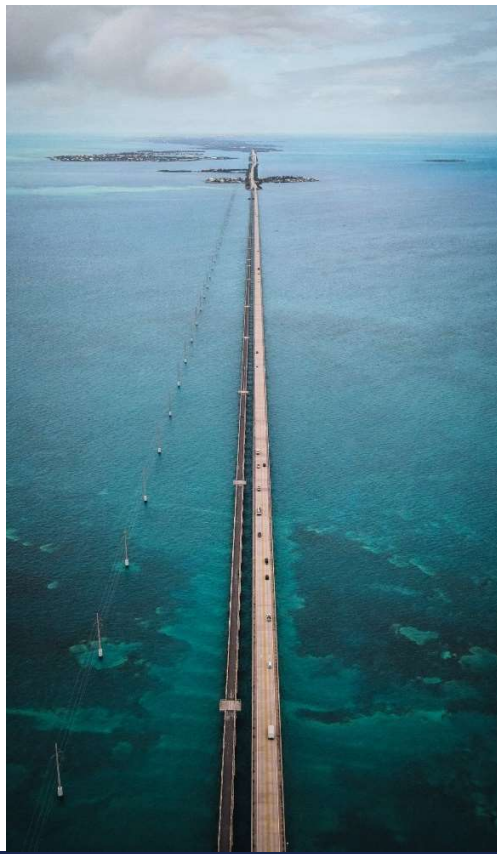




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Flood risk, water and environment

Surface Water Drainage Strategy AEG5048_SO32_Botley_05

Site Address: Boorley Park Primary School

Nairn Road

Botley

Hampshire

SO32 2SH

UK Experts in Flood Modelling, Flood Risk
Assessments, and Surface Water Drainage Strategies

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Flood risk, water and environment

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Site Location: Boorley Park Primary School, Nairn Road, Botley, Hampshire, SO32 2SH

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1. Introduction

- 1.1. Aegaea were commissioned by NH Developments Ltd to undertake a Surface Water Drainage Strategy (SWDS) to discharge planning conditions 4 and 5 attached to planning application F/23/96256. The conditions are as follows;

Condition 4 – Drainage

No development shall start on site until a detailed surface water drainage scheme for the site, based on the principles set out within the Flood Risk Assessment and Surface Water Drainage Strategy Revision A (Aegaea, ref. AEG02758_S032_Botley_07), has been submitted to and approved in writing by the Local Planning Authority. The submitted details shall include:

- a. A technical summary highlighting any changes to the design from that within the approved Flood Risk Assessment.*
- b. Detailed drainage plans to include type, layout and dimensions of drainage features including references to link to the drainage calculations.*
- c. Detailed drainage calculations to demonstrate existing runoff rates are not exceeded and there is sufficient attenuation for storm events up to and including 1:100 + climate change.*
- d. Confirmation that sufficient water quality measures have been included to satisfy the methodology in the Ciria SuDS Manual C753 particularly in relation to the proprietary treatment device.*
- e. Exceedance plans demonstrating the flow paths and areas of ponding in the event of blockages or storms exceeding design criteria.*

Reason:

To ensure suitable drainage to prevent flood risk, in accordance with Policy DM6 of the Eastleigh Borough Local Plan (2016-2036).

Condition 5 - Drainage maintenance

Prior to first occupation of the development hereby permitted, details for the long term maintenance arrangements for the surface water drainage system shall be

submitted to and approved in writing by the Local Planning Authority. The details shall include:

- a. Maintenance schedules for each drainage feature type and ownership;*
- b. Details of protection measures.*

The drainage system shall thereafter be maintained in accordance with the approved details.

Reason:

To ensure long term management of the drainage system to protect against flood risk, in accordance with Policy DM6 of the Eastleigh Borough Local Plan (2016-2036).

Site Overview

- 1.2. The site of the proposed development is Boorley Park Primary School, Nairn Road, Botley, Hampshire, SO32 2SH (Figure 1).



Figure 1: Site Location (Base map and data from Google Satellite Imagery)

- 1.3. The existing site is an undeveloped field adjacent to a school. It is understood that the proposed development is for the erection of a single-storey children's nursery with off road car parking (development proposals are included as Appendix A).
- 1.4. The Topographic Survey of the site is included in this report as Appendix B. The maximum ground elevation at the site is approximately 26.37m AOD (Above Ordnance Datum) in the northwest and the minimum ground elevation is approximately 22.59m AOD in the southeast.
- 1.5. Environment Agency (EA) Light Detection and Ranging (LiDAR) data Digital Terrain Model has been used to visualise the topography of the site (Figure 2).

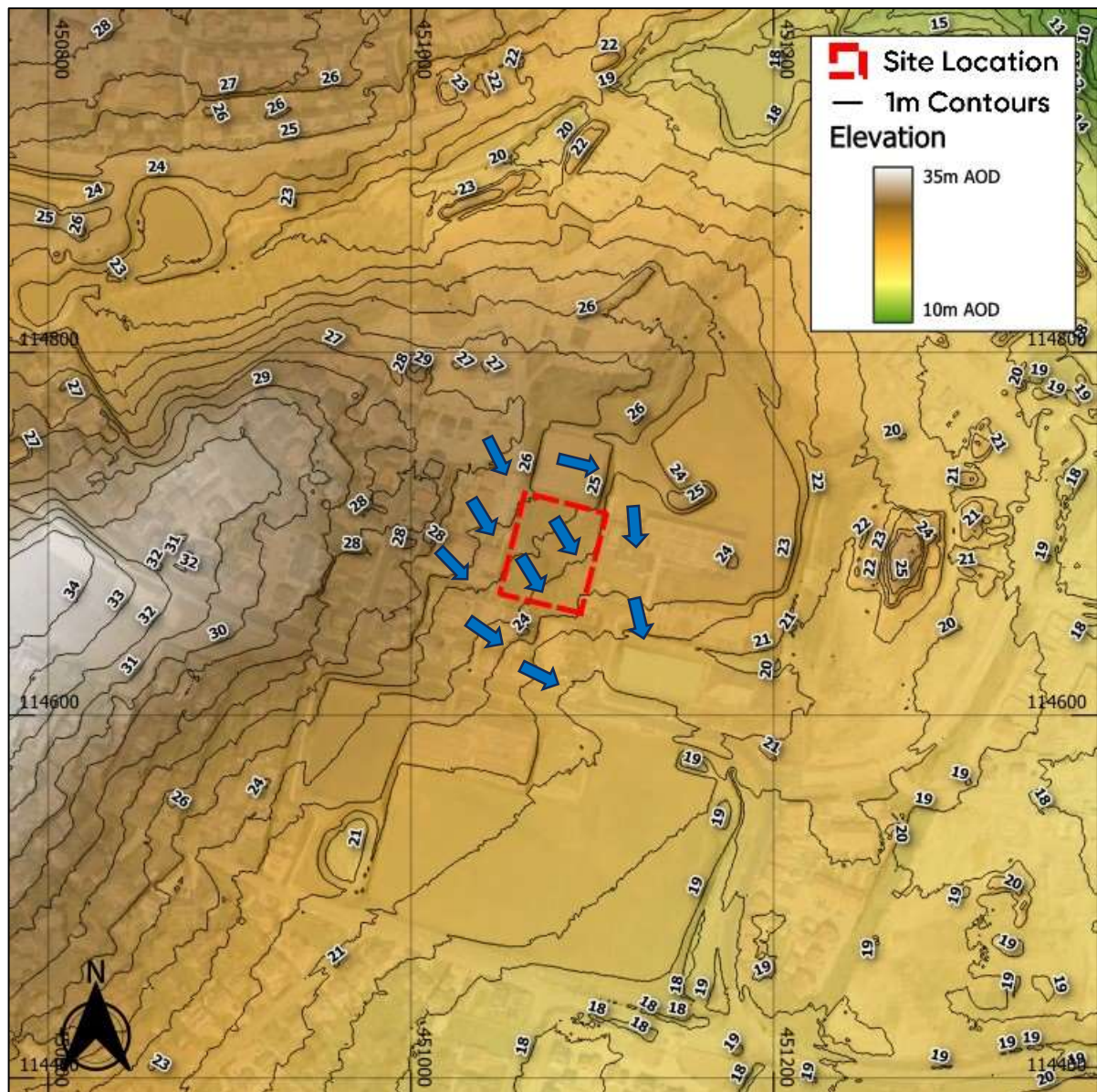


Figure 2: Site Topography and Existing Overland Flow Pathways (Base map and data from Google Satellite Imagery)

- 1.6. Eastleigh Borough Council is the Local Planning Authority (LPA) for the site and Hampshire Council is the designated Lead Local Flood Authority (LLFA). The site sits within the Environment Agency's Solent and South Downs region.

The Local Plan

- 1.7. Policy DM6, *Sustainable Surface Water Management and Watercourse Management* – sets out the requirements for how and when Sustainable Drainage Systems should be utilised.

1. New development (excluding extensions to dwellings and changes of use), will only be permitted if it incorporates Sustainable Drainage Systems (SuDS). Wherever feasible, naturalised filtration should be included within the treatment train as follows:

a. On sites of 1 hectare or more, or within 100m of the River Itchen SAC or Solent Maritime SAC, SuDS schemes should include at least three forms of naturalised filtration. On sites within 100m of headwaters and tributaries draining into a SAC, SuDS schemes should include at least three forms of naturalised filtration unless hydrological studies and project-level Habitats Regulations Assessment demonstrate this to be unnecessary to protect the integrity of the SAC and its qualifying features;

b. On other sites of between 0.5 hectares and 1 hectare, SuDS schemes should include at least two forms of naturalised filtration; and

c. On other sites of less than 0.5 hectares non-naturalised SuDS e.g. permeable paving will be considered where justified.

2. In order to reduce flooding and maintain water quality (in accordance with DM8) SuDS schemes should:

a. be designed and monitored in accordance with the CIRIA C753 SuDs Manual or equivalent national or local guidance, noting that all receiving waters in the Borough should be classified as protected waters;

b. manage surface water runoff as close to its source as possible;

c. ensure that discharge rates are reduced as far as possible and that on greenfield sites these should at least mirror greenfield rates before development;

d. be provided as part of any application for outline or full planning permission;

e. where discharge is to a wetland or wet woodland habitat, flows off site must mirror the natural hydrological pathways;

f. include clear arrangements for their whole life management and maintenance.

3. Where a watercourse is present on a development site, it should be retained or restored into a natural state and enhanced where possible. The culverting of any watercourse will not generally be permitted, and development should wherever possible remove any existing culverts and increase on-site flood storage. Development should be laid out to enable maintenance of the watercourse.

4. Where development drains into a waterway connected to the Natura 2000 or Ramsar network a site specific Construction Environment Management Plan must be prepared before permission.

2. Consultation and Review

Documents and Online Mapping

2.1. Local Governments and Lead Local Flood Authorities provide documents which contain data and policies on flood risk and new development in their areas. These documents are introduced and briefly summarised below.

2.2. The following sources of information have been reviewed for this assessment:

- Geoindex Onshore (British Geological Survey, 2022)
- Eastleigh Borough Local Plan (2016-2036) (Eastleigh Borough Council, 2022)¹
- Hampshire County Council Preliminary Flood Risk Assessment (2011)²
- Hampshire County Council Local Flood and Water Management Strategy (2020)³
- Eastleigh Borough Council Strategic Flood Risk Assessment, Update (2016)⁴
- CIRIA C753 SuDS manual⁵

CIRIA C753 SuDS manual

2.3. The CIRIA SuDS manual has been used throughout this SWDS in order to determine an appropriate strategy for the proposed development. This guidance covers the planning, design, construction and maintenance of Sustainable Drainage Systems (SuDS) to assist with their effective implementation within both new and existing developments. It looks at how to maximise amenity and biodiversity benefits and deliver the key objectives of managing flood risk and water quality. There is also supporting information covering topics such as materials, landscape design, maintenance, community engagement and costs and benefits.

¹ <https://www.eastleigh.gov.uk/media/11234/eastleigh-borough-local-plan.pdf>

² <https://documents.hants.gov.uk/flood-water-management/watercourses/PFRAResportsavedJan2016.pdf>

³ <https://documents.hants.gov.uk/flood-water-management/local-flood-water-management-strategy.pdf>

⁴ <https://www.push.gov.uk/wp-content/uploads/2018/05/Eastleigh.pdf>

⁵ https://www.ciria.org/CIRIA/Memberships/The_SuDs_Manual_C753_Chapters.aspx

3. Surface Water Drainage Strategy

Ground Conditions

- 3.1. The British Geological Survey's (BGS) mapping shows no superficial deposits underlying the site. The bedrock underlying the site is Wittering Formation comprising sand, silt and clay.
- 3.2. Historical BGS boreholes approximately 20m northeast of the site (BGS Ref: SU51SW110) show the standing water level was encountered at 1.7m below ground level (bgl). The standing water level was measured twice more at the same borehole site at 1.5m bgl, and 4.6m bgl.
- 3.3. BRE365 Infiltration testing was conducted on site on the 24th August 2024 and the results are included in this report as Appendix C. The results of the tests show that infiltration will not be possible on site. Within test pits TP01 and TP04, three complete tests cycles could not be complete within a full day. As such, this drainage strategy discounts the use of infiltration, and all attenuation features are to be lined to prevent infiltration.

Watercourses

- 3.4. The nearest main river to the site is the Ford Lake River situated approximately 450m to the east of the site flowing south towards Botley.
- 3.5. There is a series of Ordinary Watercourses located approximately 114m east of the site that are assumed to be field drains providing positive drainage to the school fields adjacent to the site.
- 3.6. Therefore, it is not feasible to discharge surface water runoff from the proposed development into watercourses this distance from the site, as land outside of the site would have to be crossed.

Sewers

- 3.7. Southern Water Asset Plans were provided and are included in this report as Appendix D – Southern Water Consultation (a section of the plan is reproduced as Figure 3 below). Figure 3 shows that there are no public sewers in the immediate vicinity of the site.



Figure 3: Sewer Asset Plan (Source: Southern Water)

- 3.8. However, despite this, it is understood that the surrounding residential development has a sewer network with a surface water sewer beneath Nairn Road adjacent to the site.
- 3.9. While the Southern Water asset plan shows no public sewers in the area, this may be due to the sewers being new and not yet reflected on the Southern Water system. The client has provided liaison with Southern Water that there is an agreement in principle (Section 106 Agreement – 11740 - 26/03/2020) for the connection to the manhole beneath Nairn Road. Connection approval included as Appendix E.

Existing Drainage Infrastructure

- 3.10. At present there is no drainage infrastructure serving the site. However, the client understands that there is a 300mm surface water drain at the site entrance connecting the site to the sewer beneath Nairn Road. As such, this connection is to be used for this drainage strategy.

Greenfield Runoff Rate

- 3.11. The total site area is approximately 0.29ha.
- 3.12. The proposed plans indicate that the development includes a total hardstanding area of approximately 2,021m² (0.202ha).
- 3.13. The IH-124 method was developed as part of the original Flood Studies Report (FSR) in 1975 and was devised to calculate runoff from small catchments by estimating the mean annual flood flow (Qbar) using the following equation:

$$QBAR_{\text{rural}} = 0.00180 \times \text{AREA}^{0.89} \times \text{SAAR}^{1.17} \times \text{SOIL}^{2.17}$$

Where:

Qbar_{rural} is the mean annual flood flow from a rural catchment (approximately 2.3 year return period).

AREA is the area of the hardstanding surfaces in ha.

SAAR is the Standard Average Annual Rainfall for the period 1941 to 1970 in mm.

SPR is Standard Percentage Runoff coefficient for the SOIL category. The SOIL category is extracted from UK Winter Rainfall Acceptance Potential (WRAP) map.

- 3.14. The ICP SuDS variation is a scaled-down version of the IH-124 runoff method for estimating peak flow rates from both undeveloped and partly urbanised catchments that are smaller than 50 ha in size, which is appropriate in this instance.
- 3.15. The parameters used for estimating the greenfield runoff rates for the site are presented in Table 1.

Table 1: ICP SuDS Input Parameters

Greenfield runoff rates from the site - simulation criteria	
Rainfall Data	FSR
Area	0.202 Ha
SAAR	800.0
SOIL	0.470

Region	Region 7
--------	----------

3.16. Table 2 displays the estimated Q_{BAR} greenfield runoff rate for an impermeable area of 0.202ha is 1.1l/s.

Table 2: Greenfield Runoff Rates

Return Period	Greenfield Runoff Rate (l/s)
1 in 1 Year	1.0
1 in 2 Year (QBAR)	1.1
1 in 30 Year	2.6
1 in 100 Year	3.6

Surface Water Drainage Strategy

- 3.17. In accordance with the SuDS Management train approach, the use of various SuDS measures to reduce and control surface water flows have been considered in detail for the development.
- 3.18. The management of surface water has been considered in respect to the SuDS hierarchy below (Table 3), as detailed in the CIRIA 753 “The SuDS Manual” (section 3.2.3).

Table 3: SuDS Drainage Hierarchy

SuDS Drainage Hierarchy				
			Suitability	Comment
	1.	Infiltration	x	BRE365 Infiltration testing was conducted on site on the 24th August 2024 and the results are included in this report as Appendix C. The results of the tests show that infiltration will not be possible on site. Within test pits TP01 and TP04, three complete tests cycles could not be complete within a full day. As such, this drainage strategy discounts the use of infiltration, and all attenuation features are to be lined to prevent infiltration.
	2.	Discharge to surface waters	x	The nearest Main River to the site is the Ford Lake River situated approximately 450m to the east of the site flowing south towards Botley. There is a series of Ordinary Watercourses located approximately 114m southeast of the site that are assumed to be field drains providing positive drainage to the school fields north of the site. Therefore, it is not feasible to discharge surface water runoff from the proposed development into watercourses this distance from the site, as land outside of the site would have to be crossed.
	3.	Discharge to surface water sewer, highway drain or similar	✓	The client has provided liaison with Southern Water that there is an agreement in principle (Section 106 Agreement - 11740 - 26/03/2020) for the connection to the manhole beneath Nairn Road.
	4.	Discharge to combined sewer	x	A more favourable method of discharge in the drainage hierarchy has been chosen.

3.19. On review of the SuDS drainage hierarchy, and with reference to both national and local policy, it is proposed that the surface water runoff from the development is managed via permeable tarmac and geocellular storage. The primary method of attenuation will be an underground attenuation tank; however, additional storage will be provided by the permeable tarmac. It is agreed with Southern Water that surface water from the proposed development will ultimately be discharged to public surface water sewer beneath Nairn Road at a restricted rate of 2l/s (as close to the greenfield rate as possible) via a hydrobrake (reference: 0066-2000-0900-2000).

3.20. It is proposed that the drainage infrastructure connects into the existing 300mm surface water drain at the site entrance, connecting the site to the sewer beneath Nairn Road.

Changes to the Surface Water Drainage Strategy

3.21. The approved Flood Risk Assessment and Surface Water Drainage Strategy included a drainage layout which has been adjusted as part of this detailed design. The changes to the design from the high level planning stage to this design are listed below;

- Permeable block paving changed to permeable tarmac construction;
- Gullies convey surface water from the carpark into a Downstream Defender for treatment;
- Raised SuDS planters are replaced with silt traps for the treatment of surface water from development the roof;
- Surface water is discharged into an existing 300mm surface water drain on site. From here surface water discharges into the Southern Water asset;

3.22. The proposed Surface Water Drainage Layout is included as Appendix F.

InfoDrainage Calculations

3.23. A network model has been produced in InfoDrainage software (v2025.2).

3.24. The model comprises;

- 7no. contributing catchment area representing the proposed roof area, patio areas, carpark, play area, and building roof for a total of 0.202ha;
- 1 geocellular attenuation unit 7.0m (W) x 16.0m (L) x 1.0m (H), with 95% porosity (107.060m³ storage provided). Hydrobrake outlet, restricting flows into the existing public sewer to 2l/s (reference: CHE-0066-2000-0900-2000);
- 4no. lined permeable tarmac (Type C) units representing the patio area to the west, south and east of the building, and the play area to the north, with a total plan area of 485m², porosity of 30%. The depth of all permeable tarmac units sub-base is 0.2m;
- 5no. proposed surface water manholes;
- 1 existing manhole representing the proposed outlet beneath Nairn Road;

3.25. Runoff from the patio areas and play area has been applied as lateral inflows into the associated permeable tarmac units. The proposed access road and carpark has been applied as point inflows into the underground drainage network.

3.26. Table 4 summarises the simulation criteria for the InfoDrainage model.

Table 4: Simulation Parameters

Catchment Area Simulation Parameters	
Rainfall Data	FSR
Total Area	0.202 Ha
Return Periods	1, 30, 30+40% for climate change, 100, 100 +45% for climate Change. Summer and Winter
Storm Durations	15, 30, 60, 120, 240, 360 (6hr), 480, 960, 1440, 2660 minute
Volumetric Runoff Coefficient	0.9 (summer and winter storms)
Percentage Impervious	100%
Time of Concentration	5 minutes

Results for the 1 in 100 Year +45% Climate Change Critical Storm Event

3.27. The full calculation outputs can be found in Appendix G of this report although the 1in100year +45% climate change results have been summarised below:

- The maximum modelled flow from the hydrobrake at the geocellular tanks outlet would be 2l/s for the critical storm event (480 minute winter).
- The maximum depth in the 1.0m deep geocellular storage tank would be 0.951m for the critical storm event (480 minute winter).
- The maximum depth in the 0.20m deep permeable tarmac units is 0.184 for the critical storm event (120 minute summer).

3.28. No flooding is observed in the critical storm event based on the InfoDrainage model.

3.29. As such, these results indicate that the runoff from the proposed development could be accommodated within a drainage system of the approximate size modelled, with surface water runoff restricted to 2l/s.

Maintenance

3.30. Table 5 presents details regarding the maintenance requirements for the proposed SuDS included as part of the development, taken from the CIRIA C753 The SuDS manual. Each manufacturer will have bespoke requirements however the below should be used as a guide.

Table 5: Specific SuDS Maintenance Requirements (Source: CIRIA SuDS Manual)

Maintenance Schedule	Required Action	Typical Frequency
Permeable Tarmac		
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than a sprayer	As required
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper structure by remedial sweeping	Every 10 to 15 years as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation

	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48hr after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually
Geocellular Storage		
Regular Maintenance	Inspect and identify any area that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial Actions	Repair/ rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/ check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required
Highway Gullies		
Regular Maintenance	Remove sediment and debris from gullies and channel drain	Quarterly

Downstream Defender

- 3.31. Maintenance should be undertaken as often as required. The maintenance responsibility for all systems should be placed with an appropriate organisation. Maintenance is to be undertaken in accordance with the manufacturer's guidelines.

Hydro International's General Guidance:

- 3.32. Maintenance is carried out from the surface, using a standard vacuum tanker and personnel are not required to enter the device.
- 3.33. With capacity to store sediments and oils and with the ability to prevent wash out, maintenance intervals can potentially be years rather than months - depending on site conditions. The unit can also be fitted with monitoring systems to alert the maintenance company when maintenance is required.

Hydrobrake

- 3.34. The Hydro-International maintenance requirements for a hydrobrake are included below;

Normally, little maintenance is required as there are no moving parts within the Flow Control. Experience has shown that if blockages occur they do so at the intake, and the cause on such occasions has been due to a lack of attention to engineering detail such as approach velocities being too low, inadequate benching, or the use of units below the minimum recommended size. The Flow Control (where applicable) is fitted with a pivoting bypass door, which allows the manhole chamber to be drained down should blockage occur. The smaller conical units, below the minimum recommended size, are also supplied with rodding facilities or vortex suppressor pipes as standard.

Following installation of the Flow Control it is vitally important that any extraneous material i.e. building materials are removed from the unit and the chamber. After the system is made live, and assuming that the chamber design is satisfactory, it is recommended that each unit be inspected monthly for three months and thereafter at six monthly intervals with hose down if required. If problems are experienced, please do not hesitate to contact the company so that an investigation may be made.

All Flow Control units are typically manufactured from grade 304 Stainless Steel, and if required they can also be manufactured in grade 316 Stainless Steel. Both materials have an estimated life span in excess of the design life of drainage systems

Table 6: SuDS Operation and Maintenance Activities

TYPICAL KEY SUDS COMPONENTS OPERATION AND MAINTENANCE ACTIVITIES													
Operation and Maintenance Activity	SuDS Component												
	Pond	Wetlands	Detention Basin	Infiltration Basin	Soakaway	Infiltration Trench	Filter Drain	Modular Storage	Pervious pavement	Swale/Bioretenention	Filter Strip	Green Roofs	Proprietary Treatment
Regular Maintenance													
Inspection	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Litter/debris removal	✓	✓	✓	✓	-	✓	✓	-	✓	✓	✓	X	-
Grass cutting	✓	✓	✓	✓	-	✓	✓	-	-	✓	✓	X	X
Weed/invasive plant control	-	-	-	-	X	-	-	X	-	X	-	✓	X
Shrub management	-	-	-	-	X	X	X	X	-	-	-	x	X
Shoreline vegetation management	✓	✓	-	X	X	X	X	X	X	X	X	X	X
Aquatic vegetation management	✓	✓	-	X	X	X	X	X	X	X	X	X	X
Occasional Maintenance													
Sediment Management	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vegetation replacement	-	-	-	-	X	X	X	X	X	-	-	✓	X
Vacuum sweeping and brushing	X	X	X	X	X	X	X	X	✓	X	X	X	X
Remedial Maintenance													

Structure rehabilitation/repair	-	-	-	-	-	-	-	-	-	-	-	-	X
Infiltration reconditioning surface	X	X	X	-	-	-	-	X	-	-	-	X	X
Key:													
Will be Required	✓	May be Required						-	Not Normally Required				X

3.35. All onsite SuDS and drainage systems will be privately maintained. A long-term maintenance regime should be agreed with the site owners before adoption. In addition to a long-term maintenance regime, it is recommended that all drainage elements implemented on site should be inspected following the first rainfall event post construction and monthly for the first quarter following construction.

3.36. The maintenance of proprietary devices will be subject to the final installed product and should be undertaken in accordance with the Manufacturers maintenance schedule and regime. The proposals have aimed to incorporate mechanisms that require minimal maintenance and reduce failure liability.

Visual Inspection/ Sweep

3.37. This should include a systematic review of the drainage infrastructure. Each element should be inspected to determine if remedial actions are needed. Where access chambers are provided, these should be used to access below ground infrastructure:

- Rodding eyes / inspection chambers are provided at both ends of all perforated pipes; these should be used to determine the level of silt within the system.
- Non-man entry inspection chambers are provided for the geo-cellular structure.
- Permeable paving should be inspected for vegetation / defects (rocking blocks), it should be swept clear of debris.

System Test

3.38. The surface water drainage system should be CCTV surveyed and dye tested at least every ten years.

Replacement of elements

3.39. Should the replacement of any element be required, this should be undertaken in accordance with the manufacturer's specifications and in a planned and controlled manner. Working on live drainage systems can pose a health and safety hazard and should only be undertaken by a competent contractor.

Surface water management during construction

3.40. The surface water runoff generated during construction has the potential to have higher concentration of oils and sediments from heavy machinery and earthworks respectively. As such, it is necessary to devise appropriate surface water management plans tailored to specific construction activities and receptors of runoff. Specific considerations are:

- Provision of appropriate bunding / containment for potentially hazardous materials / chemicals;
- Re-fuelling of plant and equipment to take place only within designated areas, with suitable pollution containment;
- Good house-keeping on site to prevent accidental spillages, and spill kits to be provided as appropriate;
- Vehicle wash down areas / wheel cleaning to be located in areas with appropriate pollution control measures;
- If water/spray dust suppression is needed, the run-off should be directed to a temporary containment area, and should not be allowed to discharge to the public sewer / infiltration devices;
- The installed surface water drainage network should be routinely inspected during construction, especially the infiltration devices; and,
- Suitable protection measures should be in place during construction to protect the watercourse and groundwater resources.

Spillage – Emergency Action

3.41. 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.

- 3.42. In the event of a serious spillage, either by volume or of unknown or toxic compounds, then this should be isolated 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.

Designing for Exceedance

- 3.43. Periods of exceedance occur when the rate of surface water runoff exceeds the drainage system capacity. Conveyance beneath ground cannot, generally, be economically or sustainably constructed to the scale required for the most extreme rainfall events. This may result, on occasion, in the surface water runoff exceeding the capacity of the drainage network, with excess water (exceedance flow) being conveyed above ground.
- 3.44. For situations where extreme rainfall intensity exceeds inlet capacities, or for extreme storm events exceeding the design flood event considered for drainage design, surface water would flow overland towards the south/ southeast towards landscaped area adjacent to the carpark.

Water Quality

- 3.45. Runoff from a school roof is considered to have a low pollution hazard indices in the CIRIA SuDS Manual guidance. As this is considered low contamination risk, it would not usually warrant any significant treatment. All downpipes should be fitted with silt traps (PSMST160 - Polypipe Polystorm Basic Silt Trap) to reduce the amount of sediment entering the subsurface piped network.
- 3.46. In order to assess the impact of the carpark the "Pollution hazard indices for different land use classifications", provided in the CIRIA SuDS Manual (C753) as table 26.2, has been reviewed.
- 3.47. The pollution hazard indices for low trafficked roads are 0.5, 0.4 and 0.4 for Total Suspended Solids, Metals and Hydrocarbons, respectively. As such, surface water on the carpark should be conveyed into a Downstream Defender, providing 0.5, 0.4, and 0.5 pollution mitigation indices for Total Suspended Solids, Metals and Hydrocarbons, respectively. See Appendix H for further details on the Downstream Defender.

4. Conclusions

- 4.1. This SWDS has been undertaken to provide sufficient information with regards to the planning conditions 4 and 5 attached to planning application F/23/96256.

Condition 4

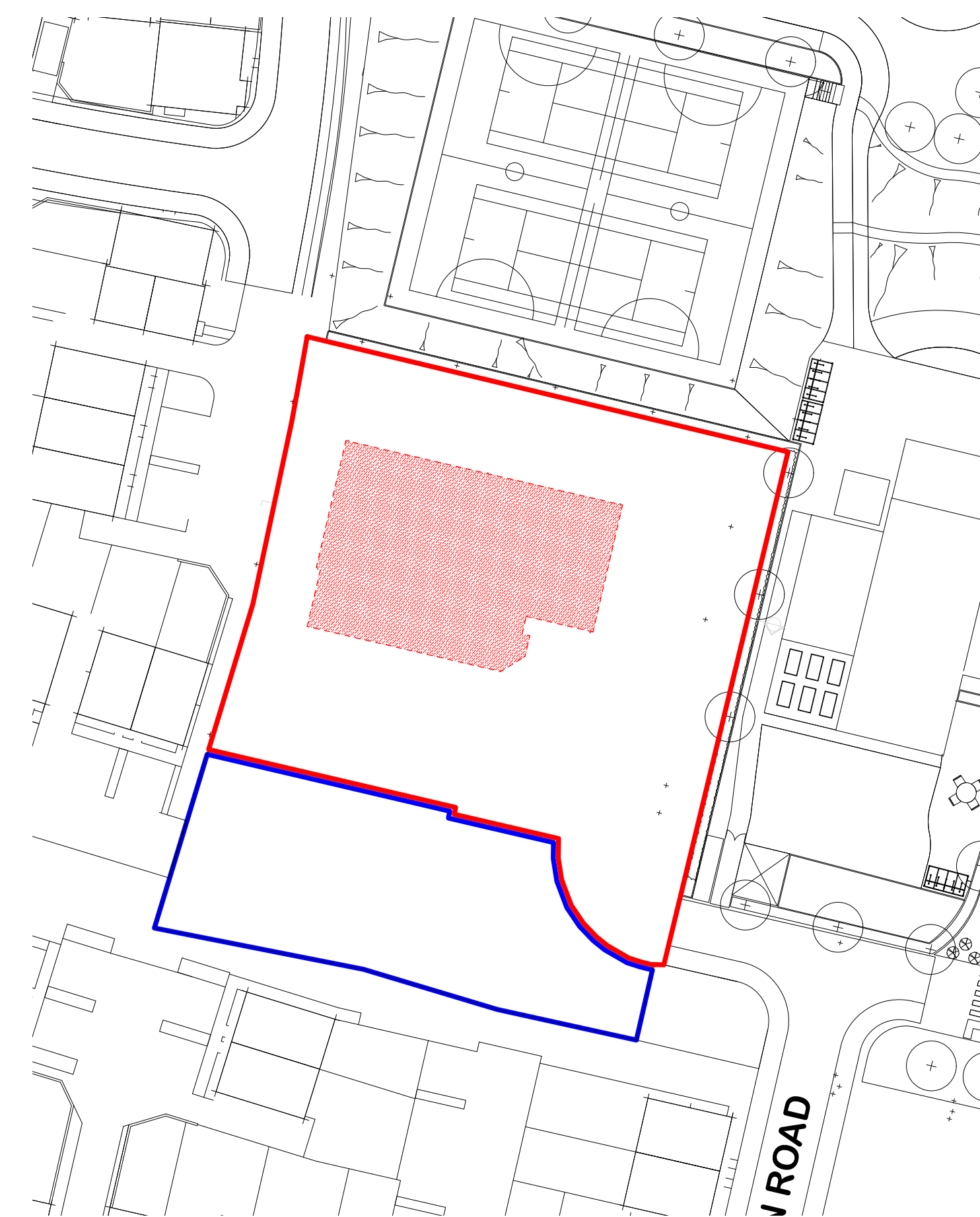
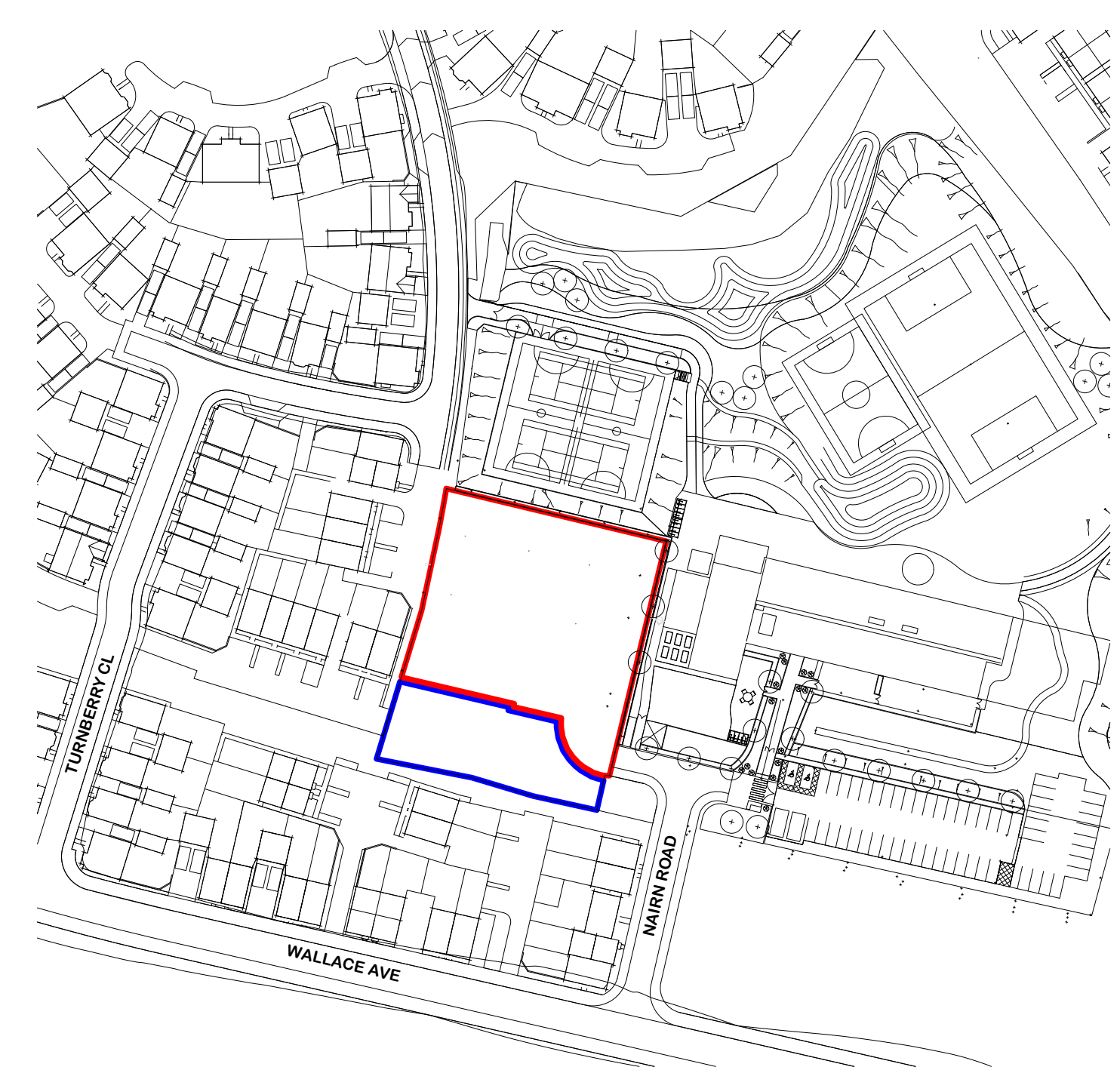
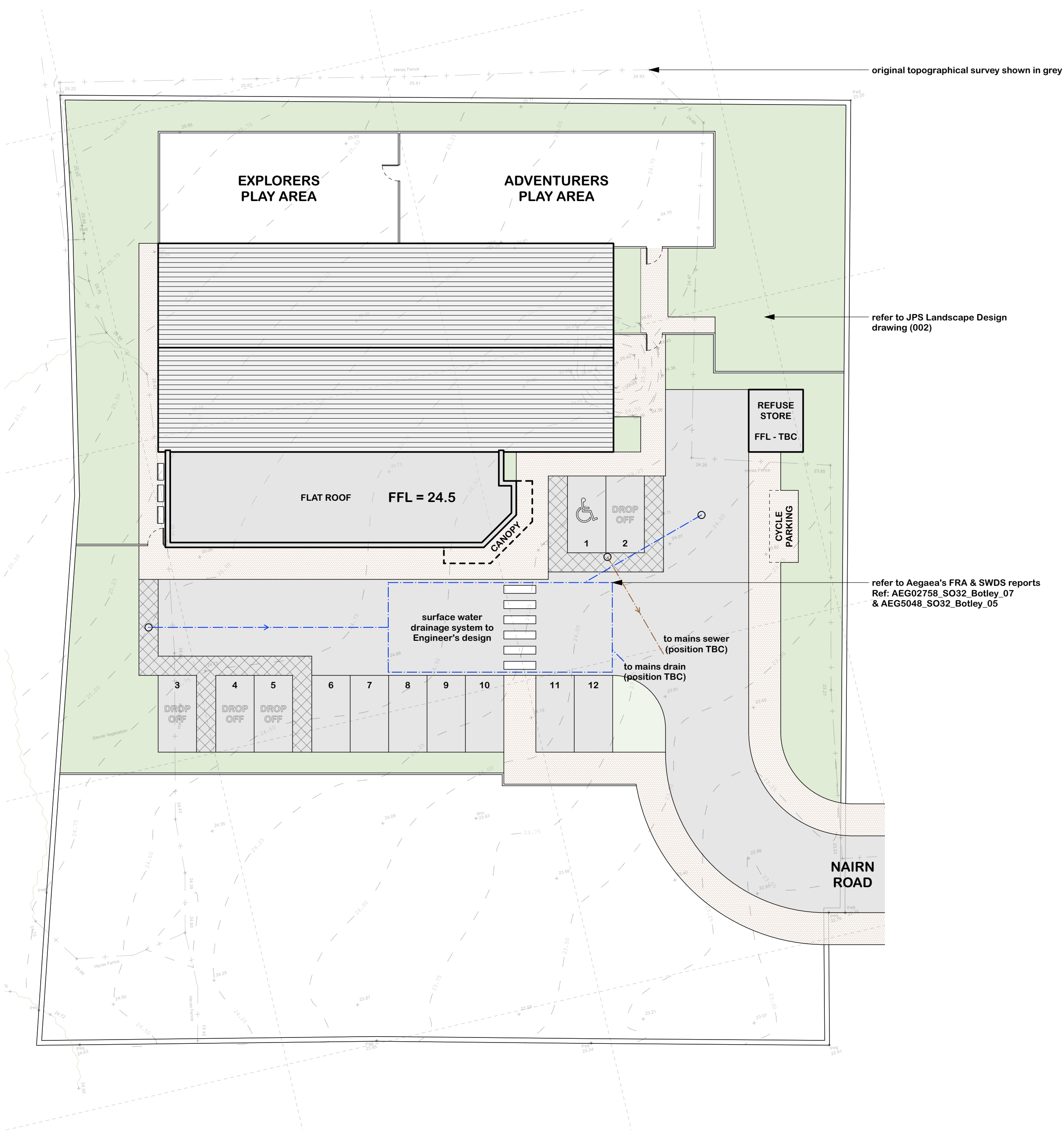
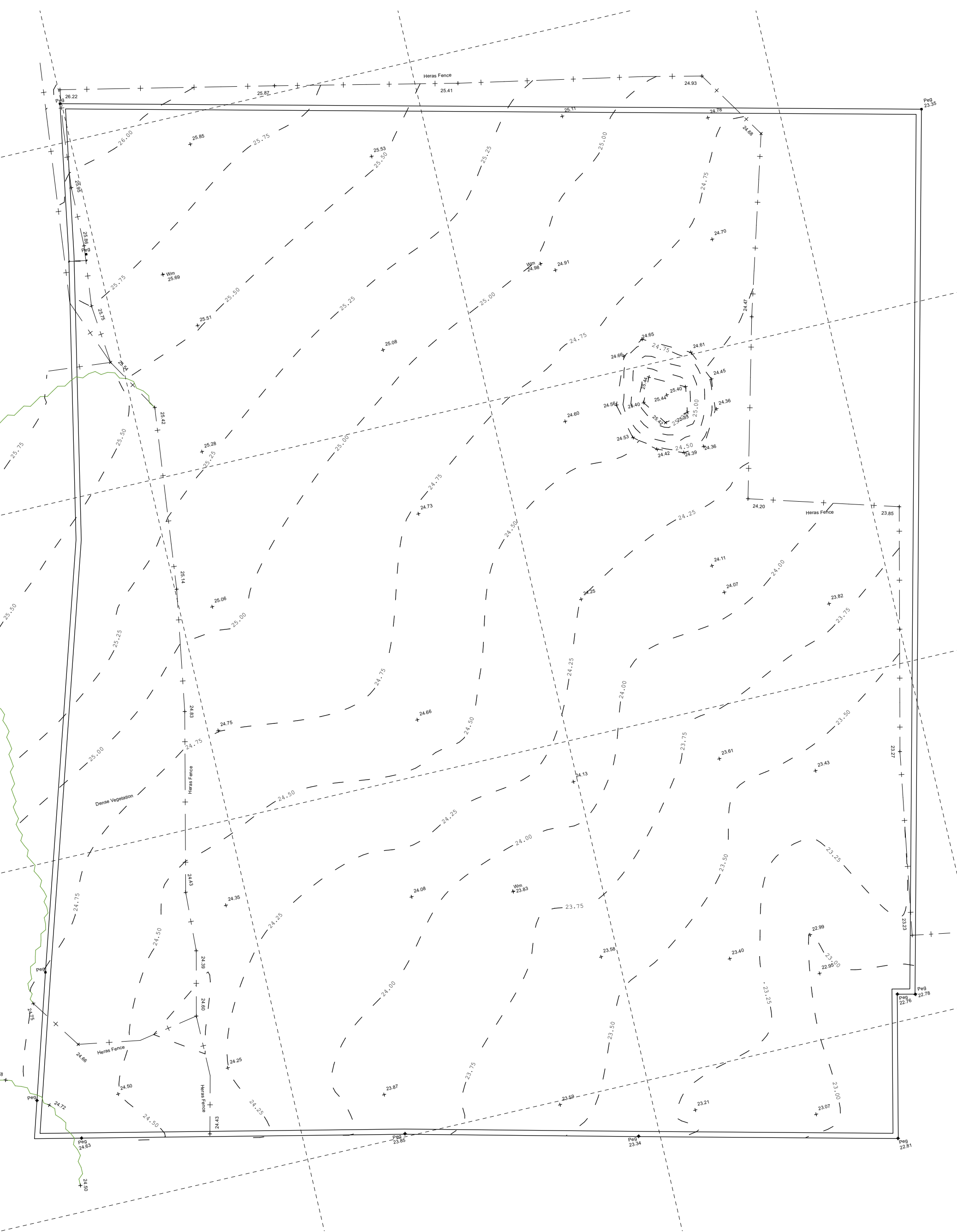
- 4.2. On review of the SuDS drainage hierarchy, and with reference to both national and local policy, it is proposed that the surface water runoff from the development is managed via permeable tarmac and geocellular storage. The primary method of attenuation will be an underground attenuation tank; however, additional storage will be provided by the permeable tarmac. It is agreed with Southern Water that surface water from the proposed development will ultimately be discharged to public surface water sewer beneath Nairn Road at a restricted rate of 2l/s (as close to the greenfield rate as possible) via a hydrobrake (reference: 0066-2000-0900-2000).
- 4.3. It is proposed that the drainage infrastructure connects into the existing 300mm surface water drain at the site entrance, connecting the site to the sewer beneath Nairn Road.
- 4.4. The full calculation outputs can be found in Appendix G of this report although the 1in100year +45% climate change results have been summarised below:
- The maximum modelled flow from the hydrobrake at the geocellular tanks outlet would be 2l/s for the critical storm event (480 minute winter).
 - The maximum depth in the 1.0m deep geocellular storage tank would be 0.951m for the critical storm event (480 minute winter).
 - The maximum depth in the 0.20m deep permeable tarmac units is 0.184 for the critical storm event (120 minute summer).
- 4.5. No flooding is observed in the critical storm event based on the InfoDrainage model.
- 4.6. As such, these results indicate that the runoff from the proposed development could be accommodated within a drainage system of the approximate size modelled, with surface water runoff restricted to 2l/s.

Condition 5

- 4.7. This report includes a maintenance schedule and details for permeable tarmac, geocellular storage and a Hydrobrake.
- 4.8. All SuDS are to be maintained by the tenant of the property (Happy Days Nursery as of 2026).

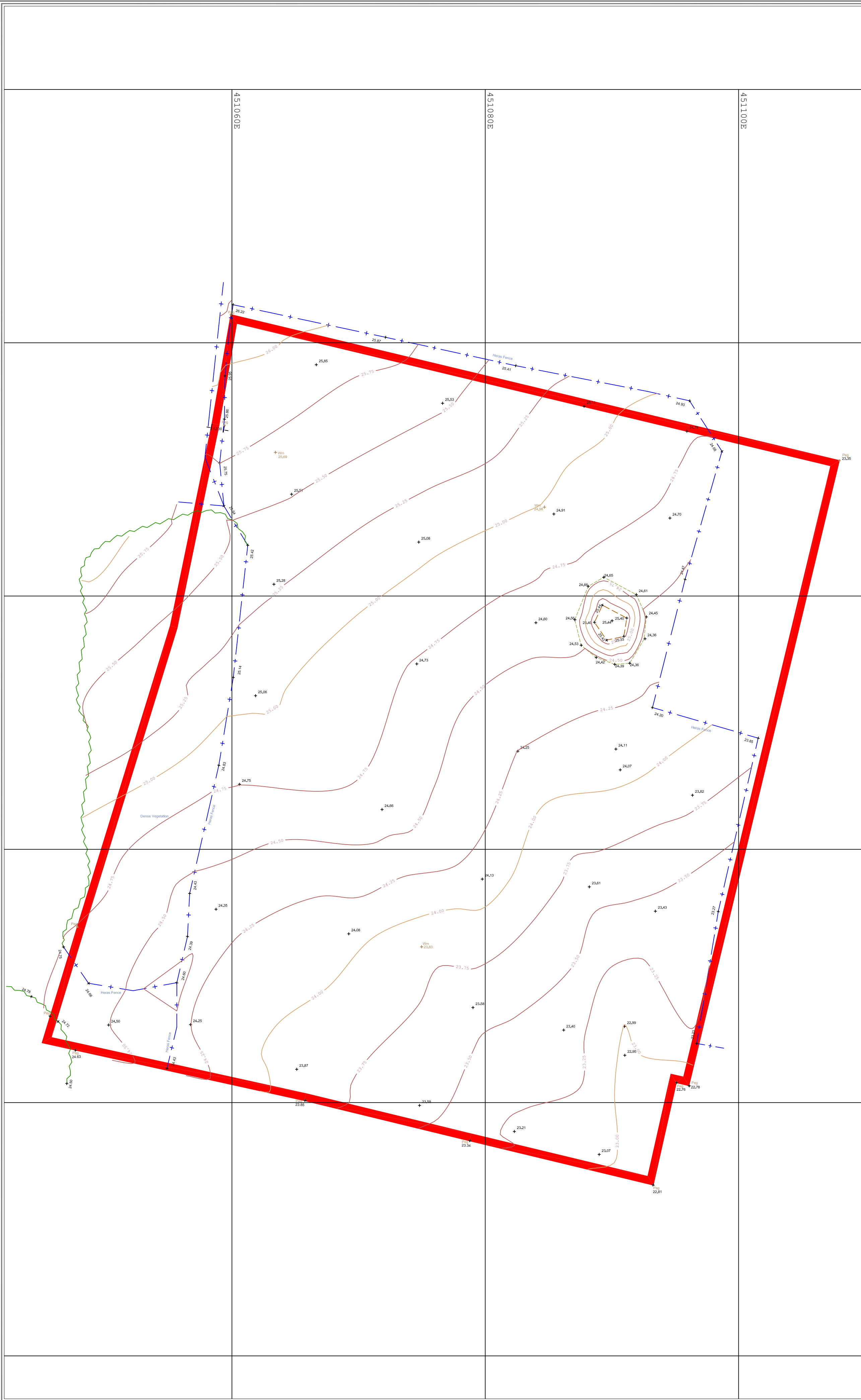
- 4.9. This Surface Water Drainage Strategy should be submitted to provide the requested detail with regards to planning conditions 4 and 5 attached to planning application F/23/96256.

Appendix A - Development Proposals



REV	DATE	NOTES	SCALE		BY
PROJECT Proposed Children's Nursery			1"	1"	100'
ADDRESS Land adj. to Boortley Park Primary School, Nairn Road, SO32 2SH			1"	1"	100'
CLIENT NH Developments			1"	1"	100'
PURPOSE Building Regulations			1"	1"	100'
DRAWING Site and Location Plans			1"	1"	100'
DATE May 2024			1"	1"	100'
PAPER A1			1"	1"	100'
DRAWING NO. 2406-BR01			1"	1"	100'

Appendix B - Topographic Survey



Station Information:

Station	Easting (m)	Northing (m)	Level (m)
GH1	451112.842	114650.437	22.173
GH2	451098.359	114600.395	20.459

OS Note:
Some services may have been omitted due to parked vehicles.
The Ordnance Survey file is to be used as a guide only.

OS Buildings Surveyed Buildings

This survey has been orientated to the Ordnance Survey (O.S.) National Grid OSGB36(15) via Global Navigational Satellite Systems (GNSS) and the O.S. Active Network (OS Net).

A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models.

The survey has been correlated to this point and a further one or more OSGB36 (15) points established to create a true O.S. bearing for angle orientation.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.

Please refer to Survey Station Table to enable establishment of the on-site grid and datum.

Legend:

Buildings	Overhead Cable	Inspection chamber	Sewer
Wall	Concrete edge	Pipe level	Manhole
Road line	Glass edge	Gully	Roadman
Line marking	Glass edge	Bank gully	Vent pipe
Drainage	Concrete kerb	Down pipe	Ground light
Centre line	Kerb	Pipe above ground	Litter
Trip of bank	Bottom of bank	Manhole	Step
Station end Name	Station end Name	Water level	Step
100,000	100,000	Flood light	Internal floor level
Tree / Bush / Shrub	Tree / Bush / Shrub	Lamp post	Threshold level
Woodland	Woodland	Telegraph post	Sign post
Area of Undergrowth	Area of Undergrowth	Electricity post	Telephone
Ridge Level	Ridge Level	Traffic light	Bollard
Eaves Level	Eaves Level	Bus stop	Electric
The Roof Level	The Roof Level	Shop front	Street Name
Gate	Gate	Shop front	Shop
Fence (types)	Fence (types)	Earth wall	Trench
Iron Railings	Iron Railings	Water meter	Brick paved
Wire Mesh	Wire Mesh	Gas valve	Concrete paving slabs
Pond & Pool	Pond & Pool	Air valve	Cover
Pond & Well	Pond & Well	Unidentified inspection	Road
Chain Link	Chain Link	Road	Road
Wooden Pickets	Wooden Pickets	Road	Road
Glass Boundary	Glass Boundary	Road	Road
Steel Palisade	Steel Palisade	Road	Road

Rev	Date	Description	Drawn	C. Ref.
-----	------	-------------	-------	---------



Rowan House
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CLIENT
**LSP
Development Ltd**

PROJECT
**Boorley Green,
Botley,
Southampton, SO32 2UA**

TITLE
**Boundary setout and Survey
Plan**

SCALE A2@ 1: 200	DATE 28.11.18
DRAWN AL	QUALITY REF E03214

Level datum Grid orientation	See notes See notes
Job number Drawing No.	32184 32184_T_REV

Rev.
0

Comments
This plan should only be used for its original purpose. Greenhatch Group accepts no responsibility for this plan if supplied to any party other than the original client.
All dimensions should be checked on site prior to design and construction.
Drainage information (where applicable) has been visually inspected from the surface and therefore should be treated as approximate only.

Notes:

Appendix C – Infiltration Tests

22nd August 2024

Our ref: GE22665/KOD01/240822

Nick Atkins
NH Developments Limited
185A Tuckton Road
Bournemouth
Dorset BH6 3LA



By email

Dear Nick,

RE: HDN Primary School Site - Boorley Green, SO32 2SH – Preliminary Information

Further to the receipt of instructions, we write to present the preliminary information from the ground investigation undertaken at the above named site (Figure 1).

The scope of works comprised:

- Construction of 5No. dynamic sampler boreholes (WS101-WS105) to depths of between 3.00m and 5.00m bgl.
- Standard Penetration Tests (SPTs) at 1m depth increments within each borehole to inform the geotechnical assessment.
- Installation of groundwater monitoring wells within boreholes WS102, WS103 and WS105 to facilitate groundwater monitoring on 4No. occasions over a 1-2 month period from the completion of the intrusive investigation.
- Construction of 2No. hand excavated pits (HP101-HP102) to depths of between 0.86m and 0.95m bgl.
- Undertake soakage testing within the two hand excavated pits (HP101-HP102) to inform the drainage strategy.

The dynamic sampler borehole positions were located to provide a general spread of coverage across the proposed building area of the site with the hand pit locations positioned to target the proposed car park area on the site. Some positions were relocated due to dense vegetation in the central-southwestern portion of the site. The locations of the exploratory holes are shown on Figure 2.

A Geo-Environmental Engineer attended site on 9th August 2024 to oversee the intrusive investigation works. The Client attended site on the 9th August 2024 to grant access to the site and to agree on the locations of the exploratory holes. The Client's ecologist also attended site on the morning of the 9th August 2024 to clear the exploratory hole locations and access tracks prior to commencement. Due to the aforementioned dense vegetation on site, the Client cut back the vegetation using a strimmer and hedge cutters to create pathways through the site to allow access for the site team and dynamic sampler rig.

Background

It is understood that the site is proposed to be developed with a nursery school with play area, car park and associated infrastructure.

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Environmental Consultants | Geotechnical Engineers | Site Investigations

Geo-Environmental Services Ltd incorporated in England number 3214980 VAT number 679544479



Site Description

At the time of the site walkover, the site comprised an open field with no building infrastructure. The site was roughly rectangular in shape and extended to approximately 0.25Ha. The site was located to the north of Wallace Avenue, off Nairn Road in Boorley Green at NGR 451081, 114689.

The site sloped gently to the east and was occupied by overgrown grass and vegetation. Several young to semi-mature trees were present on site, mainly spread across the central and southern portions of the site. The main coverage of ground comprised grass, brambles and weeds.

Anthropogenic features on site consisted of an electricity substation box and a tap and connected pipework located at the site entrance in the south-east corner of the site, both of which were yet to be connected to services at the time of the site walkover.

A small stockpile was noted in the developer's plans, and evidence of the stockpile was identified during the site walkover. The stockpile was located in the centre of site and was overgrown with grass and vegetation.

The site was bounded by residential infrastructure to the south and west. The land immediately to the east and north comprised a school and associated school grounds. The site boundary comprised trees to the south and west, and wooden panelled fencing to the north and east

The access to site school comprised a padlocked gate off Nairn Road, a small cul-de-sac located adjacent to the school to the east of the site.

Ground Conditions

The ground conditions encountered in the exploratory holes comprised a mantle of Topsoil overlying superficial clay, sand and interbedded clay and sand of the Wittering Formation with clay soils of the London Clay Formation tentatively identified at one location (WS104) due to a change noted in the characteristics of the soils compared with the overlying soils. A generalised summary of the encountered conditions is presented in Table 1.

Top (m bgl)	Base (m bgl)	Geology	Locations
0	0.25 - 0.40	TOPSOIL: Dark brown/brown fine to SAND with varying proportions of clay, gravel, roots (1-5mm) and rootlets and semi decomposed roots 1mm; Dark brown sandy CLAY with abundant rootlets and roots 1-2mm.	All
0.25 – 0.40	0.86+ - 5.00+	WITTERING FORMATION: Greenish grey/pale brown/pale grey/reddish brown/orangish brown fine to medium SAND with varying proportions of clay, gravel, reddish brown/orange/dark brown staining, roots (1-3mm) and rootlets; Orange/pale grey/brown/reddish brown interbedded fine clayey SAND and sandy CLAY with varying proportions of reddish brown/orange staining, rootlets and roots (1-3mm); Stiff orange/pale grey/grey/orangish brown CLAY with varying proportions of sand, reddish orange staining, sand lenses (1-5mm) and rootlets.	All
4.90	5.00+	LONDON CLAY FORMATION: Dark grey silty CLAY with sand lenses 1mm.	WS104

Table 1 Summary of Ground Conditions

For more detailed information reference should be made to the exploratory hole logs in Appendix A.

In-situ Standard Penetration Tests (SPTs) were undertaken at 1m depth intervals within the boreholes. SPT 'N' values ranged between N=8 and N=19 within the soils of the Wittering Formation and N=15 within soils of the London Clay. SPT N values are presented in the respective borehole logs.

Obstructions and Access Issues

No natural or man-made obstructions were encountered within the exploratory holes undertaken. Obstructions could be encountered elsewhere on the site.

A number of exploratory holes were relocated due to dense vegetation in the central-southwestern portion of the site.

Groundwater

Groundwater was encountered within four of the exploratory holes during the intrusive investigation as summarised in Table 2.

Location	Water strike (m bgl)	Time elapsed (mins)	Water rose to (m bgl)
WS101	1.99	20	1.99
WS103	2.97	20	2.97
WS104	2.91	20	2.91
WS105	2.15	20	2.15

Table 2 Groundwater encountered during intrusive investigation

Combined ground gas and groundwater monitoring wells were installed within three of the dynamic sampler boreholes (WS102, WS103, and WS105) in order to facilitate return spot monitoring of groundwater depths on 4No. further occasions over a 1-2 month period. At the time of writing, one of the return groundwater monitoring visits have been undertaken, the details of which are presented in Table 3.

Location	Well Depth (m bgl)	Depth to Groundwater (m bgl)
		15/08/2024
WS102	3.00	Dry
WS103	3.00	Dry
WS105	2.44	2.14

Table 3 Return groundwater monitoring results

At the time of writing, monitoring is ongoing on site and as such, further groundwater monitoring results will be presented within an updated report for the site on completion of the monitoring.

For further details on the groundwater monitoring, please refer to Appendix B.

Ground Gas

Combined ground gas and groundwater monitoring wells were installed within three of the dynamic sampler boreholes (WS102, WS103, and WS105) in order to facilitate return spot monitoring of ground gases on 4No. further occasions over a 1-2 month period. These locations were selected to provide general coverage of the site. At the time of writing, one of the return monitoring visits has been undertaken on 15th August 2024.

The spot monitoring undertaken to date has not detected methane. Carbon dioxide has been detected in the range of 0.0% to 4.8% and oxygen in the range of 16.7% to 20.5%. Borehole flow rates of between 0.7l/hr and 0.9l/hr were recorded during the monitoring. VOCs were recorded up to 0.7ppm during the monitoring and atmospheric pressure was recorded as 1013mb.

For further details on the ground gas monitoring, please refer to Appendix B.

Soakaways

Two hand excavated trial pits were undertaken on site with both used for soakage testing. The soakage pits were logged by a Geo-Environmental Engineer and soakage testing was commenced within the pits.

Soakage testing was undertaken in accordance with BRE Digest 365 Soakaway Design. During the course of the testing within TP01 and TP04, it became apparent that due to the ground conditions encountered, three complete test cycles could not be achieved in the timescale for testing agreed with the Client (one day). HP101 and HP102 were charged with water in the morning of the 9th August 2024. A fall in water of c. 0.29m in HP101 and 0.14m in HP102 was recorded over the course of the drainage period which was considered insufficient for an infiltration rate to be calculated. As such HP101 and HP102 were backfilled in the afternoon of the 9th August having failed to achieve 75% drainage.

Based on the testing undertaken, conventional soakaways are not considered feasible for the disposal of storm water on this site.

Preliminary Geotechnical Assessment

The ground conditions encountered in the exploratory holes comprised primarily Topsoil overlying sand and clay soils. Whilst testing is in hand, it is recommended that the clay soils underlying the site are assumed to be of high volume change potential.

It is anticipated that conventional foundations may be suitable terminating within the Wittering Formation. A preliminary net allowable bearing capacity of 90kPa is recommended within the sand and firm to stiff clay of the Wittering Formation. This will be reviewed and possibly updated once testing has been completed. Inclusion of reinforcement may be required.

Further assessment for foundations will be presented following completion of the laboratory testing.

Groundwater was not encountered at depths considered to be within of the zone of influence for construction of foundations. Despite this, it would be prudent to assume that shallow groundwater could be encountered during construction. Whilst clay strata may be stable in the short term, it is possible that groundwater in more granular strata could induce instability. Water ingress through more granular layers might be expected to cause running sand and excavation instability.

Laboratory testing is underway, and results will be presented in the main report.

Preliminary Contamination Assessment

Made Ground was not encountered within the exploratory holes undertaken. No organoleptic evidence of possible contamination was recorded in the exploratory holes. Made Ground or evidence of contamination may be present elsewhere on site.

Laboratory testing is underway, the findings of which will be presented in the main report.

Closure

The comments provided herein are for preliminary purposes only and could change following receipt and review of geotechnical and geochemical laboratory testing. As such, detailed design should not be undertaken based on the preliminary findings.



We trust we have interpreted your request correctly and provided sufficient information for your current requirements. Should you have any queries please do not hesitate to contact us.

Yours sincerely
For and on Behalf of Geo-Environmental



Katie O'Dea BSc (Hons), MSc, FGS
katie.odea@gesl.net

Enc

Figure 1	Site Location Plan
Figure 2	Exploratory Hole Location Plan
Appendix A	Preliminary Exploratory Hole Logs and In-Situ Test Results
Appendix B	Ground Gas and Groundwater Monitoring Results (to date)
Appendix C	Soakage Test Results





FIGURES



Project Title: HDN Primary School Site – Boorley Green
Location : Nairn Road, Southampton, Hampshire,
SO32 2SH
Project No. : GE22665
Client : NH Developments Limited

Title : Figure 1 - Site Location Plan
Scale: 1:2000
Engineer: TU



Legend Key
Project Bounds - Project
Bounds



Project Title: HDN Primary School Site – Boorley Green
Location : Nairn Road, Southampton, Hampshire,
SO32 2SH
Project No. : GE22665
Client : NH Developments Limited

Title : Figure 2 - Exploratory Hole Location Plan
Scale: 1:500
Engineer: TU



Geo-Environmental

Legend Key

- Locations By Type - Empty
- Locations By Type - TP
- ⊕ Locations By Type - WLS



APPENDIX A

Preliminary Exploratory Hole Logs and In-Situ Test Results



 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net			Borehole Log				Borehole No. WS101 Sheet 1 of 2			
Project Name: HDN Primary School Site – Boorley Green			Project No. GE22665		Co-ords: 451065E - 114701N		Hole Type WLS			
Location: Nairn Road, Southampton, Hampshire, SO32 2SH					Level: 25.20		Scale 1:25			
Client: NH Developments Limited					Dates: 09/08/2024		Logged By DG/KOD			
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
					0.30	24.90		Grass overlying dark brown clayey gravelly fine SAND with abundant rootlets and roots 1-3mm. TOPSOIL	1	
		0.40	ES	2.4kg/cm2	0.60	24.60		Stiff orange and grey slightly sandy CLAY with frequent rootlets. Sand is fine. WITTERING FORMATION		
		0.50	D							
		0.50	PP							
									Orange, pale grey and brown interbedded fine SAND and sandy CLAY with some reddish brown staining. WITTERING FORMATION	1
		1.00	D	N=12 (2,2/3,3,3,3)	1.40	23.80		Firm pale grey and orange interbedded sandy CLAY and clayey SAND with reddish brown staining. WITTERING FORMATION		
		1.00	SPT							
									Greenish grey fine to medium SAND with reddish brown and orange staining. WITTERING FORMATION	2
		2.00	D	N=11 (2,2/3,2,3,3)	1.90	23.30		Pale grey and orange interbedded sandy CLAY and clayey fine to medium SAND with reddish brown staining. WITTERING FORMATION		
		2.00	SPT							
									Pale grey and orange interbedded sandy CLAY and clayey fine to medium SAND with reddish brown staining. WITTERING FORMATION	3
		2.50	D	N=12 (3,3/3,3,3,3)	2.20	23.00				
									Poor recovery. Wet sand infilling hole.	4
4.00	D	N=15 (3,3/4,3,4,4)	4.10	21.10						
4.00	ES									
4.00	SPT									
							Pale brown and pale grey slightly clayey fine SAND. WITTERING FORMATION	5		
4.50	D		5.00	20.20						
							Continued on Next Sheet			
Dynamic Sampling Run Details		Water Strike Details (mbgl)		Remarks						
Depth Top	Depth Base	Diameter	Depth Strike	Rose To	Collapse to 2.6m bgl.					
			1.99	1.99						



Status
PRELIM



www.gesl.net

Borehole Log

Borehole No.

WS101

Sheet 2 of 2

Project Name:

HDN Primary School Site –
Boorley Green

Project No.
GE22665

Co-ords:

451065E - 114701N

Hole Type	WLS
1	0.0000
2	0.0000
3	0.0000
4	0.0000
5	0.0000
6	0.0000
7	0.0000
8	0.0000
9	0.0000
10	0.0000
11	0.0000
12	0.0000
13	0.0000
14	0.0000
15	0.0000
16	0.0000
17	0.0000
18	0.0000
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88	0.0000
89	0.0000
90	0.0000
91	0.0000
92	0.0000
93	0.0000
94	0.0000
95	0.0000
96	0.0000
97	0.0000
98	0.0000
99	0.0000
100	0.0000

Location:

Nairn Road, Southampton, Hampshire, SO32 2SH

Level:

25.20

Scale
1:25

Client:

NH Developments Limited

Dates:

09/08/2024

Logged By
DG/KOD

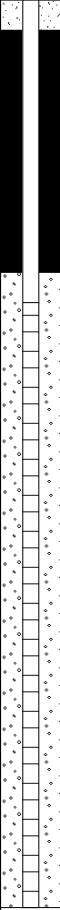
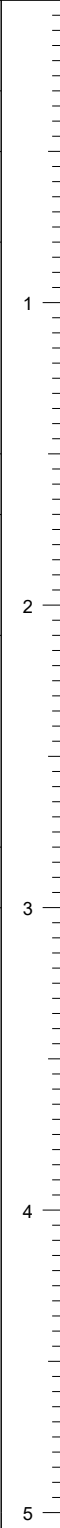
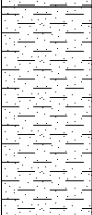
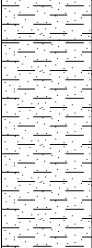
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		5.00	SPT	N=14 (3,4/3,4,3,4)				End of Borehole at 5.00m	

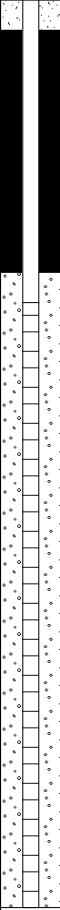
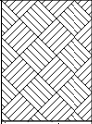
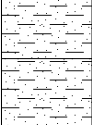
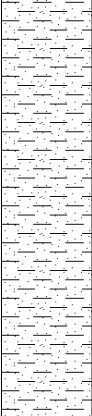
Dynamic Sampling Run Details			Water Strike Details (mbgl)		Remarks
Depth Top	Depth Base	Diameter	Depth Strike	Rose To	
			1.99	1.99	Collapse to 2.6m bgl.



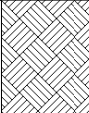
Status

PRELIM

 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net				Borehole Log				Borehole No. WS102 Sheet 1 of 1			
Project Name:		HDN Primary School Site – Boorley Green		Project No. GE22665		Co-ords: 451083E - 114698N		Hole Type WLS			
Location: Nairn Road, Southampton, Hampshire, SO32 2SH				Level: 24.63		Scale 1:25					
Client: NH Developments Limited				Dates: 09/08/2024		Logged By DG/KOD					
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.10	ES	1.5kg/cm2	0.30	24.33		Brown gravelly fine SAND with abundant rootlets and some semi decomposed roots 1mm. Gravel is fine to coarse subrounded flint. TOPSOIL			
					0.50	24.13		Light brown fine SAND with rare rootlets and dark brown staining. WITTERING FORMATION			
	0.60 0.60	D PP			0.80	23.83		Stiff orange brown and pale grey interbedded sandy CLAY and fine SAND. WITTERING FORMATION			
			1.00 1.00 1.00 1.20	D PP SPT ES	1.5kg/cm2 N=12 (2,2/2,2,4,4)					Stiff grey and orange sandy CLAY with fine sand lenses. WITTERING FORMATION	
			1.60	D		1.50	23.13			Reddish brown clayey fine SAND with grey lenses of clay. WITTERING FORMATION	
					1.70	22.93		Orangish brown pale grey interbedded sandy CLAY and orange fine SAND. WITTERING FORMATION			
			2.00 2.00	D SPT	N=10 (2,2/3,2,2,3)	2.10	22.53			Pale brown sandy CLAY/clayey SAND with rare orange staining. Sand is fine. WITTERING FORMATION	
			2.50	D							
			2.80	PP	1.3kg/cm2	2.80	21.83			Firm light grey sandy CLAY. Sand is fine with light sand lenses. WITTERING FORMATION	
			3.00 3.00 3.00	D ES SPT	N=14 (3,4/3,3,4,4)	3.00	21.63			End of Borehole at 3.00m	
	Dynamic Sampling Run Details		Water Strike Details (mbgl)		Remarks					 Status PRELIM	
	Depth Top	Depth Base	Diameter	Depth Strike	Rose To	Some clays unsuitable for hand pen testing.					

 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net			Borehole Log				Borehole No. WS103 Sheet 1 of 1					
Project Name:		HDN Primary School Site – Boorley Green		Project No. GE22665		Co-ords: 451062E - 114686N		Hole Type WLS				
Location:		Nairn Road, Southampton, Hampshire, SO32 2SH				Level: 24.74		Scale 1:25				
Client:		NH Developments Limited				Dates: 09/08/2024		Logged By DG/KOD				
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description				
		Depth (m)	Type	Results								
		0.20	ES	1.4kg/cm2	0.40	24.34		Dark brown sandy CLAY with abundant rootlets and roots 1-2mm. TOPSOIL				
		0.50 0.50	D PP		0.60	24.14		Firm orangish brown sandy CLAY with occasional rootlets. Sand is fine. WITTERING FORMATION Orangish brown and pale grey interbedded fine SAND and sandy CLAY. WITTERING FORMATION				
		0.90 1.00 1.00	ES D SPT	N=13 (2,2/3,3,3,4)	2.20	22.54		Pale grey sandy CLAY with sand lenses 1-2mm and some reddish orange stained sand lenses. Sand is fine. WITTERING FORMATION				
		1.50	D									
		2.00 2.00	D SPT	N=14 (3,3/3,4,3,4)								
				2.50 2.60	D ES							
				3.00 3.00	D SPT	N=10 (2,2/3,2,2,3)	3.00	21.74			End of Borehole at 3.00m	
											4	
											5	
		Dynamic Sampling Run Details		Water Strike Details (mbgl)		Remarks						
Depth Top	Depth Base	Diameter	Depth Strike	Rose To	Standpipe depth 3.03					 Status PRELIM		
			2.97	2.97								

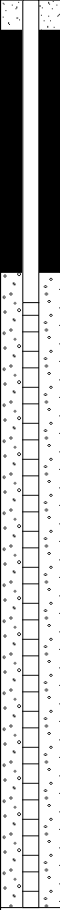
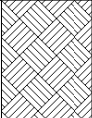
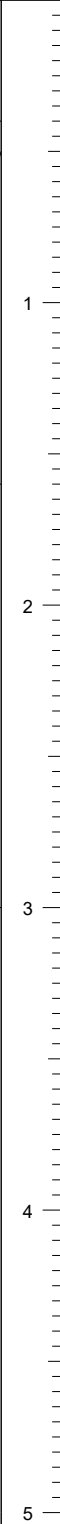
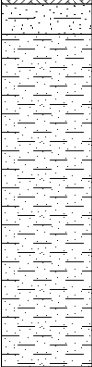
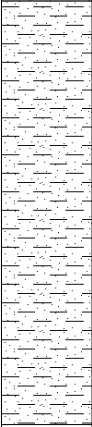
 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log				Borehole No. WS104 Sheet 1 of 2	
Project Name: HDN Primary School Site – Boorley Green		Project No. GE22665		Co-ords: 451090E - 114687N		Hole Type WLS	
Location: Nairn Road, Southampton, Hampshire, SO32 2SH				Level: 24.11		Scale 1:25	
Client: NH Developments Limited				Dates: 09/08/2024		Logged By DG/KOD	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.40	23.71		Grass overlying dark brown gravelly fine SAND with abundant rootlets. TOPSOIL	1
		0.50	D	2.8kg/cm2				Stiff brown and pale orange sandy CLAY with some rootlets. Sand is fine. WITTERING FORMATION	
		0.50	PP						
		0.60	ES						
		1.00	D	N=14 (2,2/4,3,3,4)	1.10	23.01		Reddish brown and pale grey interbedded fine SAND and sandy CLAY with dark reddish brown staining. WITTERING FORMATION	
		1.00	SPT						
		1.40	ES					Orangish brown and pale grey interbedded sandy CLAY and fine SAND with dark reddish brown staining. WITTERING FORMATION	2
		1.50	D						
		2.00	D	N=15 (2,3/4,4,3,4)	1.90	22.21		Orangish brown fine SAND with some pale grey clay lenses and reddish brown staining. WITTERING FORMATION	
		2.00	SPT						
		2.50	D	1.3kg/cm2	2.30	21.81		Firm pale purplish grey and orange sandy CLAY with sand lenses 1-5mm. Sand is fine. WITTERING FORMATION	3
		2.50	PP						
2.70	ES								
3.00	D	N=15 (3,4/4,3,4,4)	3.00	21.11		No recovery WITTERING FORMATION	4		
3.00	SPT								
3.50	D								
4.00	D	N=19 (4,4/5,5,4,5)	4.00	20.11		Pale brown fine SAND. WITTERING FORMATION	5		
4.00	SPT								
4.50	D		4.60	19.51		Pale grey and pale orangish brown interbedded CLAY and fine SAND. WITTERING FORMATION			
4.80	D		4.90	19.21		Dark grey silty CLAY with sand lenses 1mm. Sand is fine. WITTERING FORMATION			
5.00	D		5.00	19.11					

Dynamic Sampling Run Details			Water Strike Details (mbgl)		Remarks
Depth Top	Depth Base	Diameter	Depth Strike	Rose To	
			2.91	2.91	
					Hold collapse to 3.0m bgl


 Status
 PRELIM

 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net			Borehole Log				Borehole No. WS104 Sheet 2 of 2			
Project Name: HDN Primary School Site – Boorley Green			Project No. GE22665		Co-ords: 451090E - 114687N		Hole Type WLS			
Location: Nairn Road, Southampton, Hampshire, SO32 2SH					Level: 24.11		Scale 1:25			
Client: NH Developments Limited					Dates: 09/08/2024		Logged By DG/KOD			
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		5.00	SPT	N=15 (4,3/3,4,4,4)				End of Borehole at 5.00m		
									6	
									7	
									8	
									9	
									10	
Dynamic Sampling Run Details		Water Strike Details (mbgl)		Remarks						
Depth Top	Depth Base	Diameter	Depth Strike							Rose To
			2.91	2.91	Hold collapse to 3.0m bgl					
					 Status PRELIM					

 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log				Borehole No. WS105 Sheet 1 of 1					
Project Name: HDN Primary School Site – Boorley Green		Project No. GE22665		Co-ords: 451077E - 114711N		Hole Type WLS					
Location: Nairn Road, Southampton, Hampshire, SO32 2SH				Level: 25.37		Scale 1:25					
Client: NH Developments Limited				Dates: 09/08/2024		Logged By DG/KOD					
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.20	ES		0.40 0.50	24.97 24.87		Brown gravelly fine SAND with occasional rootlets. Rare fine to coarse sized gravel. TOPSOIL			
		0.45	D								
		0.60	ES								
		1.00 1.00	D SPT	N=12 (3,3/3,3,3,3)	1.60	23.77		Orangish brown and grey clayey fine SAND. Sand is fine with grey clay lenses. WITTERING FORMATION Orangish brown and grey interbedded CLAY and SAND. Sand is fine. WITTERING FORMATION			
		1.50	D								
		2.00 2.00	D SPT								
		2.50 2.50	D ES	N=8 (2,2/2,2,2,2)				Light brown and light grey fine interbedded SAND and CLAY. Occasional red lenses of sand. WITTERING FORMATION			
		3.00 3.00	D SPT								
						N=11 (3,3/3,2,3,3)	3.00	22.37			End of Borehole at 3.00m
		Dynamic Sampling Run Details		Water Strike Details (mbgl)		Remarks Clay unsuitable for hand pen testing. Standpipe depth: 2.48m bgl.					
Depth Top	Depth Base	Diameter	Depth Strike	Rose To							
			2.15	2.15							



Status
PRELIM



Trial Pit ID:	HP101
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Status:	PRELIM
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Trial Pit Log

Date Printed:
22/08/2024

Sheet 1 of 1

Scale:	1:25
--------	------

Weather: Hot, sunny

Hole Termination:

Stability: Sides stable

Samples & In Situ Testing			Strata Details					Water	Backfill		
Depths	Sample ID	Test Result	Reduced Level	Depth (m) (Thickness)	Legend	Strata Description					
0.40	D1		23.96	(0.30)		Grass overlying dark brown gravelly fine SAND with frequent rootlets and roots 1-3mm. Sand is fine. TOPSOIL		0.5			
				0.30		Pale orangish brown gravelly fine SAND with some rootlets and roots 1-3mm. Sand is fine. WITTERING FORMATION					
0.80	D2		23.76	0.50		Orangish brown and pale grey fine SAND with CLAY lenses. WITTERING FORMATION		1.0			
				(0.45)							
			23.31	0.95	End of Trial Pit at 0.95m					1.0	
								1.5			
								2.0			
								2.5			
								3.0			
								3.5			

Dimensions:

Final Depth:	0.95m
--------------	-------

Final Width:

Final Length:

Remarks

Photo:



PhotoofPit



PhotoofSpoil

Water Strikes (mbgl)

Depth Strike

Rose to

Time Elapsed (mins)

 Geo-Environmental	Contract Name: HDN Primary School Site – Boorley Green			Client: NH Developments Limited			Trial Pit ID: HP102			
	Contract Number: GE22665	Date Started: 09/08/2024	Logged By: DG/KOD	Checked By:	Status: PRELIM	Sheet 1 of 1				
	Easting: 451088.3	Northing: 114682.3	Ground Level: 23.91mOD	Plant Used:	Date Printed: 22/08/2024	Scale: 1:25				
Trial Pit Log				Weather: Dry, hot		Hole Termination:		Stability: Sides unstable		
Samples & In Situ Testing			Strata Details						Water	Backfill
Depths	Sample ID	Test Result	Reduced Level	Depth (m) (Thickness)	Legend	Strata Description				
0.30	D1		23.66	0.25		Grass overlying dark brown gravelly fine SAND with abundant rootlets and roots 1-5mm. TOPSOIL				
			23.51	0.40		Pale orangish brown and some pale grey fine SAND with clay lenses and some rootlets. WITTERING FORMATION				
				(0.46)		Orangish brown gravelly fine SAND. Gravel is fine to coarse sub angular ironstone. WITTERING FORMATION			0.5	
0.80	D2		23.05	0.86		End of Trial Pit at 0.86m			1.0	
									1.5	
									2.0	
									2.5	
									3.0	
									3.5	
Dimensions:						Photo:				
Final Depth:	0.86m					 PhotoofPit				
Final Width:										
Final Length:										
Remarks						 PhotoofSpoil				
Soakage pit										
Water Strikes (mbgl)										
Depth Strike		Rose to		Time Elapsed (mins)						



APPENDIX B

Ground Gas and Groundwater Monitoring Results (to date)



Project: HDN Primary school site, Boorley Green
 Ref: GE22665
 Client: NH Developments Limited



Location	Date	Time (sec)	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Flow (l/hr)	VOC (ppm)	Pressure (mb)	GWL (m bgl)	GSV/Qhgs		Characteristic Situation		CS1 Limiting Value Check			NHBC			
										CH ₄	CO ₂	BS8485 & C665		Flow	CH ₄	CO ₂	CH ₄		CO ₂	
												CH ₄	CO ₂				GSV	Conc.	GSV	Conc.
WS102	15/08/24	0	0	0	20.2	0.9	0.4	1013	Dry	0.000	0.000	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS102	15/08/24	10	0	3.4	17.4	0.9	0.4	1013	Dry	0.000	0.031	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS102	15/08/24	20	0	3.7	16.9	0.9	0.4	1013	Dry	0.000	0.033	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS102	15/08/24	30	0	3.7	16.7	0.9	0.4	1013	Dry	0.000	0.033	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS102	15/08/24	60	0	3.8	16.7	0.9	0.4	1013	Dry	0.000	0.034	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS102	15/08/24	90	0	3.7	16.7	0.9	0.4	1013	Dry	0.000	0.033	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS102	15/08/24	120	0	3.6	16.9	0.9	0.4	1013	Dry	0.000	0.032	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS102	15/08/24	180	0	3.1	17.3	0.9	0.4	1013	Dry	0.000	0.028	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS103	15/08/24	0	0	1.1	20.5	0.7	0.6	1013	Dry	0.000	0.008	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS103	15/08/24	10	0	3.7	18.5	0.7	0.6	1013	Dry	0.000	0.026	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS103	15/08/24	20	0	3.9	18	0.7	0.6	1013	Dry	0.000	0.027	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS103	15/08/24	30	0	4.3	17.5	0.7	0.6	1013	Dry	0.000	0.030	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS103	15/08/24	60	0	4.5	17.2	0.7	0.6	1013	Dry	0.000	0.032	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS103	15/08/24	90	0	4.5	17.2	0.7	0.6	1013	Dry	0.000	0.032	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS103	15/08/24	120	0	4.2	17.4	0.7	0.6	1013	Dry	0.000	0.029	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS103	15/08/24	180	0	4.1	17.6	0.7	0.6	1013	Dry	0.000	0.029	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS105	15/08/24	0	0	3.1	18.3	0.9	0.7	1013	2.14	0.000	0.028	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS105	15/08/24	10	0	4.2	18.3	0.9	0.7	1013	2.14	0.000	0.038	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS105	15/08/24	20	0	4.8	18.2	0.9	0.7	1013	2.14	0.000	0.043	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS105	15/08/24	30	0	4.8	18.5	0.9	0.7	1013	2.14	0.000	0.043	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS105	15/08/24	60	0	4.8	18.2	0.9	0.7	1013	2.14	0.000	0.043	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS105	15/08/24	90	0	4.8	18.2	0.9	0.7	1013	2.14	0.000	0.043	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS105	15/08/24	120	0	4.7	18.2	0.9	0.7	1013	2.14	0.000	0.042	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN
WS105	15/08/24	180	0	4.6	18.3	0.9	0.7	1013	2.14	0.000	0.041	CS1	CS1	NO	NO	NO	GREEN	GREEN	GREEN	GREEN



APPENDIX C

Soakage Testing Results



 Geo-Environmental	Soakaway Test Results (after BRE Digest 365)	Geo-Environmental Services Limited Unit 7 Danworth Farm, Cuckfield Road, Hurstpierpoint, West Sussex BN6 9GL +44(0)1273 832972 www.gesl.net
Project Name : HDN Primary School Site - Boorley Green		Job No. : GE22665
Client : NH Developments Limited		Date : 09/08/2024

Pit reference	HP101
Pit depth (m)	0.95
Pit width (m)	0.30
Pit length (m)	0.30
Depth to standing water (m)	

Test 1

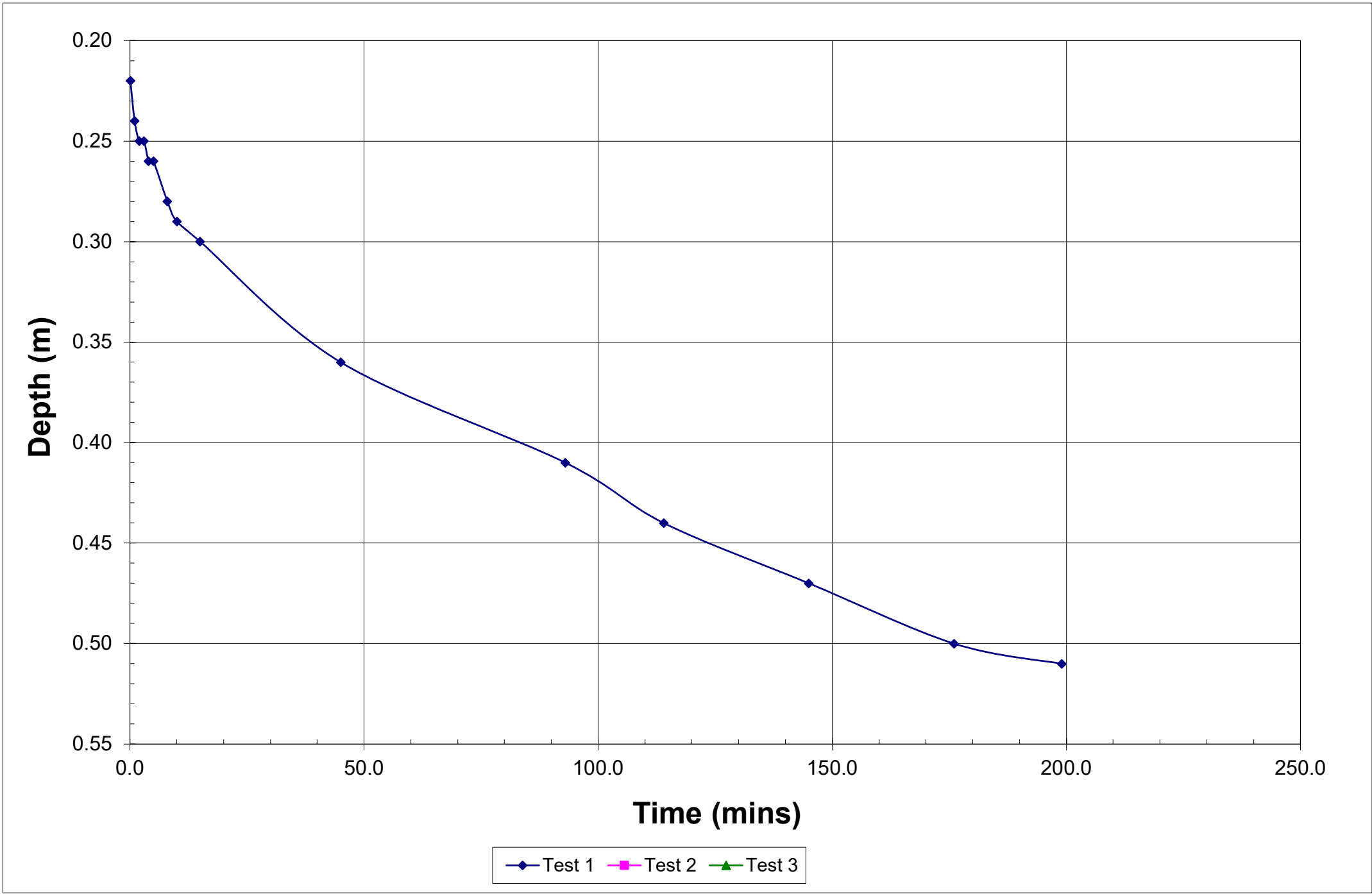
Time (min)	Depth (m)
0.1	0.22
1.0	0.24
2.0	0.25
3.0	0.25
4.0	0.26
5.0	0.26
8.0	0.28
10.0	0.29
15.0	0.30
45.0	0.36
93.0	0.41
114.0	0.44
145.0	0.47
176.0	0.50
199.0	0.51

Test 2

Time (min)	Depth (m)

Test 3

Time (min)	Depth (m)



Max. depth (m)	0.95	0.95	0.95
Effective depth (m)	0.73	0.95	0.95
75% effective depth (m)	0.40	0.24	0.24
50% effective depth (m)	0.59	0.48	0.48
25% effective depth (m)	0.77	0.71	0.71
t75 (min)			
t50 (min)			
t25 (min)			
Vp 75-25	0.03	0.04	0.04
ap 50	0.528	0.66	0.66
tp 75-25	0.00	0.00	0.00

Soil infiltration rate (m/s)	Insufficient fall in water to complete test	
Soil infiltration rate (mm/hr)	Insufficient fall in water to complete test	

 Geo-Environmental	Soakaway Test Results (after BRE Digest 365)	Geo-Environmental Services Limited Unit 7 Danworth Farm, Cuckfield Road, Hurstpierpoint, West Sussex BN6 9GL +44(0)1273 832972 www.gesl.net
Project Name : HDN Primary School Site - Boorley Green		Job No. : GE22665
Client : NH Developments Limited		Date : 09/08/2024

Pit reference	HP102
Pit depth (m)	0.86
Pit width (m)	0.30
Pit length (m)	0.30
Depth to standing water (m)	

Test 1

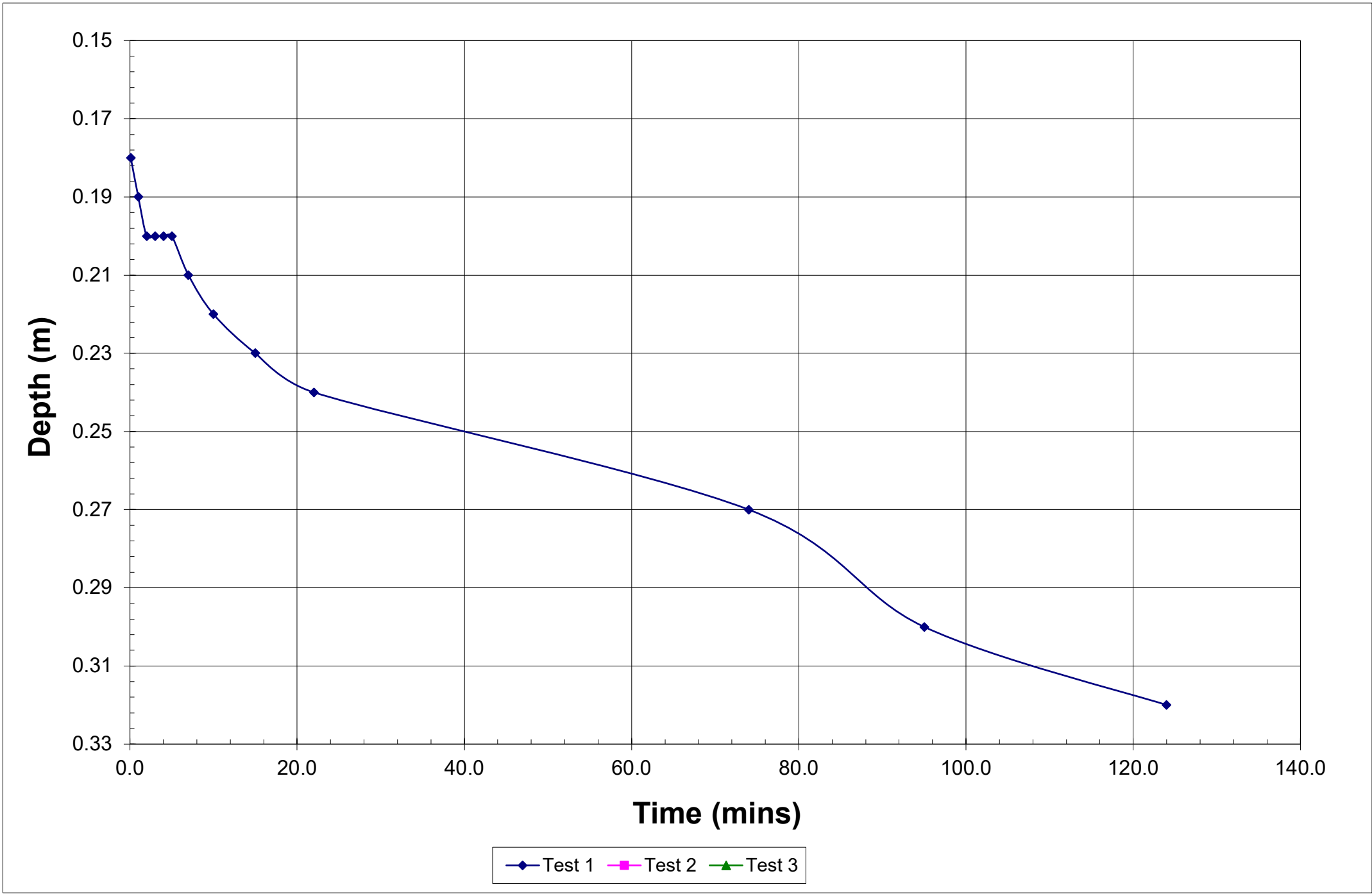
Time (min)	Depth (m)
0.1	0.18
1.0	0.19
2.0	0.20
3.0	0.20
4.0	0.20
5.0	0.20
7.0	0.21
10.0	0.22
15.0	0.23
22.0	0.24
74.0	0.27
95.0	0.30
124.0	0.32

Test 2

Time (min)	Depth (m)

Test 3

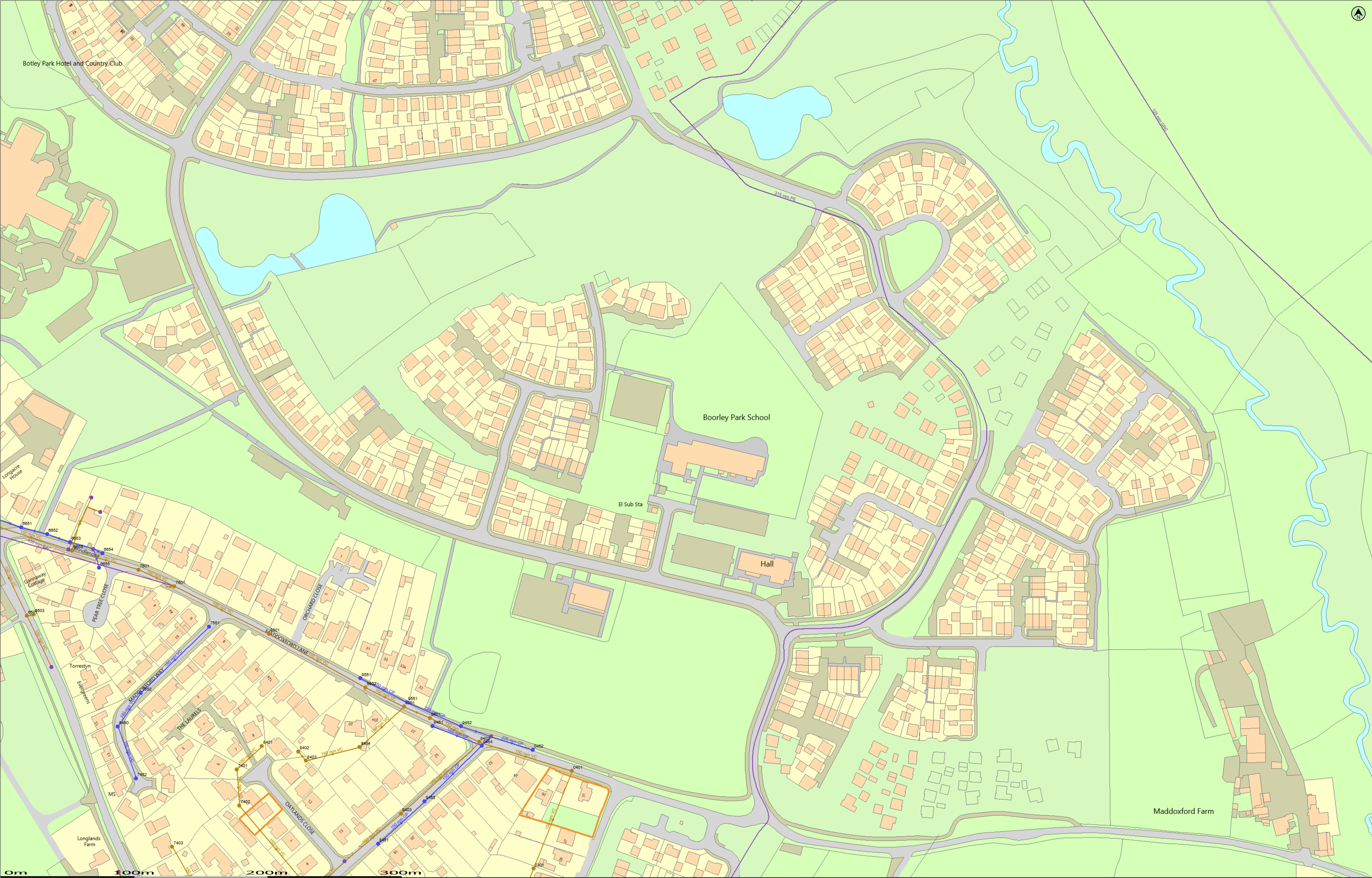
Time (min)	Depth (m)



Max. depth (m)	0.86	0.86	0.86
Effective depth (m)	0.68	0.86	0.86
75% effective depth (m)	0.35	0.22	0.22
50% effective depth (m)	0.52	0.43	0.43
25% effective depth (m)	0.69	0.65	0.65
t75 (min)			
t50 (min)			
t25 (min)			
Vp 75-25	0.03	0.04	0.04
ap 50	0.498	0.606	0.606
tp 75-25	0.00	0.00	0.00

Soil infiltration rate (m/s)	Insufficient fall in water to complete test	
Soil infiltration rate (mm/hr)	Insufficient fall in water to complete test	

Appendix D – Southern Water Asset Plan



(c) Crown copyright and database rights 2023 Ordnance Survey 100031673 Date: 07/08/23 Scale: 1:1250 Map Centre: 451125.114708 Data updated: 05/05/23 Our Ref: 1243162 - 1 Wastewater Plan A1

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2023 Ordnance Survey 100031673. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

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

nick@aegaea.com
2758



Appendix E – Southern Water Connection Approvals



Ms Klaudia Spurek
124 City Road
London
EC1V 2NX

Your ref

Our ref
10215

Date
23 June 2023

Contact
Tel 0330 303 0119

Dear Ms Spurek,

Application to Connect to the Public Sewerage System - Section 106.

Location: Boorley Green Nursery, Nairn Road, Southampton, Hampshire, SO32 2SH.

We are pleased to advise that your Section 106 application to connect to the public surface water sewers, as shown on your drawing 190204-PIN-99-XX-DR-C-10100 Revision P2 dated 26/03/2020, is approved by Southern Water. Our approval means we are satisfied with your connection method.

Connections to existing/new Southern Water assets (i.e., manholes) and the arrangement of Southern Water assets (i.e., pipe junctions within manholes) should always be in accordance with the new Design and Construction Guidance manual ("the Code") and Southern Water's guidance documentation. [water.org.uk/sewerage-sector-guidance-approved-documents/](https://www.water.org.uk/sewerage-sector-guidance-approved-documents/)

This Section 106 approval does not confirm that public sewer network capacity is available at your location for the proposed development. The availability of capacity may be assessed through the Pre-Planning Enquiry process.

Please note that your connection should not proceed if:

- There are unapproved changes to your submitted plan or to the intended connection point. Any unapproved changes may lead to us disconnecting your connection under S109 of the Water Industry Act 1991.
- The relevant Planning Authority has set out conditions relating to the site's drainage and those conditions have not yet been discharged.
- You have not consulted our Health and Safety Advisory that can be viewed at the following link southernwater.co.uk/developing-building/health-and-safety

- You have not obtained the necessary Building Regulations Approvals or, if relevant, obtained a Highway Authority Road Opening License.
- Landowner consent has not been obtained where your connection is to be made through another Party's land.

What Comes Next?

To progress, select the 'Accept' option on the Get Connected customer dashboard. Or, if you have further questions, please select the 'Query' option. If you do not wish to progress with the application, then please select the 'Withdraw' option.

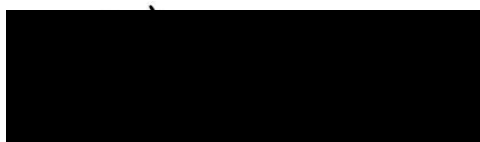
Now you have received our approval, you will need to arrange with your contractor to carry out your works on site to connect into our sewer. Once the connection has been made it is a mandatory requirement for the point of connection to be inspected by one of our Assistant Adoption Managers.

To arrange this inspection, please select 'Ready for Inspection' on your Get Connected customer dashboard. Once this has been selected, please contact Andy Gayle our Assistant Adoption Manager for this area on 07788 183938 and request an inspection giving at least two full working days' notice.

We have prepared a site inspection checklist so that inspection of your sewer connection can be passed first time southernwater.co.uk/media/3028/ds-site-inspection-checklist.pdf

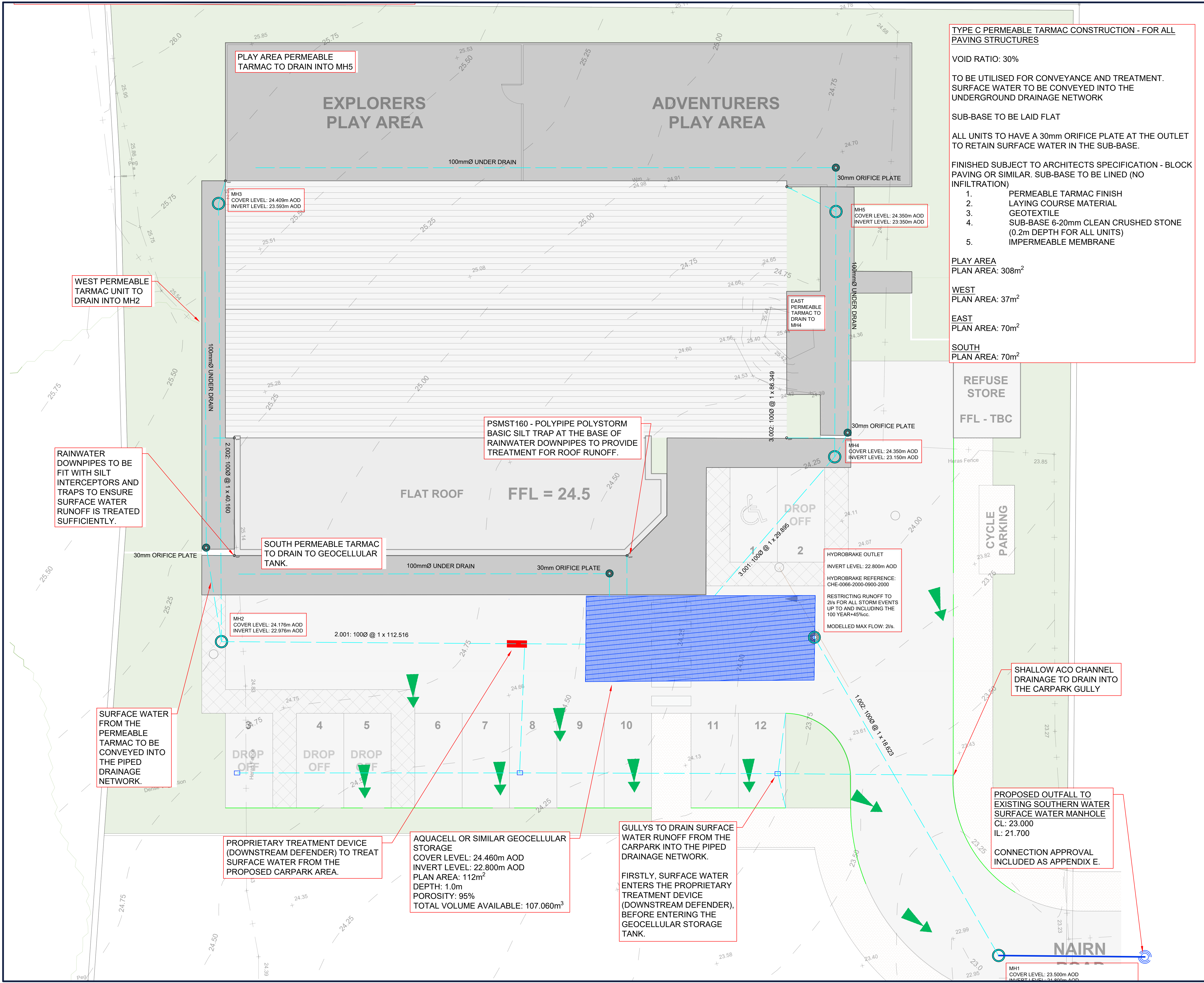
Once we are happy that your connection to the public sewer complies with our requirements and have passed our inspection, we will send you a completion letter within 7 working days. It's important to ensure your connection is inspected to prevent any risk of disconnection at a later date.

Yours sincerely,



Samantha Jenkins
Interim Head of Developer Services
Developer Services

Appendix F – Surface Water Drainage Layout



TYPE C PERMEABLE TARMAC CONSTRUCTION - FOR ALL PAVING STRUCTURES

VOID RATIO: 30%

TO BE UTILISED FOR CONVEYANCE AND TREATMENT. SURFACE WATER TO BE CONVEYED INTO THE UNDERGROUND DRAINAGE NETWORK

SUB-BASE TO BE LAID FLAT

ALL UNITS TO HAVE A 30mm ORIFICE PLATE AT THE OUTLET TO RETAIN SURFACE WATER IN THE SUB-BASE.

FINISHED SUBJECT TO ARCHITECTS SPECIFICATION - BLOCK PAVING OR SIMILAR. SUB-BASE TO BE LINED (NO INFILTRATION)

1. PERMEABLE TARMAC FINISH
2. LAYING COURSE MATERIAL
3. GEOTEXTILE
4. SUB-BASE 6-20mm CLEAN CRUSHED STONE (0.2m DEPTH FOR ALL UNITS)
5. IMPERMEABLE MEMBRANE

PLAY AREA
PLAN AREA: 308m²

WEST
PLAN AREA: 37m²

EAST
PLAN AREA: 70m²

SOUTH
PLAN AREA: 70m²

- NOTES:**
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT REPORTS, PLANS AND ARCHITECTURAL DRAWINGS
 2. THIS DRAWING SHOULD NOT BE SCALED. THERE SHOULD BE NO RELIANCE ON THIS DRAWING WITH REGARDS TO DIMENSIONS. ALL DIMENSIONS SHOULD BE CONFIRMED ON SITE.
 3. ANY DISCREPANCY ON THIS DRAWING SHOULD BE REPORTED TO AEGAEA IMMEDIATELY FOR CLARIFICATION.
 4. THE CONTRACTOR IS RESPONSIBLE FOR ALL WORKS AND FOR THE STABILITY, INSTALLATION AND HEALTH AND SAFETY OF THE WORKS.
 5. AEGAEA HAVE PRODUCED THIS DRAWING BASED ON THE DRAWINGS AND INFORMATION PROVIDED BY THE CLIENT AVAILABLE AT THE TIME OF PRODUCTION. WE CANNOT ACCEPT RESPONSIBILITY FOR DISCREPANCIES RESULTING FROM NEW PLANS/ INFORMATION BEING ISSUED POST-ISSUE OF THIS DRAWING. THE CONTRACTOR SHOULD REVIEW THIS DRAWING IN LIGHT OF WIDER SITE INFORMATION SUCH AS CONTAMINATION, UTILITIES SURVEYS AND SITE INVESTIGATIONS
 6. IT IS THE RESPONSIBILITY OF THE PRINCIPLE CONTRACTOR TO MAKE THE DESIGNER AND CLIENT AWARE OF SITE-SPECIFIC RISKS AND HAZARDS THAT MAY AFFECT THE DRAWING AND SPECIFICATION

LEGEND

	EXISTING SURFACE WATER DRAIN
	PROPOSED SURFACE WATER DRAIN
	ACO CHANNEL DRAINAGE
	HYDROBRAKE MANHOLE
	SURFACE WATER MANHOLE
	ATTENUATION
	RAINWATER PIPE
	PUBLIC SURFACE WATER MANHOLE
	OVERLAND FLOW EXCEEDANCE ROUTES
	GULLY DRAINAGE
	PERMEABLE TARMAC
	DOWNSTREAM DEFENDER

CLIENT: NH DEVELOPMENTS LTD

**SITE: BOORLEY PRIMARY SCHOOL,
NAIRN ROAD, BOTLEY, HAMPSHIRE,
SO32 2SH**

**DRAWING: SURFACE WATER DRAINAGE
LAYOUT**

DRAWING NUMBER: AEG5048_DR01

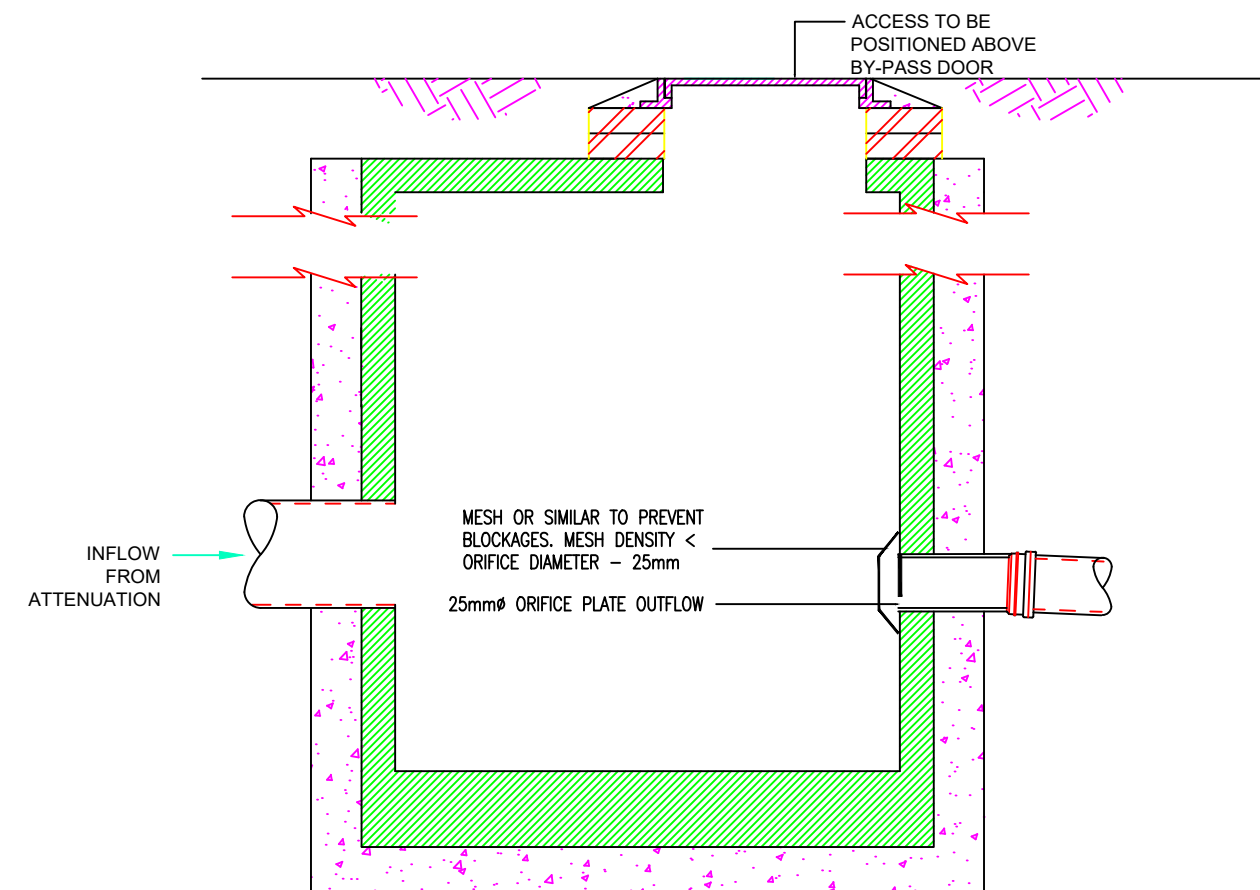
DATE: 07/11//2024

REV: B

DRAWN BY: JA

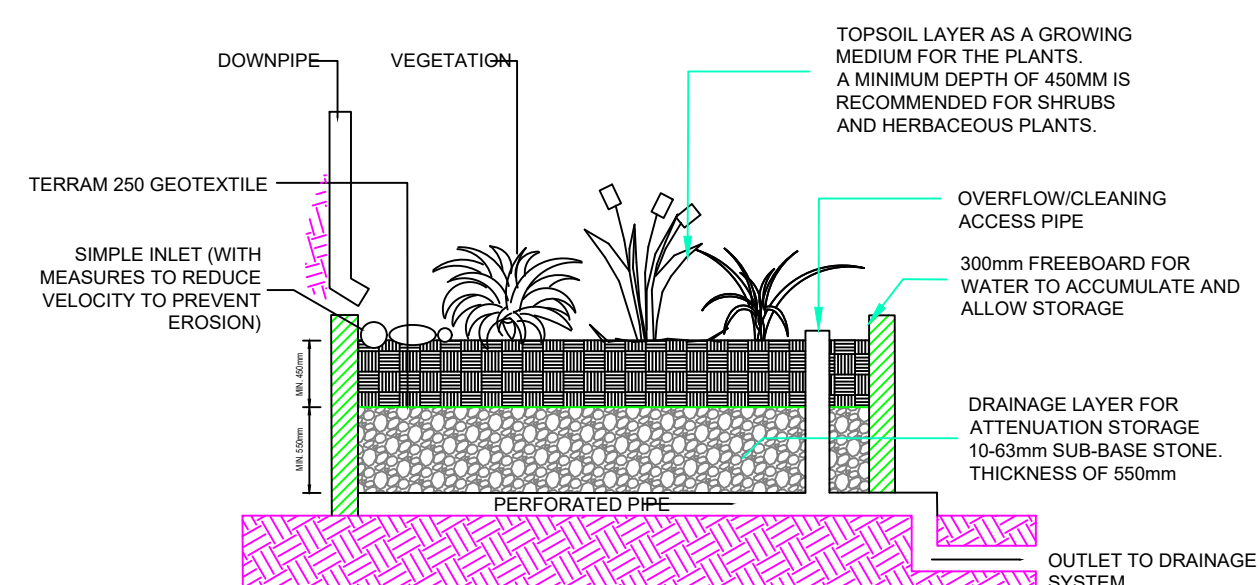
DRAWING SCALE: 1:200 @ A3

**PRELIMINARY DRAWING
FOR PLANNING ONLY - NOT FOR
CONSTRUCTION**

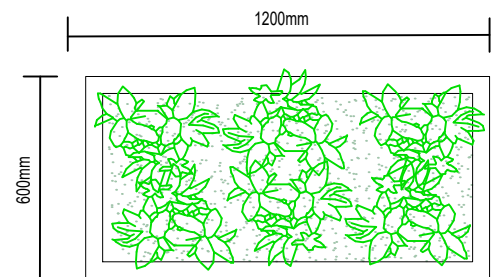


FLOW CONTROL MANHOLE

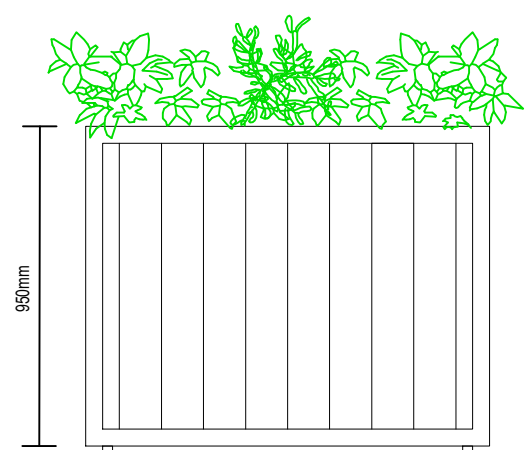
(1:20)



RAISED PLANTER (1:20)

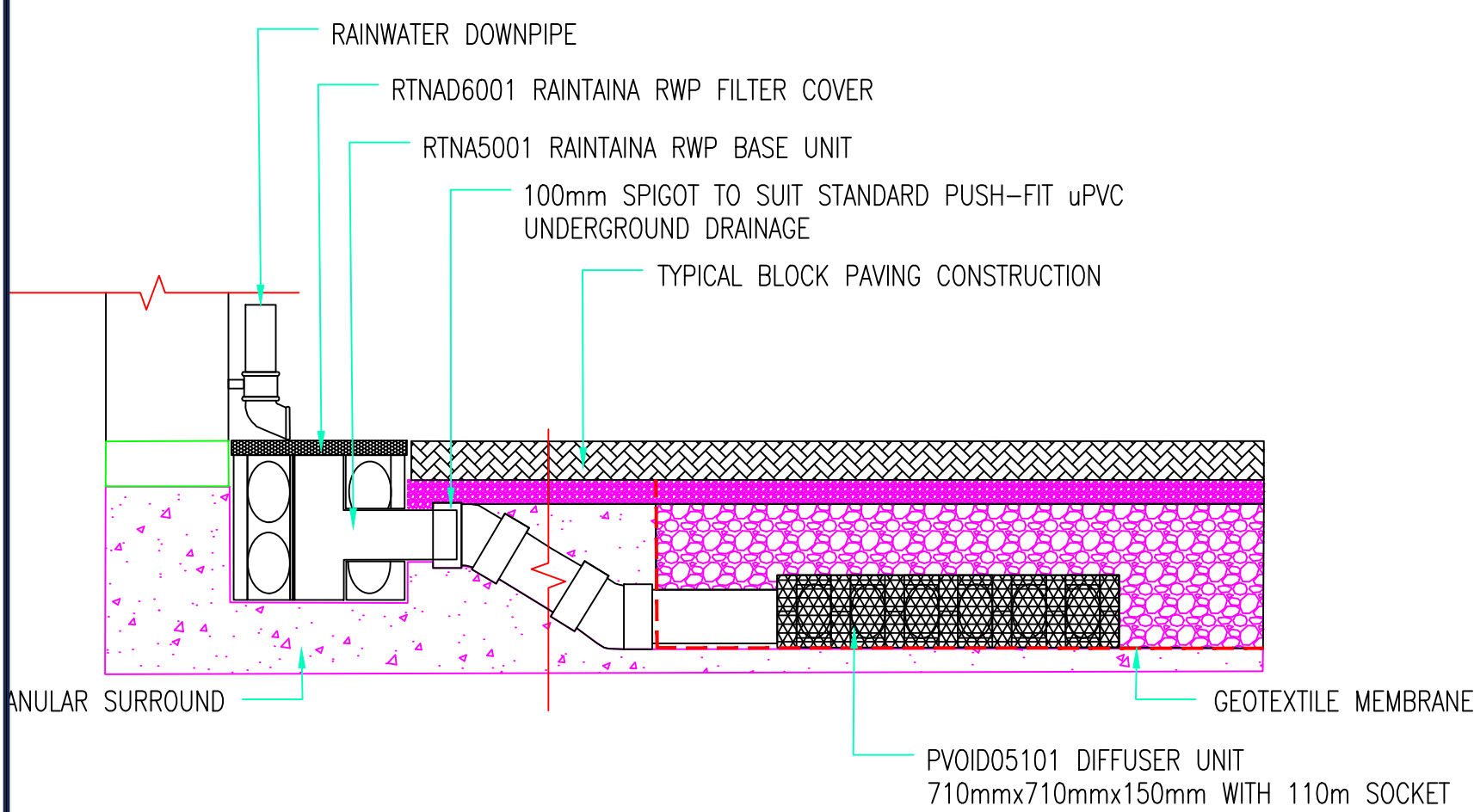


UNIT DIMENSIONS (mm):
SMALL - 1200 (l) x 600 (w) x 950 (d)
STORAGE CAPACITY: 0.3m³
KEY COMPONENTS:
OUTLET WITH INTEGRAL FLOW CONTROL
OVERFLOW OUTLET
INTEGRAL VERTICAL HIGH-LEVEL EMERGENCY
OVERFLOW
HIGH VOLUME STORAGE COMPARTMENT

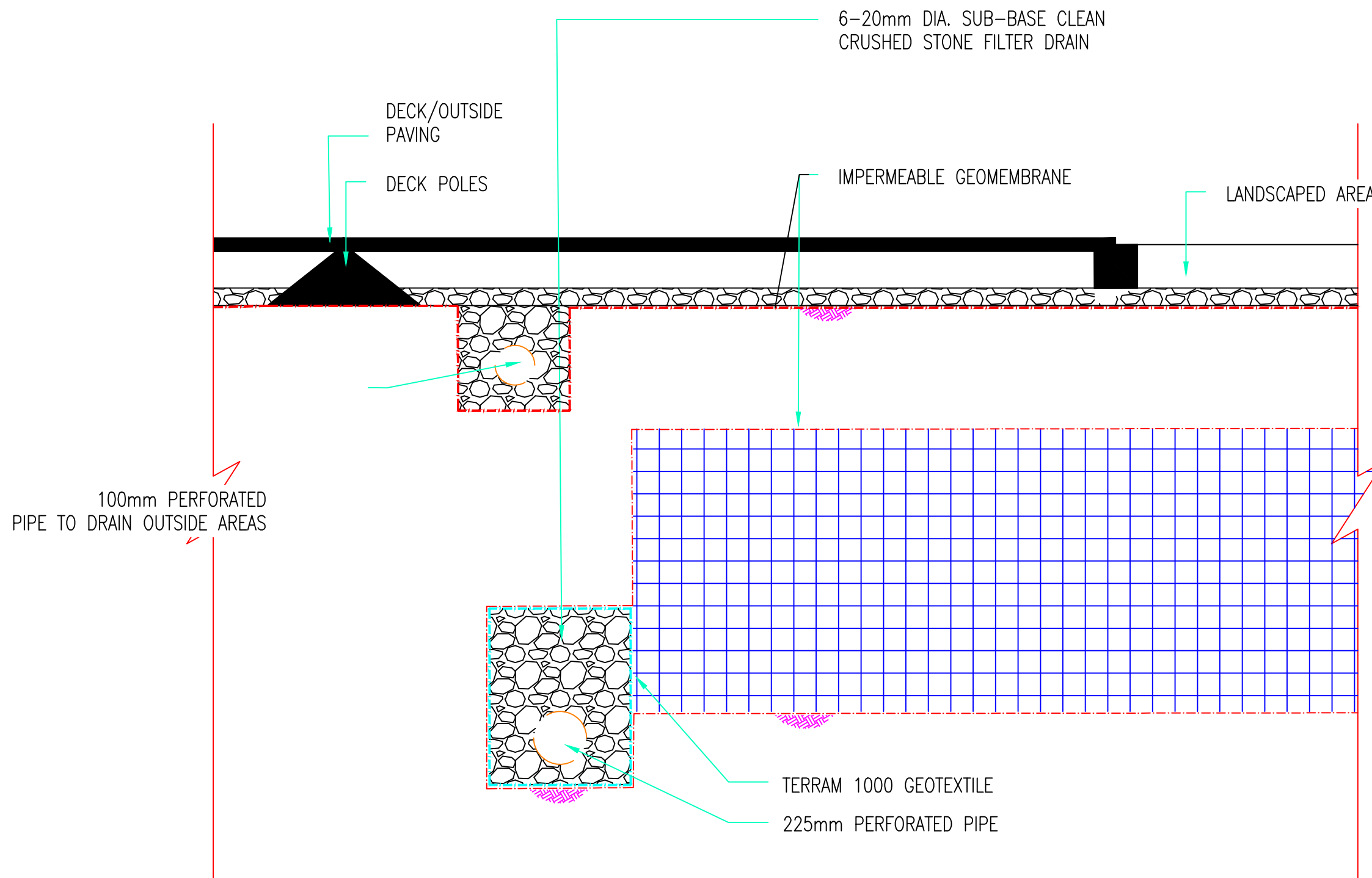


SUDS PLANTER® - SMALL

(1:20)

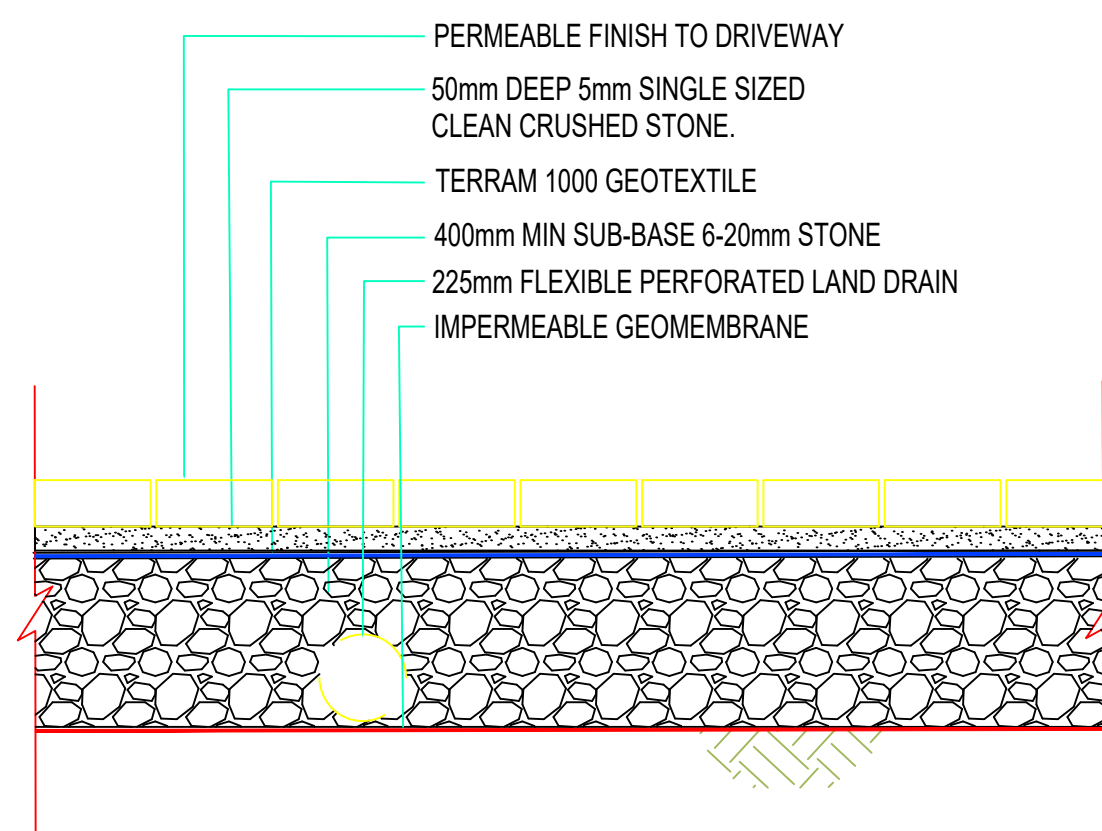


DIFFUSER INLET TO PAVING SUB-BASE

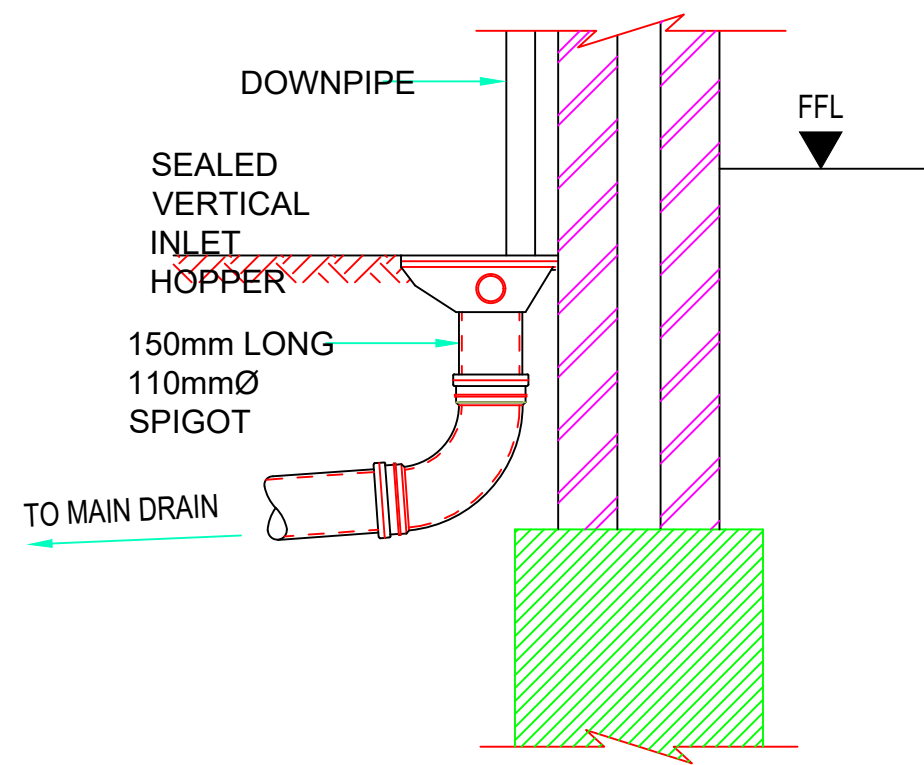


GEOCELLULAR CRATES AND EXTERNAL PAVING INDICATIVE DETAIL

(1:20)

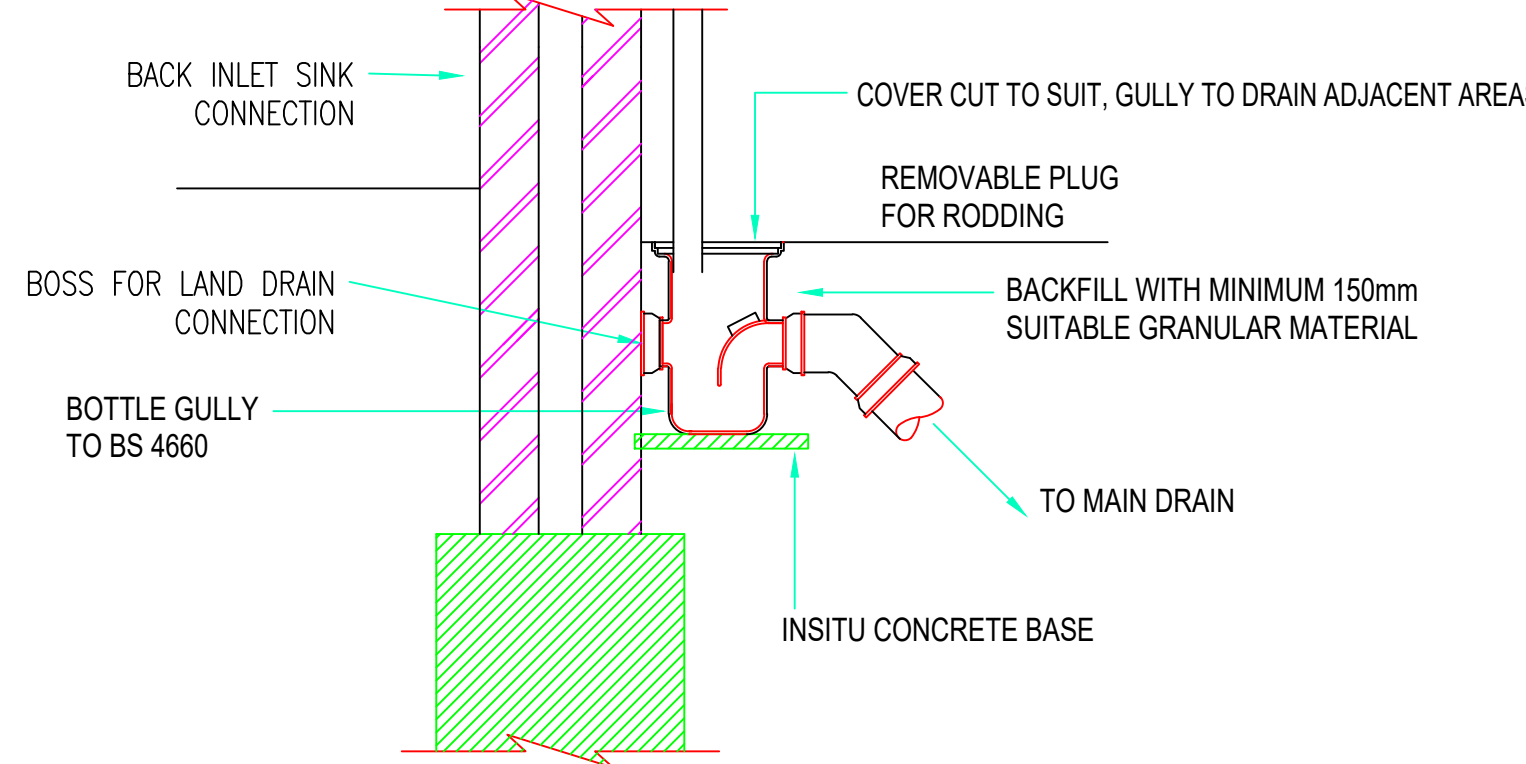


TYPE C PERMEABLE PAVING



RWP CONNECTION.

(1:20)



TRAPPED RWP CONNECTION.

(1:20)

- NOTES:
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT REPORTS, PLANS AND ARCHITECTURAL DRAWINGS
 2. THIS DRAWING SHOULD NOT BE SCALED. THERE SHOULD BE NO RELIANCE ON THIS DRAWING WITH REGARDS TO DIMENSIONS. ALL DIMENSIONS SHOULD BE CONFIRMED ON SITE.
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 4. THE CONTRACTOR IS RESPONSIBLE FOR ALL WORKS AND FOR THE STABILITY, INSTALLATION AND HEALTH AND SAFETY OF THE WORKS.
 5. AEGAEA HAVE PRODUCED THIS DRAWING BASED ON THE DRAWINGS AND INFORMATION PROVIDED BY THE CLIENT AVAILABLE AT THE TIME OF PRODUCTION. WE CANNOT ACCEPT RESPONSIBILITY FOR DISCREPANCIES RESULTING FROM NEW PLANS/ INFORMATION BEING ISSUED POST-ISSUE OF THIS DRAWING. THE CONTRACTOR SHOULD REVIEW THIS DRAWING IN LIGHT OF WIDER SITE INFORMATION SUCH AS CONTAMINATION, UTILITIES SURVEYS AND SITE INVESTIGATIONS
 6. IT IS THE RESPONSIBILITY OF THE PRINCIPLE CONTRACTOR TO MAKE THE DESIGNER AND CLIENT AWARE OF SITE-SPECIFIC RISKS AND HAZARDS THAT MAY AFFECT THE DRAWING AND SPECIFICATION

CLIENT: NH DEVELOPMENTS LTD

SITE: BOORLEY PRIMARY SCHOOL,
NAIRN ROAD, BOTLEY, HAMPSHIRE,
SO32 2SH

DRAWING: CONSTRUCTION DETAILS

DRAWING NUMBER: AEG5048_DR02

DATE: 27/09/2023

REV: -

DRAWN BY: JA

DRAWING SCALE: SEE DETAILS

PRELIMINARY DRAWING
FOR PLANNING ONLY - NOT FOR
CONSTRUCTION

Appendix G – InfoDrainage Calculations

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Inflows Storm Phase: Phase		Company Address: Aegaea Ltd			



Play Area

Type : Catchment Area

Area (ha)	0.03
-----------	------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.900
Winter Volumetric Runoff	0.900
Time of Concentration (mins)	5
Percentage Impervious (%)	100



West Patio

Type : Catchment Area

Area (ha)	0.004
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.900
Winter Volumetric Runoff	0.900
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Roof

Type : Catchment Area

Area (ha)	0.064
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.900
Winter Volumetric Runoff	0.900
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Carpark

Type : Catchment Area

Area (ha)	0.066
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.900
Winter Volumetric Runoff	0.900
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,	Date: 24/09/2024		
	Designed by: JA	Checked by:	Approved By:
Report Details: Type: Inflows Storm Phase: Phase	Company Address: Aegaea Ltd		



Access Road

Type : Catchment Area

Area (ha)	0.025
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.900
Winter Volumetric Runoff	0.900
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area

Type : Catchment Area

Area (ha)	0.007
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.900
Winter Volumetric Runoff	0.900
Time of Concentration (mins)	5
Percentage Impervious (%)	100



East Patio

Type : Catchment Area

Area (ha)	0.007
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.900
Winter Volumetric Runoff	0.900
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase		Company Address: Aegaea Ltd			



West PP

Type : Porous Paving

Dimensions

Exceedance Level (m)	24.350
Depth (m)	0.200
Base Level (m)	24.150
Paving Layer Depth (mm)	5
Membrane Percolation (m/hr)	3.0
Porosity (%)	30
Length (m)	18.500
Long. Slope (1:X)	2000.00
Width (m)	2.000
Total Volume (m³)	2.266

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	100
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	West Patio
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	2.003
Outlet Type	Orifice
Diameter (m)	0.030
Coefficient of Discharge	0.600
Invert Level (m)	24.150

Advanced

Conductivity (m/hr)	500.0
---------------------	-------

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase		Company Address: Aegaea Ltd			



Play Area PP

Type : Porous Paving

Dimensions

Exceedance Level (m)	24.500
Depth (m)	0.200
Base Level (m)	24.300
Paving Layer Depth (mm)	5
Membrane Percolation (m/hr)	3.0
Porosity (%)	30
Length (m)	38.500
Long. Slope (1:X)	2000.00
Width (m)	8.000
Total Volume (m³)	18.230

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	100
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Play Area
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	3.004
Outlet Type	Orifice
Diameter (m)	0.030
Coefficient of Discharge	0.600
Invert Level (m)	24.300

Advanced

Conductivity (m/hr)	500.0
---------------------	-------

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase		Company Address: Aegaea Ltd			



East PP

Type : Porous Paving

Dimensions

Exceedance Level (m)	24.350
Depth (m)	0.200
Base Level (m)	24.150
Paving Layer Depth (mm)	5
Membrane Percolation (m/hr)	3.0
Porosity (%)	30
Length (m)	17.500
Long. Slope (1:X)	2000.00
Width (m)	4.000
Total Volume (m³)	4.191

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	100
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	East Patio
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	3.003
Outlet Type	Orifice
Diameter (m)	0.030
Coefficient of Discharge	0.600
Invert Level (m)	24.150

Advanced

Conductivity (m/hr)	500.0
---------------------	-------

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase		Company Address: Aegaea Ltd			



South PP

Type : Porous Paving

Dimensions

Exceedance Level (m)	24.350
Depth (m)	0.200
Base Level (m)	24.150
Paving Layer Depth (mm)	5
Membrane Percolation (m/hr)	3.0
Porosity (%)	30
Length (m)	17.500
Long. Slope (1:X)	2000.00
Width (m)	4.000
Total Volume (m³)	4.191

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	100
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Catchment Area
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	4.001
Outlet Type	Orifice
Diameter (m)	0.030
Coefficient of Discharge	0.600
Invert Level (m)	24.150

Advanced

Conductivity (m/hr)	500.0
---------------------	-------

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase		Company Address: Aegaea Ltd			



Cellular Storage

Type : Cellular Storage

Dimensions

Exceedance Level (m)	24.460
Depth (m)	1.000
Base Level (m)	22.800
Number of Crates Long	1
Number of Crates Wide	1
Number of Crates High	1
Porosity (%)	95
Crate Length (m)	16
Crate Width (m)	7
Crate Height (m)	1
Total Volume (m³)	107.060

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Carpark
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (2)

Inlet Type	Point Inflow
Incoming Item(s)	Roof
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (3)

Inlet Type	Point Inflow
Incoming Item(s)	2.001
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (4)

Inlet Type	Point Inflow
Incoming Item(s)	3.001
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	4.001
Bypass Destination	(None)
Capacity Type	No Restriction

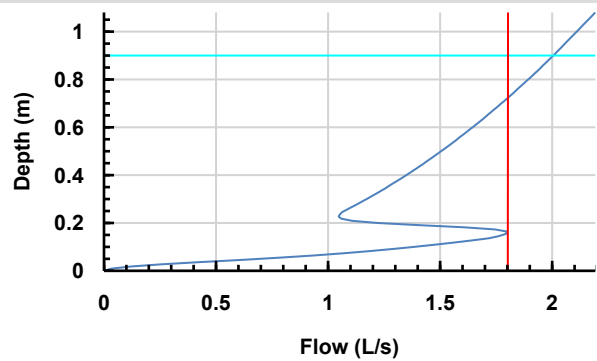
Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase		Company Address: Aegaea Ltd			

Outlets

Outlet

Outgoing Connection	1.002
Outlet Type	Hydro-Brake®
Invert Level (m)	22.800
Design Depth (m)	0.900
Design Flow (L/s)	2.0
Objective	Minimise Upstream Storage Requirements
Application	Surface Water Only
Sump Available	☐

Unit Reference	CHE-0066-2000-0900-2000
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Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Connections Storm Phase: Phase		Company Address: Aegaea Ltd			

Name	Length (m)	Connection Type	Slope (1:X)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Upstream Cover Level (m)	Upstream Invert Level (m)
1.002	18.623	Pipe	18.623		0.6	100	24.460	22.800
1.001	18.312	Pipe	183.122		0.6	150	23.500	21.800
2.003	14.958	Pipe	12.741		0.6	100	24.359	24.150
2.001	19.803	Pipe	112.516		0.6	100	24.176	22.976
3.004	9.141	Pipe	9.622		0.6	100	24.519	24.300
3.003	14.288	Pipe	14.288		0.6	100	24.359	24.150
3.001	10.463	Pipe	29.895		0.6	100	24.350	23.150
3.002	17.270	Pipe	86.349		0.6	100	24.350	23.350
2.002	24.779	Pipe	40.160		0.6	100	24.409	23.593
4.001	12.133	Pipe	8.987		0.6	100	24.359	24.150

Name	Downstream Cover Level (m)	Downstream Invert Level (m)	Lock	Flow Restriction (L/s)	Culvert Type	Culvert Entrance
1.002	23.500	21.800	None	2.2	(None)	(None)
1.001	23.000	21.700	None		(None)	(None)
2.003	24.176	22.976	None	0.8	(None)	(None)
2.001	24.460	22.800	None		(None)	(None)
3.004	24.350	23.350	None	0.8	(None)	(None)
3.003	24.350	23.150	None	0.8	(None)	(None)
3.001	24.460	22.800	None		(None)	(None)
3.002	24.350	23.150	None		(None)	(None)
2.002	24.176	22.976	None		(None)	(None)
4.001	24.176	22.800	None	0.8	(None)	(None)

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Manhole Schedule Storm Phase: Phase		Company Address: Aegaea Ltd			

Name	Cover Level (m) Invert Level (m)		Connection Details				Type
Coordinates (m)	Depth (m)	Manhole Size (m)	Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
MH1	23.500 21.800	Diameter / Length: 1.200	{1} 1.002	Pipe	21.800	Diam/Width:100	Manhole
E:249.501 N:-16.610	1.700		{a} 1.001	Pipe	21.800	Diam/Width:150	Not Applicable
Southern Water Surface Water Sewer	23.000 21.700	Diameter / Length: 1.200	{1} 1.001	Pipe	21.700	Diam/Width:150	Manhole
E:267.813 N:-16.750	1.300						Not Applicable
MH5	24.350 23.350	Diameter / Length: 1.200	{1} 3.004	Pipe	23.350	Diam/Width:100	Manhole
E:243.463 N:22.515	1.000		{a} 3.002	Pipe	23.350	Diam/Width:100	Not Applicable
MH2	24.176 22.976	Diameter / Length: 1.200	{1} 2.003	Pipe	22.976	Diam/Width:100	Manhole
E:213.745 N:-0.525	1.200		{2} 2.002	Pipe	22.976	Diam/Width:100	
			{a} 2.001	Pipe	22.976	Diam/Width:100	Not Applicable
MH4	24.350 23.150	Diameter / Length: 1.200	{1} 3.003	Pipe	23.150	Diam/Width:100	Manhole
E:242.351 N:5.281	1.200		{2} 3.002	Pipe	23.150	Diam/Width:100	
			{a} 3.001	Pipe	23.150	Diam/Width:100	Not Applicable

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Manhole Schedule Storm Phase: Phase		Company Address: Aegaea Ltd			

Name	Cover Level (m) Invert Level (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
MH3	24.409 23.593	Diameter / Length: 1.200					Manhole
E:213.906 N:24.253	0.816		{a} 2.002	Pipe	23.593	Diam/Width:100	Not Applicable

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Network Design Criteria Storm Phase: Phase		Company Address: Aegaea Ltd			

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Pipe Options

Lock Slope Options	None
Design Options	Minimise Excavation
Design Level	Level Soffits
Min. Cover Depth (m)	1.200
Min. Slope (1:X)	500.00
Max. Slope (1:X)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Pipe Size Library

Default

Add. Increment (mm)	75
Max. Diameter (mm)	0

Diameter (mm)	Min. Slope (1:X)	Max. Slope (1:X)
100	0.00	0.00
150	0.00	0.00

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Network Design Criteria Storm Phase: Phase		Company Address: Aegaea Ltd			

Manhole Options

Apply Offset	☐
--------------	--------------------------

Manhole Size Library

Default

Diameter / Width

Connection (mm)	Diameter / Length (m)	Width (m)
0	1.200	0.000
375	1.350	0.000
500	1.500	0.000
750	1.800	0.000

Additional Sizing

Connection (mm)	900
Diameter / Length (m)	0.900
Width (m)	0.000

Depth

Depth (m)	Diameter / Length (m)	Width (m)
0.000	1.050	0.000
1.500	1.200	0.000

Access

Depth (m)	Ladder Protrusion (mm)
0.000	130
3.000	230

Benching Requirements

Landing Width (mm)	500
Benching Width (mm)	225

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,	Date: 24/09/2024			
	Designed by: JA	Checked by:	Approved By:	
Report Title: Rainfall Analysis Criteria	Company Address: Aegaea Ltd			

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall		
FSR	Type: FSR	
Region	England And Wales	
M5-60 (mm)	19.2	
Ratio R	0.350	
Summer	☒	
Winter	☒	

Return Period	
Return Period (years)	Increase Rainfall (%)
1.0	0.000
30.0	0.000
100.0	0.000
30.0	40.000
100.0	45.000

Storm Durations	
Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Title: UK and Ireland Rural Runoff Calculator		Company Address: Aegaea Ltd			

ICP SUDS / IH 124

Details

Method	ICP SUDS
Area (ha)	0.202
SAAR (mm)	800.0
Soil	0.47
Region	Region 7
Urban	0
Return Period (years)	0

Results

Region	QBAR Rural (L/s)	QBAR Urban (L/s)	Q 1 (years) (L/s)	Q 30 (years) (L/s)	Q 100 (years) (L/s)
Region 7	1.1	1.1	1.0	2.6	3.6

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase		Company Address: Aegaea Ltd			



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
MH1	FSR: 1 years: +0 %: 15 mins: Summer	23.50 0	21.80 0	21.855	0.055	3.8	0.062	0.000	3.5	2.443	OK
Southern Water Surface Water Sewer	FSR: 1 years: +0 %: 15 mins: Summer	23.00 0	21.70 0	21.752	0.052	3.5	0.000	0.000	3.6	2.443	OK
MH5	FSR: 1 years: +0 %: 480 mins: Summer	24.35 0	23.35 0	23.366	0.016	0.3	0.018	0.000	0.3	6.119	OK
MH2	FSR: 1 years: +0 %: 60 mins: Summer	24.17 6	22.97 6	22.986	0.010	0.1	0.011	0.000	0.1	0.330	OK
MH4	FSR: 1 years: +0 %: 240 mins: Summer	24.35 0	23.15 0	23.164	0.014	0.5	0.016	0.000	0.5	5.471	OK
MH3	FSR: 1 years: +0 %: 15 mins: Summer	24.40 9	23.59 3	23.593	0.000	0.0	0.000	0.000	0.0	0.000	OK

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase		Company Address: Aegaea Ltd			



FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
MH1	FSR: 30 years: +0 %: 15 mins: Summer	23.50 0	21.80 0	21.899	0.099	9.8	0.112	0.000	9.2	5.974	OK
Southern Water Surface Water Sewer	FSR: 30 years: +0 %: 15 mins: Summer	23.00 0	21.70 0	21.792	0.092	9.2	0.000	0.000	9.4	5.974	OK
MH5	FSR: 30 years: +0 %: 240 mins: Summer	24.35 0	23.35 0	23.370	0.020	0.5	0.022	0.000	0.5	9.694	OK
MH2	FSR: 30 years: +0 %: 480 mins: Summer	24.17 6	22.97 6	23.261	0.285	0.3	0.322	0.000	0.1	1.766	Surcharged
MH4	FSR: 30 years: +0 %: 480 mins: Summer	24.35 0	23.15 0	23.262	0.112	0.8	0.127	0.000	0.8	16.848	Surcharged
MH3	FSR: 30 years: +0 %: 15 mins: Summer	24.40 9	23.59 3	23.593	0.000	0.0	0.000	0.000	0.0	0.000	OK

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase		Company Address: Aegaea Ltd			



FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
MH1	FSR: 100 years: +0 %: 15 mins: Summer	23.50 0	21.80 0	21.922	0.122	12.8	0.138	0.000	11.9	6.565	OK
Southern Water Surface Water Sewer	FSR: 100 years: +0 %: 15 mins: Summer	23.00 0	21.70 0	21.811	0.111	11.9	0.000	0.000	12.0	6.565	OK
MH5	FSR: 100 years: +0 %: 480 mins: Winter	24.35 0	23.35 0	23.426	0.076	0.6	0.086	0.000	0.6	17.495	OK
MH2	FSR: 100 years: +0 %: 480 mins: Winter	24.17 6	22.97 6	23.422	0.446	0.2	0.505	0.000	0.1	1.831	Surcharged
MH4	FSR: 100 years: +0 %: 480 mins: Winter	24.35 0	23.15 0	23.424	0.274	0.9	0.310	0.000	0.8	21.743	Surcharged
MH3	FSR: 100 years: +0 %: 15 mins: Summer	24.40 9	23.59 3	23.593	0.000	0.0	0.000	0.000	0.0	0.000	OK

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase		Company Address: Aegaea Ltd			



FSR: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
MH1	FSR: 30 years: +40 %: 15 mins: Summer	23.50 0	21.80 0	21.932	0.132	13.8	0.149	0.000	12.8	6.958	OK
Southern Water Surface Water Sewer	FSR: 30 years: +40 %: 15 mins: Summer	23.00 0	21.70 0	21.818	0.118	12.8	0.000	0.000	12.9	6.958	OK
MH5	FSR: 30 years: +40 %: 480 mins: Winter	24.35 0	23.35 0	23.488	0.138	0.6	0.156	0.000	0.6	19.005	Surcharged
MH2	FSR: 30 years: +40 %: 480 mins: Winter	24.17 6	22.97 6	23.485	0.509	0.2	0.575	0.000	0.1	1.957	Surcharged
MH4	FSR: 30 years: +40 %: 480 mins: Winter	24.35 0	23.15 0	23.486	0.336	0.9	0.380	0.000	0.9	23.583	Surcharged
MH3	FSR: 30 years: +40 %: 15 mins: Summer	24.40 9	23.59 3	23.593	0.000	0.0	0.000	0.000	0.0	0.000	OK

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase		Company Address: Aegaea Ltd			



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
MH1	FSR: 100 years: +45 %: 15 mins: Summer	23.500	21.800	22.039	0.239	18.5	0.271	0.000	17.1	8.970	Surcharged
Southern Water Surface Water Sewer	FSR: 100 years: +45 %: 15 mins: Summer	23.000	21.700	21.850	0.150	17.1	0.000	0.000	17.3	8.970	OK
MH5	FSR: 100 years: +45 %: 480 mins: Winter	24.350	23.350	23.756	0.406	0.8	0.459	0.000	0.7	25.121	Surcharged
MH2	FSR: 100 years: +45 %: 480 mins: Winter	24.176	22.976	23.751	0.775	0.3	0.876	0.000	0.2	2.728	Surcharged
MH4	FSR: 100 years: +45 %: 480 mins: Winter	24.350	23.150	23.753	0.603	1.1	0.682	0.000	1.1	30.858	Surcharged
MH3	FSR: 100 years: +45 %: 480 mins: Winter	24.409	23.593	23.751	0.158	0.1	0.179	0.000	0.0	0.233	Surcharged

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: Aegaea Ltd			



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Lost Volume (m³)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Cellular Storage	FSR: 1 years: +0 %: 480 mins: Summer	22.961	22.961	0.161	0.161	4.4	17.087	0.000	1.7	0.000	36.222	115	84.040
West PP	FSR: 1 years: +0 %: 60 mins: Summer	24.179	24.173	0.019	0.023	0.3	0.235	0.000	0.1	0.000	0.341	34	89.614
Play Area PP	FSR: 1 years: +0 %: 360 mins: Summer	24.351	24.346	0.032	0.046	1.1	3.643	0.000	0.3	0.000	5.366	138	80.017
East PP	FSR: 1 years: +0 %: 120 mins: Summer	24.182	24.179	0.023	0.029	0.5	0.555	0.000	0.2	0.000	0.890	38	86.747
South PP	FSR: 1 years: +0 %: 120 mins: Summer	24.183	24.179	0.024	0.029	0.5	0.565	0.000	0.2	0.000	0.914	37	86.508

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,	Date: 24/09/2024			
	Designed by: JA	Checked by:	Approved By:	
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address: Aegaea Ltd			

Status
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Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: Aegaea Ltd			



FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Lost Volume (m³)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Cellular Storage	FSR: 30 years: +0 %: 480 mins: Summer	23.261	23.261	0.461	0.461	9.4	49.059	0.000	1.8	0.000	64.460	284	54.176
West PP	FSR: 30 years: +0 %: 60 mins: Summer	24.202	24.200	0.042	0.050	0.8	0.511	0.000	0.4	0.000	0.889	27	77.460
Play Area PP	FSR: 30 years: +0 %: 240 mins: Summer	24.399	24.397	0.080	0.097	3.1	8.198	0.000	0.5	0.000	9.725	155	55.027
East PP	FSR: 30 years: +0 %: 120 mins: Summer	24.213	24.212	0.054	0.062	1.1	1.227	0.000	0.4	0.000	2.175	36	70.735
South PP	FSR: 30 years: +0 %: 120 mins: Summer	24.215	24.214	0.056	0.064	1.1	1.271	0.000	0.4	0.000	2.255	37	69.673

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,	Date: 24/09/2024		
	Designed by: JA	Checked by:	Approved By:
	Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		
Company Address: Aegaea Ltd			

Status
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Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: Aegaea Ltd			



FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Lost Volume (m³)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Cellular Storage	FSR: 100 years: +0 %: 480 mins: Winter	23.422	23.422	0.622	0.622	8.1	66.229	0.000	1.8	0.000	73.647	400	38.139
West PP	FSR: 100 years: +0 %: 60 mins: Summer	24.216	24.215	0.057	0.065	1.0	0.677	0.000	0.4	0.000	1.185	29	70.116
Play Area PP	FSR: 100 years: +0 %: 240 mins: Summer	24.428	24.426	0.109	0.126	4.0	10.877	0.000	0.6	0.000	12.025	180	40.332
East PP	FSR: 100 years: +0 %: 120 mins: Summer	24.233	24.232	0.074	0.082	1.4	1.648	0.000	0.5	0.000	2.884	41	60.673
South PP	FSR: 100 years: +0 %: 120 mins: Summer	24.236	24.235	0.077	0.085	1.5	1.706	0.000	0.5	0.000	2.971	42	59.301

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,	Date: 24/09/2024		
	Designed by: JA	Checked by:	Approved By:
	Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		
Company Address: Aegaea Ltd			



Status
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Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: Aegaea Ltd			



FSR: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Lost Volume (m³)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Cellular Storage	FSR: 30 years: +40 %: 480 mins: Winter	23.485	23.485	0.685	0.685	8.7	72.852	0.000	1.8	0.000	77.568	431	31.952
West PP	FSR: 30 years: +40 %: 60 mins: Summer	24.220	24.219	0.061	0.069	1.1	0.721	0.000	0.4	0.000	1.261	29	68.203
Play Area PP	FSR: 30 years: +40 %: 360 mins: Summer	24.438	24.436	0.119	0.136	3.3	11.794	0.000	0.7	0.000	16.753	187	35.306
East PP	FSR: 30 years: +40 %: 120 mins: Summer	24.238	24.238	0.079	0.088	1.5	1.761	0.000	0.5	0.000	3.069	42	57.983
South PP	FSR: 30 years: +40 %: 120 mins: Summer	24.242	24.241	0.083	0.091	1.6	1.836	0.000	0.5	0.000	3.186	43	56.200

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,	Date: 24/09/2024		
	Designed by: JA	Checked by:	Approved By:
	Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		
Company Address: Aegaea Ltd			

Status
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Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: Aegaea Ltd			



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Lost Volume (m³)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Cellular Storage	FSR: 100 years: +45 %: 480 mins: Winter	23.751	23.751	0.951	0.951	11.5	101.173	0.000	2.0	0.000	92.479	487	5.499
West PP	FSR: 100 years: +45 %: 60 mins: Summer	24.246	24.245	0.086	0.095	1.5	1.002	0.000	0.5	0.000	1.729	32	55.778
Play Area PP	FSR: 100 years: +45 %: 360 mins: Summer	24.487	24.484	0.168	0.184	4.4	16.280	0.000	0.8	0.000	21.550	225	10.692
East PP	FSR: 100 years: +45 %: 120 mins: Summer	24.272	24.272	0.114	0.122	2.1	2.475	0.000	0.6	0.000	4.181	51	40.957
South PP	FSR: 100 years: +45 %: 120 mins: Summer	24.277	24.276	0.118	0.126	2.2	2.572	0.000	0.6	0.000	4.337	52	38.644

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,	Date: 24/09/2024		
	Designed by: JA	Checked by:	Approved By:
	Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		
Company Address: Aegaea Ltd			



Status
OK
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Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase		Company Address: Aegaea Ltd			



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.002	FSR: 1 years: +0 %: 480 mins: Summer	Pipe	Cellular Storage	MH1	24.460	22.961	0.032	36.215	0.8	0.12	1.7	Surcharged
1.001	FSR: 1 years: +0 %: 15 mins: Summer	Pipe	MH1	Southern Water Surface Water Sewer	23.500	21.855	0.054	2.443	0.6	0.27	3.5	OK
2.003	FSR: 1 years: +0 %: 60 mins: Summer	Pipe	West PP	MH2	24.359	24.171	0.008	0.339	0.5	0.01	0.1	OK
2.001	FSR: 1 years: +0 %: 60 mins: Summer	Pipe	MH2	Cellular Storage	24.176	22.986	0.064	0.330	0.0	0.02	0.1	OK
3.004	FSR: 1 years: +0 %: 360 mins: Summer	Pipe	Play Area PP	MH5	24.519	24.339	0.013	5.363	0.6	0.02	0.3	OK
3.003	FSR: 1 years: +0 %: 120 mins: Summer	Pipe	East PP	MH4	24.359	24.176	0.011	0.888	0.5	0.01	0.2	OK
3.001	FSR: 1 years: +0 %: 240 mins: Summer	Pipe	MH4	Cellular Storage	24.350	23.164	0.085	5.471	0.1	0.04	0.5	OK
3.002	FSR: 1 years: +0 %: 360 mins: Summer	Pipe	MH5	MH4	24.350	23.366	0.015	5.356	0.5	0.05	0.3	OK
2.002	FSR: 1 years: +0 %: 15 mins: Summer	Pipe	MH3	MH2	24.409	23.593	0.004	0.000	0.0	0	0.0	OK
4.001	FSR: 1 years: +0 %: 120 mins: Summer	Pipe	South PP	Cellular Storage	24.359	24.177	0.073	0.911	0.0	0.01	0.2	OK

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase		Company Address: Aegaea Ltd			



FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.002	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	Cellular Storage	MH1	24.460	22.983	0.056	2.178	0.9	0.13	1.8	Surcharged
1.001	FSR: 30 years: +0 %: 15 mins: Summer	Pipe	MH1	Southern Water Surface Water Sewer	23.500	21.899	0.095	5.974	0.8	0.7	9.2	OK
2.003	FSR: 30 years: +0 %: 60 mins: Summer	Pipe	West PP	MH2	24.359	24.196	0.076	0.886	0.6	0.02	0.4	OK
2.001	FSR: 30 years: +0 %: 15 mins: Summer	Pipe	MH2	Cellular Storage	24.176	22.991	0.099	0.274	0.0	0.05	0.3	OK
3.004	FSR: 30 years: +0 %: 240 mins: Summer	Pipe	Play Area PP	MH5	24.519	24.389	0.016	9.716	0.7	0.03	0.5	OK
3.003	FSR: 30 years: +0 %: 120 mins: Summer	Pipe	East PP	MH4	24.359	24.208	0.027	2.173	0.6	0.03	0.4	OK
3.001	FSR: 30 years: +0 %: 120 mins: Summer	Pipe	MH4	Cellular Storage	24.350	23.195	0.100	7.423	0.1	0.08	0.9	OK
3.002	FSR: 30 years: +0 %: 240 mins: Summer	Pipe	MH5	MH4	24.350	23.370	0.058	9.694	0.5	0.08	0.5	OK
2.002	FSR: 30 years: +0 %: 15 mins: Summer	Pipe	MH3	MH2	24.409	23.593	0.008	0.000	0.0	0	0.0	OK
4.001	FSR: 30 years: +0 %: 120 mins: Summer	Pipe	South PP	Cellular Storage	24.359	24.210	0.100	2.251	0.1	0.02	0.4	OK

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase		Company Address: Aegaea Ltd			



FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.002	FSR: 100 years: +0 %: 960 mins: Summer	Pipe	Cellular Storage	MH1	24.460	23.393	0.035	124.524	0.9	0.13	1.8	Surcharged
1.001	FSR: 100 years: +0 %: 15 mins: Summer	Pipe	MH1	Southern Water Surface Water Sewer	23.500	21.922	0.116	6.565	0.8	0.91	11.9	OK
2.003	FSR: 100 years: +0 %: 60 mins: Summer	Pipe	West PP	MH2	24.359	24.211	0.100	1.181	0.6	0.02	0.4	OK
2.001	FSR: 100 years: +0 %: 30 mins: Winter	Pipe	MH2	Cellular Storage	24.176	23.131	0.100	0.348	0.0	0.06	0.3	Surcharged
3.004	FSR: 100 years: +0 %: 240 mins: Summer	Pipe	Play Area PP	MH5	24.519	24.418	0.031	12.014	0.7	0.03	0.6	Surcharged
3.003	FSR: 100 years: +0 %: 120 mins: Summer	Pipe	East PP	MH4	24.359	24.228	0.091	2.880	0.6	0.03	0.5	OK
3.001	FSR: 100 years: +0 %: 60 mins: Summer	Pipe	MH4	Cellular Storage	24.350	23.227	0.100	4.792	0.1	0.09	1.0	OK
3.002	FSR: 100 years: +0 %: 240 mins: Summer	Pipe	MH5	MH4	24.350	23.399	0.100	11.987	0.5	0.1	0.6	OK
2.002	FSR: 100 years: +0 %: 15 mins: Summer	Pipe	MH3	MH2	24.409	23.593	0.034	0.000	0.0	0	0.0	OK
4.001	FSR: 100 years: +0 %: 120 mins: Summer	Pipe	South PP	Cellular Storage	24.359	24.231	0.100	2.967	0.1	0.02	0.5	OK

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase		Company Address: Aegaea Ltd			



FSR: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.002	FSR: 30 years: +40 %: 120 mins: Winter	Pipe	Cellular Storage	MH1	24.460	23.354	0.046	18.300	0.8	0.13	1.8	Surcharged
1.001	FSR: 30 years: +40 %: 15 mins: Summer	Pipe	MH1	Southern Water Surface Water Sewer	23.500	21.932	0.125	6.958	0.8	0.98	12.8	OK
2.003	FSR: 30 years: +40 %: 60 mins: Summer	Pipe	West PP	MH2	24.359	24.215	0.100	1.256	0.6	0.03	0.4	OK
2.001	FSR: 30 years: +40 %: 30 mins: Summer	Pipe	MH2	Cellular Storage	24.176	23.156	0.100	0.356	0.0	0.06	0.4	Surcharged
3.004	FSR: 30 years: +40 %: 360 mins: Summer	Pipe	Play Area PP	MH5	24.519	24.428	0.068	16.746	0.7	0.03	0.7	Surcharged
3.003	FSR: 30 years: +40 %: 60 mins: Summer	Pipe	East PP	MH4	24.359	24.233	0.058	2.140	0.6	0.03	0.5	OK
3.001	FSR: 30 years: +40 %: 240 mins: Summer	Pipe	MH4	Cellular Storage	24.350	23.444	0.100	16.101	0.1	0.09	1.0	Surcharged
3.002	FSR: 30 years: +40 %: 240 mins: Summer	Pipe	MH5	MH4	24.350	23.447	0.100	12.648	0.5	0.1	0.6	OK
2.002	FSR: 30 years: +40 %: 15 mins: Summer	Pipe	MH3	MH2	24.409	23.593	0.044	0.000	0.0	0	0.0	OK
4.001	FSR: 30 years: +40 %: 120 mins: Summer	Pipe	South PP	Cellular Storage	24.359	24.237	0.100	3.181	0.1	0.03	0.5	OK

Project: AEG5048_SO32_Botley_07 Boorley Park Primary School, Nairn Road, Botley,		Date: 24/09/2024			
		Designed by: JA	Checked by:		Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase		Company Address: Aegaea Ltd			

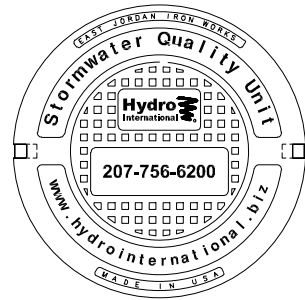
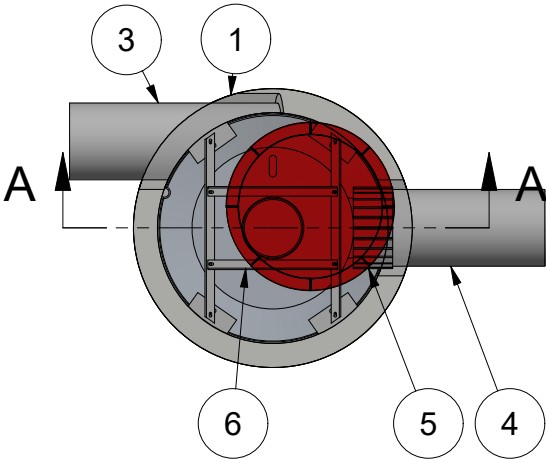


FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.002	FSR: 100 years: +45 %: 480 mins: Winter	Pipe	Cellular Storage	MH1	24.460	23.751	0.038	92.384	0.9	0.14	2.0	Surcharged
1.001	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	MH1	Southern Water Surface Water Sewer	23.500	22.039	0.150	8.970	1.0	1.31	17.1	Surcharged
2.003	FSR: 100 years: +45 %: 60 mins: Summer	Pipe	West PP	MH2	24.359	24.240	0.100	1.723	0.6	0.03	0.5	OK
2.001	FSR: 100 years: +45 %: 30 mins: Summer	Pipe	MH2	Cellular Storage	24.176	23.281	0.100	0.472	0.1	0.08	0.5	Surcharged
3.004	FSR: 100 years: +45 %: 360 mins: Summer	Pipe	Play Area PP	MH5	24.519	24.476	0.100	21.541	0.7	0.04	0.8	Surcharged
3.003	FSR: 100 years: +45 %: 120 mins: Summer	Pipe	East PP	MH4	24.359	24.268	0.100	4.176	0.6	0.04	0.6	Surcharged
3.001	FSR: 100 years: +45 %: 120 mins: Winter	Pipe	MH4	Cellular Storage	24.350	23.563	0.100	11.327	0.2	0.11	1.2	Surcharged
3.002	FSR: 100 years: +45 %: 240 mins: Winter	Pipe	MH5	MH4	24.350	23.690	0.100	15.409	0.5	0.12	0.8	Surcharged
2.002	FSR: 100 years: +45 %: 960 mins: Winter	Pipe	MH3	MH2	24.409	23.724	0.100	0.000	0.0	0	0.0	Surcharged
4.001	FSR: 100 years: +45 %: 120 mins: Summer	Pipe	South PP	Cellular Storage	24.359	24.272	0.100	4.332	0.1	0.03	0.6	Surcharged

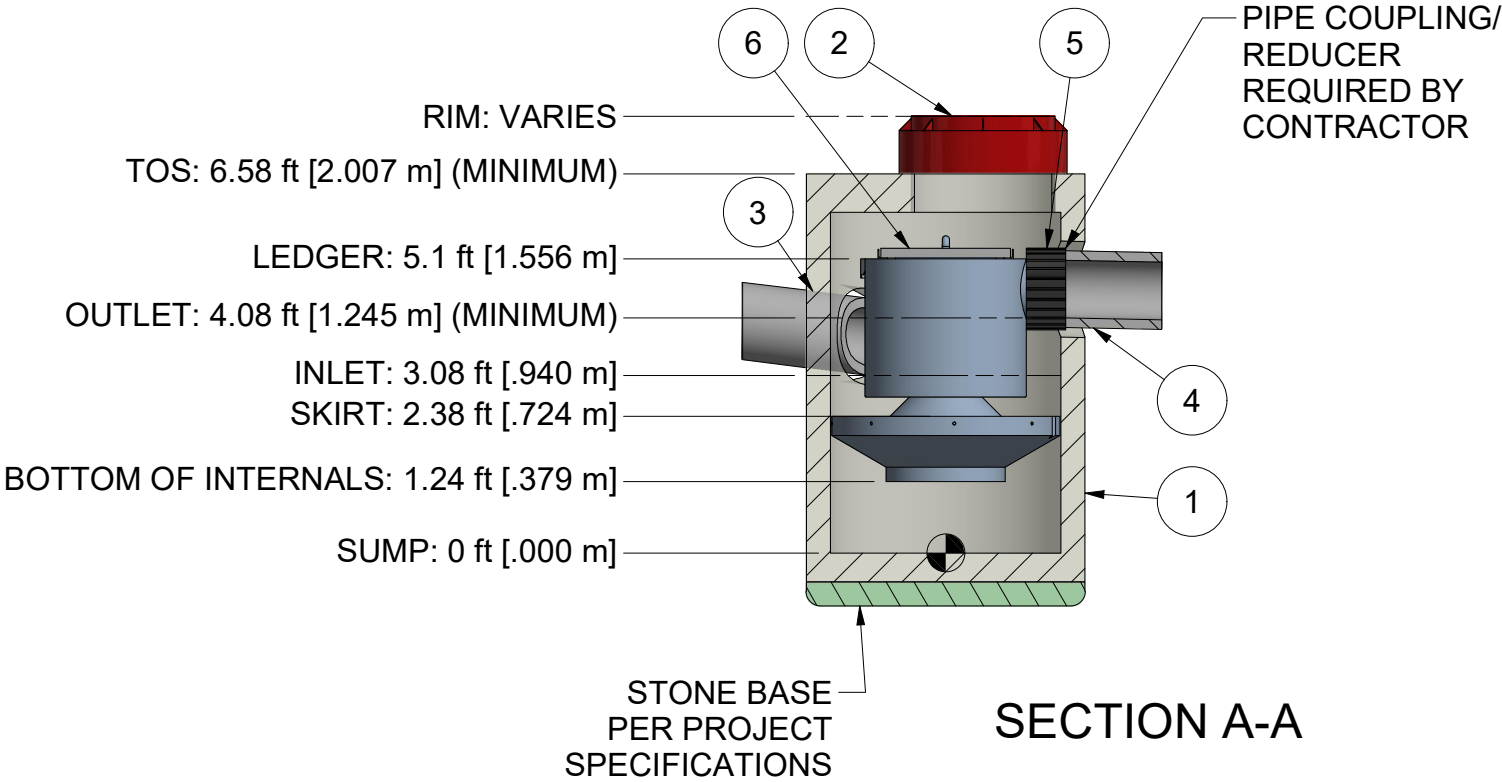
Appendix H – Downstream Defender Details

OUTLET STUB ID: 12" (300 mm)
OUTLET STUB OD: 12.5" (318 mm)



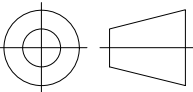
HYDRO FRAME AND COVER (INCLUDED)

GRADE RINGS BY OTHERS
AS REQUIRED



1. MANHOLE WALL AND SLAB THICKNESSES ARE NOT TO SCALE.
2. CONTACT HYDRO INTERNATIONAL FOR A BOTTOM OF STRUCTURE ELEVATION PRIOR TO SETTING DOWNSTREAM DEFENDER MANHOLE.

PROJECTION



IF IN DOUBT ASK

DATE:
12/7/2020

SCALE:
1:1

DRAWN BY:
ER

CHECKED BY:
MRJ

APPROVED BY

Title
4ft-DIAMETER
DOWNSTREAM DEFENDER

GENERAL ARRANGEMENT

Hydro
International
A CRH COMPANY
hydro-int.com
HYDRO INTERNATIONAL

WEIGHT:
N/A

MATERIAL:

STOCK NUMBER:

DRAWING NO.:
DD GA-4

SHEET SIZE:
B

SHEET:
1 OF 1

Rev:
A

NOTE: NOT FOR CONSTRUCTION.
CONTACT HYDRO FOR SITE
SPECIFIC DETAIL

PARTS LIST

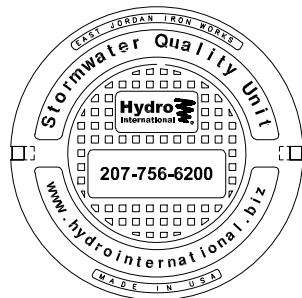
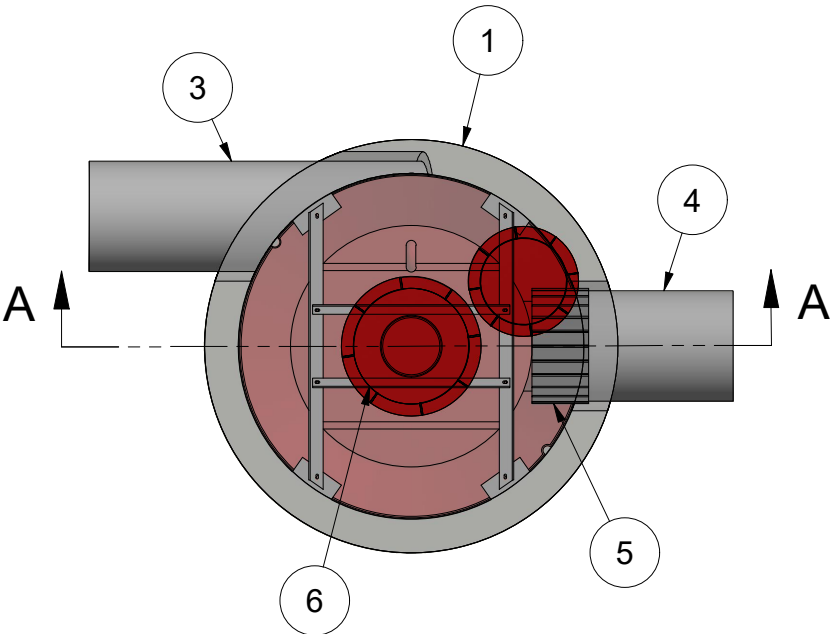
ITEM	QTY	SIZE (in)	SIZE (mm)	DESCRIPTION
1	1	48	1200	PRECAST MANHOLE (BY HYDRO VIA PRECASTER)
2	1	30	750	FRAME AND COVER
3	1	12 (MAX)	300 (MAX)	INLET PIPE (BY OTHERS)
4	1	12 (MAX)	300 (MAX)	OUTLET PIPE (BY OTHERS)
5	1			PIPE COUPLING (BY OTHERS)
6	1			INTERNAL COMPONENTS (PRE-INTALLED)

EQUIPMENT PERFORMANCE

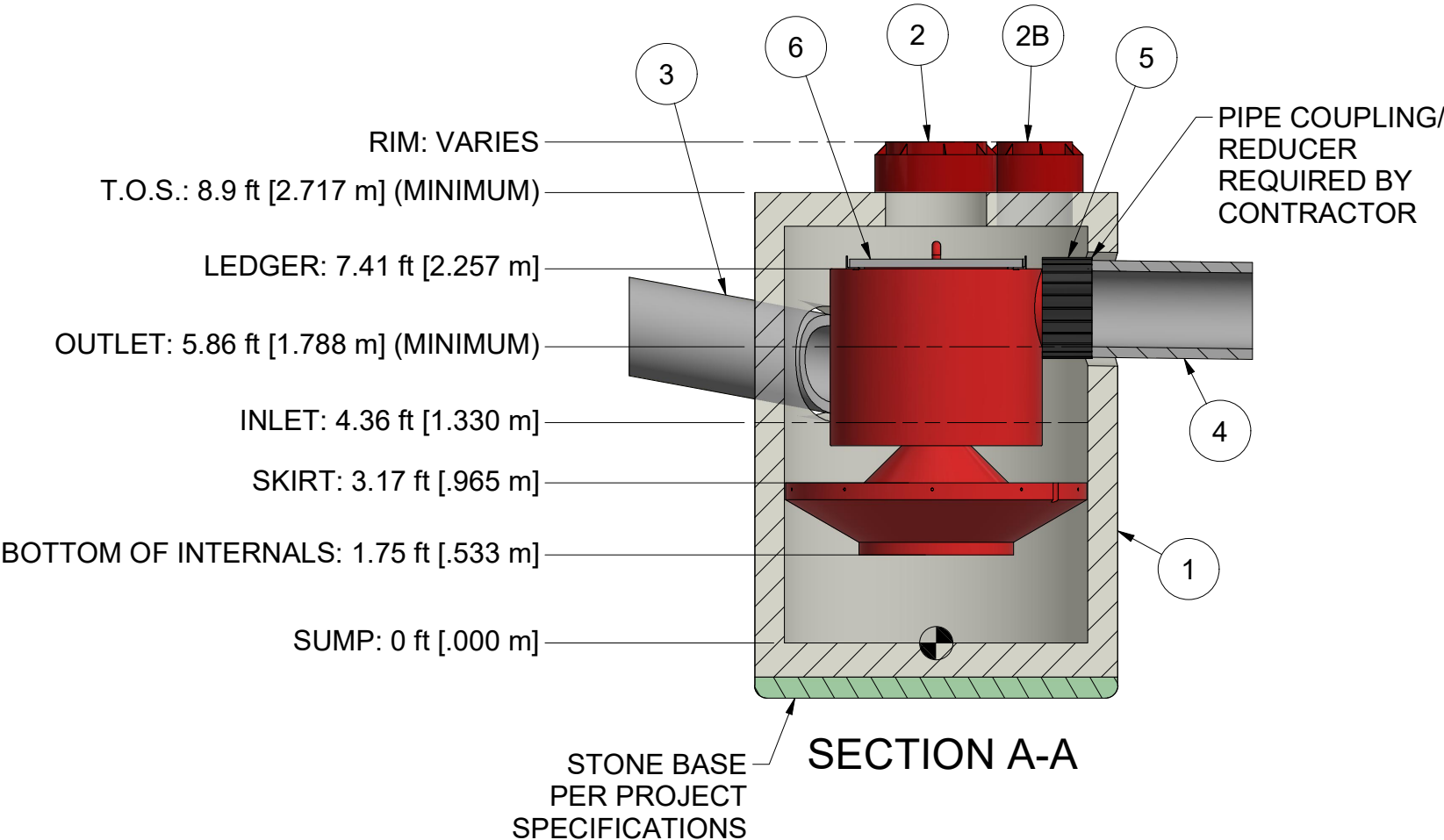
The stormwater treatment unit shall adhere to the hydraulic parameters given in the chart below and provide the removal efficiencies and storage capacities as follows:

- The treatment system shall use an induced vortex to separate pollutants from stormwater runoff.
- Peak Hydraulic Capacity: 3.0 cfs (85 l/s)
- Sediment Storage Capacity: 0.70 cu. yd. (0.53 cu. m)
- Continuous Oil Storage Capacity: 70 gal. (265 liters)
- Sediment shall be stored in a zone that is isolated from the main flow path and protected from reentrainment by a benching skirt.
- For more product information including regulatory acceptances, please visit <https://hydro-int.com/en/products/downstream-defender>

OUTLET STUB ID: 18" (450 mm)
OUTLET STUB OD: 18.7" (475 mm)



HYDRO FRAME AND COVER (INLCUDED)
GRADE RINGS BY OTHERS
AS REQUIRED



1. MANHOLE WALL AND SLAB THICKNESSES ARE NOT TO SCALE.
2. CONTACT HYDRO INTERNATIONAL FOR A BOTTOM OF STRUCTURE ELEVATION PRIOR TO SETTING DOWNSTREAM DEFENDER MANHOLE.



IF IN DOUBT ASK

DATE: 10/8/2019	SCALE: 1 / 50	
DRAWN BY: ER	CHECKED BY: MRJ	APPROVED BY:
Title 6ft-DIAMETER		

NOTE: NOT FOR CONSTRUCTION.
CONTACT HYDRO FOR SITE
SPECIFIC DETAIL

EQUIPMENT PERFORMANCE

The stormwater treatment unit shall adhere to the hydraulic parameters given in the chart below and provide the removal efficiencies and storage capacities as follows:

- The treatment system shall use an induced vortex to separate pollutants from stormwater runoff.
- Peak Hydraulic Capacity: 8.0 cfs (227 l/s)
- Sediment Storage Capacity: 2.10 cu. yd. (1.59 cu. m)
- Continuous Oil Storage Capacity: 216 gal. (818 liters)
- Sediment shall be stored in a zone that is isolated from the main flow path and protected from reintraintment by a benching skirt.
- For more product information including regulatory acceptances, please visit <https://hydro-int.com/en/products/downstream-defender>

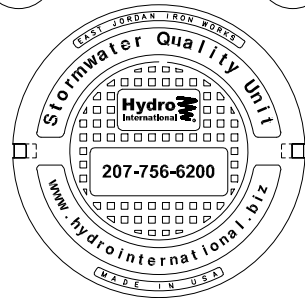
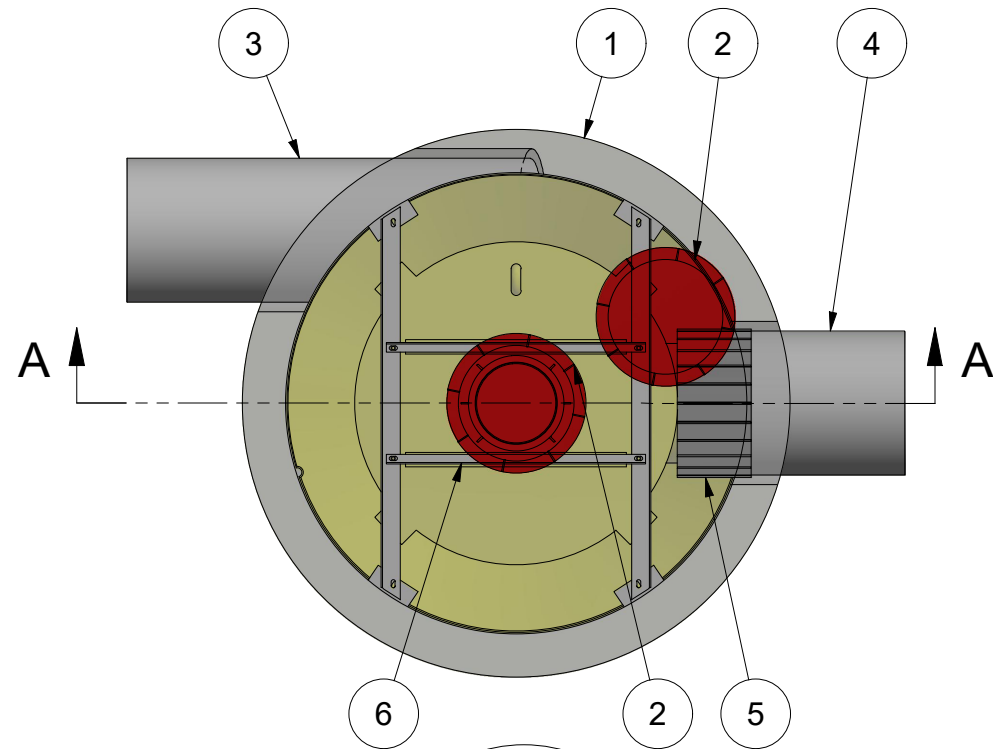
PARTS LIST				
ITEM	QTY	SIZE (in)	SIZE (mm)	DESCRIPTION
1	1	72	1800	PRECAST MANHOLE (BY HYDRO VIA PRECASTER)
2	3	24	600	FRAME AND COVER
2B	1	18	450	FRAME AND COVER
3	1	18 (MAX)	450 (MAX)	MAX INLET PIPE (BY OTHERS)
4	1	18 (MAX)	450 (MAX)	MAX OUTLET PIPE (BY OTHERS)
5	1			PIPE COUPLING (BY OTHERS)
6	1			INTERNAL COMPONENTS (PRE-INTALLED)

GENERAL ARRANGEMENT



A CRH COMPANY
hydro-int.com
HYDRO INTERNATIONAL

WEIGHT: N/A	MATERIAL:
STOCK NUMBER: NEXT ASSY	
DRAWING NO.: DD GA-10	
SHEET SIZE: B	SHEET: 1 OF 1
Rev: A	



HYDRO FRAME AND COVER (INLCUDED)

GRADE RINGS BY OTHERS
AS REQUIRED

RIM: VARIES
T.O.S.: 11.67 ft [3.556 m]
(MINIMUM)

LEDGER: 9.94 ft [3.030 m]

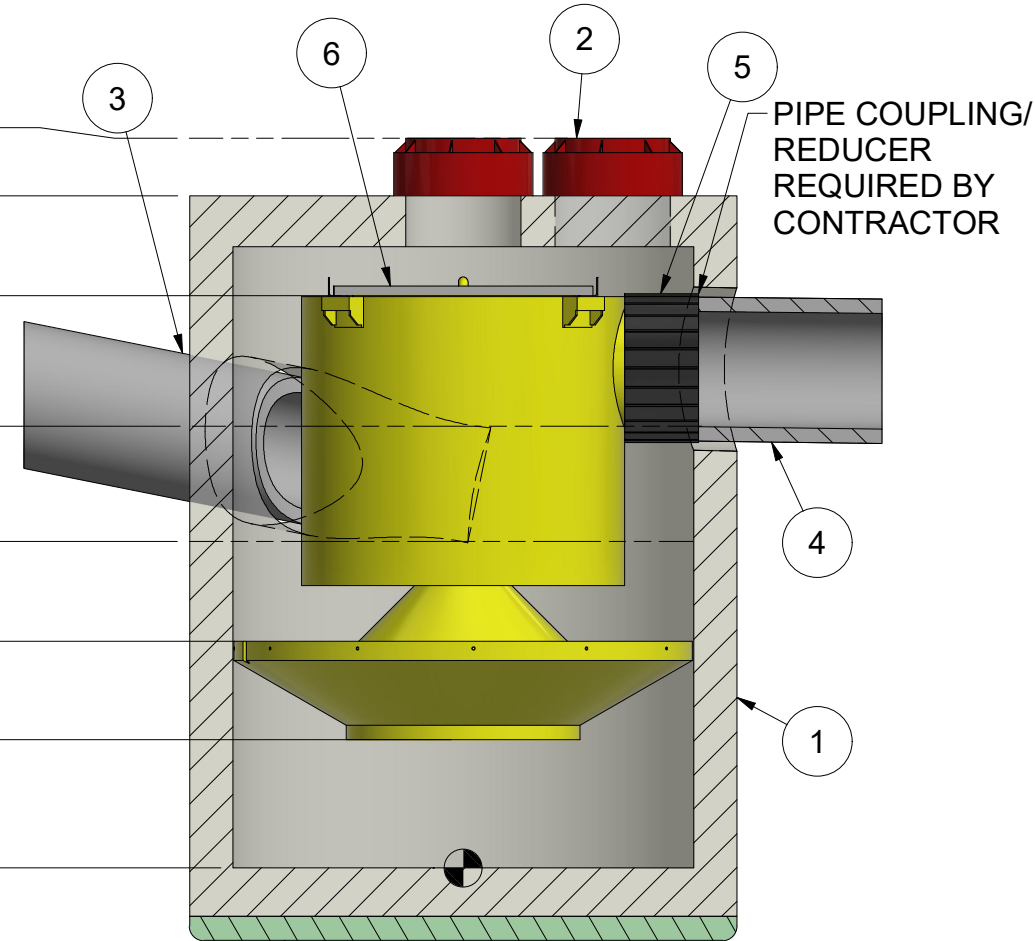
OUTLET: 7.67 ft [2.337 m]
(MINIMUM)

INLET: 5.67 ft [1.727 m]

SKIRT: 3.94 ft [1.200 m]

BOTTOM OF INTERNALS 2.23 ft [.680 m]

SUMP: 0 ft [.000 m]



STONE BASE
PER PROJECT
SPECIFICATIONS

SECTION A-A

NOTE: NOT FOR CONSTRUCTION.
CONTACT HYDRO FOR SITE
SPECIFIC DETAIL

OUTLET STUB ID: 24" (600 mm)
OUTLET STUB OD: 24.8" (630 mm)

1. MANHOLE WALL AND SLAB THICKNESSES ARE NOT TO SCALE.
2. CONTACT HYDRO INTERNATIONAL FOR A BOTTOM OF STRUCTURE ELEVATION PRIOR TO SETTING DOWNSTREAM DEFENDER MANHOLE.



IF IN DOUBT ASK

DATE: 12/8/2020 SCALE: 1 / 50

DRAWN BY: ER CHECKED BY: MRJ APPROVED BY:

Title
8ft DIAMETER
DOWNSTREAM DEFENDEER

GENERAL ARRANGEMENT



WEIGHT: N/A MATERIAL:

STOCK NUMBER:

DRAWING NO.: DD GA-8

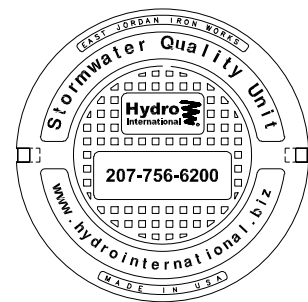
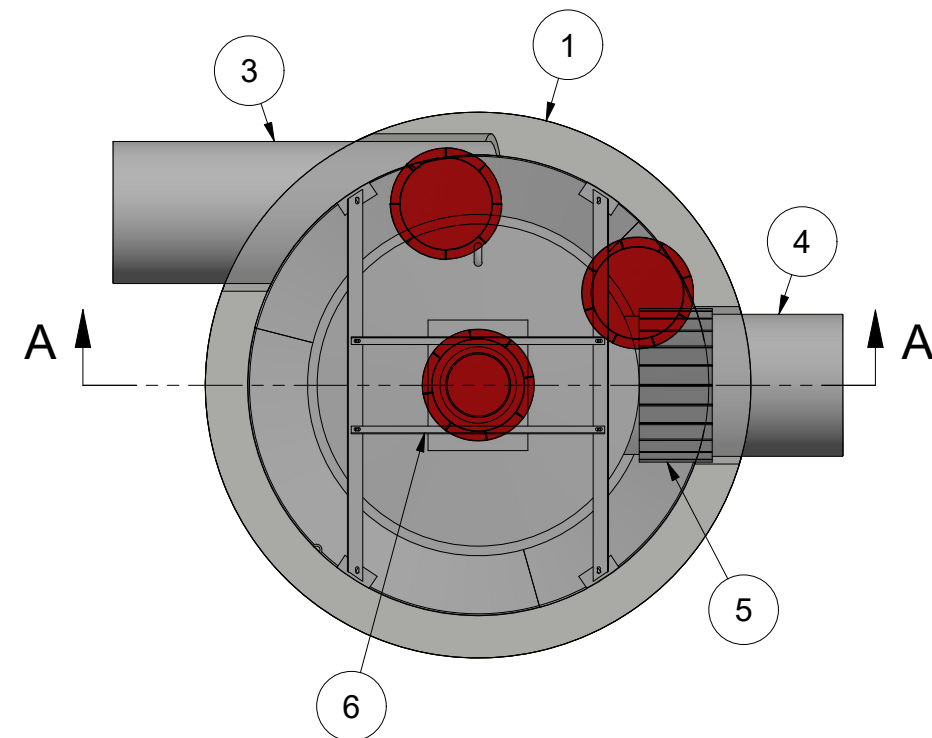
SHEET SIZE: B SHEET: 1 OF 1 Rev: B

EQUIPMENT PERFORMANCE

The stormwater treatment unit shall adhere to the hydraulic parameters given in the chart below and provide the removal efficiencies and storage capacities as follows:

1. The treatment system shall use an induced vortex to separate pollutants from stormwater runoff.
2. Peak Hydraulic Capacity: 15.0 cfs 425 l/s)
3. Sediment Storage Capacity: 4.65 cu. yd. (3.56 cu. m)
4. Continuous Oil Storage Capacity: 540 gal. (2044 liters)
5. Sediment shall be stored in a zone that is isolated from the main flow path and protected from reentrainment by a benching skirt.
6. For more product information including regulatory acceptances, please visit <https://hydro-int.com/en/products/downstream-defender>

PARTS LIST					
ITEM	QTY	SIZE (in)	SIZE (mm)	DESCRIPTION	
1	1	96	2400	PRECAST MANHOLE (BY HYDRO VIA PRECASTER)	
2	2	24	600	FRAME AND COVER	
3	1	24 (MAX)	600 (MAX)	INLET PIPE (BY OTHERS)	
4	1	24 (MAX)	600 (MAX)	OUTLET PIPE (BY OTHERS)	
5	1			PIPE COUPLING (BY OTHERS)	
6	1			INTERNAL COMPONENTS (PRE-INTALLED)	



HYDRO FRAME AND COVER (INLCUDED)

GRADE RINGS BY OTHERS
AS REQUIRED

EQUIPMENT PERFORMANCE

The stormwater treatment unit shall adhere to the hydraulic parameters given in the chart below and provide the removal efficiencies and storage capacities as follows:

1. The treatment system shall use an induced vortex to separate pollutants from stormwater runoff.
2. Peak Hydraulic Capacity: 25.0 cfs (708 l/s)
3. Sediment Storage Capacity: 8.70 cu. yd. (6.65 cu. m)
4. Continuous Oil Storage Capacity: 1050 gal. (3975 liters)
5. Sediment shall be stored in a zone that is isolated from the main flow path and protected from reintraintment by a benching skirt.
6. For more product information including regulatory acceptances, please visit <https://hydro-int.com/en/products/downstream-defender>

RIM: VARIES
T.O.S.: 14.1 ft [4.299 m]
(MINIMUM)

LEDGER: 12.56 ft [3.829 m]

OUTLET: 9.44 ft [2.877 m]
(MINIMUM)

INLET: 6.94 ft [2.115 m]

SKIRT: 4.73 ft [1.441 m]

BOTTOM OF INTERNALS: 2.71 ft [.826 m]

SUMP: 0 ft [.000 m]

STONE BASE
PER PROJECT
SPECIFICATIONS

SECTION A-A

NOTE: NOT FOR CONSTRUCTION.
CONTACT HYDRO FOR SITE
SPECIFIC DETAIL

OUTLET STUB ID: 30" (750 mm)
OUTLET STUB OD: 36" (900 mm)

1. MANHOLE WALL AND SLAB THICKNESSES ARE NOT TO SCALE.
2. CONTACT HYDRO INTERNATIONAL FOR A BOTTOM OF STRUCTURE ELEVATION PRIOR TO SETTING DOWNSTREAM DEFENDER MANHOLE.



IF IN DOUBT ASK

DATE: 12/7/2020
SCALE: 1 / 50
DRAWN BY: ER
CHECKED BY: MRJ
APPROVED BY:

Title
10ft-DIAMETER
DOWNSTREAM DEFENDER

GENERAL ARRANGEMENT

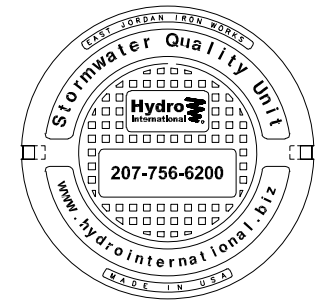
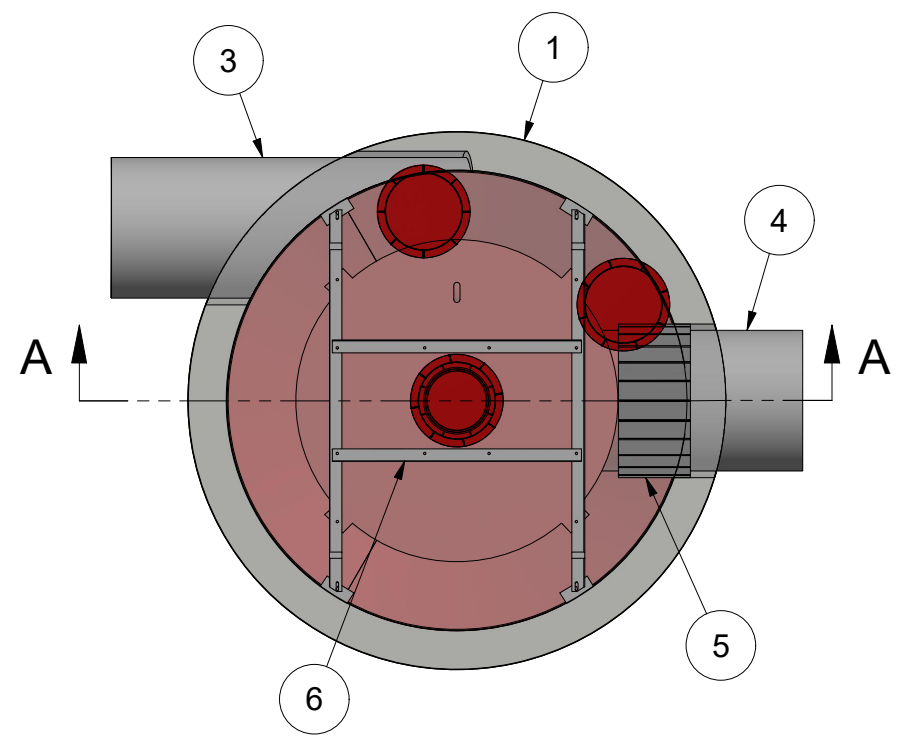


WEIGHT: N/A
MATERIAL:
STOCK NUMBER: NEXT ASSY
DRAWING NO.: DD GA-10
SHEET SIZE: B
SHEET: 1 OF 1
Rev: A

PARTS LIST

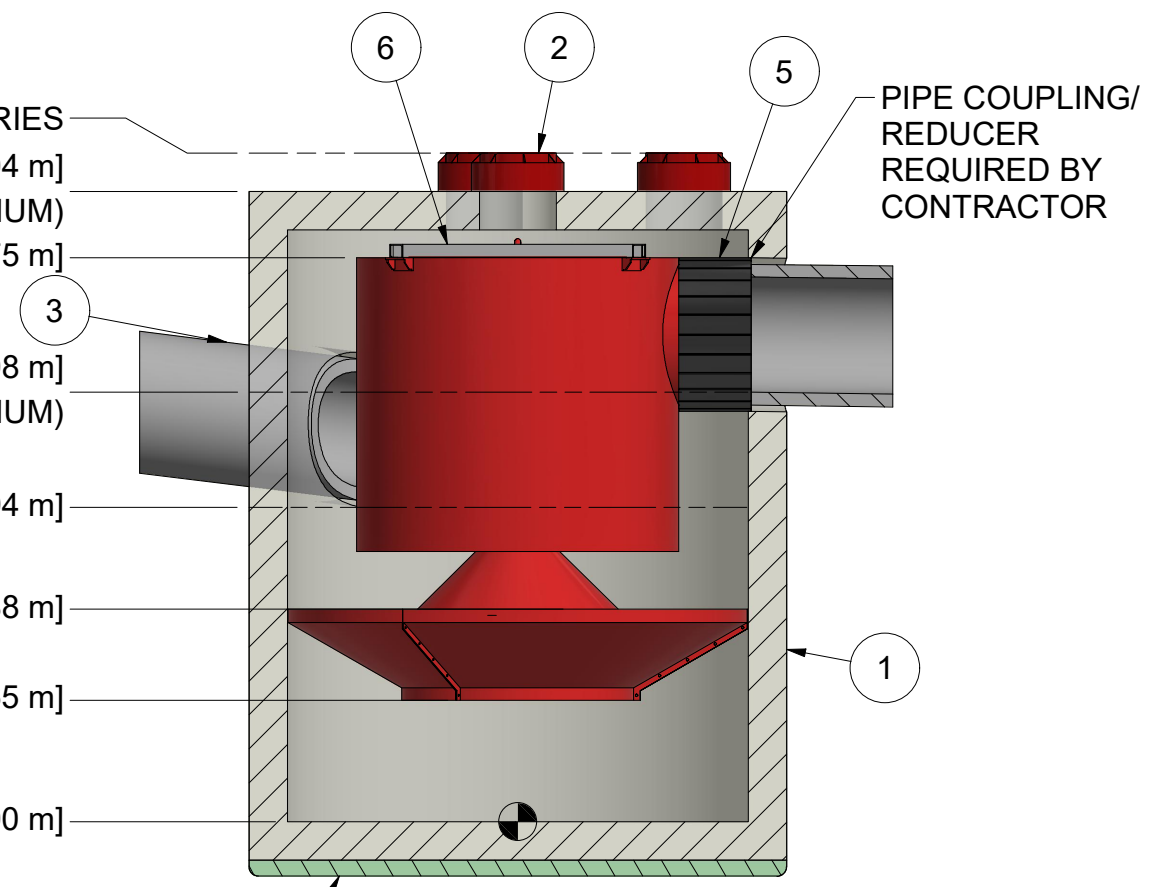
ITEM	QTY	SIZE (in)	SIZE (mm)	DESCRIPTION
1	1	120	3000	PRECAST MANHOLE (BY HYDRO VIA PRECASTER)
2	3	24	600	FRAME AND COVER (QTY 3)
3	1	30 (MAX)	750 (MAX)	INLET PIPE (BY OTHERS)
4	1	30 (MAX)	750 (MAX)	OUTLET PIPE (BY OTHERS)
5	1			PIPE COUPLING (BY OTHERS)
6	1			INTERNAL COMPONENTS (PRE-INTALLED)

OUTLET STUB ID: 36" (900 mm)
OUTLET STUB OD: 42" (1050 mm)



HYDRO FRAME AND COVER (INLCUDED)
GRADE RINGS BY OTHERS
AS REQUIRED

RIM: VARIES
T.O.S.: 16.42 ft [5.004 m]
(MINIMUM)
LEDGER: 14.68 ft [4.475 m]
OUTLET: 11.18 ft [3.408 m]
(MINIMUM)
INLET: 8.18 ft [2.494 m]
SKIRT: 5.54 ft [1.688 m]
BOTTOM OF INTERNALS: 3.17 ft [.965 m]
SUMP: 0 ft [.000 m]



SECTION A-A

STONE BASE
PER PROJECT
SPECIFICATIONS

NOTE: NOT FOR CONSTRUCTION.
CONTACT HYDRO FOR SITE
SPECIFIC DETAIL

1. MANHOLE WALL AND SLAB THICKNESSES ARE NOT TO SCALE.
2. CONTACT HYDRO INTERNATIONAL FOR A BOTTOM OF STRUCTURE ELEVATION PRIOR TO SETTING DOWNSTREAM DEFENDER MANHOLE.



IF IN DOUBT ASK

DATE: 12/7/2020
SCALE: 1 / 50
DRAWN BY: ER
CHECKED BY: MRJ
APPROVED BY:

Title
12ft-DIAMETER
DOWNSTREAM DEFENDER

GENERAL ARRANGEMENT



WEIGHT: N/A
MATERIAL:
STOCK NUMBER:
DRAWING NO.: DD GA-12
SHEET SIZE: B
SHEET: 1 OF 1
Rev: A

EQUIPMENT PERFORMANCE

The stormwater treatment unit shall adhere to the hydraulic parameters given in the chart below and provide the removal efficiencies and storage capacities as follows:

1. The treatment system shall use an induced vortex to separate pollutants from stormwater runoff.
2. Peak Hydraulic Capacity: 38.0 cfs (1076 l/s)
3. Sediment Storage Capacity: 14.70cu. yd. (11.24 cu. m)
4. Continuous Oil Storage Capacity: 1770 gal. (6700 liters)
5. Sediment shall be stored in a zone that is isolated from the main flow path and protected from reintraintment by a benching skirt.
6. For more product information including regulatory acceptances, please visit <https://hydro-int.com/en/products/downstream-defender>

PARTS LIST				
ITEM	QTY	SIZE (in)	SIZE (mm)	DESCRIPTION
1	1	144	3700	PRECAST MANHOLE (BY HYDRO VIA PRECASTER)
2	3	24	600	FRAME AND COVER (QTY 3)
3	1	36 (MAX)	900 (MAX)	INLET PIPE (BY OTHERS)
4	1	36 (MAX)	900 (MAX)	OUTLET PIPE (BY OTHERS)
5	1			PIPE COUPLING (BY OTHERS)
6	1			INTERNAL COMPONENTS (PRE-INTALLED)