

BDW North Thames

Land at Talbot Way, Letchworth

Drainage Technical Note

**Report Ref:
2502330-ACE-XX-XX-RP-C-0301**

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REV	ISSUE PURPOSE	AUTHOR	CHECKED	APPROVED	DATE
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Distribution

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1.0 Introduction

Scope

- 1.1. Ardent Consulting Engineers, hereafter referred to as 'Ardent', has been appointed by BDW North Thames to provide a Drainage Strategy and Drainage Technical Note in support of a reserved matters planning application for a residential development comprising 120 units.
- 1.2. The site benefits from outline planning, ref; 21/00504/OP. This report has been prepared to demonstrate a suitable drainage strategy can be implemented for the site.

Development Proposals

- 1.3. The development proposals seek Reserved Matters permission for a residential development of comprising 120 residential units (40% affordable) including detailed appearance, landscaping, layout and scale in line with the approved outline application (ref. 21/00504/OP) and the design principles within the LGCHF LG3 Design Framework. Refer to **Figure 1-1** for an extract of the site layout and to **Appendix A** for the full plan.



Figure 1-1: Extract of Site Layout (HTA Architects Ltd.)

- 1.4. A vehicular access point and pedestrian access to the development are proposed off Flint Road to the south of the development. Two pedestrian accesses are proposed to the north of the development off the existing public right of way. A vehicular access to the existing allotments on the west of the site.
- 1.5. The total application area of the site is approximately 5.54ha, while the net developable area is circa 3.63 ha.

Planning Background

- 1.6. Outline planning has been granted conditional permission in April 2025 with all matters reserved except access, for a *"residential development comprising of up to 120 dwellings with vehicular access via Flint Road"*.
- 1.7. The outline planning application was supported by a Flood Risk Assessment (FRA) and Drainage Strategy produced by Environmental Protection Group Ltd. (EPG), both dated January 2023. The proposed drainage strategy prepared by Ardent in support of the Reserved Matters application aligns with the principles established in the approved Outline FRA. Any deviations from the outline strategy have been clearly communicated and represent improvements to the overall design.
- 1.8. The Outline Planning conditions relevant to the drainage proposals are Conditions 3, 4, 6, and 7. Condition 5 relates to temporary drainage and is therefore included within the scope of temporary works and is excluded from this statement. The former conditions are outlined below:

1.8.1. Condition 3: *Prior to commencement of development, in accordance with the submitted Surface Water Management Drainage Strategy by EPG (Revisions 2.0, January 2023, ref: EPG-9262-DS-01) and additional information prepared by EPG (dated 25th April 2023, ref: EPG-LGC-LTR-04), detailed designs of a surface water drainage scheme, incorporating the following measures shall be submitted to and approved by the Local Planning Authority:*

(a) Detailed infiltration testing in accordance with BRE Digest 365 (or equivalent) OR if infiltration is proven to be unfavourable, then surface water runoff rates will be attenuated and restricted to greenfield rates (no greater than 8l/s) and will discharge to the Anglian Water sewer in Flint Road;

(b) Detailed designs, modelling calculations and plans of the drainage conveyance network (including engineering drawings of all SuDS elements) in the: -50%

annual probability critical rainfall event to show no surcharging of the drainage network;

- 3.33% annual probability critical rainfall event plus climate change to show no above ground flooding on any part of the site;

- 1% annual probability critical rainfall plus climate change event to show, if any, the depth, volume and storage location of any above ground flooding from the drainage network 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.

(c) Half drain down times for any infiltration SuDS features to demonstrate that they are able to half drain within 24 hours. Attenuation features should be able to half drain in 24-48 hours.

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

(e) Finished ground floor levels of properties are a minimum of 300mm above expected flood levels of all sources of flooding or 150mm above ground level, whichever is the more precautionary.

(f) A plan showing exceedance flow routes within and off site above the 1% AEP (plus climate change) storm event.

The approved scheme shall be implemented prior to the first occupation of the development.

Reason: To ensure the flood risk is adequately addressed for each new dwelling and not increased in accordance with NPPF Paragraphs 167 and 169 and Policy NE7 of the North Hertfordshire Local Plan 2011-2031.

1.8.2. Condition 4: *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 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:

- (a) A timetable for its implementation;*
- (b) Details of SuDS features and connecting drainage structures and maintenance requirement for each aspect;*
- (c) 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.*

Reason: To ensure that the development achieves a high standard of sustainability and ensure the flood risk is adequately addressed for each new dwelling and not increased in accordance with Policies NE7 and NE8 of the North Hertfordshire Local Plan 2011-2031.

1.8.3. Condition 6: *No works involving excavations that penetrate into the chalk aquifer below the groundwater table (for example, piling or the installation of a geothermal open/closed loop system) system shall be carried out until the following has been submitted to and approved in writing by the Local Planning Authority:*

- (i) An Intrusive Ground Investigation to identify the current state of the site and appropriate techniques to avoid displacing any shallow contamination to a greater depth.*
- (ii) A risk assessment identifying both the aquifer and the abstraction points as potential receptors of contamination.*
- (iii) A method statement detailing the depth and type of excavations (eg piling) to be undertaken including mitigation measures (e.g. appropriate piling design) to prevent and/or minimise any potential migration of pollutants to public water supply. Any excavations must be undertaken in accordance with the terms of the approved method statement.*

Reason: To avoid displacing any shallow contamination to a greater depth and to prevent and/or minimise any potential migration of pollutants to a public water supply abstraction.

1.8.4. Condition 7: *Prior to construction above damp-proof course, a scheme for on-site foul water drainage works, including connection point and discharge rate to the public network, shall be submitted to and approved in writing by the Local Planning Authority.*

Reason: To prevent environmental and amenity problems arising from flooding.

2.0 Existing Site

Description

- 2.1. The site is situated on the north-east of Letchworth Garden City to the east of Talbot Way and north of Flint Road. The site is bounded by allotments and then residential properties on the western side. The northern side is bounded by an existing public right of way and further residential properties. On the southern and eastern sides are some existing woodland areas that bound the site. This woodland separates the southern edge of the site from an existing industrial estate off Flint Road.
- 2.2. The site and the surrounding area are shown in **Figure 2-1**.



Figure 2-1: Site and surrounding area (Google maps)

- 2.3. The Local Planning Authority (LPA) for the site is North Hertfordshire District Council (NHC), and Hertfordshire County Council (HCC) are the Lead Local Flood Authority (LLFA). The site is entirely greenfield, and has never been developed with the exception to an existing track serving the allotments adjacent to the site. There are existing hedgerows and tree lines on the site, with a woodland area on the south of the site. The approximate centre of the site is at grid coordinates 523275m easting, 234085m northing.

- 2.4. The site is referenced as 'LG3' within North Hertfordshire District Council's Local Plan 2011-2031. This document is part of the council's Development Plan which is used to determine planning applications. Within the Local Plan, 'LG3', is one of the twelve sites in Letchworth that have been allocated with an aim to be built over the plan period.
- 2.5. The topographical survey, which was undertaken by Greenhatch Group Ltd. in April 2019, is included in **Appendix B**. The site is generally flat around the highpoint of 89.05m on the northern/western part of the site. The land then slopes down from the higher areas at circa 1:16 slope toward the fence line on the lower points of the site on the south to circa 76.10m. Beyond the fence line is some dense trees and vegetation that slope steeply down toward the low point of circa 74.45m in the south-eastern corner of the site.

Existing Drainage

- 2.6. Anglian Water sewer asset records have been obtained for the whole of the site and are included in **Appendix C**. An extract of the sewer records is shown in **Figure 2-2**.



Figure 2-2: Extract of Existing Anglian Water asset records (Anglian Water)

- 2.7. Based on the available information, there are no existing surface water sewers located within the application boundary. South of the site, a 375mm diameter surface water sewer extends southwards along Flint Road. Adjacent to this, a 225mm diameter foul water sewer also extends southwards along Flint Road.

3.0 Surface Water Drainage

Technical Standards

3.1. The surface water drainage strategy for the proposed development is in accordance with the following technical standards and best practice guidance, which are referred to throughout this section:

- North Hertfordshire Council Local Plan 2011-2031;
- Hertfordshire County Council LLFA Summary Guidance for developers (dated August 2021);
- The CIRIA SuDS Manual C753;
- Non-statutory technical standards for sustainable drainage systems. A Best Practice Guidance was published by the Local Authority SuDS Officer Organisation (LASOO) in July 2015 to accompany this document;
- BS8582 Code of practice for surface water management for development sites;
- The National Planning Policy Framework.

Outline Drainage Strategy

3.2. The approved Outline drainage strategy utilised infiltration to dispose of runoff. The infiltration rates used on the strategy, based off testing completed by G7 Geotech (see **Appendix D**) completed in October 2021, used the most favourable value (1.41×10^{-5} m/s). However, as stated in the SuDS Manual section 25.3, "*the worst-case infiltration rate value should be used unless sound justification for doing otherwise is demonstrated*". Given that there is no noticeable change in ground conditions across the site, there is no justification to use the more favourable rate. Examining the potential to utilise infiltration for the proposed drainage strategy, the worst case rate should be used (2.06×10^{-6} m/s).

3.3. In order to secure support from Herts LLFA and remove the holding objection, the outline drainage strategy had to demonstrate an alternative option was available which was not reliant upon infiltration. For this option, the infiltration basin became an attenuation basin and an offsite connection to the existing surface water sewers was agreed with Anglian Water at a maximum discharge rate of 8l/s.

3.4. To provide adequate attenuation capacity within the Outline drainage strategy, cellular tanks buried beneath detention basins were used. In the drainage design calculations for the Outline drainage strategy, default CV (runoff coefficient) values were used. A 10% Urban Creep factor was applied to the impermeable areas within the outline proposals.

Drainage Hierarchy Consideration

- 3.5. In accordance with the CIRIA guidance C753 (hereafter referred to as the SuDS manual), the drainage hierarchy needs to be considered and is listed below in descending order of preference:

- 3.5.1. Infiltration to the maximum extent that is practical – where it is safe and acceptable to do so;
- 3.5.2. Discharge to surface waters;
- 3.5.3. Discharge to surface water sewers;
- 3.5.4. Discharge to a combined sewer (last resort).

Infiltration

- 3.6. In accordance with the drainage hierarchy, infiltration was considered as the primary method for surface water disposal. The feasibility of infiltration is subject to verification of ground conditions, soil contamination, and soakage capacity, in line with the requirements of *The SuDS Manual* and *BRE Digest 365*.
- 3.7. As outlined in paragraph 3.3, the approved outline drainage strategy proposed the use of infiltration to manage surface water runoff. Four infiltration tests were undertaken across the site; however, only two of these tests could be completed successfully due to slow infiltration and difficulties achieving measurable soakage. The completed tests recorded infiltration rates of approximately 1.5×10^{-5} m/s, while the incomplete or failed tests indicated much lower rates, in the region of 2.0×10^{-6} m/s or below. In accordance with *The SuDS Manual*, the lowest measured rate should be adopted for design purposes unless distinct geological variation can be demonstrated. Given that all test locations targeted the same chalk strata, the lower infiltration rate has been used to assess viability.
- 3.8. Using the lowest verified infiltration rate of 2.0×10^{-6} m/s, infiltration basins would require in the order of 1,400 m³ of attenuation to accommodate design storm events, which would more than double the approved outline storage provision. Furthermore, drainage modelling indicates that with this infiltration rate, the basins would not achieve the required half-drain time (≤ 24 hours) as set out in *The SuDS Manual Table 26.2*.
- 3.9. The above points confirm that infiltration is not a practical or reliable option for the development. The combination of limited test success, poor soakage performance, and excessive storage requirements therefore renders an infiltration-based strategy unviable for this site.

Discharge to surface waters

- 3.10. There are no existing watercourses or waterbodies within or adjacent to the site. As such, discharge to a watercourse is not considered a viable option for this development.

Discharge to surface waters sewers

- 3.11. In accordance with the drainage hierarchy, it is proposed that surface water runoff from the site will discharge to the existing public sewer network to the south at a restricted rate of 8.0 l/s, which is below the calculated greenfield runoff rate. This discharge rate was agreed in principle by Anglian Water at the outline stage, and has subsequently been reaffirmed through technical correspondence by Ardent with Anglian Water (see **Appendix E**). Hertfordshire County Council, as Lead Local Flood Authority, has confirmed that they accept this approach (see **Appendix F**).

Consideration of Sustainable Drainage Systems (SuDS)

3.12. DEFRA's Non-statutory technical guidance for Sustainable Drainage Systems and "The SuDS manual" have been used to develop the appropriate SuDS strategy. The constraints and opportunities for the use of various SuDS components are summarised in **Table 3-1** below.

Table 3-1: General viability of SuDS components for the development

SuDS Component	Infiltration Devices
Constraints	Given that the site is suspected to have limited infiltration soakage capacity, infiltration devices are not considered a viable drainage option.
Opportunities	None.
SuDS Component	Lined Permeable Paving (Source Control)
Constraints	The treatment and conveyance benefits of permeable paving rely on regular maintenance. While value engineering may be applied at the detailed design stage, incorporating alternative sustainable treatment stages is recommended to manage water quality effectively.
Opportunities	Permeable paving can be used to provide a stage of treatment in private drives around the site, should this be required as part of the treatment train.
SuDS Component	Rainwater Harvesting (Source Control)
Constraints	The benefits of rainwater harvesting on a specific design storm event cannot be quantified, due to the seasonal availability of storage within the structure.
Opportunities	Opportunities in garden areas to provide harvesting features such as water butts exist. However, it is difficult to quantify contribution, and therefore not included within calculations as part of this surface water management strategy.
SuDS Component	Swales (Permeable Conveyance)
Constraints:	In order to provide practicable attenuation benefits 1:3 side-slope swales tend to require a significant land requirement.
Opportunities:	Where possible swales will be incorporated along roads and in open spaces in coordination with the architect and landscape architect. These can be underdrained where required to reduce landtake.
SuDS Component	Bioretention Systems (Filtration)
Constraints:	Bioretention systems have more rigorous upkeep and maintenance and are therefore often poorly maintained. This leads to clogging over time. They are subject to coordination and can be difficult to get adopted within the sewer network.
Opportunities:	Bio Retention and Raingardens will be incorporated within verges and/or public landscaped areas, designed in coordination with the architect and landscape architect.
SuDS Component	Green Roofs (Source Control)

Constraints:	Subject to Architect's design and house-types, all houses will have pitched roofs. Increased structural load not feasible for individual houses.
Opportunities:	None.
SuDS Component	Attenuation Ponds/Basins (Retention/Detention)
Constraints:	In order to provide practicable attenuation benefits, 1:3 side slopes ponds/basins tend to require significant land requirement. There are also existing treelines/hedge lines on the edges of the site that are likely to be retained for the development. Any ponds/basins and associated reprofiling of levels will need to be located outside the root protection areas for these trees.
Opportunities:	There is space within the development to allow basins to be used to provide stormwater storage and treatment.
SuDS Component	Attenuation Tanks (Retention/Detention)
Constraints:	Attenuation Tanks require a significant land requirement which would need to be strategically placed and correctly aligned within the above construction type.
Opportunities:	Where required to provide supplementary attenuation tanks can be used where readily accessible such as parking spaces and open spaces, these will be designed as part of the SuDS treatment train to ensure source control is provided upstream to remove sediment and other contaminants.

3.13. Going through each of the different SuDS components in **Table 4-1**, it has been deemed that Attenuation Basins, Swales, and Bioretention Systems are the most viable option to provide both surface water storage and treatment within the surface water drainage system prior to discharging off site. Buried storage will be required to provide additional attenuation volume due to the steep topography and existing landscaping limiting the effective volume of the basins.

3.14. A proposed SuDS Treatment Plan has been produced as part of the drainage strategy. A copy of this can be found in **Appendix G**.

3.15. A proposed SuDS Maintenance Plan has been produced as part of the drainage strategy. A copy of this can be found in **Appendix H**.

Climate Change Allowance

3.16. The Planning Practice Guidance (PPG), last updated in August 2022, states that to allow for the predicted impacts of climate change on peak rainfall allowance, consideration should be given to the catchment within which the site is located. The site is located in the Upper and Bedford Ouse Management Catchment.

3.17. The PPG states that to account for the impact of climate change on surface water runoff within the catchment, the following increases stated **Table 3-2** below,

should be applied to the site rainfall intensities. For developments with lifetime up to or beyond 2100, the upper end allowances should be used.

3.18. Therefore, in line with the policy requirements, the proposed drainage strategy will apply 35% and 40% for the effects of climate change on the 3.3% and 1% annual exceedance rainfall events.

Table 3-2: Upper and Bedford Ouse Management Catchment Climate Change Allowance Factors

Upper and Bedford Ouse Management Catchment	Higher Central	Upper End
3.3% annual exceedance rainfall event		
Total potential change 2050s	20%	35%
Total potential change 2070s	25%	35%
1% annual exceedance rainfall event		
Total potential change 2050s	20%	40%
Total potential change 2070s	25%	40%

Proposed Surface Water Drainage Strategy

3.19. For the net developable area of 3.63 ha, it is proposed to limit the total surface water discharge for all storm events up to and including the 1 in 100 year plus climate change events into the existing sewers back to 8.0 l/s. This approach is in line with the conditional planning approval for the outline strategy (21/00504/OP) which stated in **Condition 3**, that *"if infiltration is proven to be unfavourable, then surface water runoff rates will be attenuated and restricted to greenfield rates (no greater than 8l/s) and will discharge to the Anglian Water sewer in Flint Road"*.

3.20. A meeting has been held with HCC as the LLFA to confirm the approach for the stormwater drainage design. The meeting minutes are provided in **Appendix F**. In line with the outline strategy, HCC have agreed to the use of default CV (runoff coefficient) values for the calculations. The network has also been assessed with a CV value of 1.0 to assess the need for any flood mitigation measures.

3.21. Using hydraulic modelling software, the surface water design calculations have been carried out for the following storm events: 1 in 2 year, 1 in 30 year + 35% climate

change, 1 in 100 year +40% climate change. The calculations are included in **Appendix I** and the results show that the attenuation features provide sufficient storage and no flooding, in line with current best practice.

3.22. The total impermeable area for the development has been measured as 2.17 ha based on the site layout included in **Appendix A** this is based on The SUDS manual approach, using 60% of the development area as assumed impermeable area. This 60% of the development area is also accounting for Urban creep.

3.23. The total impermeable area for the development has been calculated as 2.17 ha, based on the site layout shown in **Appendix A**. This figure has been derived using the SuDS Manual (C753) methodology, assuming 60% of the total development area to be impermeable. The 60% allowance is robust and accounts for urban creep.

3.24. The proposed drainage strategy is included in **Appendix J** and indicates how the site will be drained, including the location of attenuation features, the indicative pipe network, and the discharge location.

3.25. The strategy divides the development into three separate catchments – northern, central, and a southern catchment. Runoff from the hardstanding areas is collected and conveyed by swales and pipework with bioretention / raingarden systems across the site. The surface water storage in the network is provided by two detention basins and an offline cellular tank. Flow controls are placed directly downstream of the basins and the tank to restricts flows through the network and maximise storage utilisation.

3.26. Vegetated headwalls have been provided at the basin inlet and outlets, offering significant landscaping benefits by promoting natural planting and enhancing the green infrastructure within the vicinity. We have provided an example construction detail of a vegetated headwall in **Appendix K**, based on GeoGrow Ltd.'s Rootlok Vegetated Wall System. An equivalent or similar system can be used for the Detention Basin, subject to approval from the adopting authority

3.27. The respective catchment areas, impermeable area including urban creep, and drainage features for each catchment are summarised below in **Table 3-3**.

Table 3-3: Drainage Catchment Area Summary

Catchment	Catchment Area (ha)	Impermeable Area +UC (ha)	Drainage Features
Northern	0.85	0.51	<i>Pipework, Swales, Detention Basin</i>
Central	1.89	1.13	<i>Pipework, Swales, Detention Basin, Bioretention System</i>
Southern	0.89	0.53	<i>Pipework, Swales, Cellular Tank, Bioretention System</i>
Total	3.63	2.17ha	<i>Pipework, Swales, Detention Basin, Bioretention System</i>

3.28. Surface water runoff from each of the catchments is conveyed via pipework and restricted through flow controls in the network. Refer to the drainage strategy in **Appendix J** for how each of the catchment within the network are connected. The net surface water runoff from the development is restricted to 8.0 l/s prior to outfall to the existing Anglian Water sewer. The overall storage provision across the basins and tank is sufficient to accommodate all rainfall events up to and including the 1 in 100 year plus 40% climate change allowance, with an additional 300 mm freeboard incorporated for exceedance management.

3.29. Following correspondence with Anglian Water, the proposed discharge rate of 8l/s into the sewer network south of the site, has been agreed. The email confirmation is included in **Appendix E**. This connection is still subject to a completed Section 106 agreement.

3.30. In the event that the capacity of the sewer network is exceeded, excess surface water will be conveyed along the established overland flow routes. These routes are designed to direct flows away from building and habited areas, guiding them toward the site's natural low points. Exceedance/overland flow routes arrows are also shown on the drainage strategy in **Appendix J**.

Surface Water Runoff Quality

3.31. Without implementing appropriate SuDS features with adequate treatment provision, the surface water runoff from the proposed impermeable surfacing would increase the risk of surface water contamination. The CIRIA C753 SuDS Manual, sets out the process for determining pollution risk from the land use and the treatment potential for a development with the 'Simple Index Approach'. Specifically, Tables

26.2, 26.3, and 26.4 in the SuDS Manual which have been duplicated in **Appendix H**.

3.32. Table 26.2 from the SuDS Manual identifying the indicative pollution hazard indices for the relevant land uses. Based on the proposed layout, the Pollution Hazard Level would be considered 'Very Low' to 'Low' for the majority of the development site, with the exception of the proposed main access road, as it is currently anticipated this will accommodate more than 300 traffic movements per day. Therefore, the Pollution Hazard Level for the main access road is considered 'Medium'.

3.33. To assess the treatment provision for each of the catchments, the SuDS mitigation contributions for the drainage features in each catchment are considered separately. To provide adequate treatment to the surface water runoff the total mitigation indices for the SuDS strategy need to exceed the pollution hazard level. The treatment calculation is provided in **Appendix H**. The calculation demonstrates that across the different catchments the array of swales, bioretention systems, and detention basins, swale, provide sufficient treatment of metals, hydrocarbons, and total suspended solids for the 'Medium' pollution Hazard Levels from the development.

3.34. It has therefore been demonstrated that adequate treatment is provided within the proposed SuDS network prior to discharging surface water runoff into the existing Anglian Water sewers.

Exceedance Routes

3.35. As a result of heavy or extreme storm events, it is sometimes unavoidable that the capacity of the sewers and other drainage systems will be exceeded. This could occur in any of the following events:

- when the runoff exceeds the inlet capacity of the drainage system;
- when the receiving water or pipe system becomes overloaded/blocked or;
- when the outfall is restricted due to flood levels in the receiving water

3.36. To limit the impact of flow exceedance on people and properties, the flow exceedance routes must be assessed and suitable mitigation measures must be incorporated. To offset the impact of exceedance the levels and masterplan have been designed to direct flows away from buildings/habited areas and toward the low points of the site and non-habited areas. These exceedance routes ultimately mimic the current flow routes on the site.

3.37. Additionally, the proposed attenuation features have been located toward the lower lying areas of the site, to ensure that any exceedance flows can be swiftly directed toward the low points of the site. The overland flow routes for the proposals are shown on the drainage strategy included in **Appendix J**.

Future Maintenance and Adoption

3.38. It is the intention that the main sewers will be adopted under a Section 104 agreement. If the proposed roads are not adopted by the Highway Authority (Hertfordshire County Council), then a suitable drainage easement around the sewers will have to be considered.

3.39. If it is not possible to get the SuDS components included within the S104 agreement, they will be conveyed to a management company for maintenance.

3.40. All the plot drainage will remain private, while all the gullies and connections within access roads will be managed by a management company if the roads are not being offered for adoption.

3.41. A maintenance plan is also included in **Appendix G**. These have been informed by the guidance outlined within the CIRIA C753 SuDS Manual, and will be supplemented by manufacturers specifications. Any drainage/SuDS features that can be adopted will be managed by HCC or Anglian Water, otherwise, a management company will be responsible for their maintenance.

4.0 Foul Water Drainage

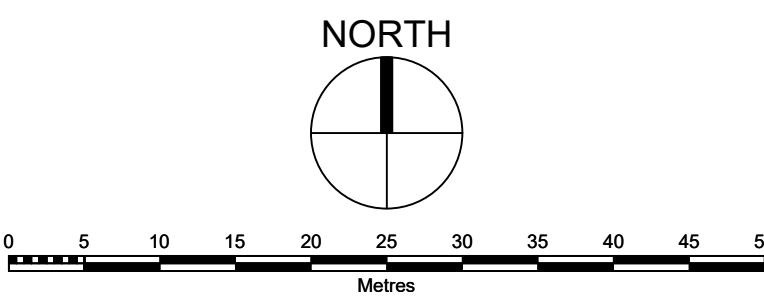
- 4.1. The proposed development comprises of 120 units. In line with the Sewerage Sector Guidance Appendix C, clause B3.1b, the peak design rate for foul water can be determined as a rate of 4000 litres per day for each dwelling. Therefore, the peak foul flow rate comes to a total of 5.6 l/s.
- 4.2. Due to the site topography, plots 103-115, totalling 13 units in the south eastern corner of the site are at a lower level than the nearest existing Anglian water asset, a private package pump is proposed to serve these units. This will fall under the responsibility of a private management company and will discharge to the proposed adoptable foul sewers within the development prior to discharging to the existing Anglian water asset in flint road. The private package pump will not put an additional l/s on top of the peak foul flow rate mentioned in paragraph 4.1.
- 4.3. The adoptable foul water drainage will collect flows generated from the proposed dwellings and convey them via a gravity sewer network toward the existing Anglian Water foul sewer located to the south of the site. Previous pre-development enquiries have been received from Anglian Water in 2021 and 2024 each of which confirmed capacity to accommodate the development discharge into the 225mm foul sewer adjacent to the site access. Specifically, Manhole F3901. See **Appendix E**.
- 4.4. The drainage strategy which shows the foul water drainage system is shown in **Appendix J**.

5.0 Conclusion

- 5.1. Ardent Consulting Engineers, has been appointed by BDW North Thames to provide a Drainage Strategy and Drainage Statement in support of a reserved matters planning application for a residential development comprising up to 120 units. The site benefits from outline planning and this report has been prepared to demonstrate a suitable drainage strategy can be implemented for the site.
- 5.2. The approved outline strategy utilised infiltration to dispose of surface water runoff which, upon review, the site is deemed unsuitable for infiltration. Instead, in line with the drainage hierarchy, the proposed drainage strategy will discharge into existing Anglian Water sewers located adjacent to the site as agreed with both the LLFA and Anglian Water.
- 5.3. The proposed drainage network manages the site through three catchments, with attenuation provided by two detention basins and an offline cellular tank. Surface water is conveyed via swales and pipework, supplemented by bioretention features, before being discharged at an agreed restricted rate of 8.0 l/s to the existing Anglian Water sewer. The system is designed to accommodate the 1 in 100 year plus 40% climate change event with additional 300mm freeboard in the basins to manage exceedance.
- 5.4. Water quality treatment of runoff has been designed in accordance with the CIRIA C753 SuDS Manual. It has been shown that using Simple Index Approach, the current proposals provide adequate pollution hazard mitigation for the surface water. Additional Source Control measures have also been included within the landscaped areas across the site as requested by the LLFA.
- 5.5. To limit the impact of exceedance flow routes on the proposed development, the masterplan and levels will be designed to convey flows away from buildings and toward non-habited area and the lower points of the site. These routes also simulate the existing flow paths and therefore will not increase flood risk.
- 5.6. It is proposed that the foul water flows from the development be conveyed by sewers and discharged into the existing Anglian Water sewer located south of the site. The peak design rate for foul water has been determined (as a rate 4000 litres per day for each dwelling) as 5.6 l/s. This approach has been agreed with Anglian Water and follows what was approved at outline planning.

Appendix A – Site Layout

Do not scale from drawings unless by agreement with HTA. Use figured dimensions only.
Check all dimensions on the print to confirm the works. Drawing to be read in conjunction with other relevant consultant information.
This drawing is the copyright of HTA Design LLP and must not be copied or reproduced in part or in whole, without the express permission of HTA Design LLP.
Drawing to be read in conjunction with specification.



- Site Boundary
- Plot number
- Car parking plot number
- Visitor car parking
- Temporary Sales Arena car parking
- Affordable Rent
- Shared Ownership
- Social Rent



I	12.05.26	JPA	Northern SUDS basin correctly shown
H	10.05.26	JPA	Southern access adjusted to match highways consultant design
F	30.05.26	JPA	Adoptable highway extended outside southern apartments
G	01.05.26	JPA	Village green footpath updated, note corrected
E	27.04.26	JPA	Landscape and SUDS updated
D	21.11.25	JPA	Minor amendments to plots 83/84, 88/89 and various other plots, parking for substitution relocated
C	31.10.25	SAB	Road Design Amended
B	08.10.25	JPA	Affordable Rent and SHG updated - social rent plots 10, 20, plots 12, 14, 17, 44, 65, 88, 91, 97, 98
A	29.09.25	JPA	Various plots updated with different boundaries
Rev	08.09.25	JPA	Partners Internal Referral, Sales centre parking relocated
Date	08.09.25	Drawn	Initial Issue Pre-Planning Pack to Foundation
Description			

PLANNING
BDW North Thames
Letchworth LG3
Proposed Site Layout

Drawing number	HTA-A DR 0100	revision	1
Scale	1:500	checked by	JPA
HTA Design LLP		approved by	BAR-LGC
London Edinburgh Manchester Bristol			hta

Appendix B – Topographical Survey



Station	Easting (m)	Northing (m)	Level (m)
GH1	523398.031	233834.898	79.762
GH2	523340.940	233936.917	80.540
GH3	523262.794	233980.937	84.554
GH4	523252.337	234075.464	88.868
GH5	523190.538	234173.143	88.778

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

OS Buildings Scavenged Buildings

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

A true OSGB36 coordinate has been established near to the site using a transformation using the OS TN/SGN and OSGB/SGN transformation models.

The survey has been completed 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 are arbitrary & not true O.S. Coordinates.

Legend:

[illegible]

1	12-12-19	Boundary Set Strip Survey	BO	GH6532
<i>No.</i>	<i>Date</i>	<i>Description</i>	<i>Drawn</i>	<i>C. No.</i>



- | | |
|--|---|
| <ul style="list-style-type: none"> ① Topographic Surveys ② Site Engineering ③ Utility / CCTV Surveys | <ul style="list-style-type: none"> ④ Measured Building Surveys ⑤ 3D Laser Scanning ⑥ Revit & BIM Models |
| <p>Rowen House
 Duffield Road
 Little Eaton
 Derby
 DE21 5DR</p> <p>Tel (01332) 830044 Fax (01332) 830055
 admin@greenhatch-group.co.uk
 www.greenhatchgroup.co.uk</p> | |
| <p>St Albans
 Unit 6, The Courtyard
 Elbow Park
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 Westminster
 AL4 5AL</p> <p>t. (01753) 854461</p> | <p>Heathcote
 24 The Quadrant
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| | <p>London
 1st Cornhill Terrace House
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 London
 NW1 6AL</p> <p>t. (02072) 241806</p> |

**Letchworth Garden City
Heritage Foundation**

**Talbot Way,
Letchworth Garden City,
SG6 1HJ**

Topographical Survey	
DATE	SCALE

A0@ 1: 500	01.04.19
MR	GH4802

Leaf datum:	See note
Grid orientation:	See note
Job number:	33132

Drawing No.	Rev.
33132_T	1

This plan should only be used for its original purpose. Greenhatch Group accepts no responsibility for this plan if supplied to any party other than the original client.

All dimensions should be checked on site prior to design and construction.

Drainage information (where applicable) has been visually inspected from the surface and therefore should be treated as approximate only.

Notes:

Appendix C – Anglian Water Sewer Records



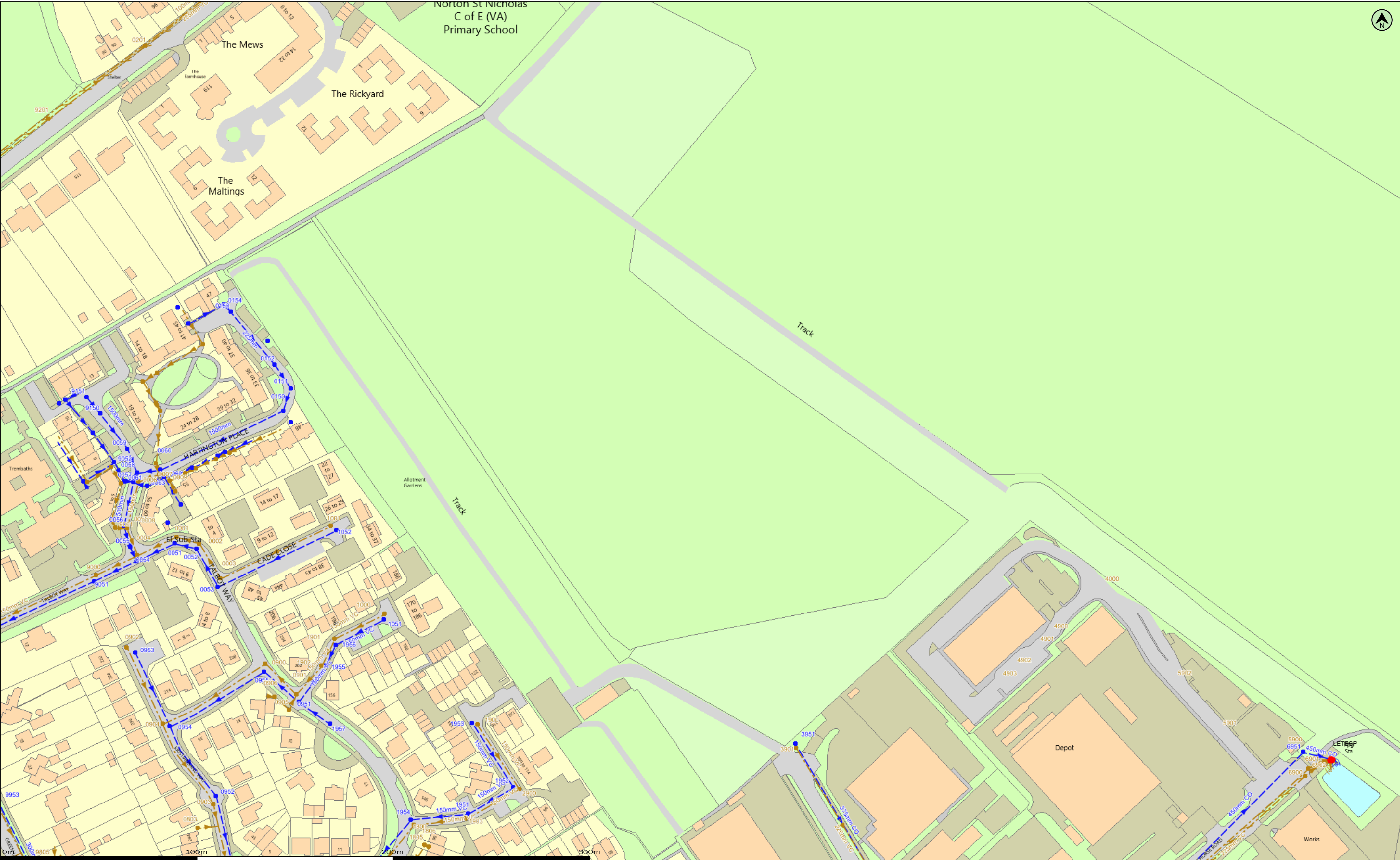
(c) Crown copyright and database rights 2025 Ordnance Survey AC0000813445 Date: 07/05/25 Scale: 1:1250 Map Centre: 523364,233875 Data updated: 30/04/25 Our Ref: 1763254 - 1 Wastewater Plan A4 Powered by digdat

This plan is provided by Anglian Water pursuant to its obligations under the Water Industry Act 1991 sections 198 or 199. It must be used in conjunction with any search results attached. The information on this plan is based on data currently recorded but position must be regarded as approximate. Service pipes, private sewers and drains are generally not shown. Users of this map are strongly advised to commission their own survey of the area shown on the plan before carrying out any works. The actual position of all apparatus MUST be established by trial holes. No liability whatsoever, including liability for negligence, is accepted by Anglian Water for any error or inaccuracy or omission, including the failure to accurately record, or record at all, the location of any water main, discharge pipe, sewer or disposal main or any item of apparatus. This information is valid for the date printed. This plan is produced by Anglian Water Services Limited (c) Crown copyright and database rights 2025 Ordnance Survey AC0000813445. This map is to be used for the purposes of viewing the location of Anglian Water plant only. Any other uses of the map data or further copies is not permitted. This notice is not intended to exclude or restrict liability for death or personal injury resulting from negligence.

Foul Sewer	--- --	Outfall*	⊕	Sewage Treatment Works	□
Surface Sewer	---		⊕	Public Pumping Station	●
Combined Sewer	---				
Final Effluent	---	Inlet*			
Rising Main*	--- --				
Private Sewer*	---				
Decommissioned Sewer*	---	Manhole*	●	Decommissioned Pumping Station	●

*(Colour denotes effluent type)

dcronin@ardent-ce.co.uk	
Talbot Way 2502330	



(c) Crown copyright and database rights 2025 Ordnance Survey AC0000813445 Date: 07/05/25 Scale: 1:1250 Map Centre: 523295,234100 Data updated: 30/04/25 Our Ref: 1763244 - 1 Wastewater Plan A2 Powered by digdat

This plan is provided by Anglian Water pursuant to its obligations under the Water Industry Act 1991 sections 198 or 199. It must be used in conjunction with any search results attached. The information on this plan is based on data currently recorded but position must be regarded as approximate. Service pipes, private sewers and drains are generally not shown. Users of this map are strongly advised to commission their own survey of the area shown on the plan before carrying out any works. The actual position of all apparatus MUST be established by trial holes. No liability whatsoever, including liability for negligence, is accepted by Anglian Water for any error or inaccuracy or omission, including the failure to accurately record, or record at all, the location of any water main, discharge pipe, sewer or disposal main or any item of apparatus. This information is valid for the date printed. This plan is produced by Anglian Water Services Limited (c) Crown copyright and database rights 2025 Ordnance Survey AC0000813445. This map is to be used for the purposes of viewing the location of Anglian Water plant only. Any other uses of the map data or further copies is not permitted. This notice is not intended to exclude or restrict liability for death or personal injury resulting from negligence.

Foul Sewer	--- --	Outfall*
Surface Sewer	---	Inlet*
Combined Sewer	---	Manhole*
Final Effluent	---	
Rising Main*	---	
Private Sewer*	---	
Decommissioned Sewer*	---	

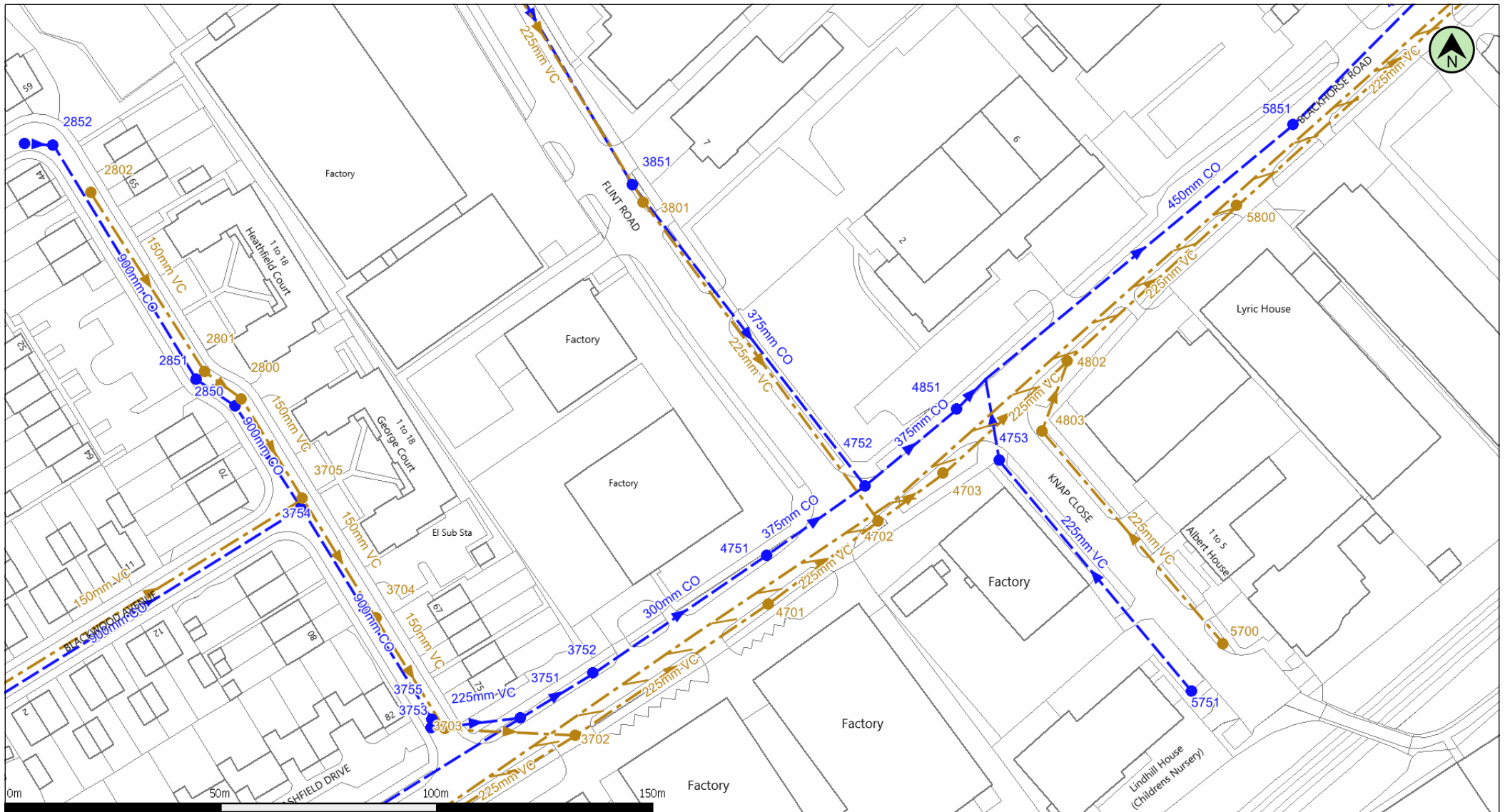
Ⓔ	Sewage Treatment Works
Ⓔ	Public Pumping Station
●	Decommissioned Pumping Station

*(Colour denotes effluent type)

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Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
0001	F	-	-	-
0002	F	-	-	-
0003	F	-	-	-
0004	F	-	-	-
0005	F	-	-	-
0006	F	-	-	-
0007	F	-	-	-
0009	F	-	-	-
0201	F	84.259	81.939	2.32
0803	F	-	-	-
0900	F	-	-	-
0901	F	-	85.158	-
0902	F	-	-	-
0903	F	-	-	-
0904	F	-	-	-
0905	F	-	-	-
0906	F	-	-	-
1000	F	-	86.09	-
1001	F	-	-	-
1800	F	-	84.3	-
1805	F	-	-	-
1806	F	-	-	-
1900	F	-	85.4	-
1901	F	-	85.615	-
1902	F	-	85.4	-
1903	F	-	84.6	-
2900	F	-	84.945	-
3901	F	80.108	77.278	2.83
6900	F	69.284	67.554	1.73
6901	F	69.098	67.088	2.01
6902	F	-	-	-
9000	F	-	-	-
9001	F	-	-	-
9201	F	86.22	84.65	1.57
9806	F	-	-	-
0051	S	-	-	-
0052	S	-	-	-
0053	S	-	-	-
0054	S	-	-	-
0055	S	-	-	-
0056	S	-	-	-
0057	S	-	-	-
0058	S	-	-	-
0059	S	-	-	-
0060	S	-	-	-
0061	S	-	-	-
0062	S	-	-	-
0063	S	-	-	-
0150	S	-	-	-
0151	S	-	-	-
0152	S	-	-	-
0153	S	-	-	-
0154	S	-	-	-
0951	S	-	85.49	-
0952	S	-	-	-
0953	S	-	-	-
0954	S	-	-	-
0955	S	-	-	-
1051	S	-	86.41	-
1052	S	-	-	-
1951	S	-	84.89	-
1952	S	-	85.22	-
1953	S	-	85.7	-
1954	S	-	84.575	-
1955	S	-	85.785	-
1956	S	-	85.955	-
1957	S	-	-	-
3951	S	80.13	76.42	3.71
6951	S	68.973	68.173	0.8
9051	S	-	-	-
9052	S	-	-	-



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Surface Sewer	---		⊕	Public Pumping Station	●
Combined Sewer	---				
Final Effluent	---	Inlet*			
Rising Main*	--- --				
Private Sewer*	---				
Decommissioned Sewer*	---	Manhole*	●	Decommissioned Pumping Station	●

*(Colour denotes effluent type)

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Talbot Way 2502330

love every drop
anglianwater

Appendix D – G7 Geotech Infiltration Test

REPORT ON TRIAL PIT SOAKAGE TESTS

Report 1277: Rev 0

9th November 2021

PROPOSED RESIDENTIAL DEVELOPMENT:

**LAND EAST OF TALBOT WAY, LETCHWORTH GARDEN CITY,
HERTFORDSHIRE SG6**



Client:	THE ENVIRONMENTAL PROTECTION GROUP LTD Warrington Business Park Long Lane Warrington WA2 8TX
On Behalf of:	LETCWORTH GARDEN CITY HERITAGE FOUNDATION

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REPORT ON TRIAL PIT SOAKAGE TESTS

PROPOSED RESIDENTIAL DEVELOPMENT:

**LAND EAST OF TALBOT WAY, LETCHWORTH GARDEN CITY,
HERTFORDSHIRE SG6**

DOCUMENT ISSUE RECORD

Revision	Author	Checked	Date
Rev 0	Keith Gibbs BSc, MSc, FGS	Alan Watson BSc (Eng), CEnv, CEng, MICE	9 th November 2021

G7 Geotech reports are independently checked

Report 1277 : Rev 0

9th November 2021

G7 Geotech Ltd has prepared this Report for the Client and their professional advisors under the Standard Terms of Appointment for Ground Investigations and Geotechnical / Geoenvironmental Consultancy accompanying our quotation. No other warranty, expressed or implied, is made as to the professional advice included in this Report or any other services provided by us. This Report may not be relied upon by any other party without the prior and express written agreement of G7 Geotech Ltd.

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3.0	EXPLORATORY WORK.....	5
4.0	GROUND CONDITIONS.....	6
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	TRIAL PIT RECORDS
	FOREWORD TO SOAKAGE TEST RESULTS
	SOAKAGE TEST RESULTS

APPENDIX C	PLANS AND MAPS
	PROPOSED RESIDENTIAL DEVELOPMENT PLAN
	TOPOGRAPHIC PLAN
	SITE PLAN
	LOCATION PLAN

APPENDIX D	UTILITIES SEARCH REPORT
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1.0 INTRODUCTION

A new residential development is proposed on land east of Talbot Way in the Norton area of Letchworth Garden City.

G7 Geotech Ltd have been instructed by The Environmental Protection Group Ltd to undertake soakage tests in trial pits in general accordance with BRE 365 (2016), 'Soakaway Design', with the aim of providing design data for infiltration surface water drainage.

This Report on Trial Pit Soakage Tests includes factual exploratory records, field test results, a summary of the ground conditions encountered and concludes with an assessment for the proposed sustainable drainage provision.

2.0 SITE DESCRIPTION

The site is situated to the east of Talbot Way in the Norton area of Letchworth Garden City, Hertfordshire SG6. National grid reference 523270E 234090N has been derived near the centre of the proposed development area.

At the time of our trial pits and soakage tests in October 2021, the site comprised a large rectangular shaped field with trees and hedges around the fenced perimeter boundaries.

Along the western side, the site is separated from the adjacent residential areas along Talbot Way by local community garden allotments. Along the northern side are similar residential developments and a school. To the east is open farmland, whilst the Flint Road light industrial estate is present along the southern side.

There was no indication of recent crop cultivation within the field with the ground surface covered in short grass. The site measures approximately 5.5 hectares. The appended Topographic Plan (Ref: GreenHatch Group Ltd drawing 33132_T, Rev 1, dated 12th December 2019), indicates ground elevations to slope down in an approximate SE direction from about +88 mOD to +75 mOD.

The appended plans show the site area with test positions and the site location.

3.0 EXPLORATORY WORK

Prior to our fieldwork a Utility Search Report was commissioned to determine the likely presence of buried services (Groundsure G7GEO-8210240). This report is appended.

The trial pits and soakage tests were carried out on the 22nd October 2021. Trial pits were excavated by a rubber tyred backhoe machine (JCB), and water was supplied by a bowser towed by a four wheeled drive vehicle commissioned by G7 Geotech Ltd. Prior to excavation, and as an additional precaution the positions were checked for buried services using CAT scanning.

The trial pit locations were specified by the client. Our investigation comprised the following elements.

Machine excavated trial pits

Four trial pits (SA01 to SA04) were excavated to depths of between 0.55m and 1.50m BGL. The investigation and testing were under the supervision of an experienced geotechnical engineer. The excavations were 'squared off' as far as reasonably practical to aid in determining accurate measurements prior to soakage testing.

All of the excavations were backfilled with arisings and made safe prior to completion of our fieldwork.

Soakage tests in trial pits

Soakage tests were undertaken in all the trial pits in general accordance with BRE 365 (2016), 'Soakaway Design'. Water was delivered by a towable bowser commissioned by G7 Geotech Ltd.

The number of cycles of soakage testing that can be completed in one day is largely determined by the rate of infiltration achieved. At this site we were able to complete three cycles of tests in SA03 and SA04. In SA01 and SA02 time only allowed for a single cycle of testing due to the much reduced rate of infiltration achieved at these locations.

The engineering trial pit records, test results and exploratory location plan are appended.

4.0 GROUND CONDITIONS

Published geological mapping from the BGS indicates the Lowestoft Formation (Glacial Till) at shallow depth (under the northern part of the site only), underlain by Holywell Nodular Chalk and New Pit Chalk Formation. The Chalk strata is shown to outcrop below the southern part of the site.

SA01 and SA02 were excavated in the central part of the southern half of the site, whilst SA03 and SA04 were located at the south-eastern corner. In all of the trial pits and below the surface topsoil/subsoil layers the Chalk was met to the full depth of excavation. The chalk initially comprised a white structureless stratum of fine to coarse gravel of chalk within a silt matrix. In SA02 a closely bedded structure was evident from about 0.80m and in SA03 and SA04 below depths of 0.50m and 0.60m respectively. Flints were absent within the chalk to the depths excavated.

Groundwater was not encountered in our trial pits which were taken to a maximum depth of 1.50m BGL.

Our soakage tests indicated the following soakage rates:

Trial Pit (and depth of test m BGL)	Soakage Rates (metres / sec)
SA01 (0.55)	2.06×10^{-6}
SA02 (1.50)	2.49×10^{-6}
SA03 (0.50)	4.61×10^{-5} , 1.64×10^{-5} , 1.48×10^{-5}
SA04 (1.50)	2.26×10^{-5} , 1.74×10^{-5} , 1.41×10^{-5}

The tests in SA03 and SA04 indicate medium permeability and good drainage conditions in the south-eastern corner of the site. The three tests in each of these positions indicated a gradually reducing soakage rate following repeated re-fills.

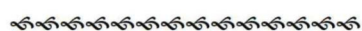
The tests further upslope in SA01 and SA02 indicated low permeability but nevertheless good drainage conditions in the central part of the southern half of the site. The slower infiltration rate at these positions did not allow time for repeated re-fills.

5.0 CONCLUSIONS

The proposed residential development scheme is shown on the appended 'Landscape GA plan', (The Environment Partnership Ref. D906.001 dated 30 April 2020).

Our test results indicate soakage rates of between 2.49×10^{-6} and 1.41×10^{-5} , when taking the lowest result at each test location. These results represent low to medium permeability and moderate to good drainage conditions typical of chalk. The results can be utilised in drainage design subject to the usual allowances for seasonal / weather variations, and prolonged rainfall.

There was a noticeable variation in the infiltration rates achieved between the two distinct test areas. The highest infiltration rates were noted where the closely bedded chalk occurred at shallower levels in SA03 and SA04 which were also situated at the lowest point on site. If possible, soakaways should be designed to penetrate into the closely bedded chalk.



GENERAL INFORMATION, LIMITATIONS AND EXCEPTIONS

Unless otherwise stated, our Report is a Ground Investigation Report [GIR] as defined in BS EN1997-2. Our Report is not intended to be and should not be viewed or treated as a Geotechnical Design Report [GDR] as defined in EN1997-2. If 'design' recommendations are provided, they are for guidance only and are intended to allow the designer to assess the results and implications of our investigation/testing and to permit preliminary design of relevant elements of the proposed scheme. When the title of the report is 'Factual Report on Ground Investigation' this means that geotechnical design recommendations are not provided.

The scope and methods of investigation used have been chosen taking into account project and site constraints including but not limited to access and space limitations. Where it has not been possible to reasonably undertake an EC7 compliant scope or investigation technique we have adopted a practical and economic scope and technique(s) to obtain indicative soil parameters and any interpretation is based upon our engineering experience and relevant published information.

The Report is issued on the condition that G7 Geotech Ltd will under no circumstances be liable for any loss arising directly or indirectly from ground conditions between the exploratory points which differ from those identified during our investigation. In addition G7 Geotech Ltd will not be liable for any loss arising directly or indirectly from any opinion given on the possible configuration of strata both between the exploratory points and/or below the maximum depth of the investigation; such opinions, where given, are for guidance only and no liability can be accepted as to their accuracy. The results of any measurements taken may vary spatially or with time and further confirmatory measurements should be made after any significant delay in using this Report.

Comments made relating to ground-water or ground-gas are based upon observations made during our investigation unless otherwise stated. Ground-water and ground-gas conditions may vary with time from those reported due to factors such as seasonal effects, atmospheric effects and and/or tidal conditions. We recommend that if monitoring installations have been included as part of our investigation, continued monitoring should be carried out to maximise the information gained.

Specific geotechnical features/hazards such as [but not limited to] areas of root-related desiccation and dissolution features in chalk/soluble rock can exist in discrete localised areas - there can be no certainty that any or all of such features/hazards have been located, sampled or identified. Where a risk is identified the designer should provide appropriate contingencies to mitigate the risk through additional exploratory work and/or an engineered solution.

Where spread foundations are used, we recommend that all excavations are inspected and approved by suitably experienced personnel; appropriate inspection records should be kept. This should also apply to any structures which are in direct contact with the soil where the soil could have a detrimental effect on performance or integrity of the structure.

Ground contamination often exists in small discrete areas - there can be no certainty that any or all such areas have been located, sampled or identified.

The findings and opinions conveyed in this Report may be based on information from a variety of third party sources such as commercially available desk based geological and environmental searches, historical maps, mining reports, radon reports, geotechnical laboratory testing and contamination laboratory analyses. G7 Geotech Ltd cannot and does not provide any guarantee as to the authenticity, accuracy or reliability of such information from third parties; such information has not been independently verified unless stated in our Report.

Our Report is written in the context of an agreed scope of work between G7 Geotech Ltd and the Client and should not be used in any different context. In light of additional information becoming available, improved practices and changes in legislation, amendment or re-interpretation of the assessment or the Report in part or in whole may be necessary after its original publication.

Unless otherwise stated our investigation does not include an arboricultural survey, asbestos survey, ecological survey or flood risk assessment and these should be deemed to be outside the scope of our investigation.

Issue 04 : 3rd August 2020

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APPENDIX D	UTILITIES SEARCH REPORT

APPENDIX A

PHOTOGRAPHS



Photograph No 1 : Plant and equipment at locations of SA03 and SA04



Photograph No 2 : View W and NW from SE side of site



Photograph No 3 : View S from northern margin of site.



Photograph No 4 : View NW from location of SA03

APPENDIX B

FOREWORD TO TRIAL PIT RECORDS

TRIAL PIT RECORDS

FOREWORD TO SOAKAGE TEST RESULTS

SOAKAGE TEST RESULTS

FOREWORD TO TRIAL PITS

GENERAL

The Trial Pit Records are compiled from the geotechnical engineer's description of the strata encountered, based on an examination of the soil arisings and the results of field and laboratory tests. Based on this data, the report presents an opinion on the configuration of strata within the site. However, such reasonable assumptions are given for guidance only and no liability can be accepted for changes in conditions not revealed by the trial pits.

EXCAVATION METHODS

Trial pits can be undertaken by either mechanical excavator or by the use of hand tools which allows the ground conditions to be reasonably well established. Some disturbance of the ground is inevitable which can influence field tests. Depths BGL relating to field tests undertaken on soil arisings are approximate only.

GROUNDWATER

The depth at which ground water is struck is entered on the Trial Pit Records. However, this observation may not indicate the true water level at that period. Due to the speed of excavation, natural ground water may be present at a depth slightly higher than the water strike. Moreover, ground water levels are subject to variations caused by changes in the local drainage conditions and by seasonal effects. When a moderate inflow of water does take place, excavation is suspended for at least 10 minutes to enable a more accurate short-term water level to be achieved. An estimate of the rate of inflow is also given. This is a relative term and serves only as a guide to the probable flow of water into an excavation. Further observations of the water level are made on completion.

SAMPLES

Disturbed bulk samples and small disturbed samples are taken and placed in polythene bags for geotechnical testing. Small jar samples and plastic tub samples are taken for laboratory ground contamination testing. Where ground water is encountered in sufficient quantity, a sample of the ground water is also taken.

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G7 Geotech G7 Geotech Ltd 49, Church Rd Leyland PR25 3AA		TRIAL PIT RECORD		Trial Pit No SA01 Sheet 1 of 1																										
Project Name: Proposed residential development		Job No 1277		Trial Pit SA01 machine excavated on 22/10/21 Groundwater not encountered. Trial Pit backfilled with arisings on completion. GL 84.5 mOD GR:523300E 234050N																										
Location: Land East of Talbot Way, Letchworth Garden City, Hertfordshire SG6																														
Client: The Environmental Protection Group Ltd																														
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<u>Photographs</u> 																														

G7 Geotech G7 Geotech Ltd 49, Church Rd Leyland PR25 3AA		TRIAL PIT RECORD		Trial Pit No SA02 Sheet 1 of 1																														
Project Name: Proposed residential development		Job No 1277		Trial Pit SA02 machine excavated on 22/10/21 Groundwater not encountered. Trial Pit backfilled with arisings on completion. GL 84.0 mOD GR:523295E 234065N																														
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G7 Geotech G7 Geotech Ltd 49, Church Rd Leyland PR25 3AA		TRIAL PIT RECORD		Trial Pit No SA03 Sheet 1 of 1																										
Project Name: Proposed residential development		Job No 1277		Trial Pit SA03 machine excavated on 22/10/21 Groundwater not encountered. Trial Pit backfilled with arisings on completion. GL 77.75 mOD GR:523400E 234045N																										
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G7 Geotech G7 Geotech Ltd 49, Church Rd Leyland PR25 3AA		TRIAL PIT RECORD		Trial Pit No SA04 Sheet 1 of 1																														
Project Name: Proposed residential development		Job No 1277		Trial Pit SA04 machine excavated on 22/10/21 Groundwater not encountered. Trial Pit backfilled with arisings on completion. GL 77.0 mOD GR:523420E 234055N																														
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FOREWORD TO SOAKAGE TESTS

GENERAL

The soakage tests are undertaken in general accordance with BRE Digest 365 : 2016, Soakaway design. Soakage tests are undertaken in either machine-excavated or hand-excavated trial pits and water can be delivered either by means of a lorry mounted bowser or by portable 25 litre plastic containers, depending on the size / depth of excavation.

The BRE guidance requires soakage rates to be calculated on the basis of water levels recorded at 25% and 75% of the effective depth of the proposed soakaway. Soakage rates can vary substantially. In highly permeable granular soils the added water may drain relatively quickly, or in practically impermeable cohesive soils the water may drain very slowly, if at all. In the case of soils of low permeability or practically impermeable soils, water levels at 25% and 75% of the effective depth may not be achievable in the available time. In these circumstances, soakage rates are calculated based on alternative selected water levels and this is stated on the results sheets.

Where soakage tests are undertaken to assess the potential for infiltration drainage beneath a sports pitch, or other widescale drainage blanket, they can be undertaken in shallow trial pits of about 0.50m depth to target the proposed pitch formation level. In these circumstances, where the drainage blanket may be relatively thin or may include check dams at intervals, the effective depth of the soakaway as described in BRE Digest 365, is not necessarily relevant to the soakage rate calculation. Alternative selected water levels are therefore taken as the basis for calculation of the soakage rates.

The BRE Digest 365 requires soakage tests to be repeated to give 3 tests at each location in order to model the effects of reduced permeability resulting from saturation of the soils following prolonged rainfall. In the case of soils of low permeability or practically impermeable soils, repeat tests may not always be feasible in the available time. However, in these circumstances, soakaways may not be a suitable drainage option anyway, and a single test, can be sufficient in order to prove this negative outcome.

The Soakage Test Records are compiled from the geotechnical engineer's description of the strata encountered, based on an examination of the soil arisings and the results of field tests. Based on this data, the report presents an opinion on the configuration of strata within the site. However, such reasonable assumptions are given for guidance only, and no liability can be accepted for changes in conditions not revealed by the trial pits / soakage tests.

EXCAVATION METHODS

Trial pits can be undertaken either by mechanical excavator or by the use of hand tools which allows the ground conditions to be reasonably well established. Some disturbance of the ground is inevitable and depending on the type of excavator bucket used this can influence soakage test results.

GROUNDWATER

The depth at which ground water is struck is entered on the Soakage Test and Trial Pit Records. However, this observation may not indicate the true water level at that period. Due to the speed of excavation, natural ground water may be present at a depth slightly higher than the water strike. Moreover, ground water levels are subject to variations caused by changes in the local drainage conditions and by seasonal effects. When a moderate inflow of water does take place, excavation is suspended for at least 10 minutes to enable a more accurate short-term water level to be achieved. An estimate of the rate of inflow is also given. This is a relative term and serves only as a guide to the probable flow of water into an excavation. Further observations of the water level are made on completion.

SAMPLES

Disturbed soil samples are taken and placed in polythene bags for geotechnical testing. Small jar samples and plastic tub samples are taken for laboratory ground contamination testing. Where ground water is encountered in sufficient quantity, a sample of the ground water is also taken.

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G7 Geotech Ltd 49, Church Rd Leyland PR25 3AA		SOAKAGE TEST RESULT		Soakage Test No SA01	
		Job No 1277		Soakage test undertaken with rubber tyred backhoe excavator (JCB) at 0.55m depth.	
Project Name: Proposed Residential Development					
Location: Land to the East of Talbot Way, Letchworth Garden City, Herts SG6					
Client: EPG Ltd					

SOAKAGE RATE

TP SOAKAGE TEST SA01 DEPTH 0.55 TEST No 1 DATE : 22nd October 2021

CASING DEPTH 0.00 m

DIMENSIONS

WIDTH 0.40 m

LENGTH 1.00 m

DIAMETER m

PERIMETER 2.800 m

BASE AREA 0.400 m²

Readings measured from **0.00** m above ground level

SOIL TYPE :-

GL - 0.20 TOPSOIL

0.20 - 0.55 White CHALK

No	time	depth	Depth bgl
1	0	0.300	0.300
2	1	0.300	0.300
3	2	0.305	0.305
4	3	0.305	0.305
5	4	0.310	0.310
6	5	0.310	0.310
7	10	0.315	0.315
8	15	0.320	0.320
9	20	0.320	0.320
10	25	0.320	0.320
11	30	0.320	0.320
12	40	0.320	0.320
13	73	0.330	0.330
14	88	0.340	0.340
15	122	0.350	0.350
16	156	0.360	0.360
17	186	0.360	0.360

	Water Level (m)	Time sec
Top WL	7 0.32	600
Bottom WL	15 0.35	7320

Vol change = 0.0140 m³

V

Soakage area = 1.0090 m²

A

Time = 6720 sec

T

Soakage Rate 2.06E-06 m/sec

Water Level v Time Graph

Time (min)	Depth (m)
0	0.300
1	0.300
2	0.305
3	0.305
4	0.310
5	0.310
10	0.315
15	0.320
20	0.320
25	0.320
30	0.320
40	0.320
73	0.330
88	0.340
122	0.350
156	0.360
186	0.360

Soakage Rate is calculated using two selected water levels
(equivalent to those at 25% and 75% of the fall in water level during
the test) and is based on BRE Digest 365: 2016: Soakaway Design

SOAKAGE TEST RESULT

Soakage Test No

SA02

Sheet 1 of 1

Project Name: Proposed Residential Development

Job No
1277

Location: Land to the East of Talbot Way, Letchworth Garden City, Herts SG6

Client: EPG Ltd

Soakage test undertaken with
rubber tyred backhoe excavator (JCB)
at 1.50m depth.

SOAKAGE RATE

TP SOAKAGE TEST SA02 DEPTH 1.50 TEST No 1 DATE: 22nd October 2021

CASING DEPTH 0.00 m

DIMENSIONS

WIDTH 0.40 m

LENGTH 1.50 m

DIAMETER m

PERIMETER 3.800 m

BASE AREA 0.600 m²

Readings measured from 0.00 m above ground level

SOIL TYPE :-

GL - 0.25 TOPSOIL
0.25 - 1.50 White CHALK

No	time	depth	Depth bgl
1	0	0.630	0.630
2	1	0.650	0.650
3	2	0.650	0.650
4	3	0.650	0.650
5	4	0.660	0.660
6	5	0.670	0.670
7	10	0.670	0.670
8	15	0.680	0.680
9	25	0.690	0.690
10	30	0.690	0.690
11	35	0.700	0.700
12	45	0.710	0.710
13	60	0.720	0.720
14	93	0.750	0.750
15	106	0.760	0.760
16	141	0.780	0.780
17	180	0.790	0.790
18	209	0.810	0.810

<< top reading

<<bottom reading

	Water Level (m)	Time sec
Top WL	6 0.67	300
Bottom WL	15 0.76	6360

Vol change = 0.0540 m³ V
 Soakage area = 3.5830 m² A
 Time = 6060 sec T

Soakage Rate 2.49E-06 m/sec

Soakage Rate is calculated using two selected water levels
 (equivalent to those at 25% and 75% of the fall in water level during
 the test) and is based on BRE Digest 365: 2016: Soakaway Design

Water Level v Time Graph

