



Canham
Consulting

Post-Planning Drainage Strategy

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Site:	Guysfield Care Home, Willian Road, Willian, NR Letchworth, Herts, SG6 2AB
Client:	Caring Homes Ltd
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1 INTRODUCTION

Canham Consulting Ltd have been commissioned by Caring Homes Group to produce a Post Planning Drainage Strategy to support the outcome of planning permission ref 24/02758/FP relating to the development of the Guysfield Residential Care Home. The proposed development intends to demolish an existing care home located onsite and construct a new care home alongside retention of an existing building; with refurbishment and new build forming the overall care home facility. A plan of the development can be found in Appendix A.

This Drainage Strategy should be read alongside the FRA and DS provided at planning stage which provided information on the flood risks associated with the proposed development, identified mitigation measures for the site and enabled demonstration of how the development met the relevant design criteria to proceed through planning.

This report follows the guidance set out in National Planning Policy Framework (NPPF), the National Planning Policy Guidance (NPPG), alongside other relevant Local Authority policies and guidance notes from authorities such as the Environment Agency (EA), Anglian Water, CIRIA, The SuDS Manual (C753) and Hertfordshire County Council's Guidance for Developers on SuDS (Sustainable Drainage Systems) Design.

The following data was collected as part of this FRA:

- Topographic Survey
- Geotechnical Information – Including Infiltration Rates
- Confirmation of How the Site Currently Drains
- Anglian Water Wastewater Sewer Asset Plan
- Anglian Water Pre-Planning Report

1.1 Planning Approval/Conditions

Planning was approved for permission reference 24/02758/FP and this Drainage Strategy addresses the following Planning Conditions.

26. No development shall commence until construction drawings of the final surface water drainage network, associated sustainable drainage components, flow control mechanisms, detailed network calculations and a construction method statement have been submitted and agreed in writing by the Local Planning Authority. The scheme shall then be constructed as per the agreed drawings, Flood Risk Assessment prepared by Canham Consulting Structural Civil Building Engineers reference 213692-CCL-XX-00-01000 Rev P05 S3, dated 24 July 2025 and drawing numbers GCH-CCL-XX-XX-DR-C-0001 Rev P03 dated 24 July 2025 (if infiltration is viable) or 213692-CCL-XX-00-DR-C-1000 Rev P02 dated 24 July 2025 (if infiltration is not viable). The scheme shall address the following matters:

I. Detailed infiltration testing in accordance with BRE Digest 365 (or equivalent) along the length and proposed depth of the proposed infiltration feature(s), as stated within section 6.2.1 of the FRA.

Or, if infiltration is not feasible Surface water runoff rates will be attenuated to 2l/s as stated within section 6.2.1 of the FRA.

II. Provision of surface water attenuation storage, sized and designed to accommodate the volume of water generated in all rainfall events up to and including the critical storm duration for the 3.33% AEP (1 in 30 year) and 1% AEP (1 in 100) rainfall events (both including allowances for climate change).

III. An assessment demonstrating the drainage scheme complies with the National Standards for SuDS July 2025, including provision of the "four pillars" of SuDS.

IV. Detailed designs, modelling calculations and plans of the of the drainage conveyance network in the:

- 3.33% AEP (1 in 30 year) critical rainfall event plus climate change to show no flooding outside the drainage features on any part of the site.*
- 1% AEP (1 in 100 year) critical rainfall plus climate change event to show, if any, the depth, volume and storage location of any flooding outside the drainage features, ensuring that flooding does not occur in any part of a building or any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development. It will also show that no runoff during this event will leave the site uncontrolled.*

V. Plans shall be submitted showing the routes for the management of exceedance surface water flow routes that minimise the risk to people and property during rainfall events in excess of 1% AEP (1 in 100) rainfall event plus climate change allowance.

VI. Finished ground floor levels of properties shall be a minimum of 300mm above expected flood levels of all sources of flooding (including any SuDS features and within any proposed drainage scheme) or 150mm above ground level, whichever is the more precautionary.

VII. Details of how all surface water management features to be designed in accordance with The SuDS Manual (CIRIA C753, 2015), including appropriate treatment stages for water quality prior to discharge.

27. The development hereby approved shall not be occupied until details of the maintenance and management of the sustainable drainage scheme have been submitted to and approved in writing by the Local Planning Authority. The drainage scheme shall be implemented prior to the first occupation of the development hereby approved and thereafter managed and maintained in accordance with the approved details in perpetuity. The Local Planning Authority shall be granted access to inspect the sustainable drainage scheme for the lifetime of the development. The details of the scheme to be submitted for approval shall include:

I. a timetable for its implementation.

II. details of SuDS feature and connecting drainage structures and maintenance requirement for each aspect including a drawing showing where they are located.

III. a management and maintenance plan for the lifetime of the development which shall include the arrangements for adoption by any public body or statutory undertaker, or any other arrangements to secure the operation of the sustainable drainage scheme throughout its lifetime. This will include the name and contact details of any appointed management company.

2 DEVELOPMENT DESCRIPTION & LOCATION

2.1 Type of Development with Location

The proposed development is for the demolition of an existing care home and the construction of a new care home alongside retention of Guys House (part of the current care home function) which will be refurbished. The site is located on the northern side of Willian Road, Willian, Letchworth Garden City, SG6 2AB, as indicated below on Figure 1. The site is centred on Grid Reference: TL 22155 30705.



Figure 1: Site Location Plan

The site is bounded to the north by a suburban residential estate. To the south, the site is bounded by Willian Road, beyond this is agricultural land. The site is bounded to the east by agricultural land, additionally, Willian Pond is located to the east of the site. The site is bounded to the west by suburban residences, Letchworth Lane, and a golf course.

The site is currently used as a residential care home and Guys House will remain as such.

A Topographic Survey of the existing site is included within Appendix B. The topographic survey indicates that the proposed development is in an area with a maximum ground level of approximately 86.92m AOD in the north of the site and a minimum ground level of approximately 81.28m AOD in the south-east of the site. The topographic survey shows the general fall of the site is from the north to the south.

The existing site area is approximately 8,365m². Of this area, impermeable surfaces account for roughly 2,194m². The impermeable areas onsite consist of the existing care home building and, the tarmac driveway and parking area. The remaining site area is understood to have permeable surfaces.

3 CLIMATE CHANGE

Due to the location of the site, the climate change factors, as defined by NPPF Technical Guidance, should be applied to the peak rainfall intensity. A 100-year lifespan for the development has been considered as residential.

National Guidance on Flood Risk Assessments and climate change allowances, shown in Table 2 of the national climate change, shows that in small and urban catchments a central level of 20% and upper end of 45% peak rainfall intensity allowance should be used to assess the range of impacts.

For the purposes of this report it is proposed that a conservative approach is considered and that a climate change factor of +45% is utilised on all drainage calculations. The +45% climate change factor used within the drainage calculations is in line with the Climate Change Allowance Note produced by Hertfordshire County Council.

4 DETAILED DEVELOPMENT PROPOSAL

4.1 Introduction

The proposed development is for a replacement residential care home located within Flood Zone 1. The site is shown to be at a low risk of surface water flooding in locations near to the existing care home.

The existing development consists of approximately 2,194m² of impermeable area which is predominately comprised of hard standing and roof area. The proposed development proposes approximately 1,065m² of impermeable roof area with the existing Guys House contributing a further 150m² impermeable roof. The access road and parking areas (1,221m²) are proposed to be constructed from permeable paving. The proposed impermeable areas plan for the proposed development is available within Appendix D. If the proposed access road and parking areas were to be constructed out of a permeable surface such as permeable paving, the proposed development will reduce the total impermeable area onsite by 978m² relative to existing.

Whilst detailing the drainage requirement, it is worth returning to the requirements of Condition 26, summarised as follows:

- I. Infiltration testing needed to demonstrate suitability of that solution.
- II. Provision of attenuation storage to accommodate surface water in all events up to 1% AEP plus climate change.
- III. Demonstration of four pillars of SuDS.
- IV. Detailed design to demonstrate no flooding in all events up to and including 3.33% AEP plus climate change event with demonstration of flood storage in 1% AEP plus climate change event.
- V. Exceedance plans to demonstrate mitigation of risk during any flooding events.
- VI. Demonstration that ground floor levels minimum of 300mm above flood levels.
- VII. Demonstration of how SuDS will deliver appropriate levels of water quality.

We outline how these elements are dealt with through the course of this Section.

4.2 Proposed Surface Water Drainage Strategy

4.2.1 SuDS Hierarchy

In identifying SuDS options, it is important to understand how the site can meet the following drainage hierarchy:

- i. Infiltration
- ii. Disposal to a watercourse
- iii. Disposal to a public sewer

The planning condition stated as follows:

I. Detailed infiltration testing in accordance with BRE Digest 365 (or equivalent) along the length and proposed depth of the proposed infiltration feature(s), as stated within section 6.2.1 of the FRA.

We undertook infiltration testing in the locations noted on Figure 2 below over 7-9th January 2026 and took groundwater levels across the winter period with no groundwater encountered up to a depth of 5m. The test locations were intended to be as close as feasible and to the relevant depths in line with the Drainage Strategy provided at planning stage.

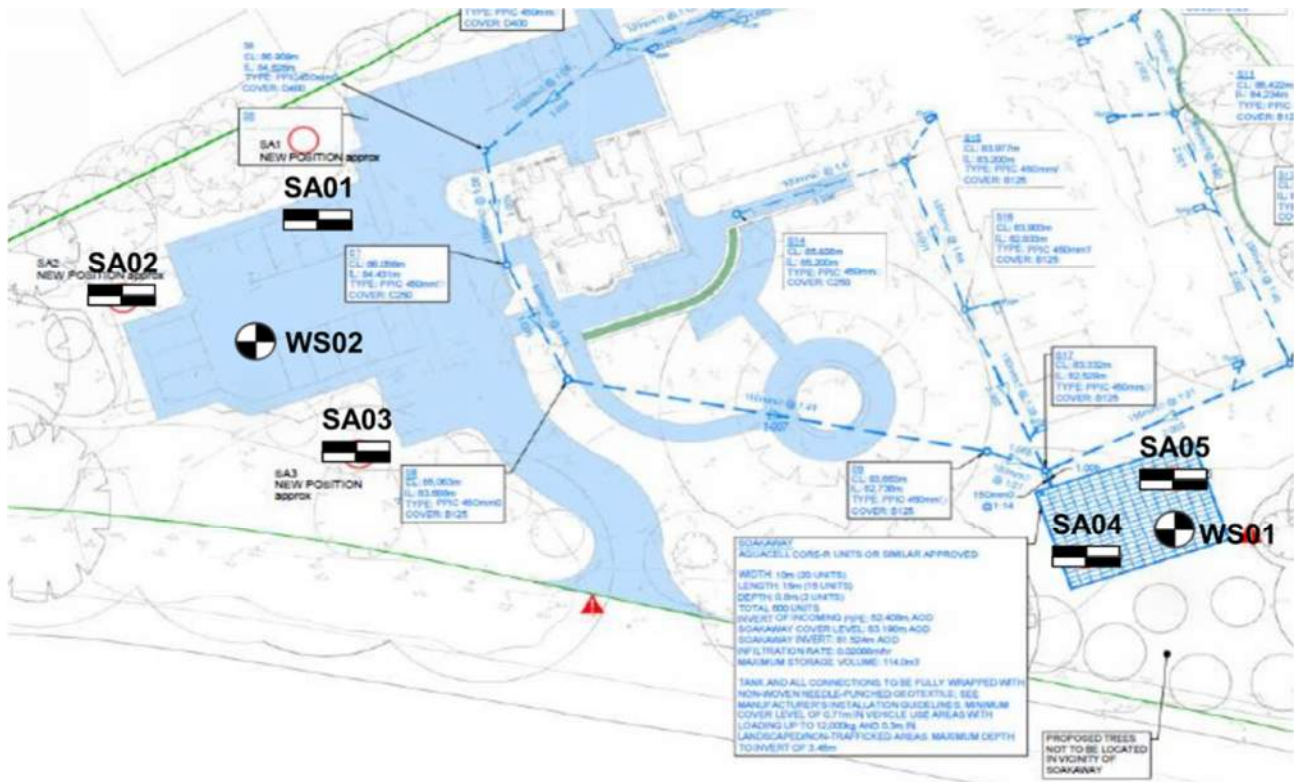


Figure 2: Infiltration Test Locations

The infiltration test results undertaken in line with BRE365 are presented on Table 1 below and included in Appendix C.

Soakaway Location	Test 1	Test 2	Test 3	Comments
SA1	$6.71 \times 10^{-7} \text{m/s}$	-	-	Lowest rate of $6.71 \times 10^{-7} \text{m/s}$ used for car park area design
SA2	$2.17 \times 10^{-6} \text{m/s}$	-	-	
SA3	$6.89 \times 10^{-5} \text{m/s}$	$4.84 \times 10^{-5} \text{m/s}$	$5.01 \times 10^{-5} \text{m/s}$	
SA4	$3.94 \times 10^{-5} \text{m/s}$	$2.93 \times 10^{-5} \text{m/s}$	$2.67 \times 10^{-5} \text{m/s}$	Lowest rate of $2.67 \times 10^{-5} \text{m/s}$ used for soakaway design
SA5	$8.85 \times 10^{-5} \text{m/s}$	$5.62 \times 10^{-5} \text{m/s}$	$5.39 \times 10^{-5} \text{m/s}$	

Table 1: Infiltration Test Results

Infiltration testing shows that infiltration rates onsite vary across the various areas tested. There is a strong correlation between those tests undertaken in sand compared to those undertaken in clay with the more productive rates established in sand. As noted in Table 1, the lowest recorded rates in each area have been used for the surface water drainage design and on that basis, we do anticipate that the rates we will actually achieve in each of the areas will be favourable compared to the assumption used but irrespective of this poor rate, we are still able to demonstrate that the drainage is appropriate and functions.

On the basis of the better infiltration rates being in the sand material which is deeper, we will ensure that the surface water discharges in this sand material in both infiltration areas. Within the soakaway, this is straightforward as the tank will be positioned at an appropriate depth within the sand and within the permeable paved area, our detail will include provision of recessed permeable pipes as part of the build up. For the permeable paved area, by utilising the lower sandy areas, our actual discharge rate will be much higher than the assumed rate used in our

calculations. Alongside this, within the design, we have enabled a hybrid drainage system through a connection of the car parking areas to the wider drainage network via permeable pipes.

We understand that the site currently discharges via infiltration and as such, Guys House, as part of the existing development, will continue to discharge surface water via the existing soakaways.

4.2.2 SuDs Design

Considering the site currently drains via infiltration and as noted above, we have developed a design which delivers infiltration via the permeable paved car park and a separate soakaway.

The open space to the east of the site poses the challenge of steep ground levels. The topographic survey within Appendix B shows a slope as much as 1:8 in the southern part of the open space. These surface levels reduce the viability of a structure such as a shallow infiltration basin. The site currently uses deeper infiltration to manage surface water associated with the existing care home roof, as evidenced in Appendix E. Therefore, it is considered that surface water associated with the proposed residential roof will discharge by infiltrating via a soakaway crated structure and surface water associated with the access road and parking areas will utilise shallow infiltration.

This proposal is backed up by the infiltration results obtained from the testing in January 2026.

A Causeway Flow network model has been created to evidence the viability of infiltrating surface water drainage network for the proposed development. The surface water drains to a cellular storage soakaway in the south of the site, located near to an existing ring soakaway. The design demonstrated that a cellular storage soakaway sized 17.0m x 10.0m x 0.8m would be required for the 1-in-100-year event plus 45% climate change. The soakaway was sized using the infiltration rate from SA04 of 0.09612m/hr and delivers a half-drain time less than 24 hours and demonstrates no flooding in any event up to and including 1 in 100 plus climate change.

Calculations for the Causeway Flow model for all events up to and including the 1 in 100 year plus 45% climate change, are available in Appendix F and a drawing of the proposed surface water drainage layout is available in Appendix G. An impermeable areas plan showing the areas considered within the calculations is included within Appendix D.

The Causeway Flow model shows no flooding or flood risk in all events up to and including the 1-in-100-year, plus climate change. The modelling demonstrates that there are no modelled water levels less than 300mm below the finished floor level of the building and therefore, the design takes account for flood risk around the building itself. It is considered that surface water will be contained within the site and will not increase the risk of flooding to third parties.

This approach is consistent with the Hertfordshire County Council LLFA Guidance for Developers which advises as follows:

The site will not flood from surface water up to a 1 in 100 chance in any year including an allowance for climate change event, OR surface water flooding will be safely contained on site up to this event, ensuring that surface water runoff will not increase flood risk to the development or third parties. There should be no flooding within the site for up to and including the 1 in 30 chance in any year rainfall event.

4.3 Pollution Treatment

Table 26.1 of the SuDS Manual (C753) indicates that a simple index approach is suitable for assessing the risk to ground water. Table 26.2 indicates the pollution indices associated with different land uses. Table 2 below summarises the pollution indices that are relevant for the proposed development.

Land Use	Pollution Hazard Level	Total Suspended Solids	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Individual property driveways and residential car parking with infrequent change	Low	0.5	0.4	0.4

Table 2: Pollution Hazard Indices

Table 3 below compares the level of treatment offered by the proposed SuDS elements associated with the proposed surface water strategy (outlined above) against the pollution indices shown above in Table 2.

	Total Suspended Solids	Metals	Hydro-carbons
Residential Roofs	0.2	0.2	0.05
Infiltration or Attenuation	Pollution associated with residential roofs is very low, it is understood that treatment of residential roof water (beyond removal of grass solids and sediments) is not required prior to discharge from the site. Should infiltration be deemed suitable for the proposed development, a level of treatment will be applied whilst the water percolates through the soil.		
Suitable Level of Treatment?	Yes	Yes	Yes
Individual Property Driveways & Car Parking	0.5	0.4	0.4
Permeable Paving	0.7	0.6	0.7
Suitable Level of Treatment?	Yes	Yes	Yes

Table 3: Indices Suitability Comparison

Based upon the information outlined above, it is believed a suitable level of treatment will be provided to the surface water prior to its discharge across both options. The permeable paving will serve as treatment for the access road and parking areas to ensure that a suitable level of treatment is applied to the surface water.

Rainwater SuDSpods and green wall areas will be used alongside the drainage provision in both scenarios to support attenuation and improvement of the quality of the flow delivering on the SuDS intent. These elements are shown on the drainage general arrangement drawing.

4.4 Drainage Modelling and Drawings

The Causeway Flow modelling is included in Appendix F and the proposed drainage design is outlined across drawing ref 213692-CCL-XX-00-DR-C-3000 included in Appendix G. The construction details can be seen in Appendix G outlining the specification of the drainage designs. As noted above, the method for discharge of the surface water is going to be discharge via infiltration. On that basis, to enable a design solution, we have established the following design assumptions which were appropriate at the time of the design:

- Traditional gullies, linear drains taking roof and hardstanding drainage to below ground surface water drainage network or via overland flow to the appropriate point.
- Design storms of up to 1 in 100 plus 45% climate change allowance with no flooding.
- Global time of entry allowance of 5 minutes.
- FEH Rainfall Data used for Drainage calculations.
- Runoff coefficient CV of 1
- Storms from 15 minute up to and including the 1,440 minute storm calculated for specified return periods/AEP events demonstrating no flooding and no impact offsite.
- 45% climate change allowed for in 3.33% and 1% AEP events in line with applicable standards at the time of the design.
- Green roof areas and rain garden pods included on drawings but not in calculations based on the assumption that both are full to consider onerous scenario.
- Factor of safety in accordance with Table 25.2 of SuDS Manual 2015 taken as 1.5 based on site area and consequences of failure (no damage or inconvenience)
- All new drainage installations have been designed in accordance with the current Building Regulations – Part H and in line with the Anglian Water requirements, as defined by the current details outlined in Design and Construction Guidance published by Water UK.
- The drainage is all intended to be private and will not be subject to adoption.

4.4.1 Exceedance Event

Should a storm greater than the critical design storm (1-in-100-year plus 40% climate change event) occur, the site will likely flood. This possibility has been considered and an exceedance flow plan has been produced for the proposed development indicating surface water overland flow routes (Appendix H). Measures to mitigate flooding within the building will include ensuring the finished floor level of the proposed development is at least 150mm about the surrounding ground level and, the installation of structures such as channel drains at access points to convey surface water around the sides of the building.

It is not anticipated that the proposed development will significantly alter the exceedance flow routes onsite as the proposed care home is located in the same position as the existing care home.

As noted within this Section, the water level does not get to within 300mm of the finished floor level for the building and as such, we do not anticipate that the exceedance routes will come into effect.

4.4.2 Four Pillars

As for any new development, it is appropriate to demonstrate how the design has addressed the four pillars of SuDS across our drainage strategy; this is as outlined in Table 4 below:

Pillar	Demonstration of Pillar
<i>Water Quantity – Control the quantity of run off</i>	Irrespective of the solution, the quantity of flow will be restricted on site and controlled so that it demonstrates betterment compared to the existing situation. The current brownfield site discharge rate will be improved in either scenario.
<i>Water Quality – Manage the quality of the runoff</i>	The solutions have been demonstrated to address the pollution mitigation indices as outlined within the SuDS Manual accounting for the various sources and methods deployed as demonstrated in Tables 4 and 5. In both designs, permeable paving will be used to deliver improvements of the water quality and where relevant, SuDS planters will be used to deliver further enhancement.
<i>Amenity – Create and sustain better places for people</i>	The proposals will reduce the impact of surface water drainage on adjacent sites and provide an example for the development of similar sites elsewhere. The site will remain in its current use however the provision will be improved and the footprint of the SuDS will be expanded more widely across the site.
<i>Biodiversity – Create and sustain better places for nature</i>	New garden areas will be provided as part of the development alongside SuDS planters to some of the downpipes and this will deliver improved biodiversity across the site.

Table 4: Four Pillars of SuDS Design

The detail outlined above outlines how the development will embrace SuDS provision to address the Four Pillars and improve the current situation across each of the four aspects.

5 DRAINAGE MAINTENANCE MEASURES

Planning Condition 27 sought that the development accounted for drainage maintenance via a Maintenance and Management Strategy. The key elements of this are as outlined below as a summary of the Condition as repeated below.

The details of the scheme to be submitted for approval shall include:

I. a timetable for its implementation.

II. details of SuDS feature and connecting drainage structures and maintenance requirement for each aspect including a drawing showing where they are located.

III. a management and maintenance plan for the lifetime of the development which shall include the arrangements for adoption by any public body or statutory undertaker, or any other arrangements to secure the operation of the sustainable drainage scheme throughout its lifetime.

This will include the name and contact details of any appointed management company.

5.1 SuDS Maintenance

SuDS schemes require more maintenance than traditional piped drainage systems and as such it is imperative that a suitable maintenance regime is established to ensure that the features are maintained and function as required.

A maintenance strategy has been completed for the site outlining the maintenance requirements of the proposed drainage system. This maintenance strategy can be found in Appendix I and this Strategy is to be in place on completion of the development ahead of use.

Caring Homes Group will assume responsibility for the lifetime of the development as part of their maintenance regime and this will either take place in house or via a maintenance company operating on their behalf but irrespective, Caring Homes Group will accept full responsibility.

5.2 Temporary Drainage Provision

In the temporary drainage scenario, there is a need to prevent pollution based on the discharge from the drainage network. We have outlined the general requirements within the Construction Surface Water Management Strategy (CSWMP) included as Appendix J. This outlines and provides detail for the temporary measures which will be deployed during construction to prevent the discharge from causing pollution.

The details included within the CSWMP will be deployed for any temporary and newly installed drainage outlet until the drainage and surfacing is fully installed on site.

The CSWMP will be included as one of the Tender documents and the contractor will provide their tender in line with the document and thereafter, be responsible for adhering to the requirements detailed.

6 SUMMARY

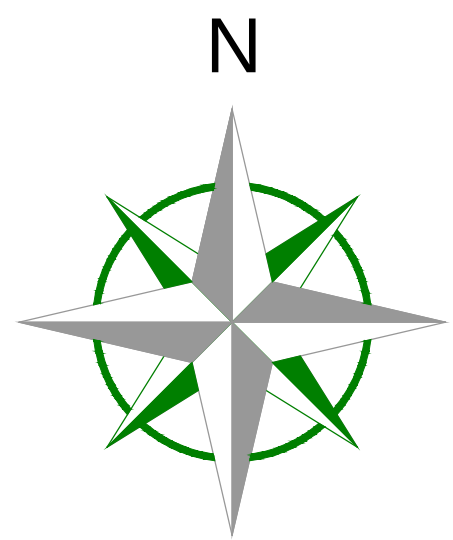
The proposed development is for the demolition of an existing care home and the construction of a new care home alongside retention of Guys House (part of the current care home function) which will be refurbished.

This report demonstrates how the design addresses Planning Conditions 26 and 27 in relation to the infiltration design approach and maintenance strategy respectively.

Appendix A

Proposed Development Plan

Appendix B Topographic Survey



Station Information:

Station	Easting (m)	Northing (m)	Level (m)
GH1	522044.655	230673.893	85.678
GH2	522150.146	230668.081	82.892
GH3	522246.409	230639.130	79.078
GH4	522154.606	230694.799	84.728
GH5	522122.107	230716.101	86.645

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

OS Buildings  **Surveyed Buildings** 

This survey has been orientated to the Ordnance Survey (OS) National Grid OSGB36(15) via Global Navigation 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 & OSCM15GB transformation models.

The survey has been conducted 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:

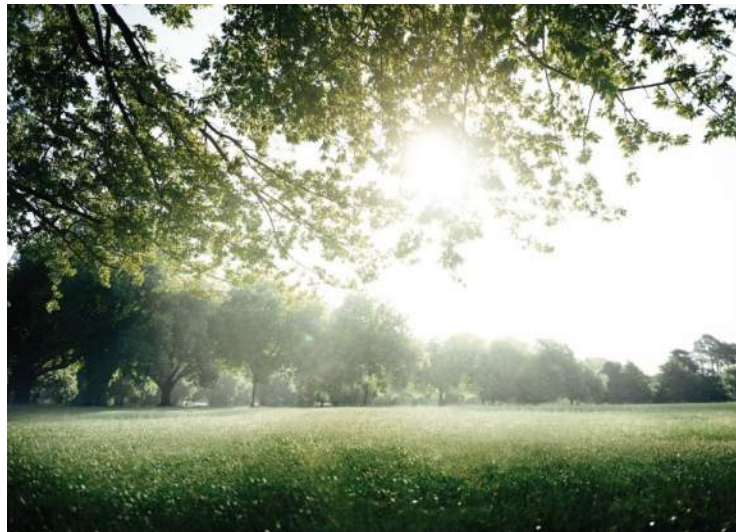
	Overhead Cable	IC	IC	IC	IC
	Concrete edge	Play	Play	Play	Play
	Grass	Gr	Gr	Gr	Gr
	Gravel	Dg	Dg	Dg	Dg
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
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	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
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	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
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	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr

Appendix C Infiltration Testing

MICROGEOTECHNICAL

AIMING TO EXCEED YOUR EXPECTATIONS

A REPORT ON A GROUND INVESTIGATION AT GUYSFIELD CARE HOME, LETCWORTH GARDEN CITY



PREPARED FOR	Caring Homes Group Ltd
DATE OF ISSUE	13 th January 2026
REPORT REFERENCE	JJC/25.222

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2. BRE365 TEST METHOD
3. SITE WORK

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APPENDIX B: WINDOWLESS SAMPLE HOLE RECORDS

APPENDIX C: TRIAL PIT AND SOAKAGE TEST RECORDS

APPENDIX D: DRAWINGS

1. INTRODUCTION

This report is the summary of a ground investigation that was undertaken at Guysfield Care Home, Letchworth Garden City. At the instruction of Caring Homes Group Ltd, an investigation was carried out to provide information regarding drainage characteristics, whilst giving an overall assessment of the shallow soil strata.

This report can be used to aid the drainage design of the proposed development.

2. BRE365 TEST METHOD

The test is performed by excavating a trial hole to a depth agreed by the client. The soils recovered from the trial hole are then sampled and logged by an engineer in general accordance with BS 5930:2015. Groundwater ingress and sidewall stability is monitored throughout whilst continuously assessing safety of practise.

Upon completion of the trial hole, 20 mm gravel is used to fill the relevant test section to keep the trial pit walls stable, avoiding any risk of collapse during the testing period. The trial hole is then backfilled with arisings to surface around a monitoring pipe and a greater diameter pipe used for filling with water. The test section is then filled with water and the water level monitored using dataloggers that measure head pressure. Testing is repeated three times before removing all pipes and reinstating to satisfactory standard.

3. SITE WORK

Micro Geotechnical Limited visited the site between 7 and 9 January 2026 to undertake five machine excavated trial pits with subsequent soakaway testing and two windowless sample holes.

Soils recovered from each excavation were logged in general accordance with BS EN 1997-2:2007 Eurocode 7 and its UK National Annex supported by BS 5930:2015.

Locations of the exploratory holes were agreed by the client prior to the investigation and are shown on drawing 25.222/draw2. Each location was scanned by a cable avoidance tool (CAT) to locate any potential buried services. Any services detected were noted and positions relocated as necessary.

The trial pits, referenced SA01 to SA05 were machine excavated by a 2.6 tonne 360 excavator using a 0.2 m wide toothed bucket. SA01, SA02 and SA03 were taken to a final depth of 0.6 m, and SA04 and SA05 were taken to 1.6 m.

The windowless sample holes, referenced WS01 and WS02 were advanced to a maximum final depth of 5.0 m. 50 mm PVC pipe was installed within WS01 and completed with a steel cover for future water monitoring.

No groundwater was encountered during excavation.

SA01 to SA05 drained successfully within 24 hours and an infiltration rate is given for each test. One test was carried out on SA01 and SA02 as per the client's instruction, due to predicted slow drainage for tests 2 and 3. The trial pit logs and infiltration rates are appended to this report.

Jonathan Cooper (BSc)
Geotechnical Engineer
Micro Geotechnical Limited



Matthew Balls
Managing Director
Micro Geotechnical Limited



APPENDIX A: REFERENCES

BRITISH STANDARD INSTITUTION. 2015. BS5930:2015+A1-2020 code of practice for ground investigations. British Standards Institution. London.

BUILDING RESEARCH ESTABLISHMENT. 2016. BRE Digest 365: Soakaway design. Building Research Establishment, London.

APPENDIX B: WINDOWLESS SAMPLE HOLE RECORDS

D = Disturbed sample

B = Bulk sample

All measurements displayed on the log are presented in metres unless otherwise stated. Soils are described in general accordance with BS5930:2015+A1-2020.

Site Guysfield Care Home, Letchworth Garden City	Number WS02
Client Caring Homes Group Ltd	Job Number 25.222
Engineer	Sheet 1/1

Excavation Method Drive-in Windowless Sampler	Dimensions	Ground Level (mOD)
	Location	Dates 07/01/2026

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	TOPSOIL (Dark brown slightly clayey slightly gravelly fine to coarse sand with rootlets. Gravel is subangular to subrounded fine to coarse flint)		
					0.30 (0.20)	Firm to stiff greyish brown slightly sandy gravelly CLAY with roots and rootlets. Gravel is subangular to subrounded fine to coarse flint and chalk		
					0.50 (0.50)	Brown clayey fine to coarse SAND with rootlets		
					1.00	Yellow brown fine to coarse SAND		
					(3.20)			
					4.20 (0.80)	Light brown very clayey SILT		
					5.00			

Remarks 1. CAT4+ scanner used to sweep location prior to excavation. 2. Windowless sample hole advanced successfully to 5.0 m without sidewall collapse. 3. No groundwater encountered. 4. Hole backfilled with arisings to surface.	Scale (approx) 1:25	Logged By WS
	Figure No. 25.222.WS02	

APPENDIX C: TRIAL PIT AND SOAKAGE TEST RECORDS

D = Disturbed sample

B = Bulk sample

All measurements displayed on the log are presented in metres unless otherwise stated. Soils are described in general accordance with BS5930:2015+A1-2020.

						Site Guysfield Care Home, Letchworth Garden City		Trial Pit Number SA01	
Excavation Method Machine excavated 2.6 tonne 360		Dimensions L 1.1 m x W 0.2 m x D 0.6 m		Ground Level (mOD)		Client Caring Homes Group Ltd		Job Number 25.222	
		Location				Dates 07/01/2026		Engineer	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
					(0.30) 0.30 (0.30) 0.60	TOPSOIL (Dark brown slightly clayey slightly gravelly fine to coarse sand with rootlets. Gravel is subangular to subrounded fine to coarse flint) Firm to stiff greyish brown slightly sandy gravelly CLAY with roots and rootlets. Gravel is subangular to subrounded fine to coarse flint and chalk Complete at 0.60m			
						Remarks 1. CAT4+ scanner used to sweep location prior to excavation. 2. Trial pit excavated to 0.6 m successfully without sidewall collapse. 3. No groundwater encountered. 4. Pit backfilled with gravel to surface. 5. Soakage test performed between 0 m and 0.6 m.			
						Scale (approx) 1:25		Logged By MJB	

Site : Guysfield Care Home, Letchworth Garden City

Client : Caring Homes Group Ltd

Engineer :

Job Number
25.222

Sheet
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Location	Date	Level	Location
SA01	07/01/2026		

Pit Width (m)	0.20
Pit Depth (m)	0.60
Pit Length (m)	1.10

Soil type at test level	TOPSOIL (Slightly clayey slightly gravelly sand) over slightly sandy gravelly CLAY
Groundwater	Not encountered
Drain discharge depth	Not known
Sidewall stability	Stable
Stone filled or open pit	Stone filled

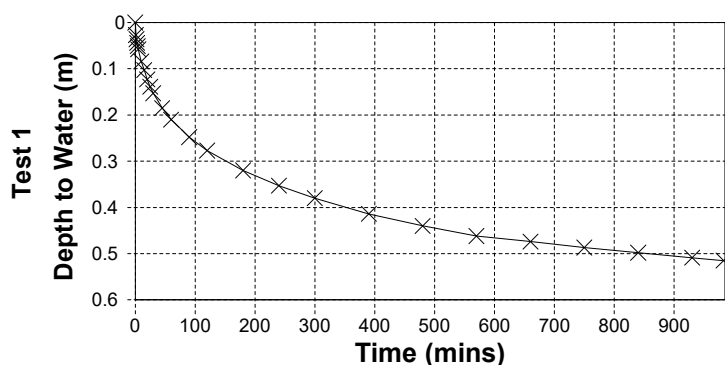
	1
Effective depth (m)	0.60
Volume outflowing between 75% & 25% (m3)*	0.02
Mean surface area through which outflow occurs (m2)	1.00
Time for outflow between 75% & 25% (min)	491.98
SOIL INFILTRATION RATE (ms⁻¹), f	6.71E-7

Remarks

1. Soakage test performed between 0 m and 0.6 m.
2. No groundwater encountered.
3. Level logger serial number 25925520.
4. Test 1 undertaken on 07/01/26.
5. One test undertaken as per clients instruction due to predicted slow drainage on 2nd test.

* Volume outflowing reduced to account for granular backfill used during testing (30 % of free volume assumed).

Elapsed time (mins)	Depth to Water Test 1
0	0.00
1	0.027
2	0.036
3	0.044
4	0.051
5	0.058
10	0.084
15	0.103
20	0.123
25	0.139
30	0.153
45	0.185
60	0.21
90	0.248
120	0.277
180	0.32
240	0.353
300	0.38
390	0.414
480	0.44
570	0.462
660	0.474
750	0.487
840	0.498
930	0.509
982.833	0.515



						Site Guysfield Care Home, Letchworth Garden City		Trial Pit Number SA02	
Excavation Method Machine excavated 2.6 tonne 360		Dimensions L 1.1 m x W 0.2 m x D 0.6 m		Ground Level (mOD)		Client Caring Homes Group Ltd		Job Number 25.222	
		Location				Dates 07/01/2026		Engineer	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
					(0.30) 0.30 (0.30) 0.60	TOPSOIL (Dark brown slightly clayey slightly gravelly fine to coarse sand with rootlets. Gravel is subangular to subrounded fine to coarse flint) Firm to stiff greyish brown slightly sandy gravelly CLAY with roots and rootlets. Gravel is subangular to subrounded fine to coarse flint and chalk Complete at 0.60m			
						Remarks 1. CAT4+ scanner used to sweep location prior to excavation. 2. Trial pit excavated to 0.6 m successfully without sidewall collapse. 3. No groundwater encountered. 4. Pit backfilled with gravel to surface. 5. Soakage test performed between 0 m and 0.6 m.			
						Scale (approx) 1:25		Logged By MJB	

Site : Guysfield Care Home, Letchworth Garden City

Client : Caring Homes Group Ltd

Engineer :

Job Number

25.222

Sheet

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Location	Date	Level	Location
SA02	07/01/2026		

Pit Width (m)	0.20
Pit Depth (m)	0.60
Pit Length (m)	1.10

Soil type at test level	TOPSOIL (Slightly clayey slightly gravelly sand) over slightly sandy gravelly CLAY
Groundwater	Not encountered
Drain discharge depth	Not known
Sidewall stability	Stable
Stone filled or open pit	Stone filled

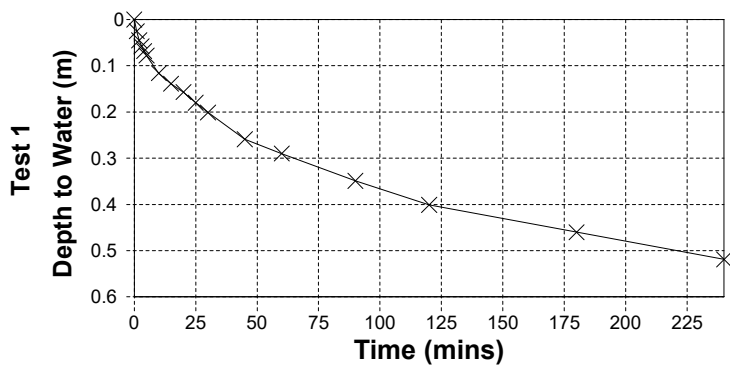
	1
Effective depth (m)	0.60
Volume outflowing between 75% & 25% (m3)*	0.02
Mean surface area through which outflow occurs (m2)	1.00
Time for outflow between 75% & 25% (min)	151.77
SOIL INFILTRATION RATE (ms-1), f	2.17E-6

Remarks

1. Soakage test performed between 0 m and 0.6 m.
2. No groundwater encountered.
3. Level logger serial number 22571150.
4. Test 1 undertaken on 07/01/26.
5. One test undertaken as per clients instruction due to predicted slow drainage on 2nd test.

* Volume outflowing reduced to account for granular backfill used during testing (30 % of free volume assumed).

Elapsed time (mins)	Depth to Water Test 1
0	0.00
1	0.025
2	0.045
3	0.058
4	0.068
5	0.078
10	0.116
15	0.139
20	0.157
25	0.18
30	0.201
45	0.259
60	0.29
90	0.349
120	0.401
180	0.46
240	0.519



						Site Guysfield Care Home, Letchworth Garden City		Trial Pit Number SA03	
Excavation Method Machine excavated 2.6 tonne 360		Dimensions L 1.2 m x W 0.2 m x D 0.6 m		Ground Level (mOD)		Client Caring Homes Group Ltd		Job Number 25.222	
		Location				Dates 07/01/2026		Engineer	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
					(0.30) 0.30 (0.30) 0.60	TOPSOIL (Dark brown slightly clayey slightly gravelly fine to coarse sand with rootlets. Gravel is subangular to subrounded fine to coarse flint) Orange fine to coarse SAND with rare subangular to subrounded fine to coarse flint gravel Complete at 0.60m	 		
						Remarks 1. CAT4+ scanner used to sweep location prior to excavation. 2. Trial pit excavated to 0.6 m successfully without sidewall collapse. 3. No groundwater encountered. 4. Pit backfilled with gravel to surface. 5. Soakage test performed between 0 m and 0.6 m.			
						Scale (approx) 1:25		Logged By MJB	

Site : Guysfield Care Home, Letchworth Garden City

Client : Caring Homes Group Ltd

Engineer :

Job Number
25.222

Sheet
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Location	Date	Level	Location
SA03	07/01/2026		

Pit Width (m)	0.20
Pit Depth (m)	0.60
Pit Length (m)	1.20

Soil type at test level	TOPSOIL (Slightly clayey slightly gravelly sand) over SAND
Groundwater	Not encountered
Drain discharge depth	Not known
Sidewall stability	Stable
Stone filled or open pit	Stone filled

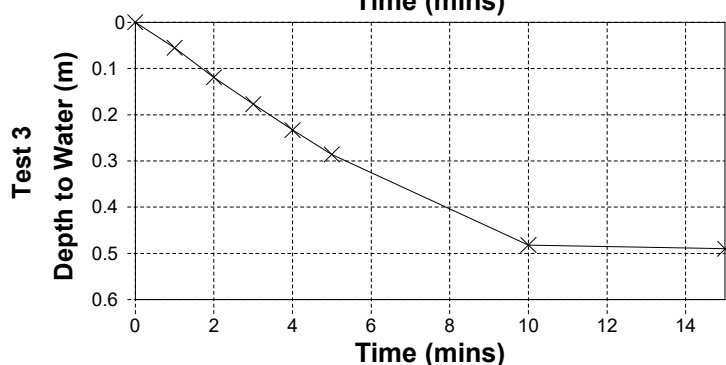
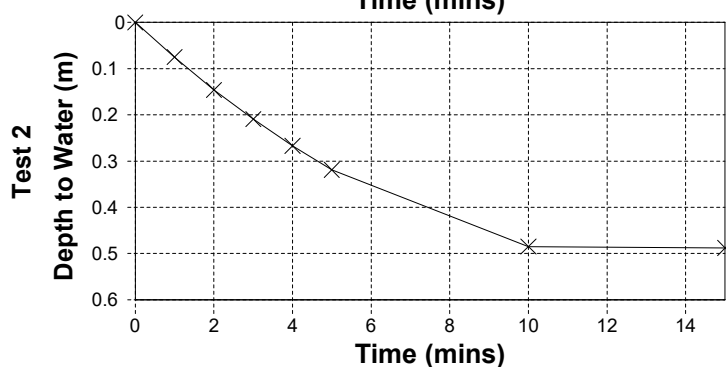
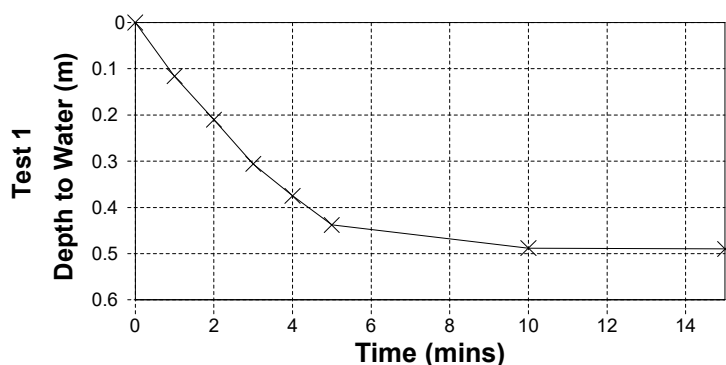
	1	2	3
Effective depth (m)	0.60	0.60	0.60
Volume outflowing between 75% & 25% (m3)*	0.02	0.02	0.02
Mean surface area through which outflow occurs (m2)	1.08	1.08	1.08
Time for outflow between 75% & 25% (min)	4.84	6.89	6.65
SOIL INFILTRATION RATE (ms-1), f	6.89E-5	4.84E-5	5.01E-5

Remarks

1. Soakage test performed between 0 m and 0.6 m.
2. No groundwater encountered.
3. Level logger serial number 11928080.
4. Test 1 undertaken on 07/01/26 and tests 2 and 3 on 08/01/26.

* Volume outflowing reduced to account for granular backfill used during testing (30 % of free volume assumed).

Elapsed time (mins)	Depth to Water Test 1	Depth to Water Test 2	Depth to Water Test 3
0	0.00	0.00	0.00
1	0.116	0.075	0.055
2	0.21	0.146	0.119
3	0.306	0.209	0.177
4	0.375	0.267	0.233
5	0.438	0.319	0.286
10	0.488	0.485	0.482
15	0.49	0.488	0.49



Excavation Method Machine excavated 2.6 tonne 360	Dimensions L 1.7 m x W 0.2 m x D 1.6 m	Ground Level (mOD)	Client Caring Homes Group Ltd	Job Number 25.222
	Location	Dates 07/01/2026	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.60)	MADE GROUND (Dark brown slightly clayey gravelly fine to coarse sand. Gravel is subangular to subrounded fine to coarse flint, brick and concrete with fragments of metal and plastic and cobble sized fragments of brick and concrete)		
					0.60	Brown slightly clayey fine to coarse SAND		
					(0.50)			
					1.10	Yellow brown fine to coarse SAND		
					(0.50)			
					1.60	Complete at 1.60m		



Remarks

- CAT4+ scanner used to sweep location prior to excavation.
- Trial pit excavated to 1.6 m successfully without sidewall collapse.
- No groundwater encountered.
- Pit backfilled with gravel to 0.6 m and backfilled with arisings to surface.
- Soakage test performed between 0.6 m and 1.6 m.

Scale (approx) 1:25	Logged By MJB	Figure No. 25.222.SA04
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Site : Guysfield Care Home, Letchworth Garden City

Client : Caring Homes Group Ltd

Engineer :

Job Number
25.222

Sheet
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Location	Date	Level	Location
SA04	07/01/2026		

Pit Width (m)	0.20
Pit Depth (m)	1.60
Pit Length (m)	1.70

Soil type at test level	Clayey SAND over SAND
Groundwater	Not encountered
Drain discharge depth	Not known
Sidewall stability	Stable
Stone filled or open pit	Stone filled

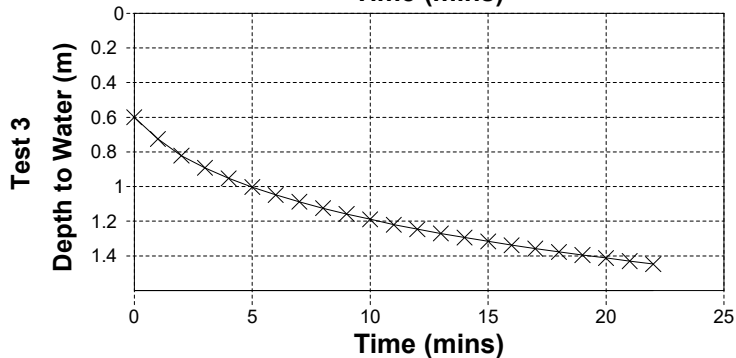
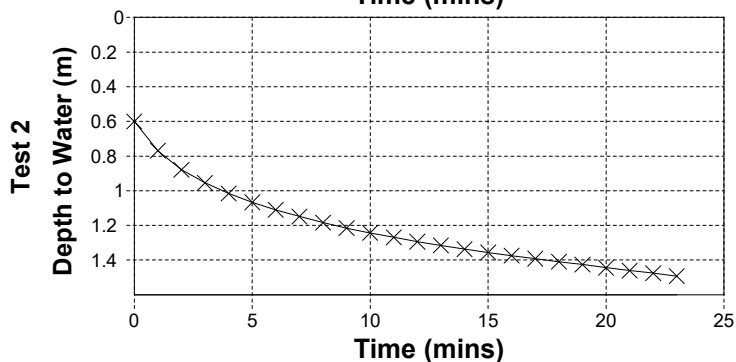
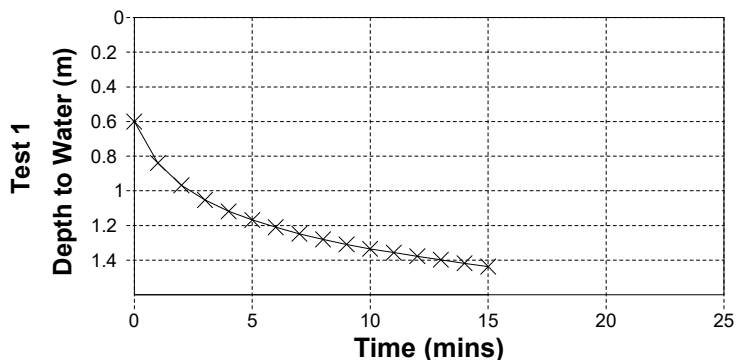
	1	2	3
Effective depth (m)	1.00	1.00	1.00
Volume outflowing between 75% & 25% (m3)*	0.05	0.05	0.05
Mean surface area through which outflow occurs (m2)	2.24	2.24	2.24
Time for outflow between 75% & 25% (min)	9.62	12.94	14.20
SOIL INFILTRATION RATE (ms-1), f	3.94E-5	2.93E-5	2.67E-5

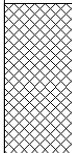
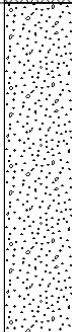
Remarks

1. Soakage test performed between 0.6 m and 1.6 m.
2. No groundwater encountered.
3. Level logger serial number 24525100.
4. Test 1 undertaken on 07/01/26 and tests 2 and 3 on 08/01/26.

* Volume outflowing reduced to account for granular backfill used during testing (30 % of free volume assumed).

Elapsed time (mins)	Depth to Water Test 1	Depth to Water Test 2	Depth to Water Test 3
0	0.60	0.60	0.60
1	0.839	0.769	0.725
2	0.968	0.879	0.822
3	1.053	0.955	0.892
4	1.118	1.016	0.952
5	1.168	1.067	1.003
6	1.21	1.111	1.048
7	1.248	1.149	1.088
8	1.28	1.184	1.125
9	1.309	1.216	1.158
10	1.335	1.244	1.189
11	1.356	1.269	1.22
12	1.377	1.294	1.246
13	1.398	1.316	1.271
14	1.418	1.337	1.294
15	1.437	1.356	1.316
16		1.375	1.338
17		1.392	1.358
18		1.41	1.377
19		1.426	1.395
20		1.444	1.412
21		1.461	1.43
22		1.476	1.447
23		1.493	



MICROGEOTECHNICAL AIMING TO EXCEED YOUR EXPECTATIONS						Site Guysfield Care Home, Letchworth Garden City		Trial Pit Number SA05	
Excavation Method Machine excavated 2.6 tonne 360		Dimensions L 1.7 m x W 0.2 m x D 1.6 m		Ground Level (mOD)		Client Caring Homes Group Ltd		Job Number 25.222	
		Location				Dates 07/01/2026		Engineer	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
					(0.50)	MADE GROUND (Dark brown clayey slightly gravelly fine to coarse sand. Gravel is subangular to subrounded fine to coarse flint and brick)			
					0.50	Brown slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse flint			
					(1.10)				
					1.60	Complete at 1.60m			



Remarks

1. CAT4+ scanner used to sweep location prior to excavation.
2. Trial pit excavated to 1.6 m successfully without sidewall collapse.
3. No groundwater encountered.
4. Pit backfilled with gravel to 0.6 m and backfilled with arisings to surface.
5. Soakage test performed between 0.6 m and 1.6 m.

Scale (approx)	Logged By	Figure No.
1:25	MJB	25.222.SA05

Site : Guysfield Care Home, Letchworth Garden City

Client : Caring Homes Group Ltd

Engineer :

Job Number
25.222

Sheet
5 / 5

Location	Date	Level	Location
SA05	07/01/2026		

Pit Width (m)	0.20
Pit Depth (m)	1.60
Pit Length (m)	1.70

Soil type at test level	Slightly gravelly SAND
Groundwater	Not encountered
Drain discharge depth	Not known
Sidewall stability	Stable
Stone filled or open pit	Stone filled

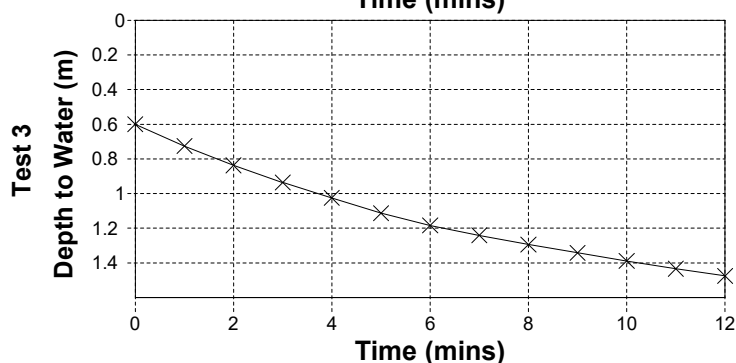
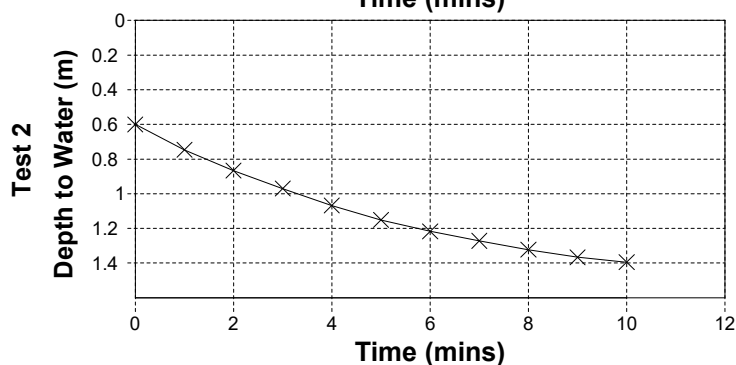
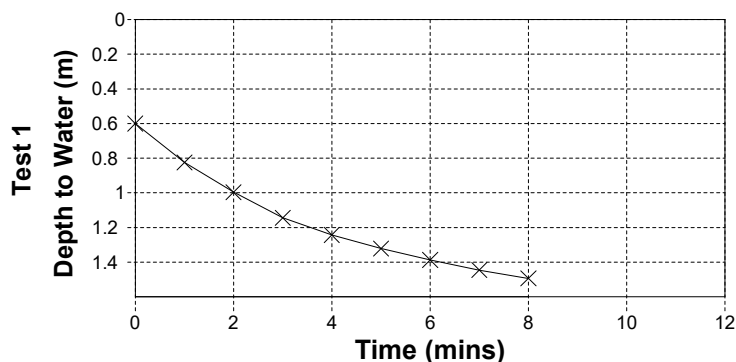
	1	2	3
Effective depth (m)	1.00	1.00	1.00
Volume outflowing between 75% & 25% (m3)*	0.05	0.05	0.05
Mean surface area through which outflow occurs (m2)	2.24	2.24	2.24
Time for outflow between 75% & 25% (min)	4.29	6.75	7.04
SOIL INFILTRATION RATE (ms-1), f	8.85E-5	5.62E-5	5.39E-5

Remarks

1. Soakage test performed between 0.6 m and 1.6 m.
2. No groundwater encountered.
3. Level logger serial number 24525120.
4. Test 1 undertaken on 07/01/26 and tests 2 and 3 on 08/01/26.

* Volume outflowing reduced to account for granular backfill used during testing (30 % of free volume assumed).

Elapsed time (mins)	Depth to Water Test 1	Depth to Water Test 2	Depth to Water Test 3
0	0.60	0.60	0.60
1	0.824	0.747	0.726
2	0.996	0.867	0.837
3	1.144	0.97	0.936
4	1.243	1.068	1.025
5	1.321	1.151	1.113
6	1.387	1.217	1.184
7	1.446	1.272	1.241
8	1.494	1.323	1.294
9		1.367	1.342
10		1.395	1.389
11			1.434
12			1.475



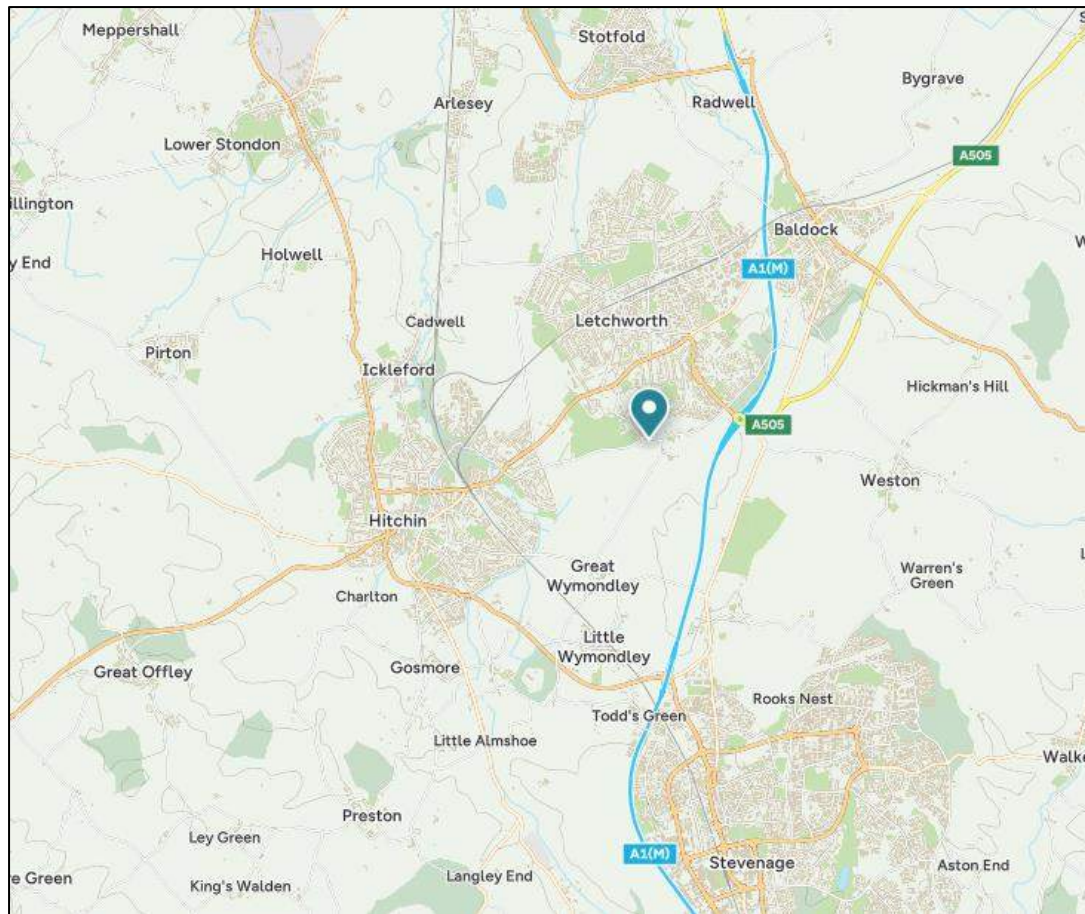
JJC/25.222
13th January 2026

APPENDIX D: DRAWINGS

Site location plan	25.222/draw1
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Trial pit location plan	25.222/draw2
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Site Location Plan

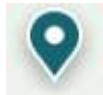


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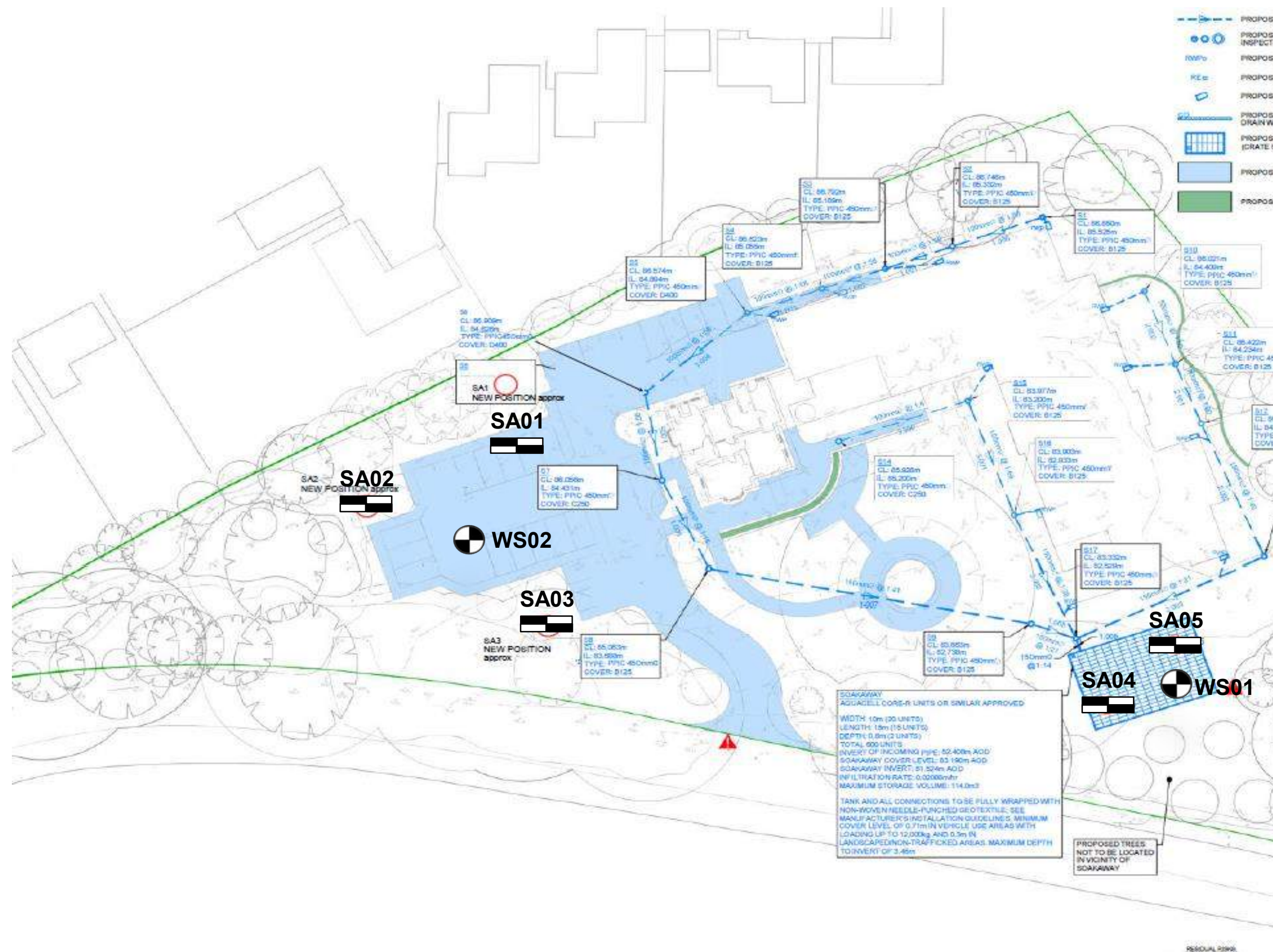
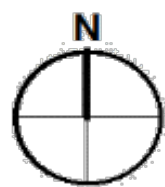
Job name: Guysfield Care Home, Letchworth Garden City

Client: Caring Homes Group Ltd

Drawing ref: 25.222/draw1



Approximate site location



Project: Guysfield Care Home, Letchworth Garden City

Client: Caring Homes Group Ltd

Title: Exploratory Hole Location Plan

Drawing: 25.222/draw2

Date: 13 Jan 2026

Notes:

Hole locations approximate.

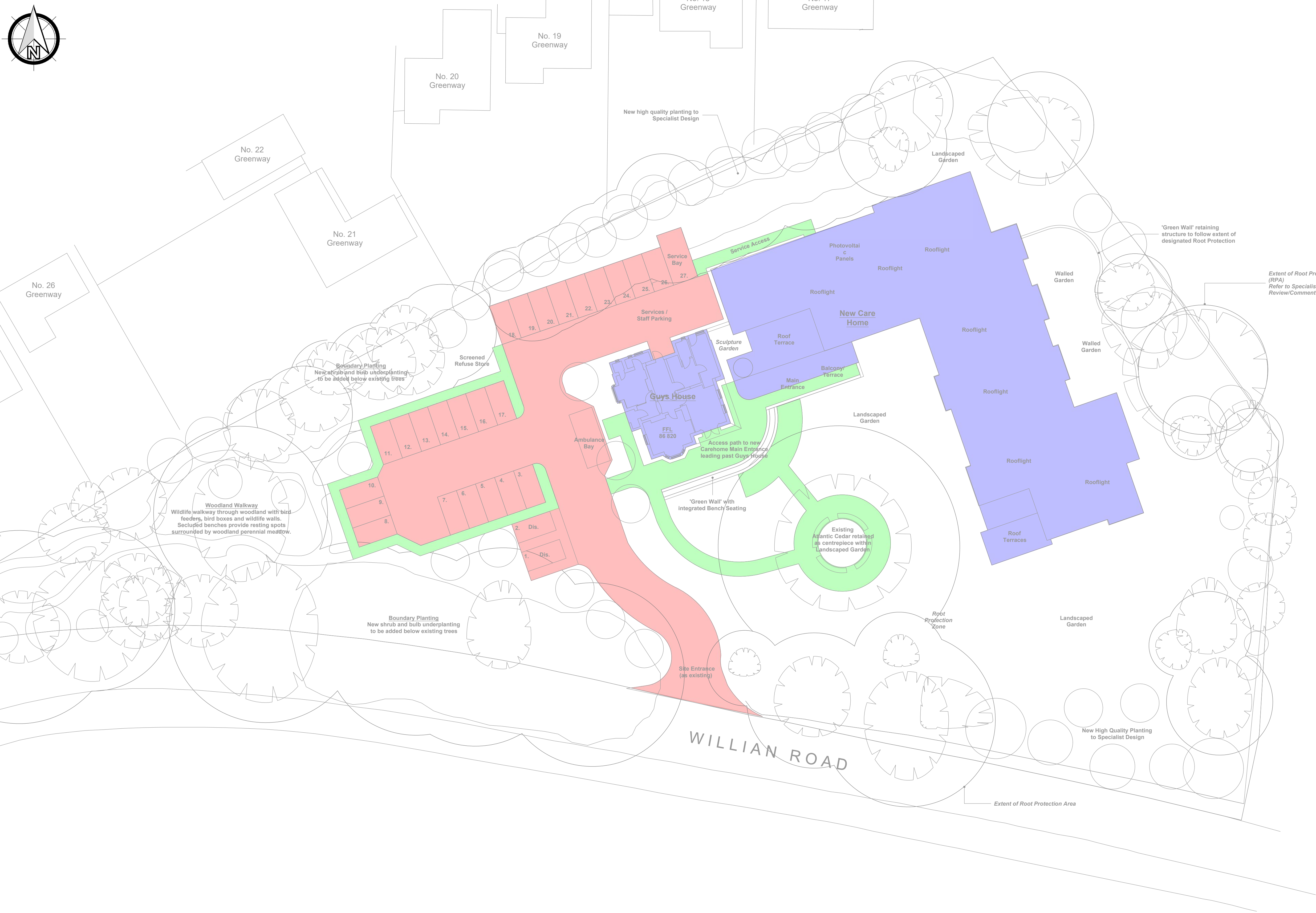
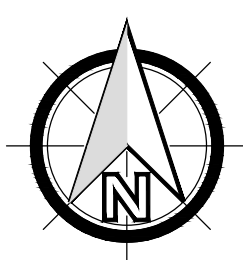
Key

 Windowless sample hole

 Machine excavated trial pit with soakage testing

Appendix D

Impermeable Areas Plan



- PLANNING GENERAL NOTES:**
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LEGEND

PROPOSED ROOF AREA: 1268m²

PROPOSED ACCESS ROAD AND PARKING PERMEABLE AREA: 992m²

PROPOSED PERMEABLE EXTERNAL SURFACE AREA: 444m²

TOTAL PROPOSED IMPERMEABLE AREA: 1268m²

TOTAL PROPOSED PERMEABLE AREA: 1436m²

P03	25.06.24	SITE LAYOUT UPDATED	SAH	MH
P02	05.06.20	SITE LAYOUT UPDATED	JDP	DR
P01	30.09.19	PRELIMINARY ISSUE	MH	MR
rev	date	details	drawn	checked



Structural Engineers **Civil Engineers** **Building Surveyors**

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client
CARING HOMES GROUP

architect
OLIVER + ROBB ARCHITECTS

project
GUYSFIELD CARE HOME, WILLIAN ROAD, WILLIAN

title
IMPERMEABLE AREAS PLAN

CCL ref:	drawn	design	checked	scale	size	date
213692	MH	MH	MR	1:250	A1 (L)	30.09.2019

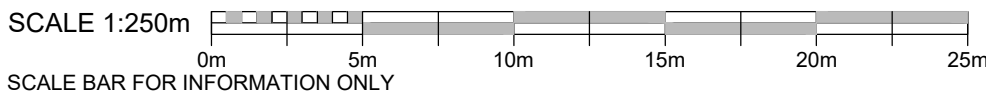
status:
S0 - WORK IN PROGRESS

drawing number
GCH-CCL-XX-XX-DR-C-0002

revision
P03

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IT INDICATES DESIGN INTENT ONLY AND IS SUBJECT TO AMENDMENT DURING FINAL DESIGN DEVELOPMENT.



Appendix E

Evidence of Existing Drainage

- Depth to pipe invert.
- Foul or Surface water manhole?
- ~~we~~ we do not need foul water inverts.



Station Information

Station	Easting	Northing	Utm Zone
CH1	523044.400	571817.127	18Q UTM
CH2	523050.740	571848.041	18Q UTM
CH3	523045.100	571850.720	18Q UTM
CH4	523194.800	571846.700	18Q UTM
CH5	523122.100	571818.120	18Q UTM

OS Note:
Some evidence 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 undertaken to the Ordnance Survey (OS) National Grid (OSNG) using the Global Navigation Satellite System (GNSS) and the OS Active Network (OS AN). A true OSNG coordinate has been established near to the site centre via a transformer using the OSN11608 & OSN11609 transformation codes.

The survey has been completed to this point and a further use of more OSNG (10) points established to create a true OS bearing for angle calculation.

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

	Boundary
	Building
	Tree
	Fence
	Road
	Path
	Ditch
	Water
	Manhole
	Pipe
	Boundary Line
	Survey Point
	Survey Line
	Survey Area
	Survey Boundary
	Survey Point
	Survey Line
	Survey Area
	Survey Boundary

Ref	Date	Description	Drawn	Q. Ref
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greenhatch group

Topographical Survey
Site Preparation
Utility & Drainage

Rowan House
Duffield Road
Little Eaton
Derby
DE21 5DR

Tel: 01332 330000
Email: info@greenhatch.co.uk
www.greenhatch.co.uk

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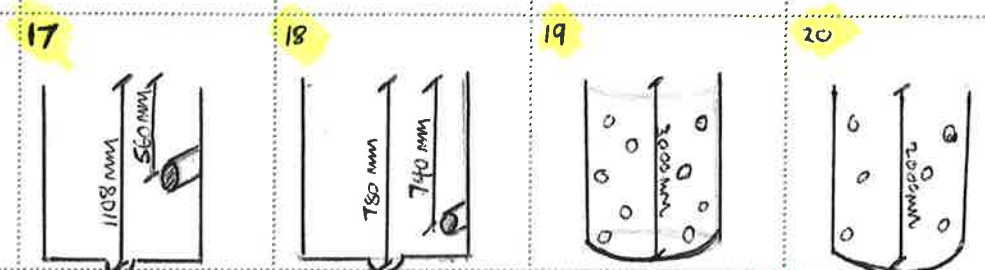
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* = Most interested in.



Photograph 1



Photograph 2



Photograph 3



Photograph 4



Photograph 5

Appendix F

Causeway Flow Calculations

Simulation Settings

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

Storm Durations

15	60	180	360	600	960
30	120	240	480	720	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	45	0	0
100	45	0	0

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	0.75
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	9.000
CV	1.000	Preferred Cover Depth (m)	0.700
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	70.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.005	5.00	86.850	450	522177.615	230737.616	1.325	85.525
2	0.007	5.00	86.746	450	522166.986	230733.903	1.414	85.332
3	0.007	5.00	86.792	450	522159.094	230731.043	1.604	85.188
4	0.006	5.00	86.623	450	522151.674	230728.456	1.568	85.055
5	0.003	5.00	86.574	450	522142.845	230725.314	1.680	84.894
6			86.909	450	522130.829	230715.182	2.284	84.625
7A	0.047	5.00	85.850	100	522101.625	230693.189	0.800	85.050
7			86.056	450	522132.816	230703.969	1.625	84.431
8A	0.047	5.00	85.050	100	522124.140	230687.903	0.800	84.250
8			85.063	450	522138.319	230692.800	1.375	83.688
9			83.663	450	522176.276	230685.779	0.925	82.738
10	0.008	5.00	86.021	450	522189.611	230728.149	1.612	84.409
11	0.008	5.00	85.422	450	522193.287	230718.810	1.188	84.234
12	0.012	5.00	85.183	450	522196.286	230711.234	1.051	84.132
13	0.008	5.00	84.446	450	522203.707	230694.253	0.777	83.669
14	0.012	5.00	85.928	450	522153.599	230708.957	0.728	85.200
15	0.016	5.00	83.977	450	522168.770	230714.160	0.777	83.200
16	0.013	5.00	83.903	450	522174.309	230699.517	0.970	82.933
17	0.006	5.00	83.332	450	522181.552	230683.881	0.803	82.529
18			83.190	450	522182.105	230682.248	0.782	82.408
19			83.090		522182.658	230680.615	0.803	82.287

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	2	11.259	0.600	85.525	85.332	0.193	58.3	100	5.19	70.0
1.001	2	3	8.394	0.600	85.332	85.188	0.144	58.3	100	5.32	70.0
1.002	3	4	7.858	0.600	85.189	85.055	0.134	58.6	100	5.45	70.0
1.003	4	5	9.372	0.600	85.055	84.895	0.160	58.6	100	5.61	70.0
1.004	5	6	15.717	0.600	84.894	84.625	0.269	58.4	100	5.87	70.0
1.005	6	7	11.388	0.600	84.626	84.431	0.195	58.4	100	6.06	70.0
2.000_1	7A	7	33.001	0.600	85.050	84.431	0.619	53.3	100	5.52	70.0
1.006	7	8	12.451	0.600	84.431	83.738	0.693	18.0	100	6.17	70.0
3.000_1	8A	8	15.001	0.600	84.250	83.688	0.562	26.7	150	5.13	70.0
1.007	8	9	38.601	0.600	83.688	82.738	0.950	40.6	150	6.58	70.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	1.010	7.9	1.3	1.225	1.314	0.005	0.0
1.001	1.011	7.9	3.0	1.314	1.504	0.012	0.0
1.002	1.008	7.9	4.8	1.503	1.468	0.019	0.0
1.003	1.008	7.9	6.3	1.468	1.579	0.025	0.0
1.004	1.009	7.9	7.1	1.580	2.184	0.028	0.0
1.005	1.010	7.9	7.1	2.183	1.525	0.028	0.0
2.000_1	1.057	8.3	11.9	0.700	1.525	0.047	0.0
1.006	1.830	14.4	19.0	1.525	1.225	0.075	0.0
3.000_1	1.956	34.6	11.9	0.650	1.225	0.047	0.0
1.007	1.583	28.0	30.9	1.225	0.775	0.122	0.0

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.008	9	17	5.606	0.600	82.738	82.604	0.134	41.8	150	6.64	70.0
2.000	10	11	10.036	0.600	84.409	84.284	0.125	80.3	100	5.19	70.0
2.001	11	12	8.148	0.600	84.234	84.132	0.102	79.9	150	5.32	70.0
2.002	12	13	18.532	0.600	84.132	83.669	0.463	40.0	150	5.51	70.0
2.003	13	17	24.463	0.600	83.669	82.604	1.065	23.0	150	5.70	70.0
3.000	14	15	16.038	0.600	85.200	83.244	1.956	8.2	100	5.10	70.0
3.001	15	16	15.656	0.600	83.200	82.933	0.267	58.6	225	5.25	70.0
3.002	16	17	17.231	0.600	82.933	82.529	0.404	42.7	225	5.39	70.0
1.009	17	18	1.724	0.600	82.529	82.408	0.121	14.2	225	6.64	70.0
1.010	18	19	1.724	0.600	82.408	82.287	0.121	14.2	225	6.65	70.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.008	1.560	27.6	30.9	0.775	0.578	0.122	0.0
2.000	0.859	6.7	2.0	1.512	1.038	0.008	0.0
2.001	1.125	19.9	4.0	1.038	0.901	0.016	0.0
2.002	1.596	28.2	7.1	0.901	0.627	0.028	0.0
2.003	2.110	37.3	9.1	0.627	0.578	0.036	0.0
3.000	2.716	21.3	3.0	0.628	0.633	0.012	0.0
3.001	1.711	68.0	7.1	0.552	0.745	0.028	0.0
3.002	2.008	79.9	10.4	0.745	0.578	0.041	0.0
1.009	3.484	138.5	51.9	0.578	0.557	0.205	0.0
1.010	3.484	138.5	51.9	0.557	0.578	0.205	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	11.259	58.3	100	1 STANDARD	86.850	85.525	1.225	86.746	85.332	1.314
1.001	8.394	58.3	100	1 STANDARD	86.746	85.332	1.314	86.792	85.188	1.504
1.002	7.858	58.6	100	1 STANDARD	86.792	85.189	1.503	86.623	85.055	1.468
1.003	9.372	58.6	100	1 STANDARD	86.623	85.055	1.468	86.574	84.895	1.579
1.004	15.717	58.4	100	1 STANDARD	86.574	84.894	1.580	86.909	84.625	2.184
1.005	11.388	58.4	100	1 STANDARD	86.909	84.626	2.183	86.056	84.431	1.525
2.000_1	33.001	53.3	100	1 STANDARD	85.850	85.050	0.700	86.056	84.431	1.525
1.006	12.451	18.0	100	1 STANDARD	86.056	84.431	1.525	85.063	83.738	1.225
3.000_1	15.001	26.7	150	1 STANDARD	85.050	84.250	0.650	85.063	83.688	1.225
1.007	38.601	40.6	150	1 STANDARD	85.063	83.688	1.225	83.663	82.738	0.775
1.008	5.606	41.8	150	1 STANDARD	83.663	82.738	0.775	83.332	82.604	0.578
2.000	10.036	80.3	100	1 STANDARD	86.021	84.409	1.512	85.422	84.284	1.038
2.001	8.148	79.9	150	1 STANDARD	85.422	84.234	1.038	85.183	84.132	0.901
2.002	18.532	40.0	150	1 STANDARD	85.183	84.132	0.901	84.446	83.669	0.627

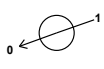
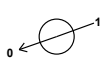
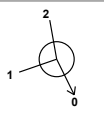
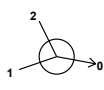
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1.000	1	450	Manhole	1 STANDARD	2	450	Manhole	1 STANDARD
1.001	2	450	Manhole	1 STANDARD	3	450	Manhole	1 STANDARD
1.002	3	450	Manhole	1 STANDARD	4	450	Manhole	1 STANDARD
1.003	4	450	Manhole	1 STANDARD	5	450	Manhole	1 STANDARD
1.004	5	450	Manhole	1 STANDARD	6	450	Manhole	1 STANDARD
1.005	6	450	Manhole	1 STANDARD	7	450	Manhole	1 STANDARD
2.000_1	7A	100	Manhole	1 STANDARD	7	450	Manhole	1 STANDARD
1.006	7	450	Manhole	1 STANDARD	8	450	Manhole	1 STANDARD
3.000_1	8A	100	Manhole	1 STANDARD	8	450	Manhole	1 STANDARD
1.007	8	450	Manhole	1 STANDARD	9	450	Manhole	1 STANDARD
1.008	9	450	Manhole	1 STANDARD	17	450	Manhole	1 STANDARD
2.000	10	450	Manhole	1 STANDARD	11	450	Manhole	1 STANDARD
2.001	11	450	Manhole	1 STANDARD	12	450	Manhole	1 STANDARD
2.002	12	450	Manhole	1 STANDARD	13	450	Manhole	1 STANDARD

Pipeline Schedule

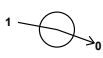
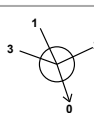
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
2.003	24.463	23.0	150	1 STANDARD	84.446	83.669	0.627	83.332	82.604	0.578
3.000	16.038	8.2	100	1 STANDARD	85.928	85.200	0.628	83.977	83.244	0.633
3.001	15.656	58.6	225	1 STANDARD	83.977	83.200	0.552	83.903	82.933	0.745
3.002	17.231	42.7	225	1 STANDARD	83.903	82.933	0.745	83.332	82.529	0.578
1.009	1.724	14.2	225	1 STANDARD	83.332	82.529	0.578	83.190	82.408	0.557
1.010	1.724	14.2	225	1 STANDARD	83.190	82.408	0.557	83.090	82.287	0.578

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.003	13	450	Manhole	1 STANDARD	17	450	Manhole	1 STANDARD
3.000	14	450	Manhole	1 STANDARD	15	450	Manhole	1 STANDARD
3.001	15	450	Manhole	1 STANDARD	16	450	Manhole	1 STANDARD
3.002	16	450	Manhole	1 STANDARD	17	450	Manhole	1 STANDARD
1.009	17	450	Manhole	1 STANDARD	18	450	Manhole	1 STANDARD
1.010	18	450	Manhole	1 STANDARD	19		Manhole	1 STANDARD

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	522177.615	230737.616	86.850	1.325	450				
						0	1.000	85.525	100
2	522166.986	230733.903	86.746	1.414	450		1	1.000	85.332
						0	1.001	85.332	100
3	522159.094	230731.043	86.792	1.604	450		1	1.001	85.188
						0	1.002	85.189	100
4	522151.674	230728.456	86.623	1.568	450		1	1.002	85.055
						0	1.003	85.055	100
5	522142.845	230725.314	86.574	1.680	450		1	1.003	84.895
						0	1.004	84.894	100
6	522130.829	230715.182	86.909	2.284	450		1	1.004	84.625
						0	1.005	84.626	100
7A	522101.625	230693.189	85.850	0.800	100				
						0	2.000_1	85.050	100
7	522132.816	230703.969	86.056	1.625	450		1	2.000_1	84.431
						2	1.005	84.431	100
						0	1.006	84.431	100
8A	522124.140	230687.903	85.050	0.800	100				
						0	3.000_1	84.250	150
8	522138.319	230692.800	85.063	1.375	450		1	3.000_1	83.688
						2	1.006	83.738	100
						0	1.007	83.688	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
9	522176.276	230685.779	83.663	0.925	450		1	1.007	82.738	150
							0	1.008	82.738	150
10	522189.611	230728.149	86.021	1.612	450		0	2.000	84.409	100
11	522193.287	230718.810	85.422	1.188	450		1	2.000	84.284	100
							0	2.001	84.234	150
12	522196.286	230711.234	85.183	1.051	450		1	2.001	84.132	150
							0	2.002	84.132	150
13	522203.707	230694.253	84.446	0.777	450		1	2.002	83.669	150
							0	2.003	83.669	150
14	522153.599	230708.957	85.928	0.728	450		0	3.000	85.200	100
15	522168.770	230714.160	83.977	0.777	450		1	3.000	83.244	100
							0	3.001	83.200	225
16	522174.309	230699.517	83.903	0.970	450		1	3.001	82.933	225
							0	3.002	82.933	225
17	522181.552	230683.881	83.332	0.803	450		1	3.002	82.529	225
							2	2.003	82.604	150
							3	1.008	82.604	150
							0	1.009	82.529	225
18	522182.105	230682.248	83.190	0.782	450		1	1.009	82.408	225
							0	1.010	82.408	225
19	522182.658	230680.615	83.090	0.803			1	1.010	82.287	225

Node 19 Online Pump Control

Flap Valve	x	Switch on depth (m)	0.200
Replaces Downstream Link	✓	Switch off depth (m)	0.100
Invert Level (m)	82.287		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.000	2.000	0.000	4.000	0.000	6.000	0.000	8.000	0.000
1.000	0.000	3.000	0.000	5.000	0.000	7.000	0.000	9.000	0.000

Node 18 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.09612	Pit Width (m)	10.000
Side Inf Coefficient (m/hr)	0.09612	Pit Length (m)	17.000
Safety Factor	1.5	Depth (m)	0.800
Porosity	0.95	Inf Depth (m)	
Invert Level (m)	81.833	Number Required	1
Time to half empty (mins)	312		

Node 7A Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00242	Width (m)	46.500
Side Inf Coefficient (m/hr)	0.00242	Length (m)	10.000
Safety Factor	1.5	Slope (1:X)	9999.0
Porosity	0.35	Depth (m)	0.325
Invert Level (m)	85.415	Inf Depth (m)	
Time to half empty (mins)	0		

Node 8A Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00242	Width (m)	46.500
Side Inf Coefficient (m/hr)	0.00242	Length (m)	10.000
Safety Factor	1.5	Slope (1:X)	9999.0
Porosity	0.35	Depth (m)	0.325
Invert Level (m)	84.615	Inf Depth (m)	
Time to half empty (mins)	0		

Other (defaults)

Entry Loss (manhole)	0.250	Exit Loss (junction)	0.000
Exit Loss (manhole)	0.250	Apply Recommended Losses	x
Entry Loss (junction)	0.000	Flood Risk (m)	0.150

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 15 minute summer	102.647	29.046
2 year 15 minute winter	72.033	29.046
2 year 30 minute summer	64.902	18.365
2 year 30 minute winter	45.546	18.365
2 year 60 minute summer	42.514	11.235
2 year 60 minute winter	28.245	11.235
2 year 120 minute summer	31.318	8.276
2 year 120 minute winter	20.807	8.276
2 year 180 minute summer	25.573	6.581
2 year 180 minute winter	16.623	6.581
2 year 240 minute summer	20.731	5.479
2 year 240 minute winter	13.773	5.479
2 year 360 minute summer	15.976	4.111
2 year 360 minute winter	10.385	4.111
2 year 480 minute summer	12.503	3.304
2 year 480 minute winter	8.307	3.304
2 year 600 minute summer	10.143	2.774
2 year 600 minute winter	6.930	2.774
2 year 720 minute summer	8.950	2.399
2 year 720 minute winter	6.015	2.399
2 year 960 minute summer	7.217	1.901
2 year 960 minute winter	4.781	1.901
2 year 1440 minute summer	5.106	1.369
2 year 1440 minute winter	3.432	1.369
30 year +45% CC 15 minute summer	407.402	115.281
30 year +45% CC 15 minute winter	285.896	115.281
30 year +45% CC 30 minute summer	261.087	73.879

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year +45% CC 30 minute winter	183.219	73.879
30 year +45% CC 60 minute summer	171.215	45.247
30 year +45% CC 60 minute winter	113.751	45.247
30 year +45% CC 120 minute summer	108.236	28.604
30 year +45% CC 120 minute winter	71.910	28.604
30 year +45% CC 180 minute summer	83.004	21.360
30 year +45% CC 180 minute winter	53.955	21.360
30 year +45% CC 240 minute summer	64.965	17.168
30 year +45% CC 240 minute winter	43.161	17.168
30 year +45% CC 360 minute summer	48.222	12.409
30 year +45% CC 360 minute winter	31.345	12.409
30 year +45% CC 480 minute summer	36.966	9.769
30 year +45% CC 480 minute winter	24.560	9.769
30 year +45% CC 600 minute summer	29.568	8.087
30 year +45% CC 600 minute winter	20.202	8.087
30 year +45% CC 720 minute summer	25.815	6.919
30 year +45% CC 720 minute winter	17.349	6.919
30 year +45% CC 960 minute summer	20.494	5.397
30 year +45% CC 960 minute winter	13.576	5.397
30 year +45% CC 1440 minute summer	14.150	3.792
30 year +45% CC 1440 minute winter	9.510	3.792
100 year +45% CC 15 minute summer	513.688	145.356
100 year +45% CC 15 minute winter	360.483	145.356
100 year +45% CC 30 minute summer	332.540	94.097
100 year +45% CC 30 minute winter	233.361	94.097
100 year +45% CC 60 minute summer	219.212	57.931
100 year +45% CC 60 minute winter	145.639	57.931
100 year +45% CC 120 minute summer	135.394	35.781
100 year +45% CC 120 minute winter	89.953	35.781
100 year +45% CC 180 minute summer	102.974	26.499
100 year +45% CC 180 minute winter	66.936	26.499
100 year +45% CC 240 minute summer	80.317	21.225
100 year +45% CC 240 minute winter	53.361	21.225
100 year +45% CC 360 minute summer	59.525	15.318
100 year +45% CC 360 minute winter	38.693	15.318
100 year +45% CC 480 minute summer	45.599	12.050
100 year +45% CC 480 minute winter	30.295	12.050
100 year +45% CC 600 minute summer	36.442	9.968
100 year +45% CC 600 minute winter	24.899	9.968
100 year +45% CC 720 minute summer	31.786	8.519
100 year +45% CC 720 minute winter	21.362	8.519
100 year +45% CC 960 minute summer	25.171	6.628
100 year +45% CC 960 minute winter	16.674	6.628
100 year +45% CC 1440 minute summer	17.312	4.640
100 year +45% CC 1440 minute winter	11.634	4.640

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	85.546	0.021	0.8	0.0034	0.0000	OK
15 minute summer	2	10	85.366	0.034	2.0	0.0054	0.0000	OK
15 minute summer	3	10	85.234	0.046	3.2	0.0074	0.0000	OK
15 minute summer	4	10	85.109	0.054	4.2	0.0085	0.0000	OK
15 minute summer	5	10	84.950	0.056	4.6	0.0090	0.0000	OK
15 minute summer	6	11	84.682	0.057	4.6	0.0090	0.0000	OK
15 minute summer	7A	10	85.130	0.080	7.9	0.0006	0.0000	OK
15 minute summer	7	11	84.508	0.077	12.4	0.0123	0.0000	OK
15 minute summer	8A	10	84.299	0.049	7.9	0.0004	0.0000	OK
15 minute summer	8	11	83.782	0.094	20.0	0.0149	0.0000	OK
15 minute summer	9	11	82.850	0.112	20.0	0.0178	0.0000	OK
15 minute summer	10	11	84.440	0.031	1.3	0.0049	0.0000	OK
15 minute summer	11	11	84.272	0.038	2.6	0.0060	0.0000	OK
15 minute summer	12	10	84.174	0.042	4.6	0.0067	0.0000	OK
15 minute summer	13	10	83.710	0.041	5.9	0.0065	0.0000	OK
15 minute summer	14	10	85.221	0.021	2.0	0.0033	0.0000	OK
15 minute summer	15	10	83.240	0.040	4.7	0.0064	0.0000	OK
15 minute summer	16	10	82.977	0.044	6.9	0.0070	0.0000	OK
15 minute summer	17	11	82.635	0.106	33.6	0.0169	0.0000	OK
180 minute summer	18	124	81.966	-0.442	13.6	21.5325	0.0000	OK
15 minute summer	19	1	82.287	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	0.8	0.458	0.101	0.0202	
15 minute summer	2	1.001	3	2.0	0.672	0.250	0.0248	
15 minute summer	3	1.002	4	3.2	0.814	0.398	0.0304	
15 minute summer	4	1.003	5	4.1	0.943	0.520	0.0409	
15 minute summer	5	1.004	6	4.6	1.010	0.581	0.0718	
15 minute summer	6	1.005	7	4.6	0.839	0.586	0.0626	
15 minute summer	7A	2.000_1	7	7.8	1.200	0.941	0.2168	
15 minute summer	7A	Infiltration		0.0				0.0
15 minute summer	7	1.006	8	12.4	1.974	0.860	0.0779	
15 minute summer	8A	3.000_1	8	7.9	0.993	0.228	0.1234	
15 minute summer	8A	Infiltration		0.0				0.0
15 minute summer	8	1.007	9	20.0	1.567	0.715	0.4948	
15 minute summer	9	1.008	17	20.1	1.552	0.728	0.0723	
15 minute summer	10	2.000	11	1.3	0.655	0.193	0.0199	
15 minute summer	11	2.001	12	2.6	0.701	0.131	0.0304	
15 minute summer	12	2.002	13	4.6	1.161	0.163	0.0732	
15 minute summer	13	2.003	17	5.8	1.523	0.157	0.0939	
15 minute summer	14	3.000	15	2.0	1.685	0.093	0.0189	
15 minute summer	15	3.001	16	4.7	0.908	0.069	0.0805	
15 minute summer	16	3.002	17	6.8	0.624	0.085	0.2054	
15 minute summer	17	1.009	18	33.6	2.248	0.243	0.0259	
180 minute summer	18	1.010	19	0.0	0.000	0.000	0.0000	
180 minute summer	18	Infiltration		3.2				40.1
15 minute summer	19	Pump		0.0				0.0

Results for 30 year +45% CC Critical Storm Duration. Lowest mass balance: 99.81%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	13	85.922	0.397	3.3	0.0631	0.0000	SURCHARGED
15 minute summer	2	13	85.913	0.581	7.5	0.0924	0.0000	SURCHARGED
15 minute summer	3	13	85.874	0.686	9.0	0.1090	0.0000	SURCHARGED
15 minute summer	4	13	85.779	0.724	10.2	0.1151	0.0000	SURCHARGED
15 minute summer	5	14	85.614	0.720	9.9	0.1144	0.0000	SURCHARGED
15 minute summer	6	15	85.323	0.698	8.0	0.1110	0.0000	SURCHARGED
30 minute summer	7A	24	85.460	0.410	27.5	7.1725	0.0000	SURCHARGED
15 minute summer	7	16	85.119	0.688	15.9	0.1094	0.0000	SURCHARGED
15 minute summer	8A	13	84.627	0.377	31.3	1.8858	0.0000	SURCHARGED
15 minute summer	8	14	84.417	0.728	35.0	0.1158	0.0000	SURCHARGED
15 minute summer	9	15	83.016	0.278	31.7	0.0441	0.0000	SURCHARGED
15 minute summer	10	10	84.480	0.071	5.3	0.0113	0.0000	OK
15 minute summer	11	10	84.320	0.086	10.6	0.0136	0.0000	OK
15 minute summer	12	10	84.226	0.094	18.5	0.0150	0.0000	OK
15 minute summer	13	10	83.756	0.087	23.7	0.0138	0.0000	OK
15 minute summer	14	10	85.244	0.044	8.0	0.0070	0.0000	OK
15 minute summer	15	10	83.284	0.084	18.6	0.0133	0.0000	OK
15 minute summer	16	10	83.023	0.090	27.1	0.0142	0.0000	OK
15 minute summer	17	10	82.745	0.216	85.7	0.0343	0.0000	OK
180 minute winter	18	176	82.452	0.044	30.2	99.9692	0.0000	OK
180 minute winter	19	176	82.452	0.165	0.8	0.0000	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	3.1	0.598	0.393	0.0881	
15 minute summer	2	1.001	3	5.3	0.747	0.671	0.0657	
15 minute summer	3	1.002	4	6.3	0.888	0.800	0.0615	
15 minute summer	4	1.003	5	7.9	1.014	0.994	0.0733	
15 minute summer	5	1.004	6	8.0	1.095	1.012	0.1230	
15 minute summer	6	1.005	7	8.5	1.082	1.068	0.0891	
30 minute summer	7A	2.000_1	7	9.4	1.279	1.138	0.2582	
30 minute summer	7A	Infiltration		0.2				0.2
15 minute summer	7	1.006	8	17.0	2.168	1.180	0.0974	
15 minute summer	8A	3.000_1	8	23.0	1.344	0.667	0.2641	
15 minute summer	8A	Infiltration		0.1				0.0
15 minute summer	8	1.007	9	31.7	1.798	1.132	0.6796	
15 minute summer	9	1.008	17	31.7	1.799	1.148	0.0977	
15 minute summer	10	2.000	11	5.3	0.919	0.779	0.0574	
15 minute summer	11	2.001	12	10.5	0.956	0.529	0.0898	
15 minute summer	12	2.002	13	18.4	1.662	0.653	0.2054	
15 minute summer	13	2.003	17	23.6	1.695	0.633	0.3390	
15 minute summer	14	3.000	15	8.0	2.468	0.373	0.0517	
15 minute summer	15	3.001	16	18.5	1.315	0.272	0.2201	
15 minute summer	16	3.002	17	27.0	0.941	0.338	0.4646	
15 minute summer	17	1.009	18	85.3	2.630	0.616	0.0537	
180 minute winter	18	1.010	19	0.8	0.177	0.006	0.0316	
180 minute winter	18	Infiltration		3.6				131.5
180 minute winter	19	Pump		0.0				0.0

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.90%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	13	86.221	0.696	4.2	0.1106	0.0000	SURCHARGED
15 minute summer	2	13	86.210	0.878	7.7	0.1396	0.0000	SURCHARGED
15 minute summer	3	13	86.160	0.972	9.7	0.1545	0.0000	SURCHARGED
15 minute summer	4	14	86.043	0.988	11.5	0.1570	0.0000	SURCHARGED
30 minute summer	5	23	85.829	0.935	10.5	0.1487	0.0000	SURCHARGED
30 minute summer	6	24	85.462	0.837	8.9	0.1331	0.0000	SURCHARGED
30 minute summer	7A	27	85.484	0.434	35.0	11.1369	0.0000	SURCHARGED
30 minute summer	7	24	85.197	0.766	16.0	0.1218	0.0000	SURCHARGED
15 minute summer	8A	13	84.641	0.391	39.4	4.2134	0.0000	SURCHARGED
15 minute summer	8	15	84.438	0.750	33.9	0.1192	0.0000	SURCHARGED
15 minute summer	9	11	83.080	0.342	31.9	0.0544	0.0000	SURCHARGED
15 minute summer	10	10	84.498	0.089	6.7	0.0142	0.0000	OK
15 minute summer	11	10	84.336	0.102	13.3	0.0162	0.0000	OK
15 minute summer	12	10	84.244	0.112	23.3	0.0178	0.0000	OK
15 minute summer	13	10	83.770	0.101	29.9	0.0161	0.0000	OK
15 minute summer	14	10	85.250	0.050	10.1	0.0079	0.0000	OK
15 minute summer	15	10	83.296	0.096	23.5	0.0152	0.0000	OK
15 minute summer	16	10	83.035	0.102	34.2	0.0162	0.0000	OK
15 minute summer	17	10	82.818	0.289	99.2	0.0460	0.0000	SURCHARGED
240 minute winter	18	232	82.632	0.224	30.3	129.0879	0.0000	OK
240 minute winter	19	232	82.632	0.345	2.6	0.0000	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	3.1	0.555	0.393	0.0881	
15 minute summer	2	1.001	3	4.4	0.771	0.553	0.0657	
15 minute summer	3	1.002	4	6.8	0.901	0.858	0.0615	
15 minute summer	4	1.003	5	8.8	1.128	1.115	0.0733	
30 minute summer	5	1.004	6	8.9	1.135	1.120	0.1230	
30 minute summer	6	1.005	7	8.9	1.136	1.121	0.0891	
30 minute summer	7A	2.000_1	7	9.5	1.292	1.142	0.2582	
30 minute summer	7A	Infiltration		0.2				0.4
30 minute summer	7	1.006	8	17.1	2.184	1.189	0.0974	
15 minute summer	8A	3.000_1	8	22.6	1.284	0.654	0.2641	
15 minute summer	8A	Infiltration		0.1				0.0
15 minute summer	8	1.007	9	31.9	1.810	1.139	0.6796	
15 minute summer	9	1.008	17	32.0	1.819	1.161	0.0987	
15 minute summer	10	2.000	11	6.6	0.935	0.976	0.0717	
15 minute summer	11	2.001	12	13.2	0.988	0.665	0.1095	
15 minute summer	12	2.002	13	23.2	1.730	0.822	0.2480	
15 minute summer	13	2.003	17	29.7	1.799	0.797	0.3700	
15 minute summer	14	3.000	15	10.1	2.535	0.472	0.0638	
15 minute summer	15	3.001	16	23.4	1.392	0.343	0.2628	
15 minute summer	16	3.002	17	34.1	1.028	0.427	0.4933	
15 minute summer	17	1.009	18	98.7	2.713	0.712	0.0565	
240 minute winter	18	1.010	19	2.6	0.201	0.019	0.0685	
240 minute winter	18	Infiltration		3.8				173.5
240 minute winter	19	Pump		0.0				0.0

Water Quality (TSS)

Node	Treatment	Effectiveness	SuDS Component	Mitigation TSS	Cumulative TSS
8A	Carpark	1.0	Pond	0.700	0.000
19					0.000

Water Quality (Metals)

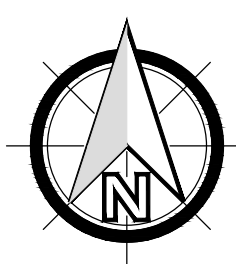
Node	Treatment	Effectiveness	SuDS Component	Mitigation Metals	Cumulative Metals
8A 19	Carpark	1.0	Pond	0.700	0.000 0.000

Water Quality (Hydrocarbons)

Node	Treatment	Effectiveness	SuDS Component	Mitigation Hydrocarbons	Cumulative Hydrocarbons
8A 19	Carpark	1.0	Pond	0.500	0.000 0.000

Appendix G

Surface Water Drainage Layout and Details



LEGEND

- PROPOSED PRIVATE SURFACE WATER PIPE
- PROPOSED PRIVATE PERFORATED SURFACE WATER PIPE
- PROPOSED PRIVATE SURFACE WATER INSPECTION CHAMBER
- RWP
- RE
- PROPOSED SUDS-POD
- PROPOSED PRIVATE SOAKAWAY TANK (CRATE SYSTEM)
- CO
- PROPOSED PRIVATE THRESHOLD CHANNEL DRAIN WITH CHANNEL OUTLET
- PROPOSED PERMEABLE PAVING
- PROPOSED GREEN WALL
- FFL: 38.250
- PROPOSED FINISHED FLOOR LEVELS

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- PRIVATE CONNECTIONS TO THE ADOPTABLE SEWERS TO BE LAID SOFFIT TO SOFFIT. NO PLASTIC PIPES ARE TO BE CONNECTED TO ADOPTABLE MANHOLES. ALL CONNECTIONS TO THE PUBLIC SEWER MUST BE CONSTRUCTED IN VITRIFIED CLAY PIPES.

PERMEABLE PAVING:

DESIGNED FOR A CBR VALUE BETWEEN 2-<3%.

SURFACE COARSE: 80mm PERMEABLE BLOCK PAVERS
BEDDING COARSE: 30mm SHARP SAND
SUBBASE COARSE: 325mm TYPE 3 PERMEABLE SUBBASE

INFILTRATION RATE: 0.00242m/hr
HALF DRAIN TIME: 1365 MINUTES

S7A:
CL: 85.850m
IL: 85.050m
TYPE: 110mmØ RE
COVER: C250

S8A:
CL: 85.050m
IL: 84.250m
TYPE: 160mmØ RE
COVER: C250

S8:
CL: 85.063m
IL: 83.688m
TYPE: 450mmØ PPIC
COVER: B125

S9:
CL: 83.663m
IL: 83.738m
TYPE: 450mmØ PPIC
COVER: B125

S17:
CL: 83.190m
IL: 82.408m
TYPE: 450mmØ PPCP
COVER: B125

SOAKAWAY
POLYSTORM MODULAR CRATES OR SIMILAR APPROVED

WIDTH: 10m (20 UNITS)
LENGTH: 17m (17 UNITS)
DEPTH: 0.8m (2 UNITS)

TOTAL NO. CRATES: 680 UNITS
MAXIMUM STORAGE VOLUME: 129.200m³

INVERT OF INCOMING PIPE: 82.408m AOD
SOAKAWAY COVER LEVEL: 83.190m AOD
SOAKAWAY INVERT: 81.833m AOD
INFILTRATION RATE: 0.09612m/hr

TANK AND ALL CONNECTIONS TO BE FULLY WRAPPED WITH NON-WOVEN NEEDLE-PUNCHED GEOTEXTILE; SEE MANUFACTURER'S INSTALLATION GUIDELINES. MINIMUM COVER LEVEL OF 0.71m IN VEHICLE USE AREAS WITH LOADING UP TO 12,000kg AND 0.3m IN LANDSCAPED/NON-TRAFFICKED AREAS. MAXIMUM DEPTH TO INVERT OF 3.45m

PROPOSED TREES
NOT TO BE LOCATED
IN VICINITY OF
SOAKAWAY

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SCALE 1:250m
0m 5m 10m 15m 20m 25m
SCALE BAR FOR INFORMATION ONLY

RESIDUAL RISKS:



CONTACT WITH LIVE SERVICES (SITE-WIDE RISK).
LOCATION OF ALL EXISTING BURIED SERVICES TO BE VERIFIED & VISUALLY MARKED ON SITE - APPROPRIATE HEALTH & SAFETY PROTECTIVE MEASURES AND WORK PRACTICES TO BE INSTATED



DAMAGE TO EXISTING SERVICE INFRASTRUCTURE (SITE-WIDE RISK).
LOCATION OF ALL EXISTING BURIED SERVICES TO BE VERIFIED & VISUALLY MARKED ON SITE - APPROPRIATE HEALTH & SAFETY PROTECTIVE MEASURES AND WORK PRACTICES TO BE INSTATED



CONTACT WITH LIVE TRAFFIC & PEDESTRIANS - APPROPRIATE TRAFFIC MANAGEMENT & PEDESTRIAN MANAGEMENT TO BE INSTATED



THE NEW SEWER SYSTEMS INCORPORATE LARGE AND DEEP CONCRETE MANHOLE STRUCTURES AND LARGE DIAMETER CONCRETE PIPES THAT WILL BE CONSTRUCTED IN DEEP EXCAVATIONS. AT ALL STAGES OF CONSTRUCTION APPROPRIATE SECURE FENCING MUST BE INSTALLED AROUND THE DEEP EXCAVATION WITH SUFFICIENT OFFSET TO PREVENT FALLS AND PREVENT COLLAPSE DUE TO UNPLANNED LATERAL LOADING FROM CONSTRUCTION PLANT. THE CONTRACTOR MUST ENSURE FULL HEALTH & SAFETY CONSIDERATION IN THE PLANNING AND EXECUTION OF THE SEWER INSTALLATION WORKS.

P05	01.10.26	COLLECTOR DRAINS UNDER PERMEABLE PAVING ADDED & SOAKAWAY ADJUSTED	OG	MH
P04	11.03.26	REVISED IN LINE WITH INFILTRATION TEST RESULTS	OG	MH
P03	24.07.25	REVISED IN LINE WITH COMMENTS	KS	MH
rev	date	details	drawn	checked



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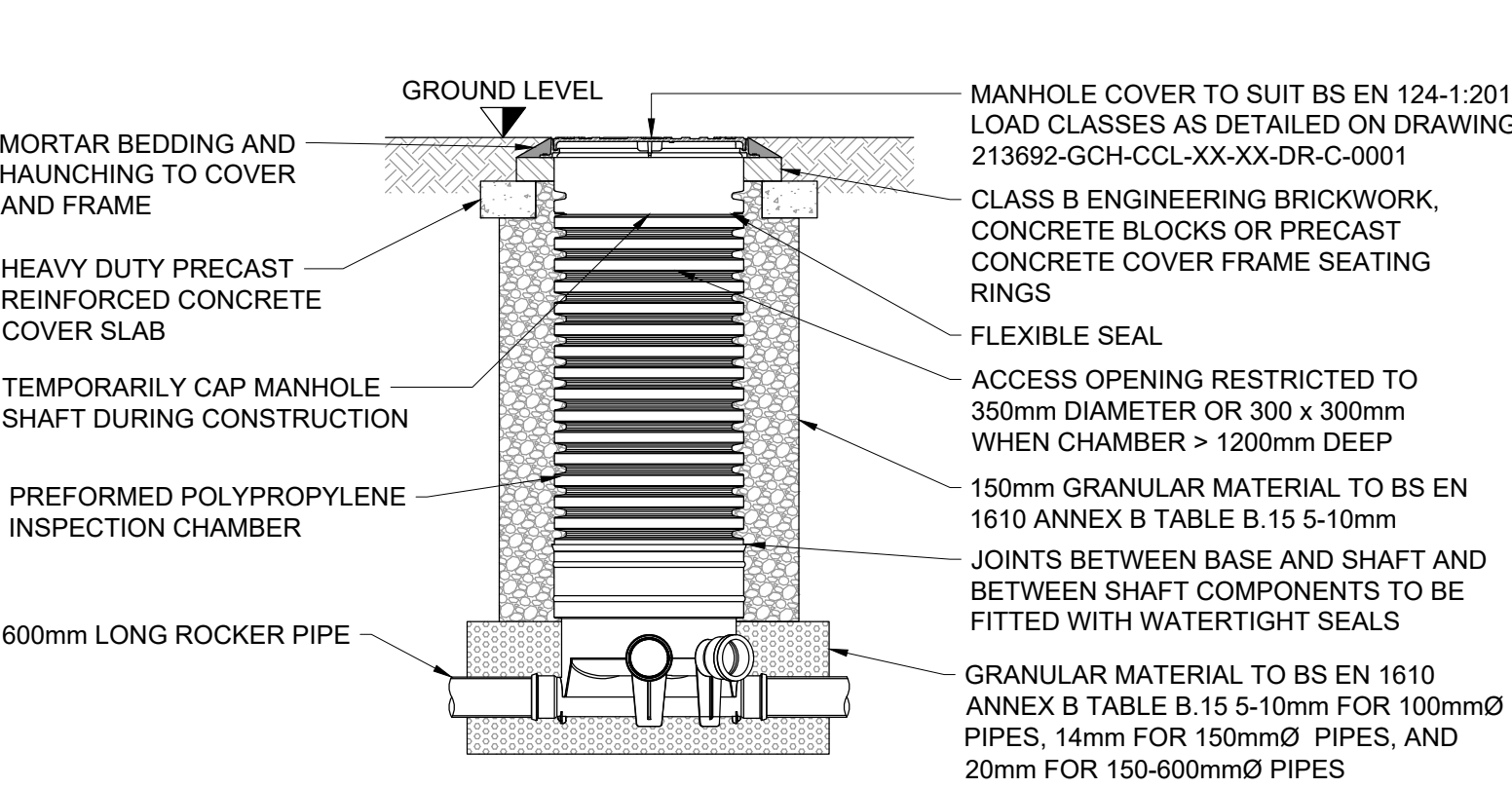
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PROPOSED SURFACE WATER DRAINAGE LAYOUT

CCL ref: 213692
drawn: MJWH
design: MH
checked: MR
scale: 1:250
size: A1 (L)
date: 30.09.2019

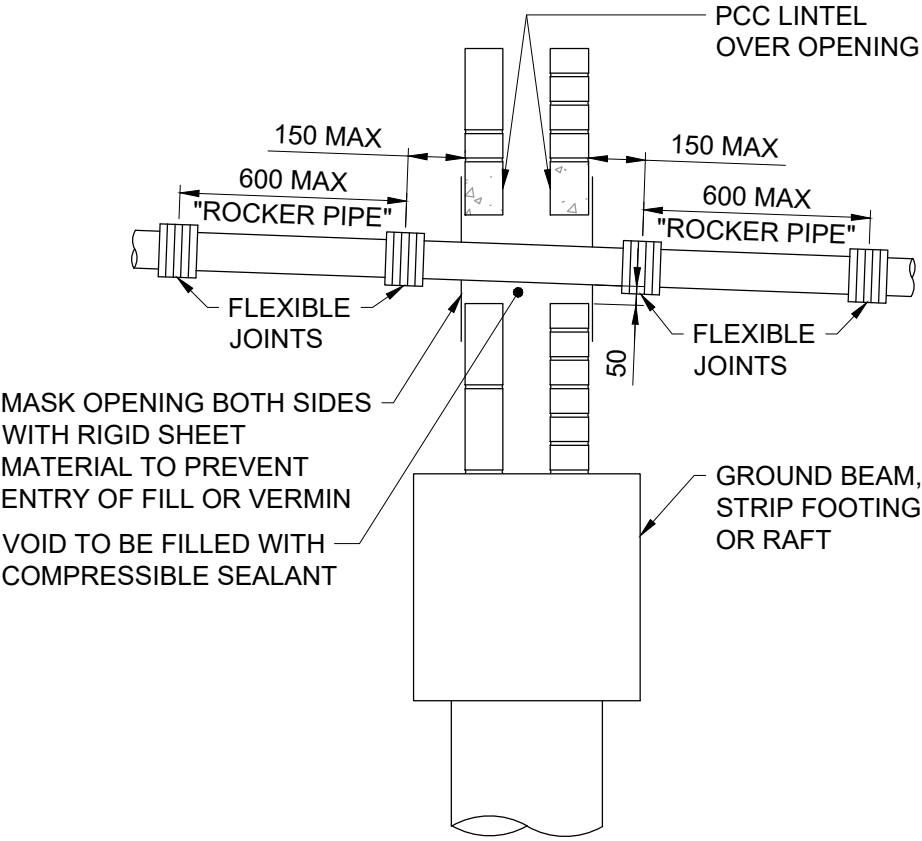
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S3 - SUITABLE FOR REVIEW & COMMENT

drawing number: GCH-CCL-XX-XX-DR-C-0001
revision: P05

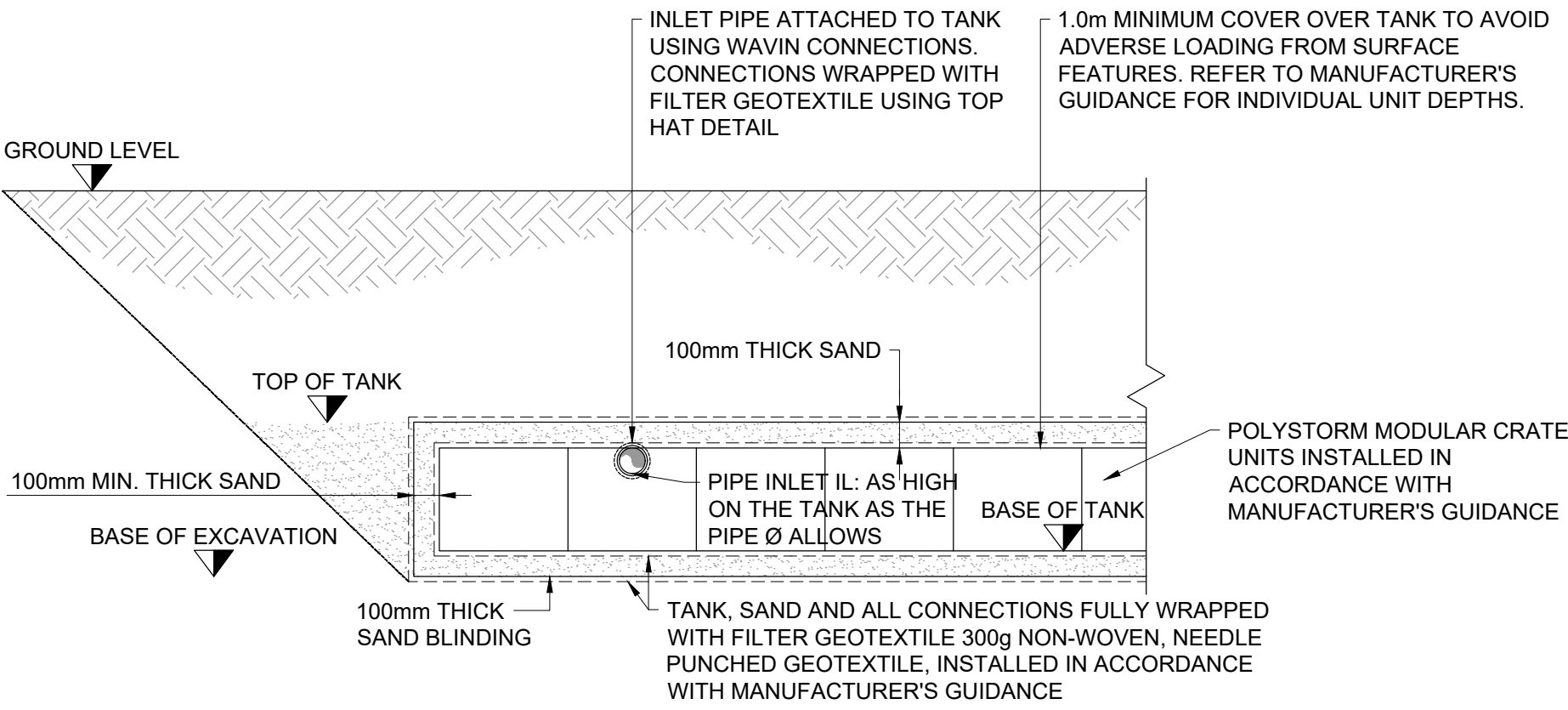
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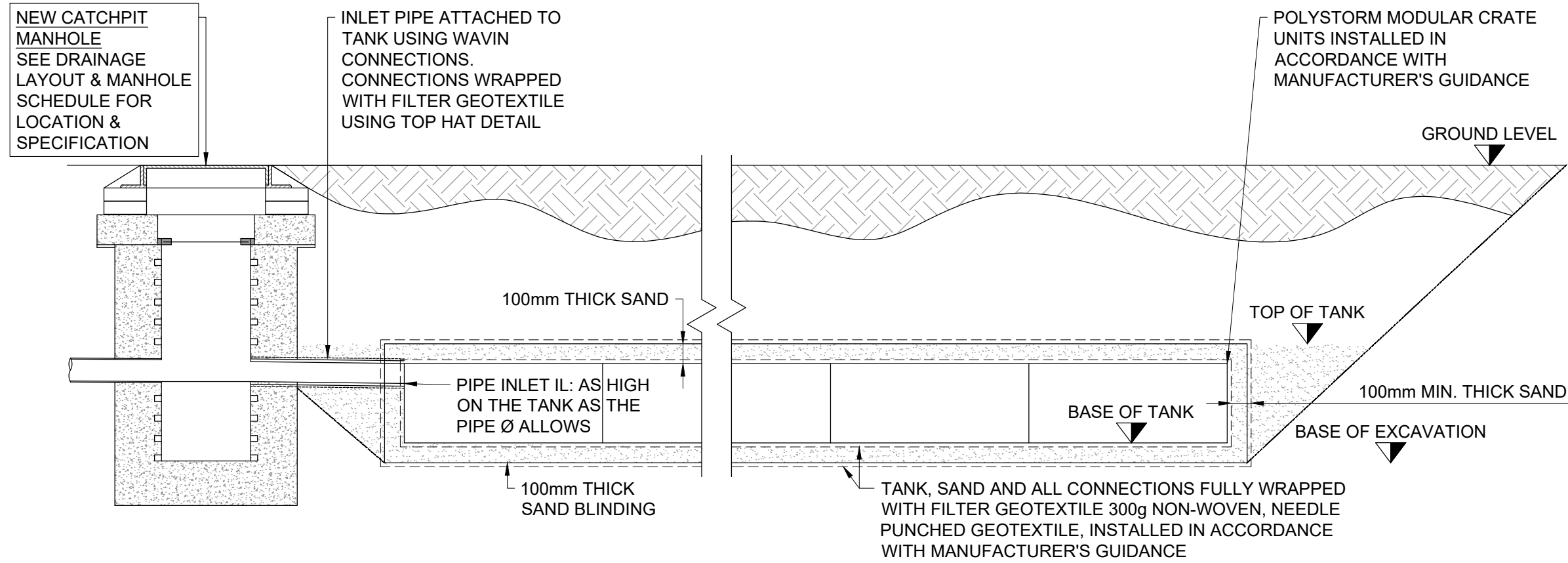
TYPICAL TURTLE ENVIRO INSPECTION CHAMBER DETAIL
INSPECTION CHAMBER IN TRAFFICKED AREAS
SCALE 1:20



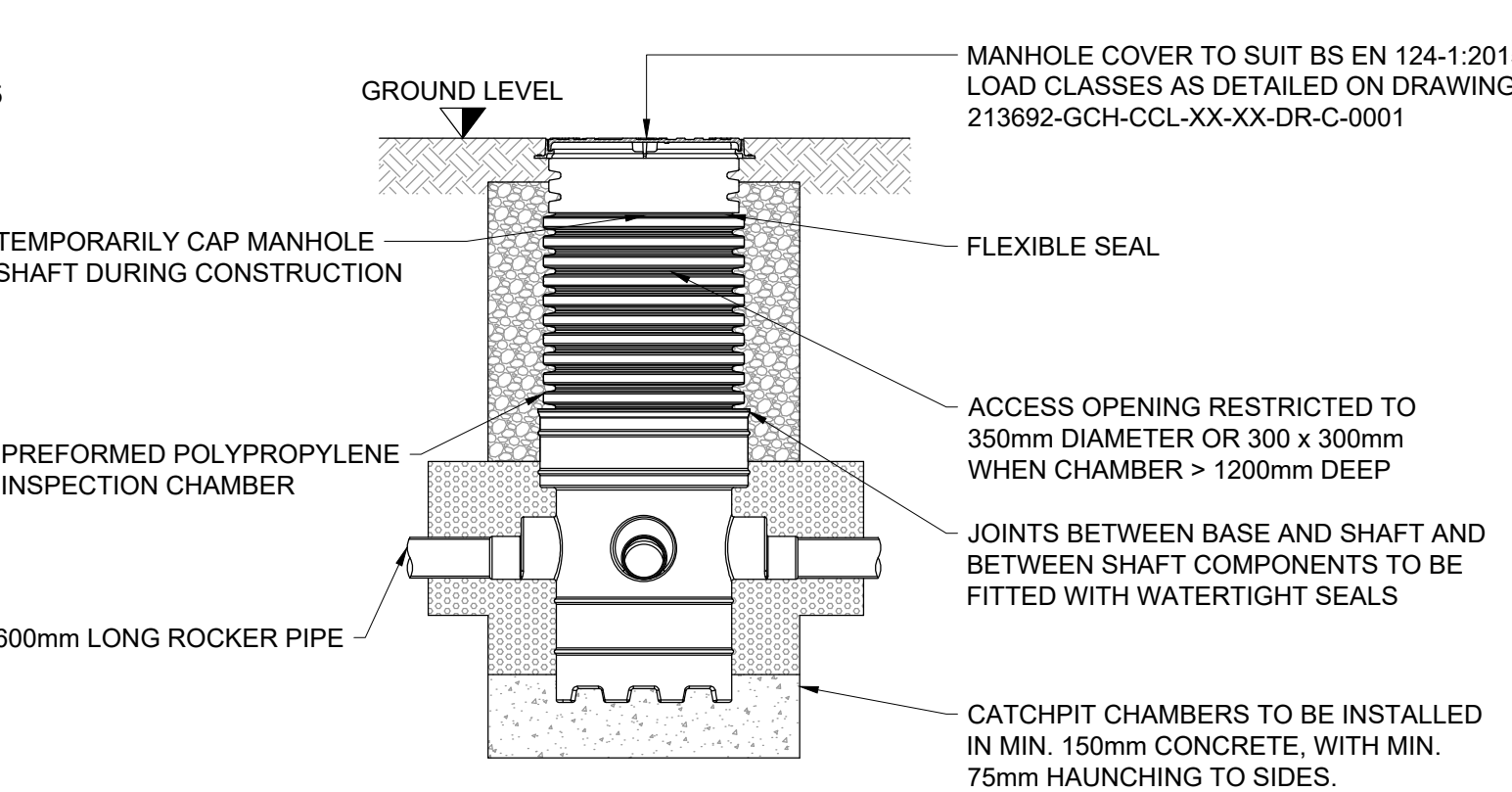
**PIPE PENETRATING WALLS
ARCH OR LINTELLED OPENING
TO GIVE 50mm SPACE ALL
ROUND PIPE**
NOT TO SCALE



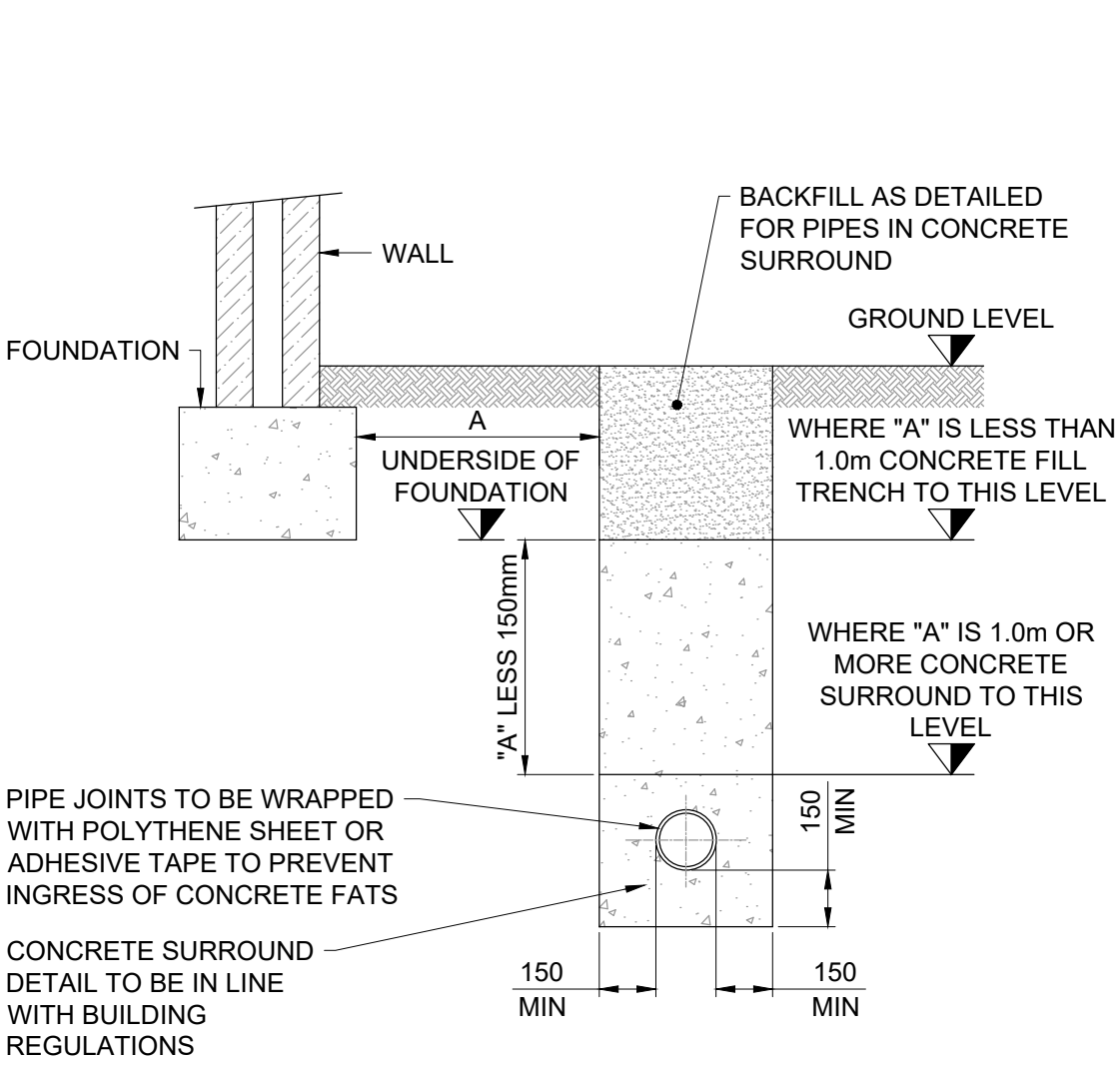
TYPICAL SECTION A-A
SCALE 1:25



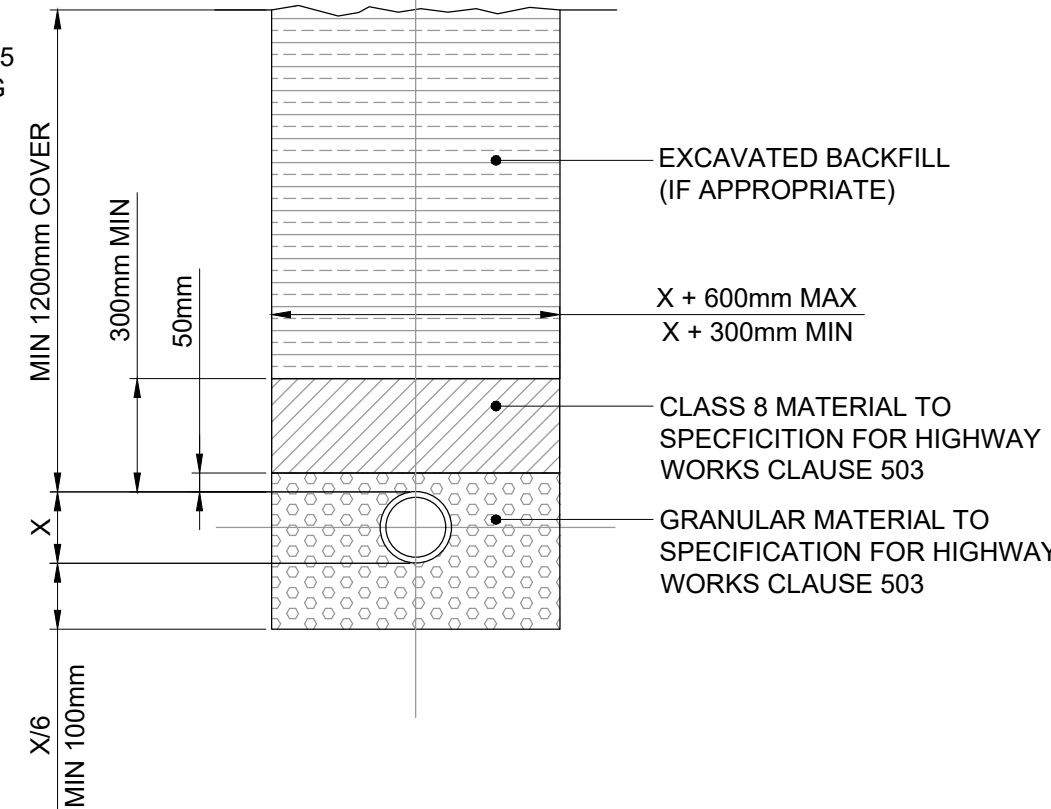
TYPICAL SECTION B-B
SCALE 1:25



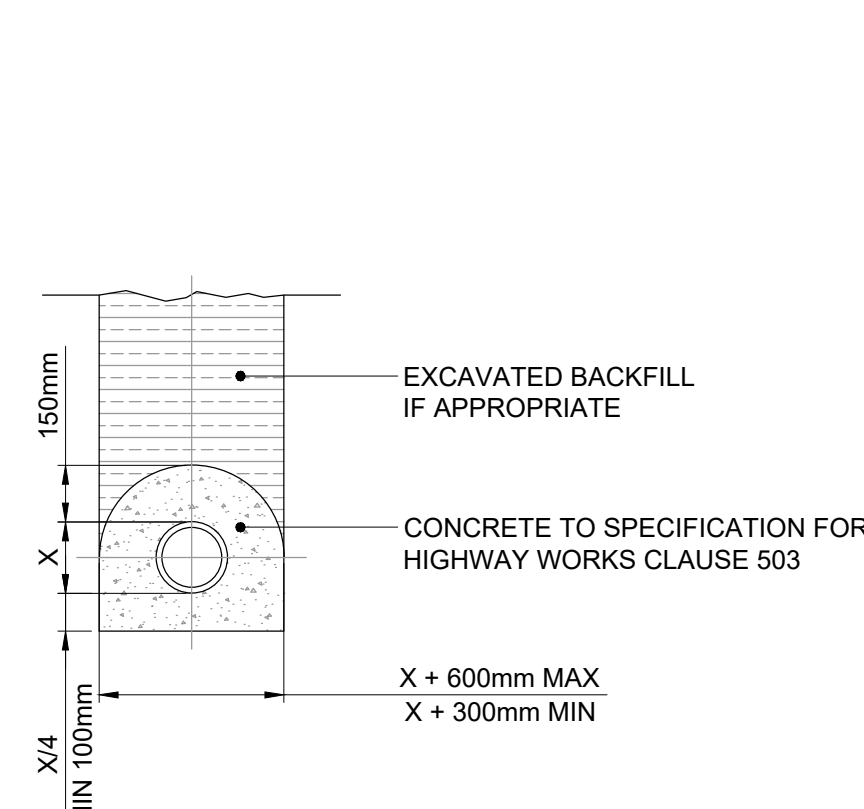
TYPICAL TURTLE ENVIRO CATCHPIT DETAIL
CATCHPIT CHAMBER IN SOFT LANDSCAPED AREAS
SCALE 1:20



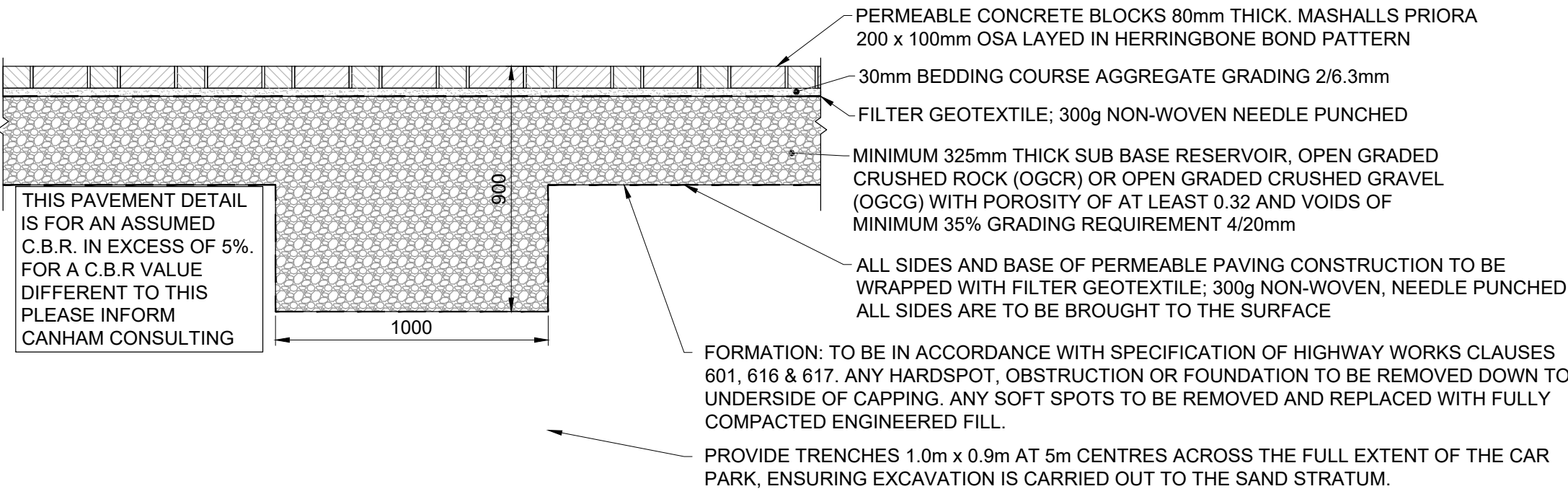
PIPE RUNS NEAR BUILDINGS
NOT TO SCALE



CLASS S BEDDING (PIPES UP TO 600mm)
PIPES WITH VEHICLE LOADING
NOT TO SCALE



**CLASS Z BEDDING
(PIPES UP TO 600mm)**
PIPES WITH VEHICLE LOADING
NOT TO SCALE



PERMEABLE PAVING DETAIL
SCALE 1:20

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P02	12.03.26	DETAILS REVISED IN LINE WITH LAYOUT	OG	MH	
P01	25.06.24	PRELIMINARY ISSUE	SAH	MH	
rev	date	details	drawn	checked	



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CARING HOMES GROUP

architect

OLIVER + ROBB ARCHITECTS

project

GUYSFIELD CARE HOME, WILLIAN ROAD, WILLIAN

title

DRAINAGE CONSTRUCTION DETAILS
SHEET 1 OF 2

CCL ref:

213692

status:

S3 - SUITABLE FOR REVIEW & COMMENT

drawing number

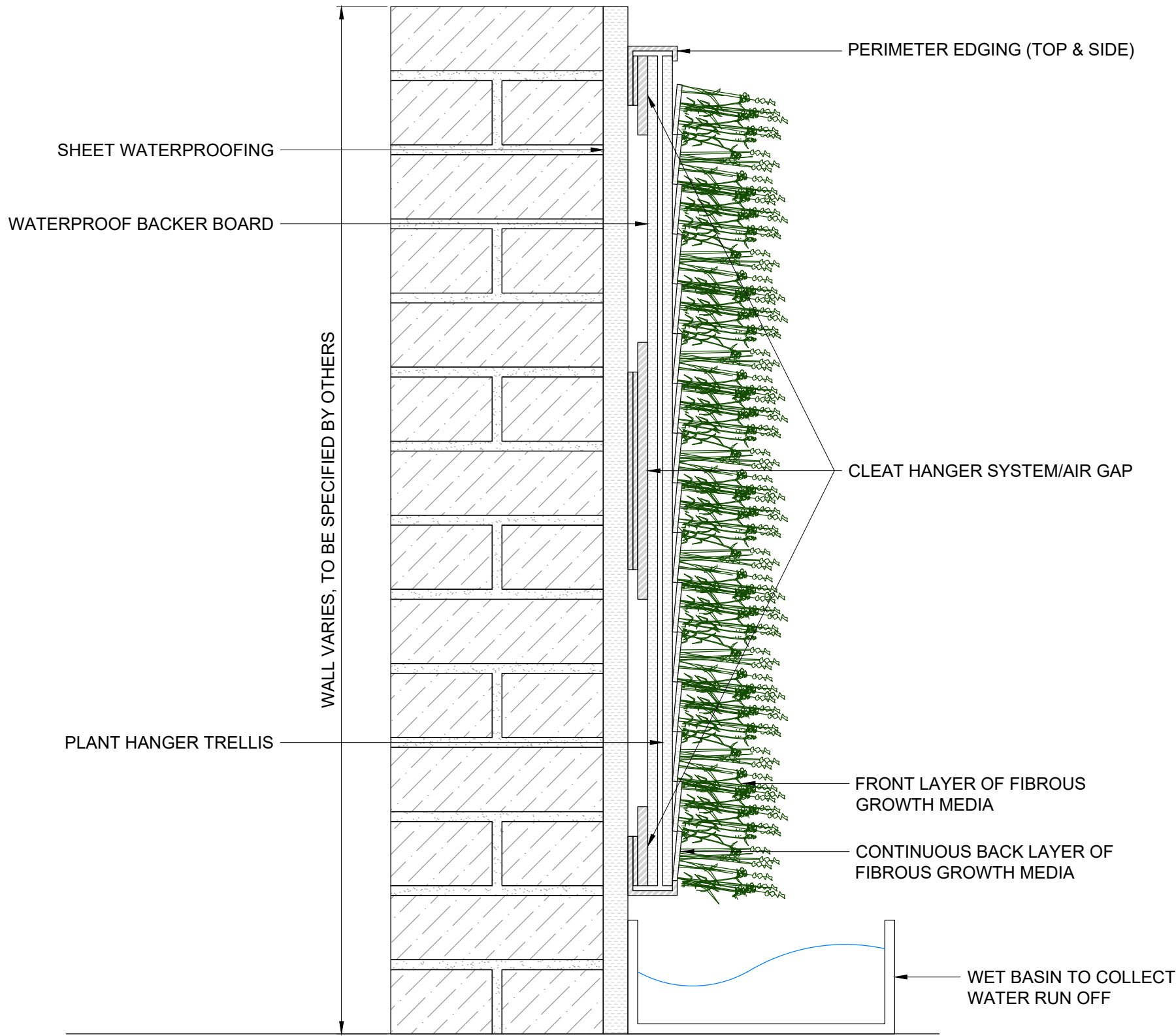
GCH-CCL-XX-XX-DR-C-0005

revision

P02

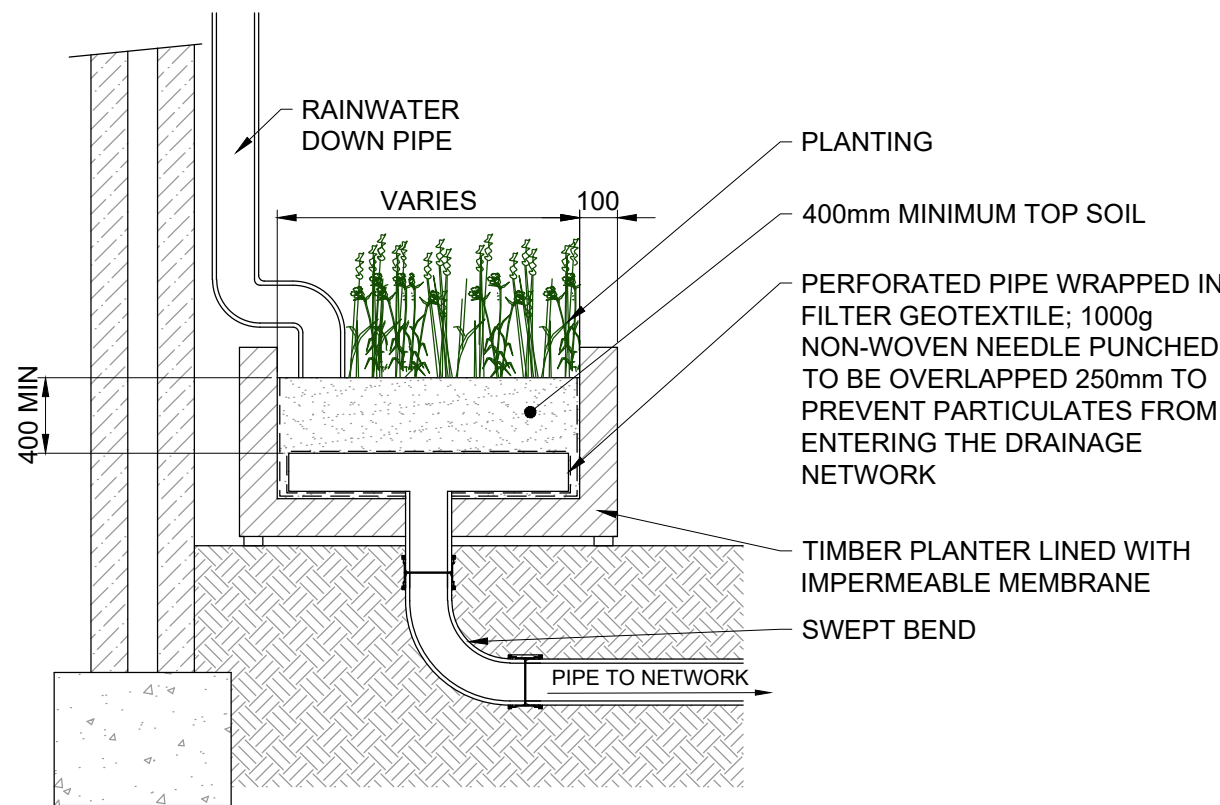
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GREEN WALL CONSTRUCTION DETAIL:

SCALE: 1:5m



RAINWATER PLANTER DETAIL

NOT TO SCALE

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P01	12.03.26	PRELIMINARY ISSUE	OG	MH
rev	date	details	drawn	checked



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title

DRAINAGE CONSTRUCTION DETAILS
SHEET 2 OF 2

CCL ref: 213692 OG MH AS SHOWN A1 (L) 12.03.2026

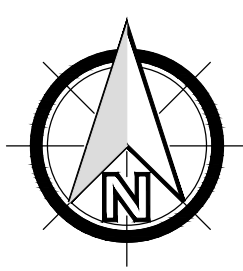
status: S3 - SUITABLE FOR REVIEW & COMMENT

drawing number: GCH-CCL-XX-XX-DR-C-0006 revision: P01

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Appendix H Exceedance Flow Plan



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LEGEND

→ EXCEEDANCE FLOW DIRECTION

P03	25.06.24	SITE LAYOUT UPDATED	SAH	MH
P02	05.06.20	SITE LAYOUT UPDATED	JDP	DR
P01	27.09.19	PRELIMINARY ISSUE	MH	MR
rev	date	details	drawn	checked



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architect
OLIVER + ROBB ARCHITECTS

project
GUYSFIELD CARE HOME, WILLIAN ROAD, WILLIAN

title
EXCEEDANCE FLOW PLAN

CCL ref:	drawn	design	checked	scale	size	date
213692	MH	MH	MR	1:250	A1 (L)	27.09.2019

status:
S0 - WORK IN PROGRESS

drawing number	revision
GCH-CCL-XX-XX-DR-C-0003	P03

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SCALE 1:250m
SCALE BAR FOR INFORMATION ONLY

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Appendix I

Maintenance Strategy



Canham
Consulting

Maintenance Strategy

Project Ref: 213692
Document Ref: 213692-CCL-XX-00-01015
Site: Guysfield Care Home, Willian Road, Willian, NR Letchworth, Herts, SG6 2AB
Client: Caring Homes Ltd
Prepared By: Matthew Herring MEng CEng MICE
Date of Report: 1st October 2026
Revision: P02
Status Code: S3

Document Issue Record

The table below provides a record of document issue and revision history:

Revisions					
Rev	Description	Prepared By	Checked By	Approved By	Date
P1	Approval	MH	JL	MR	12/03/26
P2	Location Plan Added	OG	JL	MH	01/10/26

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3	SUMMARY OF DESIGN INTENT	6
4	INSPECTIONS	7
5	OPERATION AND MAINTENANCE REQUIREMENTS FOR PERMEABLE PAVING.....	8
6	OPERATION AND MAINTENANCE REQUIREMENTS FOR SOAKAWAY	9
7	OPERATION AND MAINTENANCE REQUIREMENTS FOR CHANNEL DRAINS.....	10
8	OPERATION AND MAINTENANCE REQUIREMENTS FOR CATCHPIT	11
9	OPERATION AND MAINTENANCE REQUIREMENTS FOR PIPES	12
10	OPERATION AND MAINTENANCE REQUIREMENTS FOR RAINWATER PLANTERS.....	13
11	OPERATION AND MAINTENANCE REQUIREMENTS FOR GREEN WALLS	14
12	EMERGENCY ACTION IN CASE OF SPILLAGES	15

Appendices

- Appendix A - Drainage Features Location Plan
- Appendix B - SuDS Maintenance Inspection Checklist

1 INTRODUCTION

This SuDS Operation and Maintenance Strategy has been produced in line with the recommendations of the CIRIA SuDS Manual (C753) and includes a number of extracts from that document.

For further information please refer to the full document, which can be downloaded free of charge at:

http://www.ciria.org/Resources/Free_publications/SuDS_manual_C753.aspx

In addition to the recommendations in this manual, please also refer to the specific maintenance guidelines provided by the manufacturers of any proprietary products that have been used in the construction of the SuDS.

2 SUDS COMPONENTS WITHIN THE DEVELOPMENT

The development contains a number of SuDS components that will require on-going inspection and maintenance. The primary components are as follows:

- **Permeable Paving** (a surface suitable for pedestrian and/or vehicular traffic, that provides a treatment medium and allows rainwater to be temporarily stored and infiltrate into the ground);
- **Soakaway** (below ground structures, designed to promote infiltration);
- **Channel Drain** (grated opening in the road surface to collect rain water);
- **Catch Pit** (chambers to facilitate the collection of sediment);
- **Pipes** (used to convey water within the drainage network)
- **Rainwater Planter** (manage and filter rainwater)
- **Green Wall** (living wall, provides attenuation and treatment of rainwater)

3 SUMMARY OF DESIGN INTENT

The proposed development is for the demolition of an existing residential care home and the construction of a new care home. The proposed access road and parking spaces will be constructed from permeable paving which will treat and infiltrate the surface water associated with these areas. The proposed roof water will discharge to a soakaway in the south of the site. A catchpit will be located immediately upstream of the soakaway.

Rainwater planters and a green wall will be included alongside these elements.

4 INSPECTIONS

As part of the on-going management of most SuDS components there is a need for regular inspections to ensure that blockages, silt and excess litter are not adversely affecting the component or scheme. It is important that this is carried out and time is allowed for corrective action to be taken.

Routine inspections should be carried out once a month for most components, particularly for the first year after installation. This frequency can then be reviewed (and if appropriate reduced). It is proposed that Caring Homes Group or a maintenance company operating on their behalf will maintain the proposed permeable paving and all other SuDS associated with the proposed development.

Recurring attendance by the same person ensures monitoring of the drainage system, a rapid response to problems and “ownership” of the SuDS components. The inspections should be recorded on a maintenance record.

5 OPERATION AND MAINTENANCE REQUIREMENTS FOR PERMEABLE PAVING

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

6 OPERATION AND MAINTENANCE REQUIREMENTS FOR SOAKAWAY

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly.
	Debris removal from catchment surface (where may cause risks to performance)	Monthly.
	Where rainfall infiltrates into blocks from above, check surface of filter for blockage by silt, algae or other matter. Remove and replace surface infiltration medium as necessary.	Monthly (and after large storms).
	Remove sediment from pre-treatment structures.	Annually, or as required.
Remedial Actions	Repair/rehabilitation of inlets, outlets, 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 and after large storms.

7 OPERATION AND MAINTENANCE REQUIREMENTS FOR CHANNEL DRAINS

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Removal of litter and debris.	6 monthly.
Occasional Maintenance	Jetting of system	As required.
	Removal of sediment, oil, grease and floatables.	As required.
Remedial Actions	Clear pipework blockages.	As required.
Monitoring	Inspect for evidence of poor operation.	Six monthly.
	Inspect system and establish appropriate replacement frequencies.	Six monthly.
	Inspect sediment accumulation rates and establish appropriate replacement frequencies.	Monthly during first half year of operation, then every six months.

8 OPERATION AND MAINTENANCE REQUIREMENTS FOR CATCHPIT

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Removal of litter and debris.	6 monthly.
Occasional Maintenance	Change of filter media.	As required.
	Removal of sediment, oil, grease and floatables.	As required.
Remedial Actions	Clear perforated pipework blockages.	As required.
Monitoring	Inspect for evidence of poor operation.	Six monthly.
	Inspect filter media and establish appropriate replacement frequencies.	Six monthly.
	Inspect sediment accumulation rates and establish appropriate replacement frequencies.	Monthly during first half year of operation, then every six months.

9 OPERATION AND MAINTENANCE REQUIREMENTS FOR PIPES

The drainage network has been designed to ensure the pipes are at self-cleansing velocities. However maintenance measures are still prudent and the below table shows the suggested inspection and maintenance requirements.

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove debris or silt from the system	Annually, or as required
Remedial Actions	High pressure jetting to clean pipe network	As required
Monitoring	Inspect catchpits and chambers for silt build-up	Monthly for 3 months, then annually

10 OPERATION AND MAINTENANCE REQUIREMENTS FOR RAINWATER PLANTERS

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Inspect and identify any areas 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)	3 Monthly
	Remove sediment from pre-treatment structures	Annually (or as required)
Remedial Actions	Repair/rehabilitation of inlets, outlets, 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

11 OPERATION AND MAINTENANCE REQUIREMENTS FOR GREEN WALLS

The maintenance for the green wall element will be maintained in line with the manufacturer requirements. This is expected to entail the following:

Regular inspection to ensure plant health on monthly basis and pruning/removal of dead matter where needed.

Inspection and testing of irrigation systems to ensure no leakage, blockage or build-up of algae. Frequency – 3-monthly.

Check drainage systems to ensure they are in good working order. Frequency – 3 monthly.

12 EMERGENCY ACTION IN CASE OF SPILLAGES

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 substances that are known to be harmful to the environment should be removed where possible using soak mats as recommended by the Environment Agency, with residual spillage allowed to bioremediate in the drainage system.

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

Contact the Environment Agency immediately on the following number.

24-hour incident hotline – 0800 80 70 60

Or if less urgent contact the regional office:

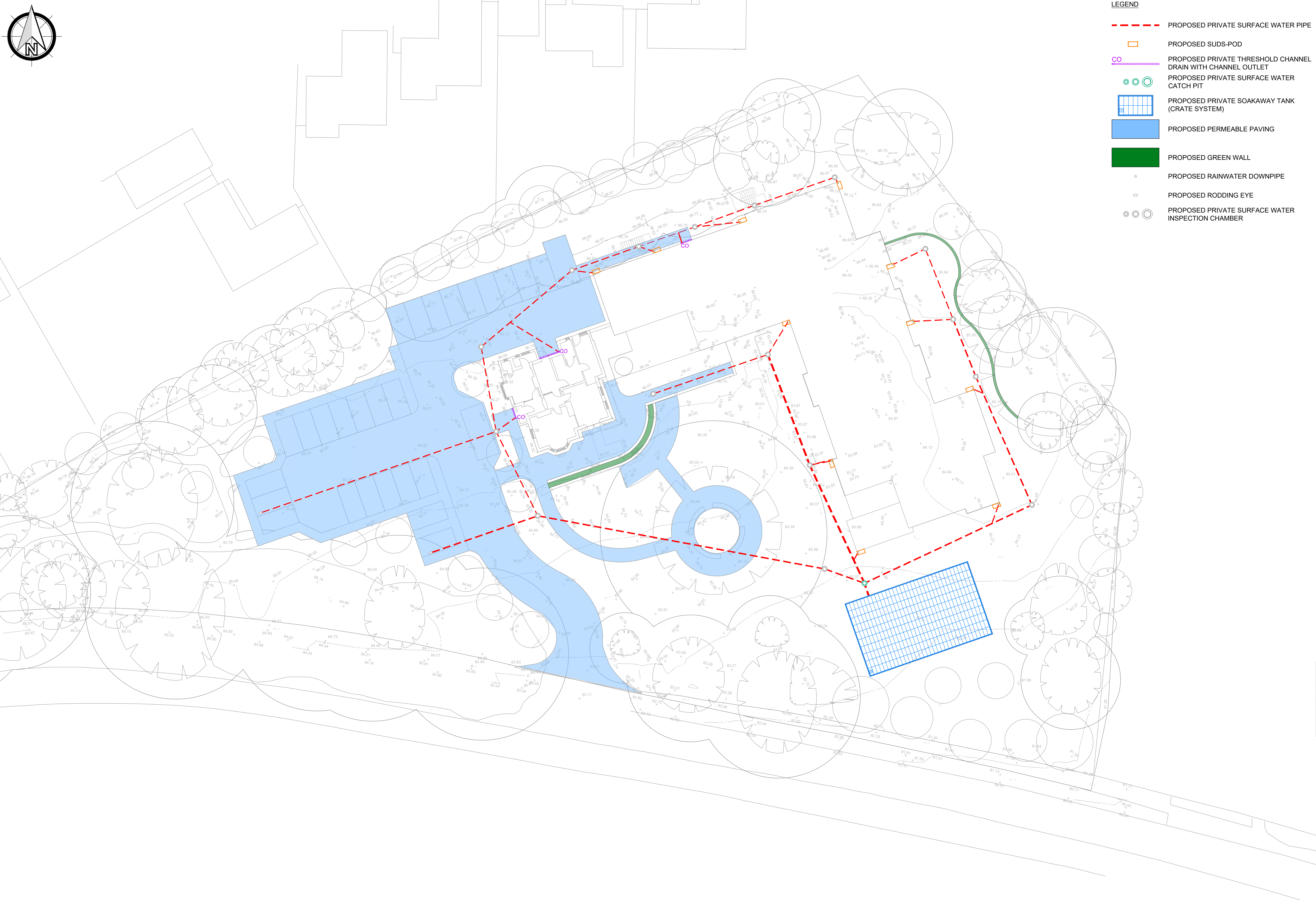
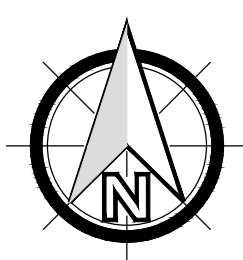
Iceni House, Cobham Road, Ipswich, Suffolk, IP3 9JD. Tel. 03708506506

Queries regarding a design feature – In the event of a concern or failure of a SuDS design feature contact:

Canham Consulting
Second Floor, 69-75 Thorpe Road, Norwich, NR1 1UA
T: (01603) 430650
E: clientservice@canhamconsulting.co.uk
W: www.canhamconsulting.co.uk

Appendices

Appendix A
Drainage Features Location Plan



- LEGEND**
- PROPOSED PRIVATE SURFACE WATER PIPE
 - PROPOSED SUDS-POD
 - PROPOSED PRIVATE THRESHOLD CHANNEL DRAIN WITH CHANNEL OUTLET
 - PROPOSED PRIVATE SURFACE WATER CATCH PIT
 - PROPOSED PRIVATE SOAKAWAY TANK (CRATE SYSTEM)
 - PROPOSED PERMEABLE PAVING
 - PROPOSED GREEN WALL
 - PROPOSED RAINWATER DOWNPIPE
 - PROPOSED RODDING EYE
 - PROPOSED PRIVATE SURFACE WATER INSPECTION CHAMBER

- PLANNING GENERAL NOTES:**
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 - THE INFORMATION SHOWN DOES NOT CONSTITUTE TECHNICAL APPROVAL FROM THE RELEVANT AUTHORITIES AND COULD BE SUBJECT TO CHANGING POST PLANNING.

- PRIVATE DRAINAGE NOTES:**
- ALL PIPES BELOW GROUND TO BE 100mm DIAMETER (UNLESS NOTED OTHERWISE).
 - ALL FOUL DRAINS BELOW FLOOR SLABS TO BE 100mm DIAMETER AND LAID AT MINIMUM GRADIENT OF 1:40 (UNLESS NOTED OTHERWISE).
 - ANY DRAIN BRANCH CONNECTED TO A W.C. WITH NO SVP IS TO BE FITTED WITH A DURGO VALVE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
 - ALL PIPE GRADIENTS TO BE IN ACCORDANCE WITH THE BUILDING REGULATIONS APPROVED DOCUMENT H.
 - ALL MATERIALS, WORKMANSHIP, ETC, TO COMPLY WITH BUILDING REGULATIONS.
 - INSPECTION CHAMBERS TO BE WAVIN 450 IC RANGE, OR SIMILAR APPROVED.
 - THE LOCATION, NUMBER AND SIZES OF ALL SOIL VENT PIPES, STUB STACKS & RAINWATER DOWNPIPES ARE TO BE CONFIRMED BY OLIVER + ROBB ARCHITECTS.
 - PRIVATE CONNECTIONS TO THE ADOPTABLE SEWERS TO BE LAID SOFFIT TO SOFFIT. NO PLASTIC PIPES ARE TO BE CONNECTED TO ADOPTABLE MANHOLES. ALL CONNECTIONS TO THE PUBLIC SEWER MUST BE CONSTRUCTED IN VITRIFIED CLAY PIPES.

P01	01.10.26	PRELIMINARY ISSUE		OG	MH
rev	date	details		drawn	checked



Structural Engineers **Civil Engineers** **Building Surveyors**

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client
CARING HOMES GROUP

architect
OLIVER + ROBB ARCHITECTS

project
GUYSFIELD CARE HOME, WILLIAN ROAD, WILLIAN

title
DRAINAGE FEATURES:
LOCATION PLAN

CCL ref: 213692
drawn: OG
design: MH
checked: MH
scale: 1:250
size: A1 (L)
date: 01.10.2026

status:
S3 - SUITABLE FOR REVIEW & COMMENT

drawing number: GCH-CCL-XX-XX-DR-C-1250
revision: P01

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THIS DRAWING IS FOR PRELIMINARY PURPOSES ONLY AND MUST NOT BE READ AS A CONSTRUCTION ISSUE.
IT INDICATES DESIGN INTENT ONLY AND IS SUBJECT TO AMENDMENT DURING FINAL DESIGN DEVELOPMENT.

SCALE 1:250m
SCALE BAR FOR INFORMATION ONLY

Appendix B
SuDS Maintenance Inspection Checklist

Project Name: Guysfield Care Home, Willian Road, Willian, NR Letchworth, Herts, SG6 2AB

CCL Ref: 213692

Maintenance Strategy | P1

Appendix A – SuDS Maintenance Inspection Checklist								
General Information								
Site ID								
Site location and co-ordinates (GIS if appropriate)								
Elements forming the SuDS scheme			Approved drawing reference(s)					
Inspection frequency			Approved specification reference					
Type of development			Specific purpose of any parts of the scheme (eg biodiversity, wildlife and visual aspects)					
Inspection date								
	Details	Y/N	Action required	Date completed	Details	Y/N	Action required	Date completed
General inspection items								
Is there any evidence of erosion, channelling, ponding (where not desirable) or other poor hydraulic performance?								
Is there any evidence of accidental spillages, oils, poor water quality, odours or nuisance insects?								
Have any health and safety risks been identified to either the public or maintenance operatives?								
Is there any deterioration in the surface of permeable or porous surfaces (eg rutting, spreading of blocks or signs of ponding water)?								

Project Name: Guysfield Care Home, Willian Road, Willian, NR Letchworth, Herts, SG6 2AB

CCL Ref: 213692

Maintenance Strategy | P1

Silt/sediment accumulation								
Is there any sediment accumulation at inlets (or other defined accumulation zones such as the surface of filter drains or infiltration basins and within proprietary devices)? If yes , state depth (mm) and extent. Is removal required? If yes , state waste disposal requirements and confirm, that all waste management requirements have been complied with (consult environmental regulator)								
Is surface clogging visible (potentially problematic where water has to soak into the underlying construction or ground (eg underdrained swale or infiltration basin)?								
Does permeable or porous surfacing require sweeping to remove silt?								
System blockages and litter build-up								
Is there evidence of litter accumulation in the system? If yes , is this a blockage risk?								
Is there any evidence of any other clogging or blockage of outlets or drainage paths?								
Vegetation								
Is the vegetation condition satisfactory (density, weed growth, coverage etc)? (Check against approved planting regime.)								
Does any part of the system require weeding, pruning or mowing? (Check against maintenance frequency stated in approved design.)								
Is there any evidence of invasive species becoming established? If yes , state action required								
Infrastructure								
Are any check dams or weirs in good condition?								

Project Name: Guysfield Care Home, Willian Road, Willian, NR Letchworth, Herts, SG6 2AB

CCL Ref: 213692

Maintenance Strategy | P1

Is there evidence of any accidental damage to the system (eg wheel ruts?)								
Is there any evidence of cross connections or other unauthorised inflows?								
Is there any evidence of tampering with the flow controls?								
Are there any other matters that could affect the performance of the system in relation to the design objectives for hydraulic, water quality, biodiversity and visual aspects? (Specify.)								
Other observations								
Information appended (eg photos)								
Suitability of current maintenance regime								
Continue as current								
Increase maintenance								
Decrease maintenance								
Next inspection								
Proposed date for next inspection								



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Appendix J

Construction Surface Water Management Plan



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Construction Surface Water Management Plan

Project Ref: 213692
Document Ref: 213692-CCL-XX-00-01020
Site: Guysfield Care Home, Willian Road, Willian, NR Letchworth, Herts, SG6 2AB
Client: Caring Homes Ltd
Prepared By: Matthew Herring MEng CEng MICE
Date of Report: 22nd July 2026
Revision: P02
Status Code: S3

Document Issue Record

The table below provides a record of document issue and revision history:

Revisions					
Rev	Description	Prepared By	Checked By	Approved By	Date
P1	Preliminary Issue	MH	JL	MR	26/03/26
P2	Construction Details Added	OG	MH	MH	22/07/26

Contents

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2 POTENTIAL IMPACTS..... 5

3 PROGRAMME OF WORKS 6

4 RESPONSIBILITY AND MONITORING 8

5 COMPLETION 9

Appendices

- Appendix A - Topographic Survey
- Appendix B - Construction Details
- Appendix C - Monitoring and Recording Sheet

1 INTRODUCTION

Canham Consulting Ltd have been commissioned by Caring Homes Group to produce a Construction Surface Water Management Plan (CSWMP) to support the outcome of planning permission ref 24/02758/FP relating to the development of the Guysfield Residential Care Home. The proposed development intends to demolish an existing care home located onsite and construct a new care home alongside retention of an existing building; with refurbishment and new build forming the overall care home facility. A plan of the development can be found in Appendix A.

1.1 Planning Approval/Conditions

Planning was approved for permission reference 24/02758/FP and this CSWMP addresses the following Planning Condition 28.

28. Development shall not commence until details and a method statement for interim and temporary drainage measures during the demolition and construction phases have been submitted to and approved in writing by the Local Planning Authority.

This information shall provide full details of who will be responsible for maintaining such temporary systems and demonstrate how the site will be drained to ensure there is no increase in the off-site flows, nor any pollution, debris and sediment to any receiving watercourse or sewer system. The site works and construction phase shall thereafter be carried out in accordance with approved method statement, unless alternative measures have been subsequently approved by the Planning Authority.

2 POTENTIAL IMPACTS

The following have been identified as potential aspects which could give rise to impacts on the surface water drainage system caused by the construction process:

- During site setup and clearance, removing existing debris from the site can change the characteristic drainage routes short term.
- Drainage works including excavation, installation and removal can expose buried soils and potentially contaminants.
- Construction materials handling, including the storage and use of fuels and oils.
- Handling of potentially polluting silt-laden run-off and excavation dewatering from construction activities and site compounds.
- Spillage or uncontrolled release of potentially polluting material such as cement, concrete, diesel, hydraulic fluid or paint.
- Silty water can arise from earthworks, exposed groundwater collecting in excavations, stockpiled materials, plant and wheel washing facilities and site roads. As such, there is potential for polluted drainage from the construction activities to enter the existing watercourses, particularly during the initial earthwork stages of the scheme.
- Other pollutants, such as construction chemicals or fuels may be carried in the drainage. Unless managed appropriately the pollutants, including sediment, could be washed into surface water sewers and from there into the local waterways resulting in contamination. Sediment deposited in the sewer system can result in restriction to the sewer pipes and reduce capacity flow, causing blockages and the potential for discharge and pollution.

3 PROGRAMME OF WORKS

Site Setup

Ahead of earthworks on site, a review of site topography will be carried out, and consideration will be given to bunding low-lying areas of the site or providing temporary swales to ensure the designated drainage plans are followed and to eliminate/minimise the potential for pollution of existing watercourses, thereby preventing overland flow to Willian Road.

During Construction Works

Before the new drainage system is installed, there is the potential for uncontrolled surface water run-off from the site. To mitigate against surface water flooding during construction activities, the proposed surface water strategy comprises a scheme of permeable surfacing, pipework and a soakaway draining to the ground via infiltration.

During the early construction phase, the surface water drainage outlets will have straw bales wrapped with a geotextile placed in front to filter the water. The bales will be inspected regularly, with additional inspections during periods of heavy rainfall. The straw bales will enable the sediment build-up to be easily monitored, and any required sediment removal activities will be concentrated in a smaller area, therefore preventing damage and reducing the risk of pollution/sedimentation to the system.

Temporary surface water drainage measures will be implemented to ensure there is no "run off" onto Willian Road or neighbouring sites and to reduce pollutants from flowing off-site or into groundwater during the course of construction. If necessary, temporary drainage measures could include creating adequate temporary lined trenches or bunds to ensure surface water remains on site.

The contractor will establish a Construction Site Plan showing compound, parking and site-specific construction surface water drainage proposals; this has the potential to change through construction.

Should any works lead to temporary excessive surface water ponding, submersible pumps are within the contractor's standard equipment list and available at short notice to disperse any ad-hoc ponding. Measures to control surface water will be reviewed regularly and could include the use of lined soil trenches or bunds, straw bales, and trapped road gullies.

Installation of New Drainage System

The groundworkers will be made aware of the importance of installing permanent drainage, and this will be reflected within the roads and sewers programme.

The initial construction works will install the drainage network and the storage provision, and in the unlikely event of on-site flooding, temporary gullies can be connected into an established system. The installation of the surface water drainage network will therefore be undertaken at the early stages of the construction project, which will enable the capture of surface water run-off.

The solution means draining into the soakaway on site, and once established, surface water will discharge into this, and this will help to mitigate any impact on any existing sewers or watercourses both on and off site.

Pavement Installation

The pavement, car park and road areas will be constructed up to subbase and base level during the construction period and then surfaced at completion.

Emergency Spill Kits

Spill kits will be positioned on site and will be relocated to be adjacent to any diesel/oil storage and at a close distance to any concrete wash out/wheel wash areas as the development progresses. Any oil storage will be bunded in line with industry standards.

Operatives having access to the kits will have received training on the use of the spill kits to contain any type of potentially environmentally harmful spill.

Construction Specific Surface Water Control Measures

Waste materials shall be removed from site at the earliest opportunity and not stored unnecessarily on site.

Initially, the temporary foul effluent from the welfare facilities shall be removed from site by an approved waste disposal company or connected to the main site-wide foul water drainage system.

Prevention of Pollution from Plant and Machinery

The contractor will promote a clean working environment to avoid pollution. Site diesel tanks will be bunded and lined. Drip trays will be used on all static plant and machinery to prevent leakage/contamination of the ground. Emergency spill kits are standard on site and operatives having access to the kits will have received training on their use to contain any type of potentially environmentally harmful spill.

To prevent materials leaking from static plant, such as pumps and generators, contaminating the ground and being washed into the existing watercourse, all static plant will be placed on drip trays.

Fuel tanks on site will be bunded and lined. The tanks will be protected from vandalism and unauthorised interference and turned off and locked when not in use.

Spill kit locations have been covered earlier in the document but will include vehicle refuelling and plant parking areas.

COSHH – Chemical Control Measures and Pollution Prevention

There are designate storage areas for plant, materials, waste, flammable substances. Safety Data Sheets and pollution prevention measures will be reviewed and discussed with site workers. Control equipment (PPE) will be provided.

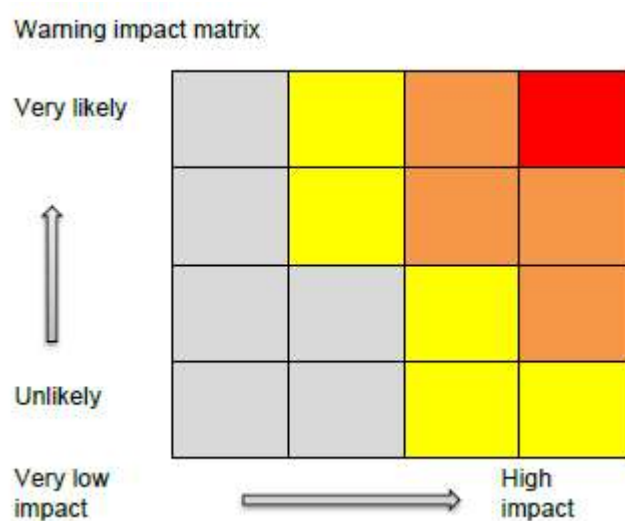
4 RESPONSIBILITY AND MONITORING

During the construction phase, the principal contractor will be responsible for setting the control systems in place, with regular monitoring and with a 24hr on call emergency contact. This is in accordance with the CDM regulations.

Monitoring of the system during construction will continue and silt/pollutants removed as appropriate to ensure a clean flow of water is maintained.

Any sediment/pollutants removed will be disposed of to a designated waste management facility.

The Met Office Weather Matrix will be used as a reference tool for weather warning impacts and to allow planning for all eventualities. Site will be made aware of the warning colours (yellow, amber and red) and procedures to follow based on the warning status.



The site will sign up to receive official severe weather warnings, so that in the event of extreme wind or rain, tasks that have the potential to cause sedimentation/pollution are postponed.

5 COMPLETION

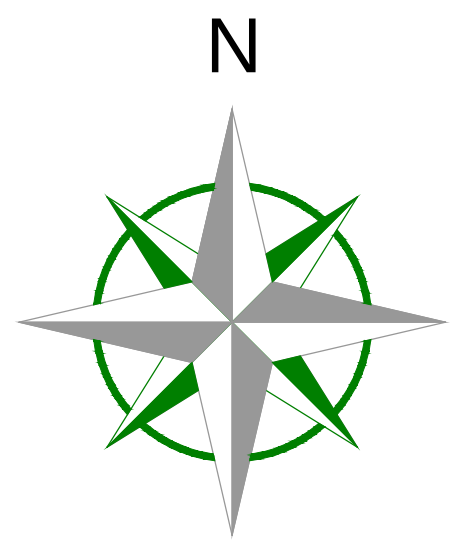
Before final completion, the new drainage system will be inspected, and CCTV surveyed to ensure any debris has been removed, so the drainage system can function as designed.

Any remedial works will need to be carried out in line with the maintenance period of the building, unless they pose a flood risk and will need to be resolved immediately.

The contractor will take overall responsibility for the maintenance of the temporary and permanent installed drainage system until the site is handed over to Caring Homes Ltd on completion. The contractor will take full responsibility and ensure there is no impact off site.

Appendix A

Topographic Survey



Station Information:

Station	Easting (m)	Northing (m)	Level (m)
GH1	522044.655	230673.893	85.678
GH2	522150.146	230668.081	82.892
GH3	522246.409	230639.130	79.078
GH4	522154.606	230694.799	84.728
GH5	522122.107	230716.101	86.645

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

OS Buildings  Surveyed Buildings 

This survey has been orientated to the Ordnance Survey (OS) National Grid OSG836(15) via Global Navigation Satellite Systems (GNSS) and the O.S. Active Network (OS Net).

A true OSG836 coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models.

The survey has been conducted to this point and a further one or more OSG836 (15) points established to create a true O.S. bearing for angle orientation.

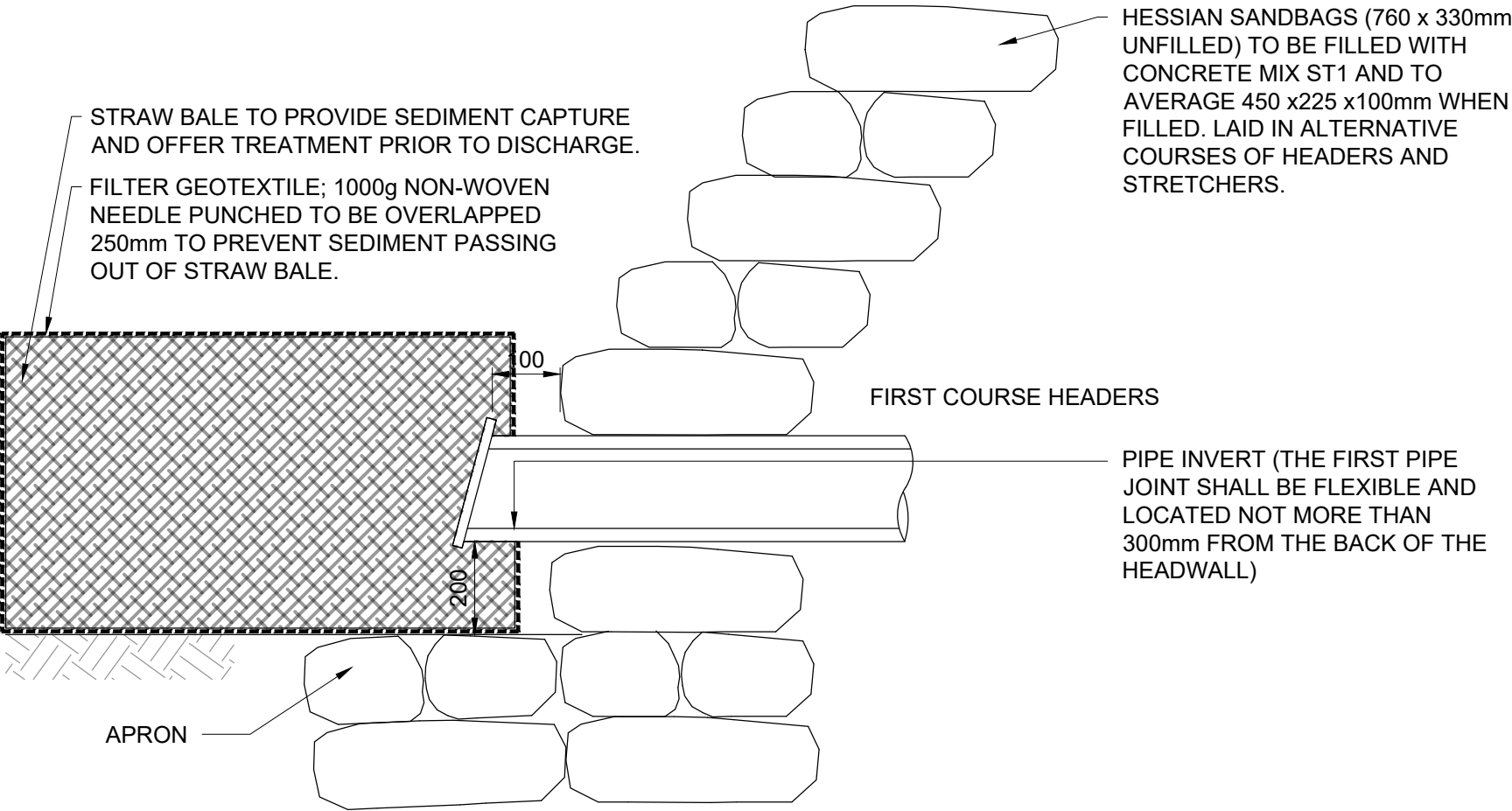
No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.
Please refer to Survey Station Table to enable establishment of the on-site grid and datum.

Legend:

	Overhead Cable	IC	IC	IC	IC
	Concrete edge	Play	Play	Play	Play
	Grass	Gr	Gr	Gr	Gr
	Gravel	Dg	Dg	Dg	Dg
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
	Gravel	Gr	Gr	Gr	Gr
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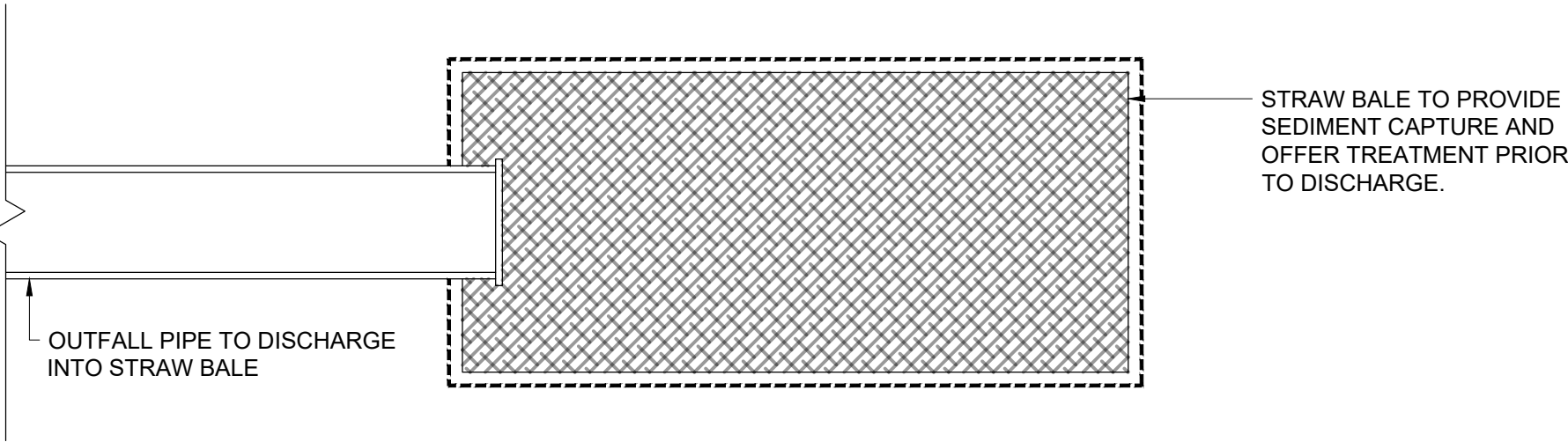
Appendix B

Construction Details



PIPE DISCHARGING INTO SWALE FROM BAGGED HEADWALL

NOT TO SCALE



OUTFALL PIPE DISCHARGING INTO STRAW BALE

SCALE: 1:10

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rev	date	details	drawn	check



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Appendix C

Monitoring and Recording Sheet

213692 - Guysfield Care Home

**Construction Surface Water Management Plan
Monitoring & Maintenance Record Sheet**

Site	Guysfield Care Home Drainage Installation				Site Manager	TBC
Monitoring Point/location	Frequency	Inspection Date	By Whom	Comments/Findings	Maintenance Required	Action Date
Bund/Trench	Weekly					
Temporary Roads	Weekly					
Pipework/Sediment Traps	Weekly					
Adjacent Site Watercourses	Weekly					
Adjacent Site Highways	Weekly					
Site Boundary	Monthly					



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