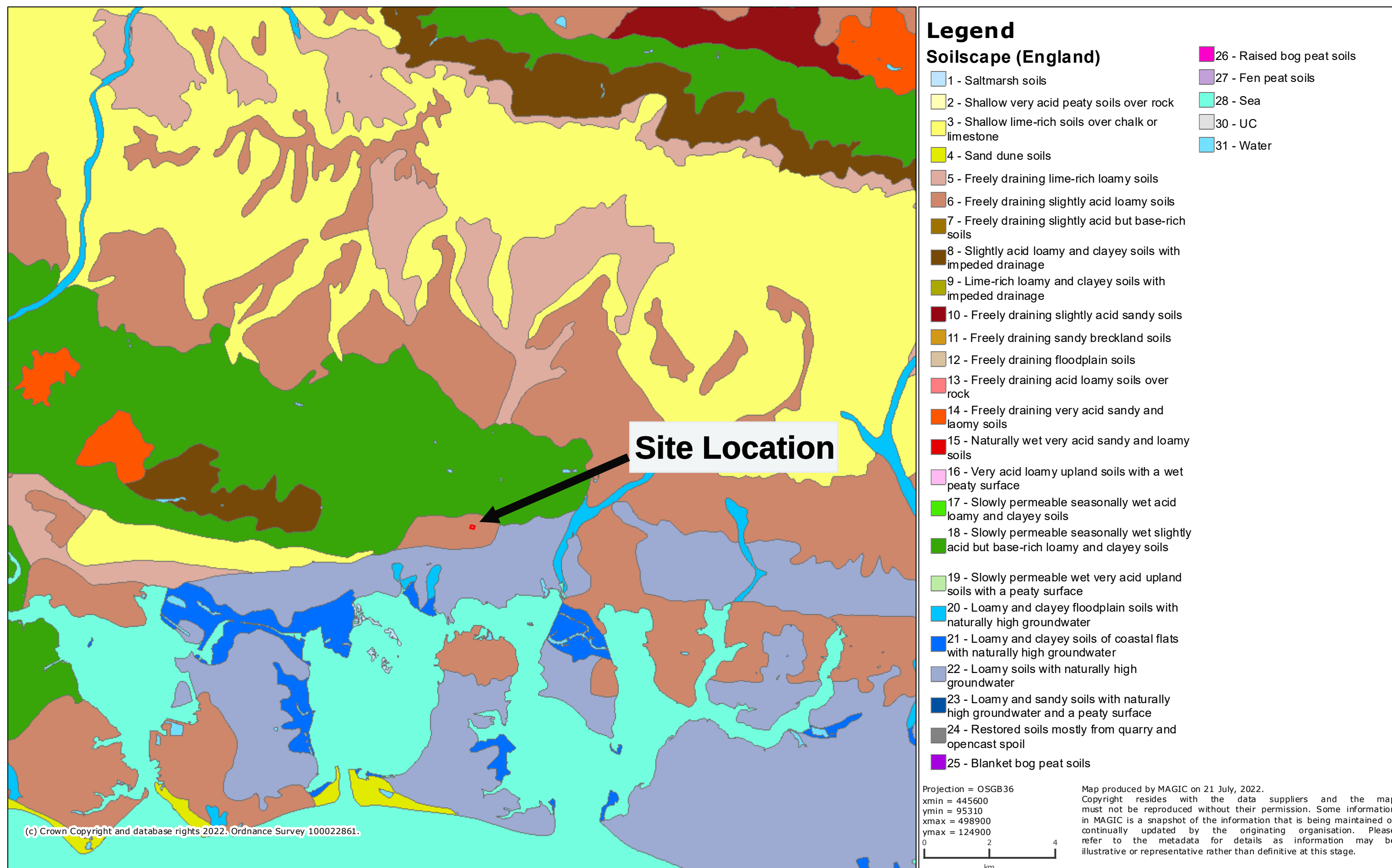
Groundwater Vulnerability Map (England)

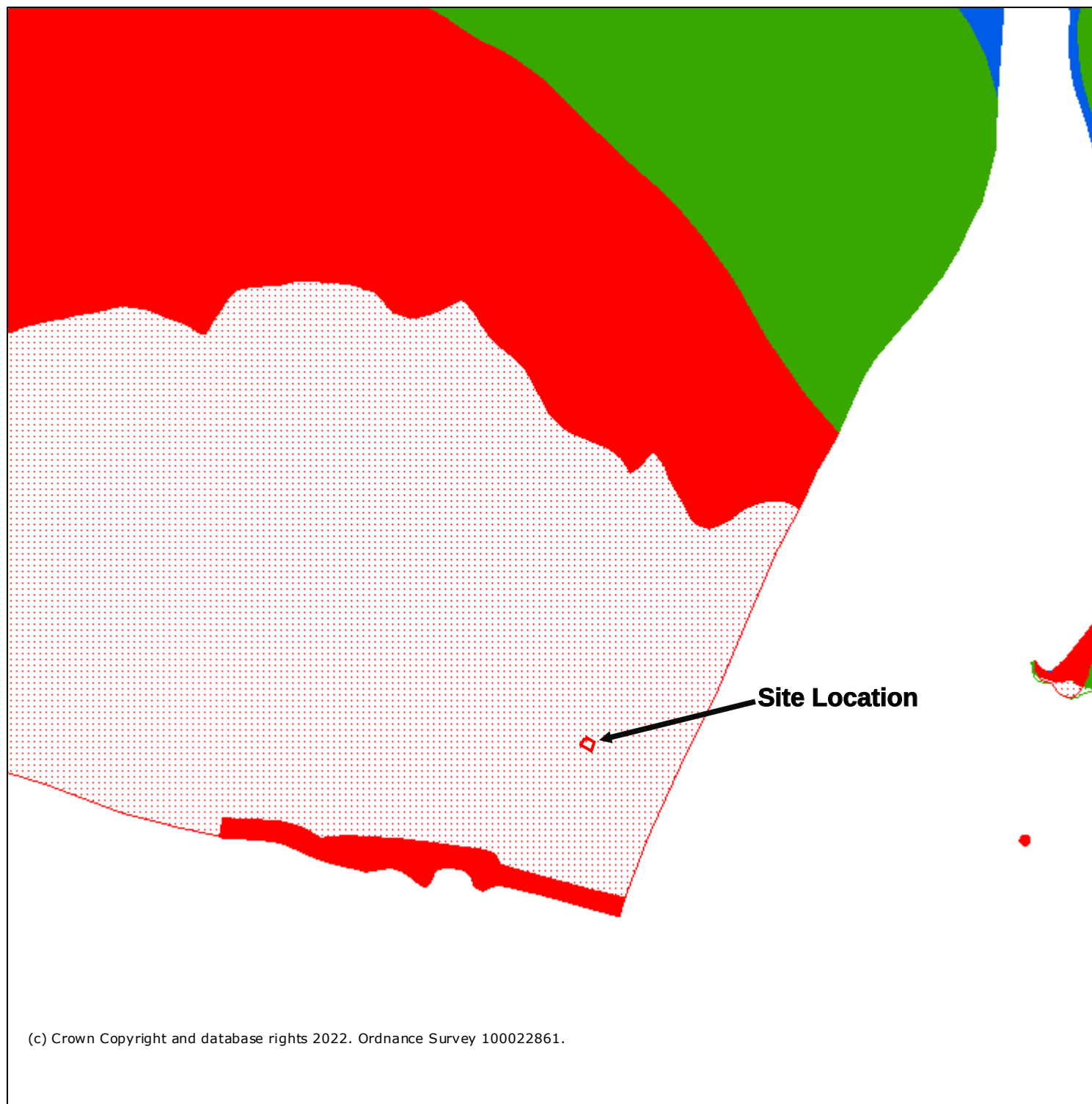
-  Local Information
-  Soluble Rock Risk
-  High
-  Medium - High
-  Medium
-  Medium - Low
-  Low
-  Unproductive



Projection = OSGB36
xmin = 445600
ymin = 95310
xmax = 498900
ymax = 124900

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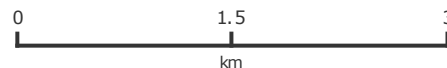




Legend

Source Protection Zones merged (England)

- Zone I - Inner Protection Zone
- Zone I - Subsurface Activity
- Zone II - Outer Protection Zone
- Zone II - Subsurface Activity
- Zone III - Total Catchment
- Zone III - Subsurface Activity
- Zone of Special Interest



Projection = OSGB36

xmin = 458900

ymin = 101800

xmax = 485600

ymax = 116600

Map produced by MAGIC on 21 July, 2022.

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Delta-Simons 3 Henley Office Park, Doddington Road, Lincoln, LN6 3QR Tel: +44 (0) 870 0400 012 Fax: +44 (0) 1522 698393 Email: info@deltasimons.com									
Project: Stanbridge Road, Havant				Project No: 13-0646.01		Hole ID: BH1			
CABLE PERCUSSION BOREHOLE LOG				Date From / To: 10/12/2014 - 11/12/2014		Client: BCP (Havant) LLP			

DESCRIPTION OF STRATA	LEGEND	WATER	CASING DEPTH / (Diam. mm)	REDUCED LEVEL/ DEPTH (Thickness)	Sample Details			Test Results	Backfill Details
					TYPE	REF	Depth	SPT N Value/Drive mm	
Concrete.				16.92 0.15 16.77 0.30 16.57 0.50					
MADE GROUND: Hardcore.					D		0.50		
MADE GROUND: Brown sandy gravelly CLAY. Gravel is fine to coarse chert and brick.				(0.90)			1.00 - 1.45	CPT N=36 3,5/5,8,11,12	
Firm brown mottled grey slightly sandy, slightly gravelly CLAY with occasional cobbles. Sand is fine to coarse. Gravel is angular to subangular fine to medium grained flint. [HEAD DEPOSITS]				15.67 1.40	D		1.50		
Medium dense to very dense light brown sandy GRAVEL. Sand is fine to coarse, gravel is sub-angular fine to medium grained with occasional cobbles of chert/ flint. No soil returns from 3.0m to 4.5m bgl. [RIVER TERRACE DEPOSITS]				(3.10)	B		2.00 - 2.45 2.50	CPT N=50/150mm (8,17/70mm/23,27)	
NO RECOVERY (Possible Driving Cobble). [RIVER TERRACE DEPOSITS].				12.57 4.50			3.00 - 3.45 4.00 - 4.45	CPT N=23 6,4/5,5,6,7 CPT N=36 10,7/6,10,8,12	
Firm brown silty gravelly CLAY. Gravel is angular to sub-angular fine to medium grained chert. [LONDON CLAY FORMATION]			(150mm)	(1.00)			5.00 - 5.45	CPT N=20 7,11/8,4,4,4	
Firm and stiff brown slightly silty CLAY with occasional fine silty partings. [LONDON CLAY FORMATION]				11.57 5.50	D		5.50		
Stiff grey silty CLAY with occasional organic laminations. [LONDON CLAY FORMATION]				(1.10)			6.00 - 6.45	CPT N=12 3,3/2,3,3,4	
Very stiff grey silty gravelly CLAY. Gravel is angular to sub-angular, fine to coarse chert, flint and occasional siltstone. [LONDON CLAY FORMATION]				10.47 6.60			7.00		
				(2.10)	D		7.50 - 7.95	U=60/450mm	
				8.37 8.70			9.00 - 9.45	SPT N=29 4,5/6,7,7,9	
				(0.60)			9.50		
				7.77 9.30	D		10.00 - 10.45		
				(1.15)					

REMARKS :

- Engineer verified logged in general accordance to BS 5930:2010.
- Area CAT scanned prior to excavation.
- Water added from 2.00m bgl.
- Groundwater encountered at 8.70m bgl.
- Installed with a HDPE standpipe to 9.50m bgl.

CHISELLING			WATER LEVEL OBSERVATIONS					
Depth From	Depth To	Time Taken		Date	Time	Water Strike	Standing Level	Casing Depth
1.40	2.80	03:00	1	11-12-14		8.70	6.10	6.00
3.50	4.50	02:30						

BOREHOLE DIAMETER	CASING DIAMETER	DEPTH SEALED
	150mm to 10.45m	

All measurements in metres unless otherwise stated	10m/page Scale: 1:62.50	Coordinates to National Grid Ground Level to Ordnance Datum	Page 1 of 2
Plant Used: Dando 2000	Coordinates / Level (mAOD): E: 472768 N: 107394 Level: 17.07	Logged By: ML	Checked By: AC Approved By: DW

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3 Henley Office Park, Doddington Road,
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Email: info@deltasimons.com



Project: **Stanbridge Road, Havant** Project No: **13-0646.01** Hole ID: **BH1**

CABLE PERCUSSION BOREHOLE LOG

Date From / To:
10/12/2014 - 11/12/2014

Client:
BCP (Havant) LLP

DESCRIPTION OF STRATA	LEGEND	WATER	CASING DEPTH / (Diam. mm)	REDUCED LEVEL/ DEPTH (Thickness)	Sample Details			Test Results	Backfill Details
					TYPE	REF	Depth	SPT N Value/Drive mm	
			10.45	6.62 _ 10.45				SPT N=43 8,8/9,11,11,12	
Borehole complete at 10.45m bgl.									

REMARKS :

1. Engineer verified logged in general accordance to BS 5930:2010.
2. Area CAT scanned prior to excavation.
3. Water added from 2.00m bgl.
4. Groundwater encountered at 8.70m bgl.
5. Installed with a HDPE standpipe to 9.50m bgl.

CHISELLING			WATER LEVEL OBSERVATIONS						
Depth From	Depth To	Time Taken		Date	Time	Water Strike	Standing Level	Casing Depth	
1.40	2.80	03:00	1	11-12-14		8.70	6.10	6.00	
3.50	4.50	02:30							
BOREHOLE DIAMETER			CASING DIAMETER			DEPTH SEALED			
			150mm to 10.45m						

All measurements in metres unless otherwise stated	10m/page Scale: 1:62.50	Coordinates to National Grid Ground Level to Ordnance Datum			Page 2 of 2
Plant Used: Dando 2000	Coordinates / Level (mAOD): E: 472768 N: 107394 Level: 17.07	Logged By: ML		Checked By: AC	Approved By: DW

Delta-Simons 3 Henley Office Park, Doddington Road, Lincoln, LN6 3QR Tel: +44 (0) 870 0400 012 Fax: +44 (0) 1522 698393 Email: info@deltasimons.com									
Project: Stanbridge Road, Havant				Project No: 13-0646.01		Hole ID: BH2			
CABLE PERCUSSION BOREHOLE LOG				Date From / To: 08/12/2014 - 09/12/2014		Client: BCP (Havant) LLP			

DESCRIPTION OF STRATA	LEGEND	WATER	CASING DEPTH / (Diam. mm)	REDUCED LEVEL/ DEPTH (Thickness)	Sample Details			Test Results	Backfill Details
					TYPE	REF	Depth	SPT N Value/Drive mm	
Concrete.				16.62 0.20					
MADE GROUND: Brown sandy gravelly CLAY. Gravel is angular to sub-rounded fine to coarse with occasional brick cobbles. Gravels comprise brick concrete and chert.				16.32 0.50	D		0.50		
MADE GROUND: Firm brown mottled grey, slightly sandy, slightly gravelly CLAY. Sand is fine to coarse, gravel is angular to sub-rounded fine to coarse flint and brick.				(0.90)			1.00 - 1.45	CPT N=22 5,4/3,4,7,8	
Dense to very dense light brown slightly sandy GRAVEL. Sand is fine to coarse, gravel is angular to sub-angular chert/ flint. [RIVER TERRACE DEPOSITS]				15.42 1.40	B		1.50		
					B		2.00 - 2.45	CPT N=48 13,11/12,11,13,12	
					B		2.50		
					B		3.00 - 3.45	CPT N=50/230mm (12,13/15,16,16,3/5mm)	
				(4.20)	B		3.50		
					B		4.00 - 4.45	CPT N=50/155mm (12,13/65mm/22,23,5/5mm)	
					B		4.50		
							5.00 - 5.45	CPT N=50/225mm (12,13/60mm/15,17,18)	
					D		5.50		
Firm brown blue slightly silty CLAY with occasional fine silty partings. [LONDON CLAY FORMATION]				11.22 5.60	U		6.00 - 6.45	U=40/450mm	
				(0.70)					
Firm green grey silty sandy CLAY. [LONDON CLAY FORMATION]				10.52 6.30					
							7.50 - 7.95	SPT N=14 2,2/3,3,4,4	
				(2.00)	D		8.00		
				8.52 8.30					
Very stiff grey silty gravelly CLAY. Gravel is fine to coarse sub-angular to rounded chert/ flint. [LONDON CLAY FORMATION]							9.00 - 9.45	SPT N=42 3,4/9,10,11,12	
				(1.87)					
							9.90 - 10.35	SPT N=50/270mm	

REMARKS : 1. Engineer verified logged in general accordance to BS 5930:2010. 2. Area CAT scanned prior to excavation. 3. Water added from 1.50m bgl. 4. Groundwater encountered at 5.90m bgl. 5. Installed with a HDPE standpipe to 9.00m bgl.	CHISELLING			WATER LEVEL OBSERVATIONS					
	Depth From	Depth To	Time Taken		Date	Time	Water Strike	Standing Level	Casing Depth
	1.80	2.80	02:30	1	09-12-14		5.90	5.10	5.50
	3.00	4.00	03:00						
	4.00	5.50	03:00						
BOREHOLE DIAMETER			CASING DIAMETER			DEPTH SEALED			
			150mm to 10.17m						

All measurements in metres unless otherwise stated	10m/page Scale: 1:62.50	Coordinates to National Grid Ground Level to Ordnance Datum	Page 1 of 2
Plant Used: Dando 2000	Coordinates / Level (mAOD): E: 472710 N: 107423 Level: 16.82	Logged By: ML	Checked By: AC Approved By: DW

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Project: **Stanbridge Road, Havant** Project No: **13-0646.01** Hole ID: **BH2**

CABLE PERCUSSION BOREHOLE LOG

Date From / To:
08/12/2014 - 09/12/2014

Client:
BCP (Havant) LLP

DESCRIPTION OF STRATA	LEGEND	WATER	CASING DEPTH / (Diam. mm)	REDUCED LEVEL/ DEPTH (Thickness)	Sample Details			Test Results	Backfill Details
					TYPE	REF	Depth	SPT N Value/Drive mm	
Borehole complete at 10.17m bgl.			10.17	6.65 – 10.17				(9,13/13,14,14,9/45mm)	

REMARKS :

1. Engineer verified logged in general accordance to BS 5930:2010.
2. Area CAT scanned prior to excavation.
3. Water added from 1.50m bgl.
4. Groundwater encountered at 5.90m bgl.
5. Installed with a HDPE standpipe to 9.00m bgl.

CHISELLING			WATER LEVEL OBSERVATIONS						
Depth From	Depth To	Time Taken		Date	Time	Water Strike	Standing Level	Casing Depth	
1.80	2.80	02:30	1	09-12-14		5.90	5.10	5.50	
3.00	4.00	03:00							
4.00	5.50	03:00							

BOREHOLE DIAMETER		CASING DIAMETER	DEPTH SEALED
		150mm to 10.17m	

All measurements in metres unless otherwise stated	10m/page Scale: 1:62.50	Coordinates to National Grid Ground Level to Ordnance Datum		Page 2 of 2
Plant Used: Dando 2000	Coordinates / Level (mAOD): E: 472710 N: 107423 Level: 16.82	Logged By: ML	Checked By: AC	Approved By: DW

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Project: Stanbridge Road, Havant				Project No: 13-0646.01		Hole ID: BH3			
CABLE PERCUSSION BOREHOLE LOG				Date From / To: 16/12/2014 - 17/12/2014		Client: BCP (Havant) LLP			

DESCRIPTION OF STRATA	LEGEND	WATER	CASING DEPTH / (Diam. mm)	REDUCED LEVEL/ DEPTH (Thickness)	Sample Details			Test Results	Backfill Details
					TYPE	REF	Depth	SPT N Value/Drive mm	
Concrete.				16.12 0.25					
MADE GROUND: Very gravelly CLAY. Gravel is fine to coarse, sub-angular to sub-rounded brick and chert.				(0.55) 15.57 0.80	D		0.50		
Firm becoming stiff light brown, slightly gravelly CLAY. Gravel is fine to coarse sub-angular to sub-rounded chert/ flint. Becoming coarser with depth. [HEAD DEPOSITS]				(1.80)	D		1.00 - 1.45	CPT N=16 2,3/4,4,3,5	
					D		1.50		
					D		2.00 - 2.45	CPT N=19 6,3/3,7,4,5	
				13.77 2.60	D		2.50		
Very dense light brown sandy GRAVEL with occasional cobbles. Gravel is fine to coarse, angular to sub-angular chert/ flint becoming coarser with depth. [RIVER TERRACE DEPOSITS]				(2.70)	D		3.00 - 3.45	CPT N=50/220mm (13,12/55mm/17,17,16/70mm)	
					D		3.50		
					D		4.00 - 4.45	CPT N=24/70mm (25,26/24/70mm)	
					D		4.50		
					D		5.00 - 5.45	CPT N=17 11,7/4,4,4,5	
Firm grey brown gravelly CLAY. Gravel is fine to coarse angular to sub-angular flint/ chert. [LONDON CLAY FORMATION]			(150mm)	11.07 5.30 10.87 5.50	D		5.50		
					D		6.00 - 6.45	SPT N=12 2,3/3,3,3,3	
Firm becoming stiff (from c.8m) grey silty CLAY. [LONDON CLAY FORMATION]				(3.40)	D		7.00		
					U		7.50 - 7.95	U=32/315mm	
				7.47 8.90			9.00 - 9.45	SPT N=23 3,4/5,6,6,6	
Stiff grey sandy gravelly CLAY. Sand is fine to coarse, gravel is fine to coarse, angular to sub-angular flint/ chert. [LONDON CLAY FORMATION]				(1.55)	D		9.50		
							10.00 - 10.45		

REMARKS : 1. Engineer verified logged in general accordance to BS 5930:2010. 2. Area CAT scanned prior to excavation. 3. Water added from 3.00m bgl. 4. Groundwater encountered at 6.90m bgl. 5. Backfilled with arisings.																			
										CHISELLING			WATER LEVEL OBSERVATIONS						
										Depth From	Depth To	Time Taken		Date	Time	Water Strike	Standing Level	Casing Depth	
										2.50	3.00	01:45	1	17-12-14		6.90	5.90	6.00	
										3.00	4.00	02:15							
BOREHOLE DIAMETER			CASING DIAMETER			DEPTH SEALED													
			150mm to 10.45m																

All measurements in metres unless otherwise stated		10m/page Scale: 1:62.50	Coordinates to National Grid Ground Level to Ordnance Datum		Page 1 of 2
Plant Used: Dando 2000	Coordinates / Level (mAOD): E: 472642 N: 107311 Level: 16.37		Logged By: ML		Checked By: AC
				Approved By: DW	

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Project: **Stanbridge Road, Havant** Project No: **13-0646.01** Hole ID: **BH3**

CABLE PERCUSSION BOREHOLE LOG

Date From / To:
16/12/2014 - 17/12/2014

Client:
BCP (Havant) LLP

DESCRIPTION OF STRATA	LEGEND	WATER	CASING DEPTH / (Diam. mm)	REDUCED LEVEL/ DEPTH (Thickness)	Sample Details			Test Results	Backfill Details
					TYPE	REF	Depth	SPT N Value/Drive mm	
			10.45	5.92 - 10.45				SPT N=40 5,7/8,9,11,12	
Borehole complete at 10.45m bgl.									

REMARKS :

1. Engineer verified logged in general accordance to BS 5930:2010.
2. Area CAT scanned prior to excavation.
3. Water added from 3.00m bgl.
4. Groundwater encountered at 6.90m bgl.
5. Backfilled with arisings.

CHISELLING

Depth From	Depth To	Time Taken		Date	Time	Water Strike	Standing Level	Casing Depth
2.50	3.00	01:45	1	17-12-14		6.90	5.90	6.00
3.00	4.00	02:15						

WATER LEVEL OBSERVATIONS

BOREHOLE DIAMETER

CASING DIAMETER

DEPTH SEALED

150mm to 10.45m

All measurements in metres unless otherwise stated

10m/page Scale: 1:62.50

Coordinates to National Grid
 Ground Level to Ordnance Datum

Page 2 of 2

Plant Used: **Dando 2000** Coordinates / Level (mAOD): **E: 472642 N: 107311 Level: 16.37** Logged By: **ML** Checked By: **AC** Approved By: **DW**

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Project: Stanbridge Road, Havant				Project No: 13-0646.01		Hole ID: BH4			
CABLE PERCUSSION BOREHOLE LOG				Date From / To: 12/12/2014 - 15/12/2014		Client: BCP (Havant) LLP			

DESCRIPTION OF STRATA	LEGEND	WATER	CASING DEPTH / (Diam. mm)	REDUCED LEVEL/ DEPTH (Thickness)	Sample Details			Test Results	Backfill Details
					TYPE	REF	Depth	SPT N Value/Drive mm	
Concrete.				15.74 0.25					
MADE GROUND: Firm brown gravelly CLAY. Gravel is fine to coarse, sub-angular to sub-rounded chert and brick.				15.29 0.70	D		0.50		
Stiff Brown slightly gravelly CLAY. Gravel is fine to medium, angular to sub-angular chert. [HEAD DEPOSITS].				(2.20)	D		1.00 - 1.45	CPT N=25 3,5/5,7,8,5	
					D		1.50		
					D		2.00 - 2.45	CPT N=24 5,7/4,6,7,7	
					D		2.50		
Very dense and dense light brown sandy GRAVEL. Sand is fine to coarse, gravel is fine to medium, angular to sub-angular chert. [RIVER TERRACE DEPOSITS]				13.09 2.90			3.00 - 3.45	CPT N=50/265mm (11,14/11,14,15,10/40mm)	
					D		3.50		
				(2.30)	D		4.00 - 4.45	CPT N=48 7,9/12,9,13,14	
					D		4.50		
Stiff brown silty gravelly CLAY. Gravel is fine to medium angular to sub-angular chert. [LONDON CLAY FORMATION]				10.79 5.20			5.00 - 5.45	CPT N=19 7,6/5,4,5,5	
				(0.60)	D		5.50		
Stiff grey silty CLAY. [LONDON CLAY FORMATION]				10.19 5.80			6.00 - 6.45	SPT N=17 2,3/4,4,4,5	
				(2.60)	D		7.00		
					U		7.50 - 7.95	U=28/450mm	
				7.59 8.40			9.00 - 9.45	SPT N=32 4,5/7,8,8,9	
Stiff to very stiff gravelly CLAY. Gravel is fine to medium, sub-angular to sub-rounded chert. [LONDON CLAY FORMATION]				(1.55)	D		9.50	SPT N=44 6,8/10,10,12,12	
							9.50 - 9.95		
				9.95 6.04 9.95					

REMARKS : 1. Engineer verified logged in general accordance to BS 5930:2010. 2. Area CAT scanned prior to excavation. 3. Water added from 3.00m bgl. 4. Groundwater encountered at 5.80m bgl. 5. Installed with a HDPE standpipe to 9.00m bgl.	CHISELLING			WATER LEVEL OBSERVATIONS					
	Depth From	Depth To	Time Taken		Date	Time	Water Strike	Standing Level	Casing Depth
	3.20	4.00	01:45	1	15-12-14		5.80	5.40	5.50
	4.00	4.90	02:15						
BOREHOLE DIAMETER			CASING DIAMETER			DEPTH SEALED			
			150mm to 9.95m						

All measurements in metres unless otherwise stated	10m/page Scale: 1:62.50	Coordinates to National Grid Ground Level to Ordnance Datum	Page 1 of 2
Plant Used: Dando 2000	Coordinates / Level (mAOD): E: 472661 N: 107247 Level: 15.99	Logged By: ML	Checked By: AC Approved By: DW

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Project: **Stanbridge Road, Havant** Project No: **13-0646.01** Hole ID: **BH4**

CABLE PERCUSSION BOREHOLE LOG

Date From / To:
12/12/2014 - 15/12/2014

Client:
BCP (Havant) LLP

DESCRIPTION OF STRATA	LEGEND	WATER	CASING DEPTH / (Diam. mm)	REDUCED LEVEL/ DEPTH (Thickness)	Sample Details			Test Results	Backfill Details
					TYPE	REF	Depth	SPT N Value/Drive mm	
Borehole complete at 9.95m bgl.									

REMARKS :

1. Engineer verified logged in general accordance to BS 5930:2010.
2. Area CAT scanned prior to excavation.
3. Water added from 3.00m bgl.
4. Groundwater encountered at 5.80m bgl.
5. Installed with a HDPE standpipe to 9.00m bgl.

CHISELLING

Depth From	Depth To	Time Taken		Date	Time	Water Strike	Standing Level	Casing Depth
3.20	4.00	01:45	1	15-12-14		5.80	5.40	5.50
4.00	4.90	02:15						

WATER LEVEL OBSERVATIONS

BOREHOLE DIAMETER **CASING DIAMETER** **DEPTH SEALED**

150mm to 9.95m

All measurements in metres
 unless otherwise stated

10m/page Scale: 1:62.50

Coordinates to National Grid
 Ground Level to Ordnance Datum

Page 2 of 2

Plant Used:
Dando 2000

Coordinates / Level (mAOD):
E: 472661 N: 107247
Level: 15.99

Logged By:
ML

Checked By:
AC

Approved By:
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Project: Stanbridge Road, Havant				Project No: 13-0646.01		Hole ID: BH5			
CABLE PERCUSSION BOREHOLE LOG				Date From / To: 11/12/2014 - 12/12/2014		Client: BCP (Havant) LLP			

DESCRIPTION OF STRATA	LEGEND	WATER	CASING DEPTH / (Diam. mm)	REDUCED LEVEL/ DEPTH (Thickness)	Sample Details			Test Results	Backfill Details
					TYPE	REF	Depth	SPT N Value/Drive mm	
Concrete.				15.88 0.30 15.68 0.50	D		0.50		
MADE GROUND: Firm brown gravelly CLAY. Gravel is fine to medium grained brick.				(1.10)			1.00 - 1.45	CPT N=13 3,2/2,3,4,4	
Firm brown gravelly CLAY. Gravel is fine to medium sub-angular to sub-rounded chert. [HEAD DEPOSITS]				14.58 1.60	D		1.50		
Medium dense and dense light brown sandy GRAVEL. Gravel is fine to medium angular to sub-angular chert. [RIVER TERRACE DEPOSITS]			(150mm)		B		2.00 2.00 - 2.45	CPT N=42 5,6/8,8,12,14	
					D		3.00 3.00 - 3.45	CPT N=50/285mm (9,11/12,11,15,12/60mm)	
					D		4.00 4.00 - 4.45	CPT N=24 5,5/6,5,6,7	
					D		5.00 5.00 - 5.45	CPT N=28 9,12/8,7,7,6	
Firm brown slightly silty CLAY with occasional chert gravel. [LONDON CLAY FORMATION]				9.98 6.20 (0.70)			6.00 - 6.45	CPT N=10 4,3/2,2,3,3	
Stiff brown slightly silty CLAY with occasional silty partings. [LONDON CLAY FORMATION]				9.28 6.90 (1.20)	D		7.00		
Stiff slightly gravelly CLAY. Gravel is fine to medium sub-angular to sub-rounded chert. [LONDON CLAY FORMATION]				8.08 8.10 (1.85)	U		7.50 - 7.95	U=70/450mm	
					D		9.00 - 9.45	SPT N=27 5,5/5,7,7,8	
				9.95 6.23 9.95			9.50 9.50 - 9.95	SPT N=42 5,7/8,11,11,12	

REMARKS : 1. Engineer verified logged in general accordance to BS 5930:2010. 2. Area CAT scanned prior to excavation. 3. Water added from 1.50m bgl. 4. Groundwater encountered at 6.90m bgl. 5. Installed with a HDPE standpipe to 9.00m bgl.	CHISELLING			WATER LEVEL OBSERVATIONS					
	Depth From	Depth To	Time Taken		Date	Time	Water Strike	Standing Level	Casing Depth
	2.20	3.00	01:30	1	12-12-14		6.90	5.20	6.00
	3.00	3.70	01:15						
	BOREHOLE DIAMETER		CASING DIAMETER		DEPTH SEALED				
			150mm to 9.95m						

All measurements in metres unless otherwise stated	10m/page Scale: 1:62.50	Coordinates to National Grid Ground Level to Ordnance Datum	Page 1 of 2
Plant Used: Dando 2000	Coordinates / Level (mAOD): E: 427712 N: 107265 Level: 16.18	Logged By: ML	Checked By: AC Approved By: DW

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Project:	Stanbridge Road, Havant	Project No:	13-0646.01	Hole ID:	BH5
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CABLE PERCUSSION BOREHOLE LOG

Date From / To:
11/12/2014 - 12/12/2014

Client:
BCP (Havant) LLP

DESCRIPTION OF STRATA	LEGEND	WATER	CASING DEPTH / (Diam. mm)	REDUCED LEVEL/ DEPTH (Thickness)	Sample Details			Test Results	Backfill Details
					TYPE	REF	Depth	SPT N Value/Drive mm	
Borehole complete at 9.95m bgl.									

REMARKS :

1. Engineer verified logged in general accordance to BS 5930:2010.
2. Area CAT scanned prior to excavation.
3. Water added from 1.50m bgl.
4. Groundwater encountered at 6.90m bgl.
5. Installed with a HDPE standpipe to 9.00m bgl.

CHISELLING

Depth From	Depth To	Time Taken		Date	Time	Water Strike	Standing Level	Casing Depth
2.20	3.00	01:30	1	12-12-14		6.90	5.20	6.00
3.00	3.70	01:15						

WATER LEVEL OBSERVATIONS

BOREHOLE DIAMETER

CASING DIAMETER

DEPTH SEALED

150mm to 9.95m

All measurements in metres
 unless otherwise stated

10m/page Scale: 1:62.50

Coordinates to National Grid
 Ground Level to Ordnance Datum

Page 2 of 2

Plant Used: Dando 2000	Coordinates / Level (mAOD): E: 427712 N: 107265 Level: 16.18	Logged By: ML	Checked By: AC	Approved By: DW
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Project: Stanbridge Road, Havant				Project No: 13-0646.01		Hole ID: BH6			
CABLE PERCUSSION BOREHOLE LOG				Date From / To: 18/12/2014 - 22/12/2014		Client: BCP (Havant) LLP			

DESCRIPTION OF STRATA	LEGEND	WATER	CASING DEPTH / (Diam. mm)	REDUCED LEVEL/ DEPTH (Thickness)	Sample Details			Test Results	Backfill Details
					TYPE	REF	Depth	SPT N Value/Drive mm	
Concrete.				16.49 0.30	B		0.30 - 0.60		
MADE GROUND: Orange brown slightly sandy very gravelly CLAY. Sand is fine to medium, gravel is sub-angular.				(0.60) 15.89 0.90	B		0.90 - 1.30		
MADE GROUND: Dense black silty sandy GRAVEL of tarmacadam/ asphalt.				15.49 1.30 15.29 1.50	B		1.30 - 1.60 1.50 - 1.95	CPT N=24 2,3/4,6,6,8	
MADE GROUND: Gravel sub-base.				(1.50)			2.50 - 2.95	CPT N=33 3,5/7,8,8,10	
Stiff light brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse, gravel is fine to coarse angular to sub-angular flint/ chert. Becoming very gravelly at base. [HEAD DEPOSITS]				13.79 3.00			3.50 - 3.95	CPT N=58 1,4/9,15,21,13	
Dense and very dense light brown sandy, cobbly GRAVEL. Gravel is fine to coarse angular to sub-angular flint/ chert. [RIVER TERRACE DEPOSITS]			(200mm)	(2.50)			4.50 - 4.95	CPT N=37 2,7/7,8,11,11	
Firm brown gravelly CLAY. [LONDON CLAY FORMATION]				11.29 5.50					
Firm grey CLAY with rare orange mottling and slightly organic partings and rare sub-angular flint gravel. [LONDON CLAY FORMATION]				(1.30) 9.99 6.80	B		6.80 - 7.20		
Stiff light and dark grey slightly gravelly CLAY. Slightly organic traces at top of strata. Gravel is fine to medium, sub-angular to subrounded chert. [LONDON CLAY FORMATION]				(1.20) 8.79 8.00	U		7.50 - 7.95	U=40/450mm	
				(1.95)	D		8.00 - 8.00		
					U		9.00 - 9.45	U=55/450mm	
					D		9.50 - 9.95 9.50 - 9.95	SPT N=24 2,3/4,6,6,8	
			9.95	6.84 9.95					

REMARKS : 1. Engineer verified logged in general accordance to BS 5930:2010. 2. Area CAT scanned prior to excavation. 3. Water added from 3.00m - 6.00m bgl. 4. Groundwater encountered at 7.00m bgl. 5. Backfilled with arisings.				CHISELLING			WATER LEVEL OBSERVATIONS					
				Depth From	Depth To	Time Taken		Date	Time	Water Strike	Standing Level	Casing Depth
				0.90	1.30	02:30	1	19-12-14		7.00		6.00
				3.00	5.00	02:00						
				BOREHOLE DIAMETER		CASING DIAMETER		DEPTH SEALED				
				200mm to 9.95m								

All measurements in metres unless otherwise stated		10m/page Scale: 1:62.50	No Coordinate Data Available Ground Level to Ordnance Datum		Page 1 of 2
Plant Used: Pilcon Cut Down	Coordinates / Level (mAOD): Level: 16.79		Logged By: SB	Checked By: AC	Approved By: DW

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Project: **Stanbridge Road, Havant** Project No: **13-0646.01** Hole ID: **BH6**

CABLE PERCUSSION BOREHOLE LOG

Date From / To:
18/12/2014 - 22/12/2014

Client:
BCP (Havant) LLP

DESCRIPTION OF STRATA	LEGEND	WATER	CASING DEPTH / (Diam. mm)	REDUCED LEVEL/ DEPTH (Thickness)	Sample Details			Test Results	Backfill Details
					TYPE	REF	Depth	SPT N Value/Drive mm	
Borehole complete at 9.95m bgl.									

REMARKS :

1. Engineer verified logged in general accordance to BS 5930:2010.
2. Area CAT scanned prior to excavation.
3. Water added from 3.00m - 6.00m bgl.
4. Groundwater encountered at 7.00m bgl.
5. Backfilled with arisings.

CHISELLING

Depth From	Depth To	Time Taken		Date	Time	Water Strike	Standing Level	Casing Depth
0.90	1.30	02:30	1	19-12-14		7.00		6.00
3.00	5.00	02:00						

WATER LEVEL OBSERVATIONS

BOREHOLE DIAMETER

CASING DIAMETER

DEPTH SEALED

200mm to 9.95m

All measurements in metres
 unless otherwise stated

10m/page Scale: 1:62.50

No Coordinate Data Available
 Ground Level to Ordnance Datum

Page 2 of 2

Plant Used:
Pilcon Cut Down

Coordinates / Level (mAOD):
Level: 16.79

Logged By:
SB

Checked By:
AC

Approved By:
DW

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Project: Stanbridge Road, Havant				Project No: 13-0646.01		Hole ID: BH7			
CABLE PERCUSSION BOREHOLE LOG				Date From / To: 12/12/2014 - 17/12/2014		Client: BCP (Havant) LLP			

DESCRIPTION OF STRATA	LEGEND	WATER	CASING DEPTH / (Diam. mm)	REDUCED LEVEL/ DEPTH (Thickness)	Sample Details			Test Results	Backfill Details
					TYPE	REF	Depth	SPT N Value/Drive mm	
Concrete.				16.59 0.20					
MADE GROUND: Hardcore GRAVEL sub-base.				16.29 0.50					
MADE GROUND: Fine to coarse brick GRAVEL.				15.99 0.80					
Red brown gravelly CLAY. [HEAD DEPOSITS]				15.69 1.10					
Medium dense and dense clayey sandy GRAVEL. Sand is medium to coarse, gravel is fine to coarse, sub-angular to sub-rounded chert. [RIVER TERRACE DEPOSITS]				(4.20)			1.50 - 1.95	CPT N=11 2,4/3,3,3,2	
							2.50 - 2.95	CPT N=33 3,6/7,8,8,10	
							3.50 - 3.95	CPT N=30 2,4/8,6,7,9	
							4.50 - 4.95	CPT N=30 5,7/8,8,7,7	
			(200mm)	11.49 5.30	D		5.30		
Firm brown sandy gravelly CLAY. Gravel is fine to medium, angular to sub-angular chert. [LONDON CLAY FORMATION]				(0.50) 10.99 5.80	D		5.80		
Firm grey CLAY becoming silty towards base. [LONDON CLAY FORMATION]				(2.00)	U		6.00 - 6.45	U=20/450mm	
					D		6.50		
							7.50 - 7.95	SPT N=13 1,2/2,3,3,5	
				8.99 7.80					
Stiff dark grey silty CLAY. [LONDON CLAY FORMATION]				(2.15)	D		9.50		
							9.50 - 9.95	SPT N=24 3,5/5,5,7,7	
			9.95	6.84 9.95					

REMARKS : 1. Engineer verified logged in general accordance to BS 5930:2010. 2. Area CAT scanned prior to excavation. 3. Groundwater encountered at 5.80m bgl. 4. Installed with a HDPE standpipe to 9.50m bgl.				CHISELLING			WATER LEVEL OBSERVATIONS				
				Depth From	Depth To	Time Taken	Date	Time	Water Strike	Standing Level	Casing Depth
				1.10	3.00	03:30	16-12-14		5.80		
				3.00	4.50	03:30					
4.50	5.30	01:00									
BOREHOLE DIAMETER				CASING DIAMETER		DEPTH SEALED					
				200mm to 9.95m							

All measurements in metres unless otherwise stated		10m/page Scale: 1:62.50	No Coordinate Data Available Ground Level to Ordnance Datum		Page 1 of 2
Plant Used: Pilcon Cut Down	Coordinates / Level (mAOD): Level: 16.79		Logged By: SB	Checked By: AC	Approved By: DW

SU70 NW/7A

C.721.068

Boring method		Shell and Auger		Location		SU 721 068		Record of BOREHOLE 1	
Boring diameter (mm)		150 to 10.20a						(sheet 1 of 2)	
Casing diameter (mm)		150 to 10.20a		Orientation				Ground level (m.O.D.) 10.75	
Boring equipment		Pilsen Wayfaxer 20						Date commenced 16.8.74	

Samples and in situ tests		Casing Depth (m)	Water Depth (m)			Date and Depth (m)	DESCRIPTION OF STRATA	O.D. Level (m.O.D.)	Legend
Depth (m)	Type								
0.10	D	NIL				0.10	TARMACADAM	10.55	
0.40	D					0.40	from fine to coarse GRAVEL with clay binder	10.35	
0.50	U								
0.95	D								
1.50	C19	1.50					Firm brown sandy silty CLAY with large FLINTS		
1.50	BD								
2.80	D					2.80	Soft to firm grey-brown sandy CLAY	7.95	
3.05	U	3.00							
3.50	S11	3.00				3.30	MEDIUM Dense grey silty fine to medium SAND	7.45	
3.50	D		3.60*						
3.70	D					3.70		7.05	
4.10	U	4.10							
4.30	W								
4.35	D								
5.60	U	5.50					Stiff to very stiff fissured dark brown silty CLAY		
6.05	D								
7.20	U	7.20							
7.65	D								
8.70	U	8.50							
9.15	D		5.60			9.20		1.55	
9.20	C67	9.20	4.30			17/8			
9.20	BD						Very dense grey fine to coarse SAND and GRAVEL		

REMARKS									
---------	--	--	--	--	--	--	--	--	--

For explanation of symbols and abbreviations see Notes, pages (i) and (ii)

LAB Ref No. SI/10783	HAVANT - ATE EXTENSION	Fig. 1
-------------------------	------------------------	--------

WIMPEY LABORATORIES LIMITED

5070 NW/130

FIG. 1.

7239 '687

BOREHOLE LOG

LOCATION S. 1. 4. 1. HAVANT, HANTS.

CARRIED OUT FOR Messrs. Malcolm & Co., ROYALTY'S (1) ASSOCIATES.

BOREHOLE No. 1.

DIAMETER: 6in.

GROUND LEVEL: ca. +12m

DATE: 27th-29th Nov. 1968.

DESCRIPTION OF STRATA	Sample	LEGEND	DEPTH	THICK- NESS	STRA. LITH. & PENETRATION T.M.B.S.
GRAVEL TOPSOIL.			G.L.	300m	NO. OF L.S. S.
Earthy SILT with angular GRAVEL.	1		1'0"	1'0"	
MODERATELY COMPACT mixed GRAVEL in creamy sandy SILTY CLAY matrix.	2		9'50	2'5"	750 BE
			3'6"		
	3		1'950	2'0"	900
			6'6"		
COMPACT medium to coarse GRAVEL and yellow brown sand, clayey at the top and base.	4			3'000	65
				10'0"	50
	6				400 100
					(3 1/2" penetration)
Yellow fine SAND.	7		4'50		35
	8		13'6"	1'5"	150
			17'0"		12
			51'00		75(LC)
MODERATELY COMPACT grey SILT with SOFT CLAY pockets.	10			1'5"	450
					penetrated.
			21'5"		
			6'450		
END OF BOREHOLE.					

R.T.W.
20.10.82

Note:

GROUND WATER encountered at 71ft. 6in. below G.L.

Final WATER level 10ft. 6in. below G.L. on completion of
borehole.

PIEZOMETER VARIABLE HEAD PERMEABILITY TEST

PROJECT NUMBER	13-0646.01
PROJECT TITLE	Standbridge Rd, Havant
BOREHOLE REF	BH5
DATE	22-Dec-14
BOREHOLE DIAMETER (mm)	150
STATIC WATER LEVEL (m bd)	3.39
"L" LENGTH SLOTTED SCREEN (m)	9.00
BASE OF STANDPIPE (m)	10.00
STRATA TYPE	Sand and Gravel
"D" BOREHOLE DIAMETER (m)	1.50E-01
"SCENARIO (a,b,c,d1,d2,e or f - case sensitive)	d2
"F" VALUE	1.35E+01
"A" AREA OF BOREHOLE (m ²)	1.77E-02

[illegible]

BASIC TIME LAG METHOD (after BS5930:1999)

$$K = A / (F \cdot T)$$

T= TIME FOR $H/H_0:0.37$

T= 0.18 (min)

T= 11.09 (sec)

K= 1.18E-04 (m/s)

K= 10.201 (m/d)

GENERAL METHOD (after BS5930:1999)

$$k = \frac{A}{F(t_2 - t_1)} \log_e \frac{H_1}{H_2}$$

t1= 0.12 (min)

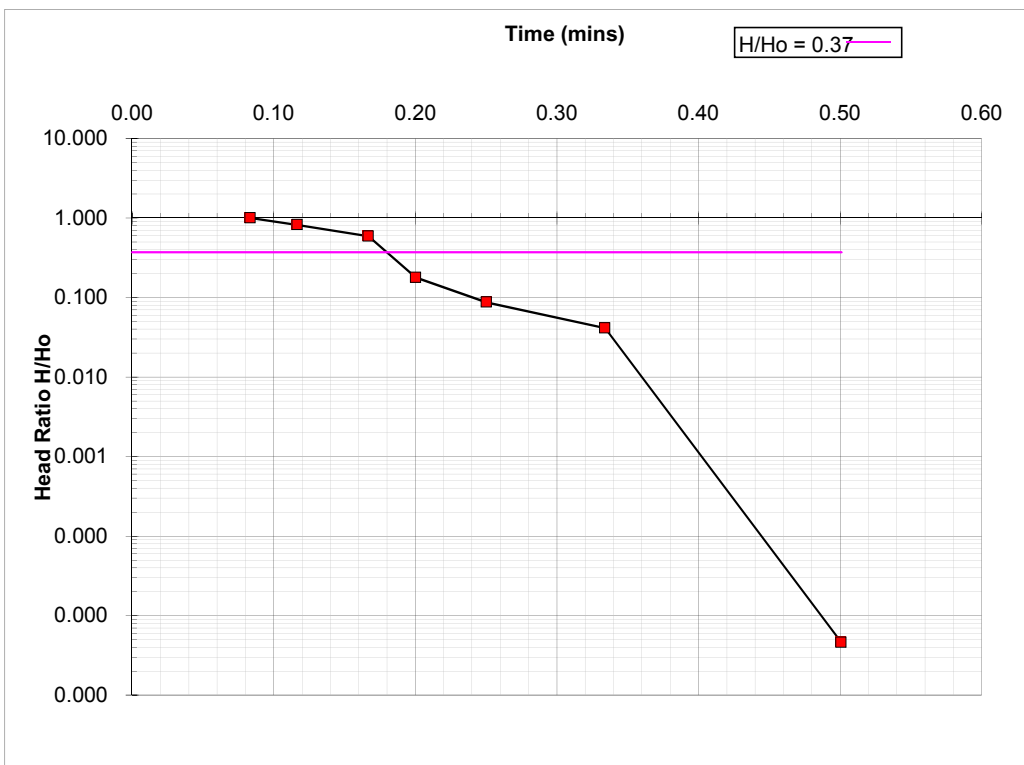
t2= 0.25 (min)

$$H(\text{head})_1 = 1.79 \text{ (m)}$$

$$H(\text{head})_2 = 0.19 \text{ (m)}$$

K= 3.76E-04 (m/s)

K= 32.524 (m/d)



PIEZOMETER VARIABLE HEAD PERMEABILITY TEST

PROJECT NUMBER	13-0646.01
PROJECT TITLE	Standbridge Rd, Havant
BOREHOLE REF	BH5
DATE	22-Dec-14
BOREHOLE DIAMETER (mm)	150
STATIC WATER LEVEL (m bd)	3.39
"L" LENGTH SLOTTED SCREEN (m)	9.00
BASE OF STANDPIPE (m)	10.00
STRATA TYPE	Sand and Gravel
"D" BOREHOLE DIAMETER (m)	1.50E-01
"SCENARIO (a,b,c,d1,d2,e or f - case sensitive)	d2
"F" VALUE	1.35E+01
"A" AREA OF BOREHOLE (m ²)	1.77E-02

TIME (mins)	Hi(mbd)	H(head)	H/Ho
0.03	0.150	3.240	1.000
0.08	0.860	2.530	0.781
0.17	1.230	2.160	0.667
0.20	1.440	1.950	0.602
0.25	1.980	1.410	0.435
0.33	2.300	1.090	0.336
0.43	2.800	0.590	0.182
0.53	3.050	0.340	0.105
0.75	3.130	0.260	0.080
0.92	3.210	0.180	0.056
1.15	3.280	0.110	0.034
1.25	3.280	0.110	0.034
1.45	3.290	0.100	0.031
2.10	3.310	0.080	0.0247
2.45	3.310	0.080	0.025
3.15	3.320	0.070	0.022
3.45	3.340	0.050	0.015
4.00	3.350	0.040	0.012
		3.390	1.046
		3.390	1.046

BASIC TIME LAG METHOD (after BS5930:1999)

$$K = A/(F \cdot T)$$

T = TIME FOR H/Ho:0.37

$$T = 0.31 \text{ (min)}$$

$$T = 18.34 \text{ (sec)}$$

$$K = 7.14E-05 \text{ (m/s)}$$

$$K = 6.168 \text{ (m/d)}$$

GENERAL METHOD (after BS5930:1999)

$$k = \frac{A}{F(t_2 - t_1)} \log_e \frac{H_1}{H_2}$$

$$t_1 = 0.17 \text{ (min)}$$

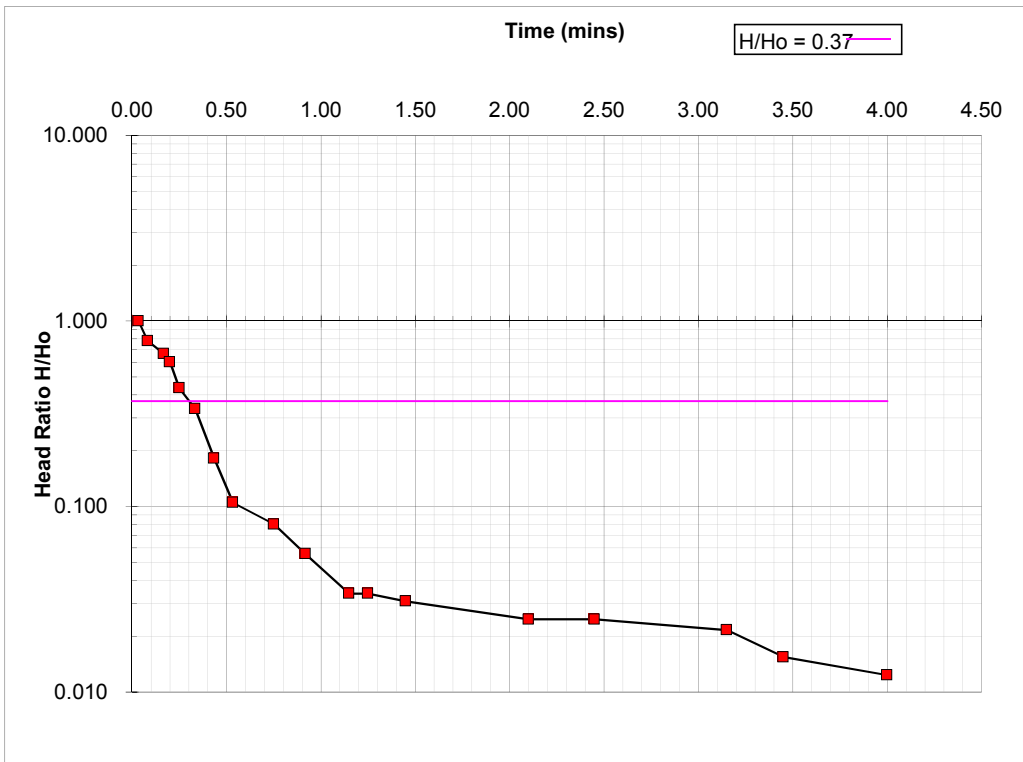
$$t_2 = 0.53 \text{ (min)}$$

$$H(\text{head})_1 = 2.16 \text{ (m)}$$

$$H(\text{head})_2 = 0.34 \text{ (m)}$$

$$K = 1.12E-04 \text{ (m/s)}$$

$$K = 9.682 \text{ (m/d)}$$



PIEZOMETER VARIABLE HEAD PERMEABILITY TEST

PROJECT NUMBER	13-0646.01
PROJECT TITLE	Standbridge Rd, Havant
BOREHOLE REF	BH5
DATE	22-Dec-14
BOREHOLE DIAMETER (mm)	150
STATIC WATER LEVEL (m bd)	3.39
"L" LENGTH SLOTTED SCREEN (m)	9.00
BASE OF STANDPIPE (m)	10.00
STRATA TYPE	Sand and Gravel
"D" BOREHOLE DIAMETER (m)	1.50E-01
"SCENARIO (a,b,c,d1,d2,e or f - case sensitive)	d2
"F" VALUE	1.35E+01
"A" AREA OF BOREHOLE (m ²)	1.77E-02

TIME (mins)	Hi(mbd)	H(head)	H/Ho
0.01	0.210	3.180	1.000
0.17	0.930	2.460	0.774
0.25	1.180	2.210	0.695
0.42	1.960	1.430	0.450
0.58	2.460	0.930	0.292
0.75	2.890	0.500	0.157
1.00	3.130	0.260	0.082
1.25	3.170	0.220	0.069
2.00	3.220	0.170	0.053
3.00	3.260	0.130	0.041
4.00	3.300	0.090	0.028
5.00	3.340	0.050	0.016
		3.390	1.066
		3.390	1.0660
		3.390	1.066
		3.390	1.066
		3.390	1.066
		3.390	1.066
		3.390	1.066
		3.390	1.066

BASIC TIME LAG METHOD (after BS5930:1999)

$$K = A/(F \cdot T)$$

T = TIME FOR H/Ho:0.37

$$T = 0.50 \text{ (min)}$$

$$T = 30.13 \text{ (sec)}$$

$$K = 4.35E-05 \text{ (m/s)}$$

$$K = 3.754 \text{ (m/d)}$$

GENERAL METHOD (after BS5930:1999)

$$k = \frac{A}{F(t_2 - t_1)} \log_e \frac{H_1}{H_2}$$

$$t_1 = 0.42 \text{ (min)}$$

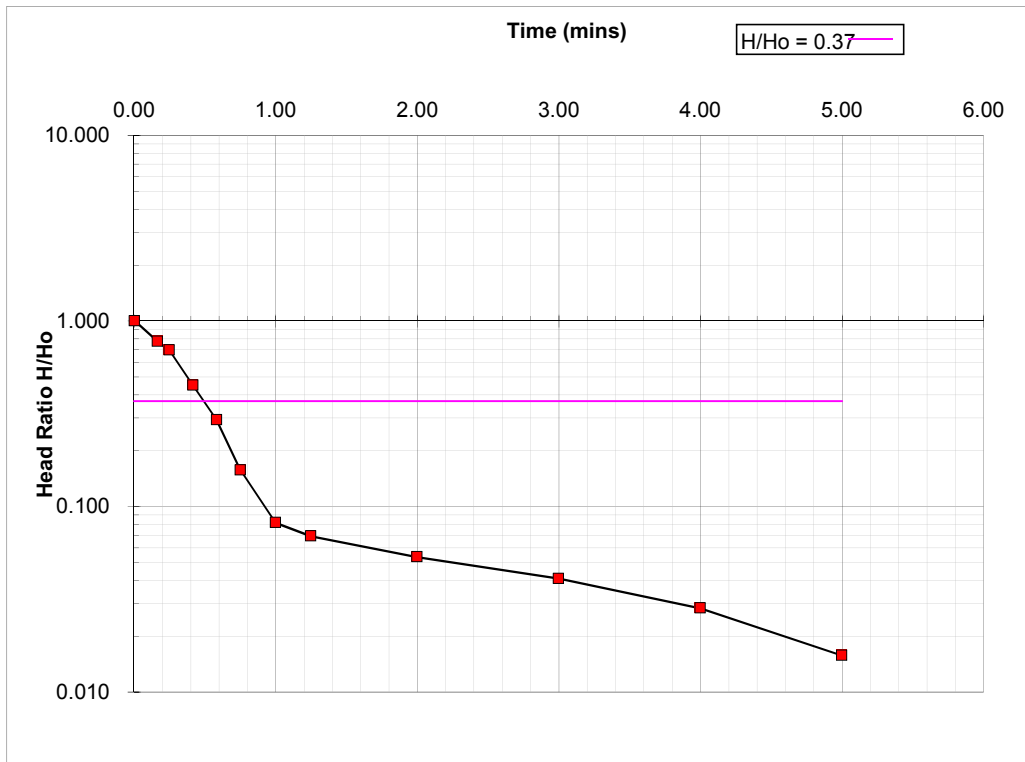
$$t_2 = 1.00 \text{ (min)}$$

$$H(\text{head})_1 = 1.43 \text{ (m)}$$

$$H(\text{head})_2 = 0.26 \text{ (m)}$$

$$K = 6.41E-05 \text{ (m/s)}$$

$$K = 5.541 \text{ (m/d)}$$



107549

[illegible]

SU7207SE

Title: 36 Stanbridge Road

Drawn by: banerin

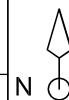
Scale: 1:1250

Date: 23/03/2013

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.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement
WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement

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472814

SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape
3205X	13.93	10.98	600	CP	CIRC																		
3350X	14.55	13.37	225	VC	CIRC																		
3450X	14.65	13.41	600	CP	CIRC																		
4300X	14.37	11.26	600	CP	CIRC																		
4301X	14.55	12.6	375	CP	CIRC																		
4302X	14.54	12.74	225	VC	CIRC																		
4303X	14.36	12.92	150	VC	CIRC																		
4350X	14.66	13.61	450	CP	CIRC																		
4351X	14.4	13.13	450	CP	CIRC																		
4353X	14.12	12.82	600	CP	CIRC																		
4400X	14.81	12.83	375	VC	CIRC																		
4401X	14.79	11.49	600	CP	CIRC	*																	
4401Y	14.79	12.79	375	VC	CIRC	*																	
4402X	14.85	12.75	375	CP	CIRC																		
4403X	15.08	13.05	225	VC	CIRC																		
4404X	14.84	13.18	225	VC	CIRC																		
4450X	14.96	13.65	600	CP	CIRC																		
4451X	14.64	13.53	600	CP	CIRC																		
5400X	15.94	14.37	225	VC	CIRC																		
5401X	15.26	13.21	375	VC	CIRC																		
5402X	15.13	11.72	600	CP	CIRC																		
5450Y	15.98		300	VC	CIRC	*																	
5450X	15.98		300	VC	CIRC	*																	
5500X	15.83	13.48	375	CP	CIRC																		
5501X	15.41	12.11	600	CP	CIRC																		
5502X	15.21	13.32	225	VC	CIRC																		
5550X	14.84	12.92	600	CP	CIRC																		
5551X	15.15	13.92	450	CP	CIRC																		
6400X	16.61	14.86	225	VC	CIRC																		
6450X	16.61	15.34	450	CP	CIRC																		
7350X	16.74	15.52	225	CP	CIRC																		
7500X	17.33	15.46	225	VC	CIRC																		
7550X	17.35	15.89	375	CP	CIRC																		
8200X	16.43	14.48	225	VC	CIRC																		
8256X	16.13	14.13	225	VC	CIRC																		
8350X	16.53	14.93	225	VC	CIRC																		

LINE STYLES / COLOURS

Brown	-----	Fluid
Red	-----	Fluid/Syphon Sewer
	-----	Fluid Vacuum Main
	-----	Fluid Rising Main
	-----	Combined
	-----	Combined Syphon Sewer
	-----	Combined Rising Main
	-----	Lateral Drains
Orange	-----	Building Over Agreement Area
Dark Blue	-----	Treated Effluent
Purple	-----	Sludge
	-----	Sewer Catchment
	-----	Section 104 Area
Light Blue	-----	Surface Water
	-----	Surface Water Rising Main
Yellow	-----	Private
Green	-----	Access Shaft
	-----	Decommissioned

MATERIALS

AK	Asbestos
BAC	Bonded Asbestos Cement
BBC	Brick (Common)
BRE	Brick (Engineering)
CC	Concrete Box Culvert
CI	Cast Iron
CO	Concrete (Pre-Cast)
CSB	Concrete Segments (boxed)
CSU	Concrete Segments (unboxed)
DI	Ductile Iron
GRP	Glass Reinforced Concrete
GRP	Glass Reinforced Plastic
MNC	Masonry in random Courses
MAN	Masonry in random Courses
PE	Polyethylene
PP	Polypropylene
PVC	Polyvinyl Chloride
RPA	Reinforced Plastic Manhole
SI	Spun Iron
ST	Steel
VC	Vertical Clay
XXX	Other
ZZZ	Unknown

Manhole (SW)	○
Manhole (FAC)	○
Lamp hole (SW)	○
Lamp hole (FAC)	○
Pumping Station (SW)	○
Pumping Station (FAC)	○
Side entry manhole (SW)	○
Side entry manhole (FAC)	○
Blind shaft (SW)	○
Blind shaft (FAC)	○
Chamber (SW)	○
Chamber (FAC)	○
Waterlight door (SW)	○
Waterlight door (FAC)	○
Flushing ch. (SW)	○
Flushing ch. (FAC)	○
Flushing ch. (SW)	○
Flushing ch. (FAC)	○
Demarcation Chamber	○

Washout (SW)	○
Washout (FAC)	○
Rodding Eye (SW)	○
Rodding Eye (FAC)	○
Gauging point (SW)	○
Gauging point (FAC)	○
Franchise chamber (SW)	○
Franchise chamber (FAC)	○
Storm Tank (SW)	○
Storm Tank (FAC)	○
Vortex chamber (SW)	○
Vortex chamber (FAC)	○
Hatch box (SW)	○
Hatch box (FAC)	○
Label ellipse	○
Dummy/524 manhole	○
Penstock chamber	○
Damboards	○
Storm Overflow	○
Roadside manhole	○

Other (S)	○
Change in sewer (S)	○
Roller valve	○
Flap valve	○
Cascade	○
Anodes	○
Valve	○
Closed Valve	○
Air Valve	○
Manhole (SW)	○
Hatch box (SW)	○
Direction arrow	○
Outfall	○
Enriching valve	○
Canopy	○
Soakaway	○
Inlet	○
Balancing Pond	○

Wastewater treatment works	○
Marine treatment works	○
Outfall headworks	○
Vent	○
Vent column	○
Tidal storage tank	○
Blind end	○
Head of Public Sewer	○
Micro Pumping Station	○

SHAPES (S)	○
A	Arch
B	Barrel
C	Circular
E	Egg
H	Household
U	U Shape
X	Other

Drawn by: banerin

Title: 36 Stanbridge Road

Date: 23/03/2013



New Lane,
Havant

SUDS Maintenance Plan

Project Ref: EB/13383

First Issue January 2023



Client
Hellier Langston

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SUSTAINABLE DRAINAGE AND LANDSCAPE MANAGEMENT PLAN FOR New Lane, Havant

An introduction to sustainable drainage systems or SuDS

SuDS are a new environmentally friendly approach to managing rainfall that uses landscape features to deal with surface water. SuDS aim to:

- Control the flow, volume and frequency of water leaving a development area
- Prevent pollution by intercepting silt and cleaning runoff from hard surfaces
- Provide attractive surroundings for the community
- Create opportunities for wildlife

SuDS at New Lane, Havant

The SuDS are designed to prevent flooding and control the flow of surface water using attractive landscape features. It is proposed that drainage strategy incorporates cellular storage soakaways car parking area. This feature is the primary source of surface water storage for the site. Surface water is then allowed to permeate into the ground.

In addition to the cellular soakaways, storage is also provided by the use of porous car parking.

- Surface water drainage system allows direct infiltration into the ground via cellular soakaways serving the proposed development.
- The second drainage system includes permeable paving which allows rain to percolate through the surface into underlying drainage layers.

SuDS Management

The proposed SuDS measures, have been designed with easy maintenance in mind. Maintenance will generally fall into one of the three following categories:

- **Regular day to day care** - litter collection, grass cutting and checking the inlets and outlets where water enters or leaves a SuDS feature
- **Occasional tasks** - managing vegetation and removing any silt that builds up in the SuDS features also after flooding events.
- **Remedial work** - repairing damage where necessary

SuDS Maintenance – Summary

		Frequency	Unit Rate	Total
	REGULAR MAINTENANCE			
1.	LITTER MANAGEMENT			
1.1	Pick up all litter in SuDs and Landscape areas and removed from	12 visits monthly		
2	GRASS MAINTENANCE – all cutting to wildlife piles			
2.1	Mow all grass verges, paths and amenity at 35-60mm with 75mm max. Leaving grass in situ	As required or monthly		
4	HARD SERVICES			
4.1	Sweep all paving regularly. Sweep and suction brush. Permeable paving in autumn after leaf fall	1 visit		
	OCCASIONAL TASKS			
6	SILT MANAGEMENT			
6.1	Remove / clear out silt from silt collection traps in linear drainage channels	As required / after flood event.		
7	REMEDIAL WORK			
7.1	Inspect SuDs system regularly to check for damage or failure.	As required / after flood event.		

SuDS Features:

SuDS techniques include attenuation structures which assist in managing discharge of water from the site, in this case infiltration into the ground.

Cellular Tanks / Soakaways are used to manage and control surface runoff. Also, they are used to store surface water under the ground which then allows it to soak into the ground.

Permeable surfaces as permeable paving, gravel or free draining soils that allow rain to percolate through the surface into underlying drainage layers. They must be protected from silt, sand, compost, mulch, etc.

Inspection Chambers and rodding eyes are used on bends or where pipes come together. They allow cleaning of the system if necessary.

Overflows can be below ground through gratings and chambers or over grass weirs in the open. They must be kept clear at all times to protect areas from flooding.

Flood routes (exceedance routes) allow water volumes exceeding the capacity of the SUDS system to escape from the site without causing damage to property. This route must be clear of obstructions at all times.

Sustainable Drainage Maintenance Specification

1.0 GENERAL REQUIREMENTS

Maintenance activities comprise: • Regular Maintenance • Occasional Task • Remedial Work	Frequency
Generally Litter Collect all litter or other debris and remove from site at each site visit	Monthly

- **Avoid** use of weed killers and pesticides to prevent chemical pollution
- **Avoid** de-icing agents wherever possible to allow bio-remediation of pollutants in permeable surfaces.
- **Protect** all permeable, porous and infiltration surfaces from silt, sand, mulch and other fine particles.

Exclusions:

- Maintenance of rainwater harvesting chambers, pumps, etc.

2.0 INLETS, OUTLETS, CONTROLS, AND INSPECTION CHAMBERS

- **Inlets and outlets structures** may be surface structures or conveyance pipes with guards or headwalls. They must be free from obstruction at all times.
- **SuDS flow control structures** can be protected orifices, slots weirs or other controls at or near the surface to be accessible and easy to maintain. They may be in baskets, in small chambers or in the open.
- **Inspection Chambers** and rodding eyes are used on bends or where pipes come together and allow cleaning of the system if necessary. They should be designed out of the system where possible.

INLETS, OUTLETS, CONTROLS AND INSPECTION CHAMBERS	
Regular Maintenance	Frequency
Inlets, outlets and surface control structures Inspect surface structures removing obstructions and silt as necessary. Check there is no physical damage. Strim vegetation 1m min. surround to structures and keep hard aprons free from silt and debris	Monthly Monthly
Inspection chambers and below ground control chambers	

Remove cover and inspect ensuring water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in autumn	Annually
Occasional Maintenance	
Check topsoil levels are 20mm above edges of baskets and chambers to avoid mower damage	As necessary
Remedial work	Frequency
Unpack stone in basket features and unblock or repair and repack stone as design detail as necessary.	As required
Repair physical damage if necessary.	As required

3.0 OVERFLOWS AND FLOOD ROUTES

- **Overflows** are overland across weirs, through gratings or within chambers and must be kept clear at all times to protect areas from flooding. They allow onward flow when part of the SuDS system is blocked.
- **Flood routes (exceedance routes)** allow water volumes that exceed the capacity of the SuDS system to pass through or round the site without causing damage to property. These routes must be clear of obstructions at all times.

OVERFLOWS AND FLOOD ROUTES	
Regular Maintenance	Frequency
Overflows. Jet pipes leading from overflow structures annually and check by running water through the overflow. Check free flow at next SUDS feature – inlet to basin or chamber.	Annually
Overflows. Remove any accumulated grass cuttings or other debris on top of grass weirs or stone filled baskets overflows.	Monthly
Flood Routes. Make visual inspection. Check route is not blocked by new fences, walls, soil or other rubbish. Remove as necessary.	Monthly
Remedial	Frequency
Overflows. If overflow is not clear then dismantle structure and reassemble to design detail.	As required

4.0 Cellular Storage

Cellular Storage	
Regular Maintenance	Frequency
Inspect inlets, outlets and control structures and remove obstructions and silt as necessary.	Monthly
Remove cover and inspect ensuring water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in autumn	Annually
Occasional Maintenance	
Remove silt from catchpits and cellular storage	As necessary
Remedial work	Frequency
Repair inlet/outlet if necessary, removal of silt build up	As required
Repair physical damage if necessary.	As required

5.0 INFILTRATION DEVICES - soakaways, infiltration trenches and infiltration basins

- **Infiltration basins, trenches, soakaways** and most of the preceding SuDs features allow water to soak into the ground.

SOAKAWAYS		
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 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 pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	As required, based on inspections
Remedial Actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring	Annually

6.0 PERMEABLE SURFACES

- **Permeable surfaces** including permeable block paving, porous asphalt, gravel or free draining soils that allow rain to percolate through the surface into underlying drainage layers. They must be protected from silt, sand, compost, mulch, etc. Permeable block paving can be cleaned by suction brushing.

PERMEABLE AND POROUS SURFACES	
Regular Maintenance	Frequency
Cleaning Brush regularly and remove sweeping from all hard surface	Monthly
Occasional Tasks	Frequency
Permeable Tasks Brush and vacuum surface once and year to prevent still blockage and enhance design life	Annually
Remedial Work	Frequency
Monitor effectiveness of permeable pavement and when water does not infiltrate immediately advise client of possible need for reinstatement of top layers or specialist cleaning. Recent experience suggest jet washing and suction cleaning will substantially reinstate pavement to 90% efficiently	As required
After Flood Event	Frequency
Brush and vacuum surface to remove silt / debris. If water still does not infiltrate immediately advise client of possible need of reinstatement of top layers or specialist cleaning. Check perforated pipework and outlet sumps.	After the flooding has subsided and is safe to undertake.

7.0 MANHOLES AND INSPECTION CHAMBERS

- **Manholes and Inspection Chambers** and rodding eyes are used on bends or where pipes come together and allow cleaning of the system if necessary. They should be designed out of the system where possible.

INLETS, OUTLETS, CONTROLS AND INSPECTION CHAMBERS	
Regular Maintenance	Frequency
Manholes and Inspection chambers and below ground control chambers	
Remove cover and inspect ensuring water is flowing freely and that the exit route for water is obstructed. Remove debris and silt. Undertake inspection after leaf fall in autumn.	Annually
Occasional Maintenance	Frequency
Check topsoil levels are 20mm above edges of baskets and chambers to avoid mower damage	As necessary
Remedial Work	Frequency
Unpack stone in basket features and unblock or repair and repack stone as design detail as necessary. Repair physical damage if necessary	As required

8.0 SPILLAGE – EMERGENCY ACTION

Most spillages on development sites are of compounds that do not pose a serious risk to the environment if they enter the drainage in a slow and controlled manner with time available for natural breakdown in a treatment system. Therefore small spillages of oil, milk or other known organic substances should be removed where possible using soak mats as recommended by the Environment Agency with residual spillage allowed to bio-remediate in the drainage system.

In the event of a serious spillage, either by volume or of unknown or toxic compounds, then isolate the spillage with soil, turf or fabric and block outlet pipes from chamber(s) downstream of the spillage with a bung(s). (A bung for blocking pipes may be made by wrapping soil or turf in a plastic sheet or close woven fabric.)

Contact the Environment Agency immediately.

9.0 QUERIES REGARDING A DESIGN FEATURE.

In the event of a concern or failure of a SuDs design feature contact The Baynham Meikle Partnership.

8 Meadow Road, Edgbaston, Birmingham B17 8BU

Tel: (0121) 434 4100

Email admin@bm-p.co.uk

10.0 RESPONSIBILITIES

The new on-site drainage will not be adopted and it is to remain in private ownership.

All drainage maintenance will be managed by Hellier Langston, details below:

Andy Hellier ah@hlp.co.uk

01329 220 111