



MEC
Consulting Group

FLOOD RISK & DRAINAGE



Milksey Lane, Graveley - Phase 2
Flood Risk Assessment
September 2025

Report Ref: 29161-FLD-0101 Rev A

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REPORT REF: 29161-FLD-0101 Rev A

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REGISTRATION OF AMENDMENTS

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December 2024	-	First issue	Zoe Jordan BSc (Hons) Flood Risk Engineer	Ryan Chafer BSc (Hons) Senior Flood Risk Engineer	Tim Rose BA (Hons), MCIHT, MTPS Regional Director
September 2025	A	Updates based on LLFA comments	Zoe Jordan BSc (Hons) Flood Risk Engineer	Ryan Chafer BSc (Hons) Principal Flood Risk Engineer	Tim Rose BA (Hons), MCIHT, MTPS Regional Director

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EXECUTIVE SUMMARY

Site Address	Milksey Lane, Graveley, Hertfordshire, SG4 7LA, E:523023, N:228248.
Site Description and Setting	The development site is to the north of Graveley, with the current site use assumed to be existing greenfield land. The site is bounded to the north by Graveley Lane and to the east is High Street. To the south and west of the is Milksey Lane and the A1M further west.
Proposed Development	A previous application for 10 residential dwellings (17/04017/FP) has been granted permission by North Hertfordshire Council with the Flood Risk Assessment written by Richard Jackson Engineering Consultants in November 2023. The proposed development is for up to 24 residential dwellings with associated infrastructure, parking and access to High Street.
Flood Risk Information	The Flood Map for Planning shows the site is located within Flood Zone 1, which is defined as land assessed as having an annual probability of river flooding of less than 0.1%. The Environment Agency Flood Risk from Surface Water Map, indicates that the site is at low risk of surface water flooding. A small flow route along the site's southern boundary, along Milksey Lane, flows south during the 1 in 1000-year storm event (low risk). The site is at low risk of flooding from all other sources.
Surface Water Drainage Strategy	In accordance with the National SuDS Standards, the strategy involves conveying surface water flows to a series of attenuation features. Surface water will then discharge from the final attenuation basin into an existing surface water sewer within High Street, at a discharge rate of 0.6l/s. This sewer has been proven to connect into the pond adjacent to Pondsides. In total, a storage volume of 782.87m³ would be required within the attenuation features to accommodate the 1%AEP40CC storm event. Additional drainage features, such as permeable paving, will be used across the site and will provide extra storage on-site. Permeable paving will serve as the first treatment stage for any runoff and ensure adequate surface water treatment is provided. These features have been excluded from calculations at this stage.
Foul Water Drainage Strategy	Sewer records obtained from Anglian Water show there are no surface water sewers within the vicinity of the site. There is a foul water sewer within Milksey Lane, which flows south towards the George and Dragon public house. The Anglian Water developer enquiry states that a gravity connection into Manhole 1001 within High Street is achievable. The AW foul water sewer flows into a Thames Water (TW) Recycling Centre. Further confirmation from Thames Water is required to confirm capacity within the Recycling Centre.
Conclusions	With the above measures in place, the development of the site will not create any flood risk issues within the wider area.
This summary should be read in conjunction with the full report and reflects an assessment of the site based on information received by MEC at the time of production.	

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1.0 INTRODUCTION

- 1.1 MEC Consulting Group Ltd, has been commissioned by Gade Homes (hereafter referred to as 'the Client') to undertake a Flood Risk Assessment for a proposed residential development at Milksey Lane, Graveley (hereafter referred to as 'the Site'). A site location plan is provided in **Appendix A** and a sketch masterplan is contained within **Appendix B**.
- 1.2 A previous application for 10 residential dwellings (17/04017/FP) was granted permission with the Flood Risk Assessment produced by Richard Jackson Engineering Consultants in November 2023.
- 1.3 This application is for a proposed development of up to 24 residential dwellings with associated infrastructure, parking and access to High Street.
- 1.4 The purpose of this Flood Risk Assessment (FRA) is to review freely available information and assess the flood risk posed to the site from a range of sources. The FRA has been carried out in accordance with the requirements of the National Planning Policy Framework (NPPF) and associated Planning Practice Guidance (PPG), with respect to flood risk and climate change.
- 1.5 Revision A of this report aims to address comments provided by Hertfordshire County Council as the Lead Local Flood Authority (LLFA), dated 3rd June 2025 (ref:25/00571/FP). The LLFA comments provided are outlined below in *Italics* and within **Appendix J**, and an MEC response is provided in normal text, addressing each comment.
- ***We are concerned that there is no principal agreement from Thames Water confirming sufficient capacity within the sewer system for this development.***
A developer enquiry has been submitted to Anglian Water, as the wastewater supplier in the area, and the response can be found within Section 7 of the report. Further information about capacity within the Thames Water Recycling Centre has been requested.
 - ***We are also concerned that there is limited explanation on how greenfield runoff volumes will not increase flood risk elsewhere due to the QBAR rate being raised from 0.6l/s to 2.0l/s***
The drainage strategy drawing 29161_01_230_01a in **Appendix H** has been updated to decrease the design outflow from 2.0l/s to the QBAR Greenfield Rate of 0.6l/s, reducing the rate to the pre-development discharge rate. Surface water from the existing greenfield land is likely to outfall into the existing sewer within High Street, which has been proven to connect to the pond adjacent to Pondsides. Therefore, the likelihood of flood risk being increased elsewhere will be low. This is in accordance with Paragraphs 181, 182 and 187 of the National Planning Policy Framework (NPPF).
- 1.6 The assessment has been carried out using our best engineering judgement; however, there are levels of uncertainty implicit in the historical data and methods of analysis. The Flood Risk Assessment has been carried out in accordance with the requirements of the documents below:

- National Planning Policy Framework (NPPF) - December 2024
- Flood Risk and Coastal Change Planning Practice Guidance (PPG) August 2022
- Environment Agency Flood Map for Planning and Risk of Flooding from Surface Water datasets from the DEFRA Spatial Data Catalogue
- DEFRA MagicMap, 2024
- British Geological Survey Geology Viewer and GeoIndex, 2024
- The Local Hertfordshire Plan – November 2022
- North Hertfordshire Strategic Flood Risk Assessment Addendum (SFRA) – September 2016
- Hertfordshire County Council Preliminary Flood Risk Assessment – June 2011
- Hertfordshire Local Flood Risk Management Strategy – February 2019
- North Hertfordshire Supplementary Planning Document – September 2024

1.7 The Local Planning Authority (LPA) is North Hertfordshire District Council (NHDC) and the Lead Local Flood Authority (LLFA) is Hertfordshire County Council (HCC). The site falls within the Anglian Water (AW) Catchment.

Disclaimer

1.8 MEC has completed this report for the benefit of the individuals referred to in paragraph 1.1 and any relevant statutory authority which may require reference in relation to approvals for the proposed development. Other third parties should not use or rely upon the contents of this report unless explicit written approval has been gained from MEC.

1.9 MEC accepts no responsibility or liability for:

- The consequence of this documentation being used for any purpose or project other than that for which it was commissioned;
- The issue of this document to any third party with whom approval for use has not been agreed.

2.0 POLICY CONTEXT

National Planning Policy Framework

- 2.1 The National Planning Policy Framework (NPPF) was published and updated most recently in December 2024 by the Ministry of Housing, Communities and Local Government.
- 2.2 The NPPF is the primary source of national planning guidance in England, setting out the Government's planning policies for England and how they are expected to be applied by local councils.
- 2.3 'Chapter 14: Meeting the challenge of climate change, flooding and coastal change' outlines the guiding principles for managing flood risk as part of the planning process, notably paragraphs 161-186.
- 2.4 The Planning Practice Guidance (PPG) sets out the vulnerability to flooding of different land uses. It encourages development to be in areas of lower flood risk where possible and stresses the importance of preventing increases in flood risk off-site to the wider catchment.
- 2.5 The PPG also states that alternative sources of flooding, other than fluvial (river flooding), should be considered when preparing an FRA. The document also includes a series of tables that define Flood Zones, the flood risk vulnerability classification of development land use, and 'compatibility' of development within the defined Flood Zones.
- 2.6 Therefore, this FRA has been completed in line with the guidance and requirements of the NPPF and PPG.

Local Plan

- 2.7 The North Hertfordshire Local Plan (2011-2031) was adopted by the council in November 2022. The Local Plan sets out how land within the authorities' boundaries can be used and developed, providing policies which the Council uses to determine planning applications. The plan aims to set out the areas where development will take place, the areas that will be protected and the policies that will be used to determine planning applications.
- 2.8 More generally, the Core Strategy also lists policies that guide the design and principles of all development within the authority's land. Those relevant to this FRA are summarised as follows;
- Policy SP12: Green Infrastructure, landscape and biodiversity
 - Policy D1: Sustainable Design
 - Policy NE7: Reducing Flood Risk
 - Policy NE8: Sustainable Drainage Systems

Local SFRA

- 2.9 The North Hertfordshire District Council Strategic Flood Risk Assessment (SFRA) was published in September 2016. The SFRA was produced to provide an appropriate evidence base for the Local Plan and provides a summary of flood risk across the district.

- 2.10 Appropriate background information has been used to inform this FRA and will be referenced accordingly.

Local PFRA

- 2.11 The Hertfordshire County Council Preliminary Flood Risk Assessment (PFRA) was published in June 2011 and was prepared to assist Hertfordshire County Council meet its duties to manage local flood risk, and the delivery of any legal requirements placed on it as Lead Local Flood Authority (LLFA) under the Flood Risk Regulations 2009.
- 2.12 Appropriate background information has been used to inform this FRA and will be referenced accordingly.

Flood Risk Management Strategy

- 2.13 Hertfordshire County Council Local Flood Risk Management Strategy (FRMS) was published in February 2019 to comply with Section 9 of the Flood and Water Management Act 2010 and aims to provide a framework for meeting its requirements to develop, maintain, apply, and monitor a local strategy for flood risk management.
- 2.14 The FRMS provides further information regarding surface water runoff, groundwater and sewer flooding and flood risk around the county and the introduction of flood risk alleviation schemes at various scales, including SuDS.

Supplementary Planning Documents

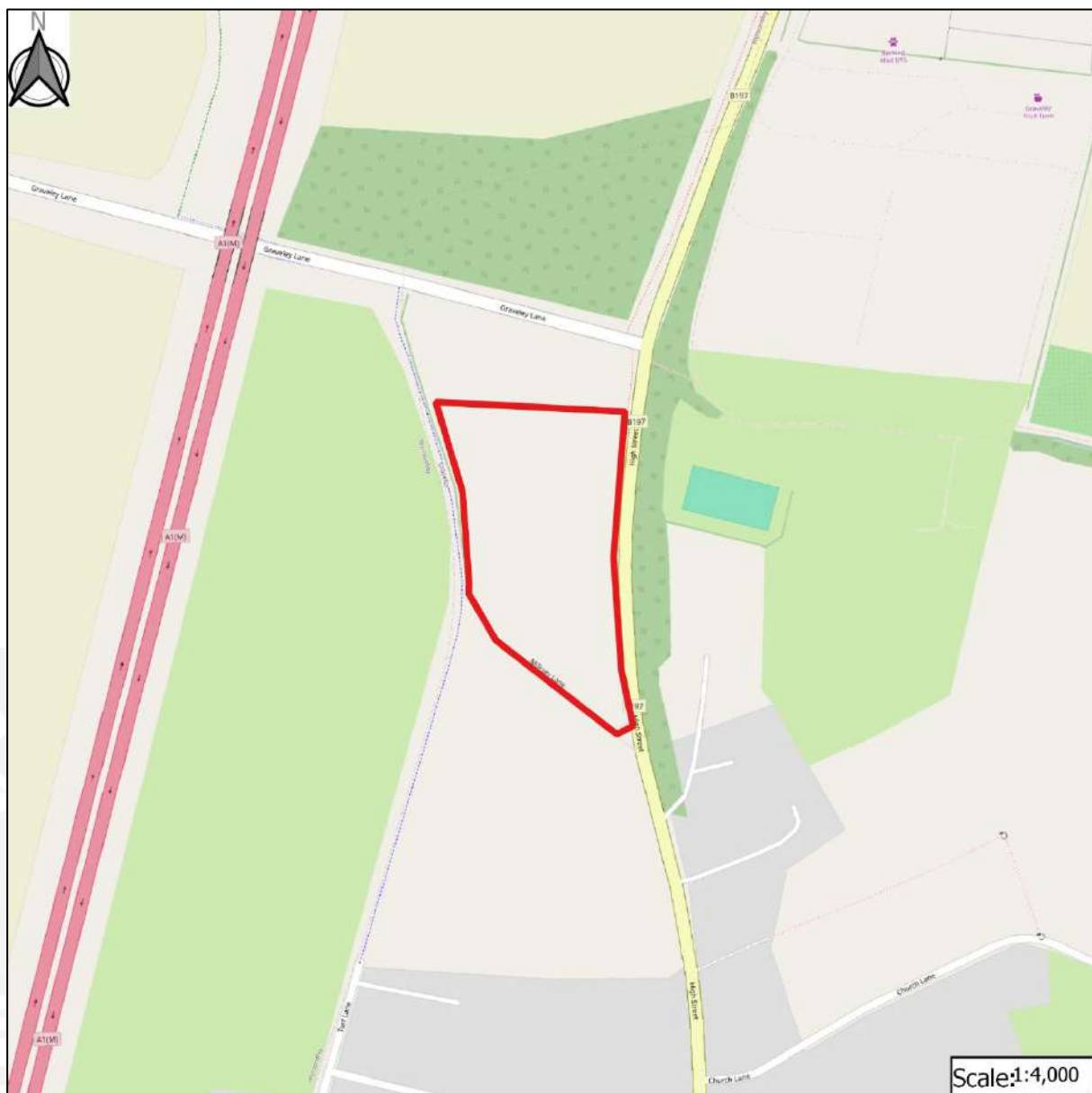
- 2.15 The North Hertfordshire Flood and Water Supplementary Planning Document (SPD) was adopted in September 2024. The SPD was published to provide developers with information on all aspects of development they will be required to meet as part of an application.
- 2.16 Specifically for this FRA, this SPD contains information on managing flood risk and the water environment within North Hertfordshire, along with information around SuDS, flood mitigation and how they should be incorporated into designs.

3.0 SITE DESCRIPTION

Site Location and Features

- 3.1 The Ordnance Survey National Grid Reference (NGR) for the centre of the site, E:523023, N:228248. The development site is to the north of Graveley with the current site use assumed to be existing greenfield land. Therefore, it is assumed to be subject to a natural regime of runoff and/or infiltration where ground conditions permit.
- 3.2 The site is bounded to the north by Graveley Lane and to the east is High Street. To the south and west of the site is Milksey Lane and the A1m is further west. The site location is shown in Figure 3.1.

Figure 3.1: Site Location Plan



Topographic Data

- 3.3 A topographical survey was undertaken by Axis Surveys in August 2024 and can be found in **Appendix C**. The information shows the site falls from north to south with levels ranging from 110.97m AOD to 100.00m AOD.

Flood Zone Maps & Flood Defence Data

- 3.4 Information relating to the current flood risk to the application site has been obtained from the Environment Agency and .gov.uk websites. There is no recorded evidence of flood defences in the vicinity of the site.

Watercourses & Hydrology

- 3.5 A review of the topographical survey confirms there are no ditches, or watercourses onsite. There are two gullies on Milksey Lane, close to the junction with High Street.
- 3.6 The closest watercourse is located approximately 153m south of the site. The watercourse flows from west to east and becomes culverted along High Street before outfalling into the existing pond on Pondsides.
- 3.7 The closest designated Main River, the Weston Tributary, is situated approximately 3.60km to the northeast, which is a tributary of the River Beane.

Historic Flooding

- 3.8 Information published from the North Hertfordshire SFRA suggests there is no evidence of historic flooding within the site.

Geological Data

- 3.9 The 1:50,000 British Geological Survey (BGS) viewer shows the whole of the site is underlain by the Holywell Nodular Chalk Formation and New Pit Chalk Formation consisting of Chalk. Superficial deposits of Lowersoft Formation consisting of Diamicton and Glaciofluvial deposits consisting of sand and gravel overlie the bedrock.
- 3.10 As part of the previous application the site was investigated for its infiltration potential in January 2018 by Richard Jackson Engineering Consultants (ref: KB/48759). The report highlights the underlying ground conditions through the trial pit. The ground conditions at the site are generally made ground to a depth of 0.75m BGL in TP1 and 0.20m BGL. The full infiltration results can be found in **Appendix D**.

Sewers

- 3.11 Sewer records have been obtained from Anglian Water, see **Appendix E**. The records show there are no surface water sewers within the vicinity of the site. There is a foul water sewer within Milksey Lane, which flows south towards the George and Dragon public house.
- 3.12 The topographical survey shows there are two gullies on Milksey Lane, close to its junction with High Street. These gullies are assumed to outfall to the existing surface water sewers in High Street. The development is assumed to outfall into these gullies when rainfall conditions result in overland flows down Milksey Lane.

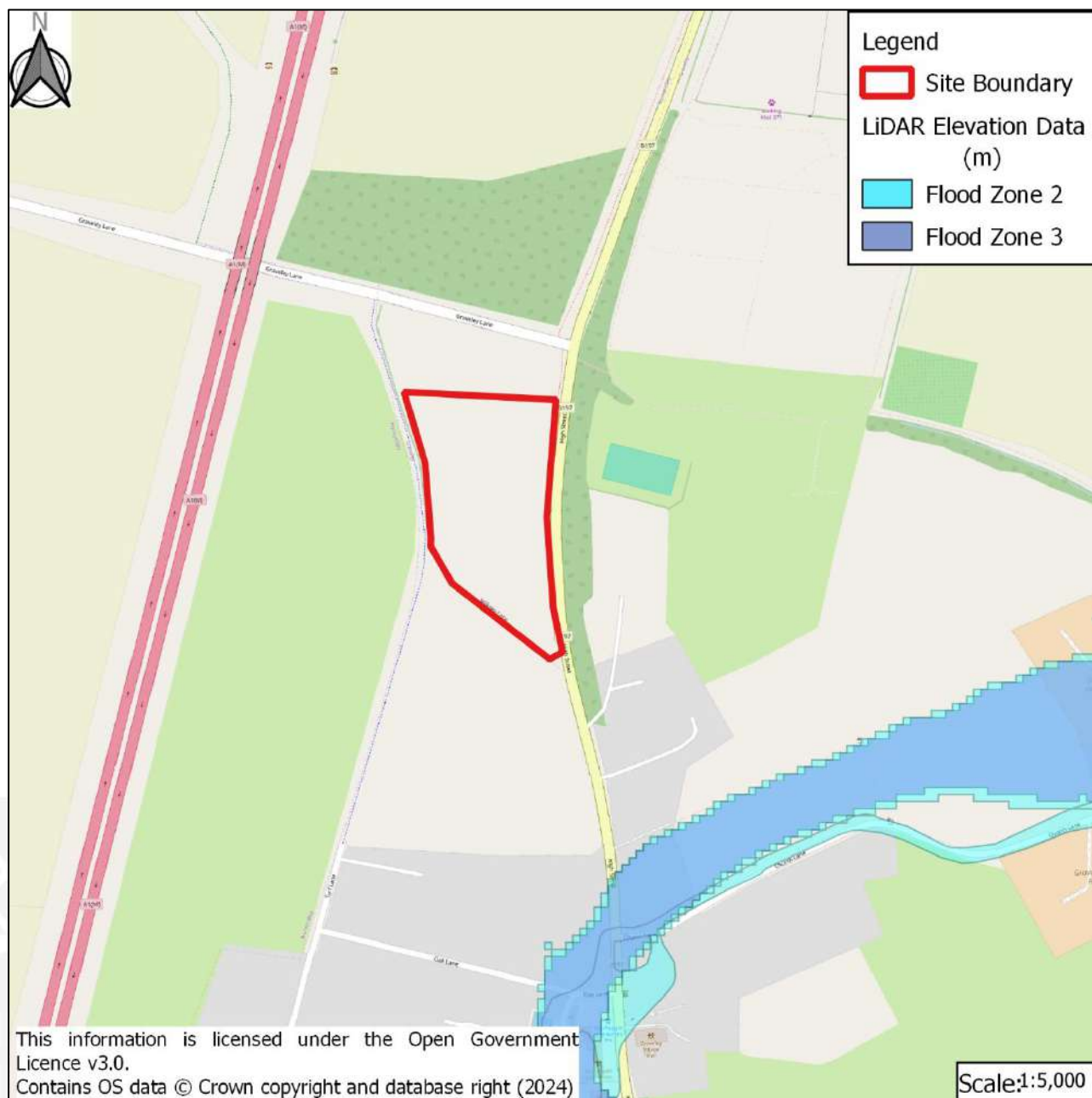
- 3.13 A CCTV Survey by SB Drain Services was undertaken as part of an application for a development south of Milksey Lane (23/00186/FP). A dye test was undertaken of the existing watercourse and surface water sewer in High Street. The survey proved connectivity from the watercourse, into the surface water sewer and into the pond adjacent to Pondsides, south of Oak Lane.
- 3.14 An additional CCTV survey was undertaken by AquaTech Drain Services in November 2024 to establish drainage connections around the proposed development. AquaTech found there were two manholes located within the treeline along the site's eastern boundary. The CCTV survey shows these manholes connect into the system downstream. Therefore, it is assumed that all of the development in Graveley currently outfalls into this system. The CCTV survey can be found in **Appendix F**.

4.0 FLOOD RISK TO SITE

Flood Zone Allocation

- 4.1 The Flood Map for Planning is shown in Figure 4.1. The map shows the site lies within Flood Zone 1. Flood Zone 1 (FZ1) is defined as land assessed as having an annual probability of river flooding less than 0.1%.

Figure 4.1: Environment Agency's Flood Map for Planning (Rivers and Seas)



Surface Water Flooding Risk

- 4.2 The Environment Agency Flood Risk from Surface Water Map (Figure 4.2) indicates that the site is at low risk of surface water flooding. A small flow route along the site's southern boundary, along Milksey Lane, flows south during the 1 in 1000-year storm event (low risk).

Figure 4.2: Environment Agency's Flood Risk from Surface Water Map



Artificial Waterbodies Flood Risk

- 4.3 The Environment Agency Mapping shows that the site is not at risk of reservoir flooding, as such, the risk of flooding from reservoirs is low.

Groundwater Flood Risk

- 4.4 Groundwater Vulnerability Mapping within MagicMaps indicates that the site is located within a medium-high Groundwater Vulnerability Area.
- 4.5 Groundwater monitoring has not been undertaken at this stage, however, previous infiltration testing, which was undertaken in January 2018 to a depth of 2.0m, did not encounter groundwater. Therefore, the risk of groundwater flooding from the site is considered low.

Sewer Flood Risk

- 4.6 The SFRA shows there has been no recorded sewer flooding within the postcode area of the planned site. Given there is no direct reference to flooding to the site the risk can be taken as low.

5.0 FLOOD RISK ASSESSMENT

Flood Risk Assessment Methodology & Objectives

5.1 It is recognised that developments that are designed without regard to flood risk may endanger lives, damage property, cause disruption to the wider community, damage the environment, be difficult to insure and require additional expense on remedial works. Current guidance on development and flood risk identifies several key aims for development to ensure that it is sustainable in flood risk terms.

5.2 These aims are as follows:

- The development should not be at significant risk of flooding and should not be susceptible to damage due to flooding;
- The development should not be exposed to flood risk such that the health, safety and welfare of the users of the development, or the population elsewhere, are threatened;
- Safe access to and from the development should be possible during flood events;
- The development should not increase flood risk elsewhere;
- The development should not prevent safe maintenance of watercourses or maintenance and operation of flood defences;
- The development should not be associated with an onerous or difficult operation and maintenance regime to manage flood risk. The responsibility for any operation and maintenance required should be clearly defined;
- Future users of the development should be made aware of any flood risk issues relating to the development;
- The development should not lead to the degradation of the environment; and
- The development should meet all of the above criteria for its lifetime, including considering the potential effects of climate change.

5.3 This Flood Risk Assessment is undertaken with due consideration of these sustainability aims and has been prepared to inform the proposed scheme.

Project Scope

5.4 In order to achieve the aims outlined above, this Flood Risk Assessment has been undertaken in accordance with current best-practice guidance, including the National Planning Practice Guidance. A scoping study was initially undertaken to identify all potential sources of flooding at the site, which may warrant further consideration. Any potential flooding issues identified in the scoping study have subsequently been considered within this FRA. The scoping study aims to review all available information and provide a qualitative assessment of the flood risk to the site and the impact of the site on flood risk elsewhere. The report has been undertaken with due regard to the EA's National Standing Advice on Development and Flood Risk.

Scoping Study

5.5 All potential sources of flooding must be considered for any proposed development.

- 5.6 Using the EA Flood Zone mapping, topographical survey and Ordnance Survey maps, a summary of the potential sources of flooding and a review of the potential risk posed by each source on the development area of the application site is presented in Table 5.1.

Table 5.1: Potential Risks posed by Flooding Sources

Source	Risk			Comments
	High	Medium	Low	
Fluvial			✓	The site is located within Flood Zone 1 (Low Probability).
Coastal & Tidal			✓	The site is not located near to the coast and is not affected by coastal or tidal flooding.
Surface Water			✓	The site is at low risk of surface water flooding.
Groundwater			✓	Groundwater was not encountered during previous infiltration testing.
Sewer			✓	Limited extent of sewers in the immediate vicinity
Reservoirs & Artificial Waterbodies			✓	The site is at low risk of reservoir or artificial watercourse flooding.

Flood Risk Mitigation

- 5.7 It is vital that the correct mitigation is put in place to minimise the flood risk to the development. In accordance with the NPPF, this includes preventing harm from occurring to the users of the site as well as ensuring the development itself is protected.

Fluvial Flood Risk Mitigation

- 5.8 The proposed development falls entirely in Flood Zone 1. Given the site is in Flood Zone 1 and at very low risk of fluvial flooding, there would be no requirements to provide any further formal mitigation at this development site.

Surface Water Flood Risk Mitigation

- 5.9 The Environment Agency Flood Risk from Surface Water Map indicates that the site is at low risk of surface water flooding. In accordance with the NPPF, finished floor levels will be set to a minimum of 150mm above the adjacent site levels. Permeable paving will be utilised to avoid any ponding of surface water above the ground. Surface water is likely to be collected by the proposed site-wide drainage infrastructure and conveyed to a proposed discharge point on-site. Based on the above, the risk of flooding will be managed at the development site post-development and the remaining risk will be low

Vulnerability Classification of Proposed Development

- 5.10 The National Planning Practice Guidance: Flood Zone and Flood Risk Tables provide information on the vulnerability classification of various developments. The proposed residential development end use of this site falls in the “more vulnerable” classification. The proposed new dwellings should be situated wholly within Flood Zone 1. A comparison of the ‘more vulnerable’ use with the development proposals within Flood Zone 1 shows that development proposals are acceptable, as shown in Table 5.2.

Table 5.2: Flood risk vulnerability and flood zone ‘compatibility’ from Flood Risk and Coastal Change - Planning Practice Guidance

Flood Risk Vulnerability classification		Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1 (<0.1%)	✓	✓	✓	✓	✓
	Zone 2 (0.1% < p < 1%)	✓	✓	Exception Test Required	✓	✓
	Zone 3a (1% < p < 5%)	Exception Test required	✓	x	Exception Test Required	✓
	Zone 3b ‘Functional Floodplain’ p > 5%)	Exception Test Required	✓	x	x	x

Sequential Test

- 5.11 According to National Planning Practice Guidance: Flood Zone and Flood Risk, the Sequential Test gives preference for locating new development in low-risk areas from all sources of flooding. However, if there is no allocated land within low-risk areas which meets the policy aims of the published Local Authority Local Plan or Local Development Framework then other sites in higher flood risk categories can be considered for that development.
- 5.12 The site lies within Flood Zone 1 and is at low risk of surface water flooding. This meets the requirements of the PPG which states the aim of the sequential test is to

“... ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk. This means avoiding, so far as possible, development in current and future medium and high flood risk areas considering all sources of flooding including areas at risk of surface water flooding”.

Exception Test

- 5.13 Based on the above the proposed development is in accordance with paragraphs 161-186 of the NPPF, as such an exception test is not required.

6.0 SURFACE WATER MANAGEMENT STRATEGY

6.1 It is essential that the proposed development does not increase flood risk to adjacent land or downstream of the Site, as well as protecting the development from flooding itself. To ensure that the flood risk is minimised, the drainage design will incorporate the following flood mitigation measures:

- Site levels will be designed to direct all overland surface water flows away from the dwellings following the land's natural topography.
- The proposed development will include a surface water drainage system that will intercept runoff generated within the development. This will minimise the risk of flooding within the proposed development and also reduce the incidence of overland flows.
- The surface water drainage system will convey flows to a series of geo-cellular tanks and attenuation basin on-site and will accommodate all storm events up to and including a 1%AEP40CC event.

Surface Water Outfall

6.2 Surface water arising from developed sites should, as far as practical, be managed in a sustainable manner to mimic the surface water flows arising from the undeveloped site. When considering the surface water discharge, the SuDS hierarchy needs to be adhered to. The SuDS hierarchy states that the options below must be adhered to in order of sustainability or otherwise evidenced before moving down to a less sustainable discharge method;

- Water reuse (where a need is identified)
- Discharge at source (soakaway)
- Watercourse or waterbody
- Surface water sewer, highway drain or other drainage system
- To a combined sewer

Discharge at Source

6.3 The 1:50,000 British Geological Survey (BGS) viewer shows the whole of the site is underlain by the Holywell Nodular Chalk Formation and New Pit Chalk Formation consisting of Chalk. Superficial deposits of Lowersoft Formation consisting of Diamicton and Glaciofluvial deposits consisting of sand and gravel overlie the bedrock.

6.4 Soil Infiltration Rate Testing has been undertaken at the site in January 2018 by Richard Jackson Engineering Consultants, in accordance with BRE365 (ref: KB/48759). Testing was undertaken in 3 trial pits, however, due to the observed poor infiltration rates, only a single test in each pit was undertaken. Due to the cohesive nature of the subsoil, infiltration is not feasible at the site and an alternative option should be sought. Infiltration results can be found in **Appendix D**.

Discharge at Watercourse

- 6.5 The closest designated Main River, the Weston Tributary, is situated approximately 3.60km to the northeast, which is a tributary of the River Beane. The closest watercourse is located approximately 153m south of the site. The watercourse flows from west to east and becomes culverted along High Street before outfalling into the existing pond on Pondside.
- 6.6 Any direct route to these watercourses would cross third-party land and therefore they would not be feasible to outfall to and an alternative option should be sought.

Discharge to Sewers

- 6.7 Sewer records have been obtained from Anglian Water, see **Appendix E**. The records show there are no surface water sewers within the vicinity of the site. There is a foul water sewer within Milksey Lane, which flows south towards the George and Dragon public house. It is not feasible to discharge to a foul water sewer unless all other options have been exhausted and therefore an alternative option should be sought.
- 6.8 The topographical survey shows there are two gullies on Milksey Lane, close to its junction with High Street. These gullies are assumed to outfall to the existing surface water sewers in High Street. The development is assumed to outfall into these gullies when rainfall conditions result in overland flows down Milksey Lane.
- 6.9 A CCTV Survey by SB Drain Services was undertaken as part of an application for a development south of Milksey Lane (23/00186/FP). A dye test was undertaken of the existing highways surface water sewer in High Street. The survey proved connectivity from the surface water sewer to the surface water ponds located adjacent to Pondside, south of Oak Lane.
- 6.10 An additional CCTV survey was undertaken by AquaTech Drain Services in November 2024 to establish drainage connections around the proposed development. AquaTech found there were two manholes located within the treeline along the site's eastern boundary. The CCTV survey shows these manholes connect into the system downstream. Therefore, it is assumed that all of the development in Graveley currently outfalls into this system. In accordance with the drainage hierarchy, surface water can outfall into the existing sewer system within High Street. The results for the CCTV surveys can be found in **Appendix F**.

Land Use

- 6.11 In order to calculate the drainage requirements an understanding of the land uses on-site needs to be known. Table 6.1, below summarises the proposed land uses within the site. The site within the red line boundary currently consists of existing open greenspace, with an existing dwelling with associated hardstanding areas. The current land use has been calculated using the existing site plan and the post-development land use has been measured from the proposed layout.

Table 6.1: Land Use Summary.

Land Use Type	Existing Site Areas		Proposed Site Areas	
	Ha	%	Ha	%
Impermeable Areas	0.21	15	0.59	41
Green Landscape / Permeable areas	1.19	85	0.81	59
TOTAL	1.40	100	1.40	100

Urban Creep Allowances

- 6.12 Urban creep is the conversion of permeable surfaces to impermeable ones over time, e.g., extensions to existing buildings. It has been shown that, over the lifetime of development, urban creep can increase impermeable areas by as much as 10%. An allowance of 10% for increases in the impermeable area due to urban creep over the lifetime of the development will be included within the drainage calculations. The impermeable area is therefore adjusted to 0.65ha.

Climate Change Allowances

- 6.13 The influence of climate change on rivers and watercourses is likely to increase the frequency of flood events and the overall volume of water that passes the site. When considering surface water runoff from the site, the increase in peak rainfall intensity varies over the lifetime of the development. Where residential developments with a lifetime beyond the 2070s are proposed the NPPF states the use of the Upper-End Allowance for the 2070s epoch (2061 to 2125) should be used, as highlighted in red in Table 6.2.

Table 6.2: Peak Rainfall intensity allowance in small and urban catchments from the Flood Risk Assessments: Climate Change Allowances Guidance

Annual Exceedance Probability	Total potential change anticipated for the '2050s' (2022 to 2060)		Total potential change anticipated for the '2070s' (2061 to 2125)	
	Central	Upper End	Central	Upper End
3.3 % AEP	20%	35%	25%	35%
1 % AEP	20%	40%	25%	40%

Discharge Rate

- 6.14 Existing runoff conditions have been calculated using the FEH method within Flow Causeway. For an impermeable area of 0.59ha, the QBAR Greenfield Rate has been calculated as 0.6l/s. The calculation of the Greenfield rate is included in **Appendix G**.

Drainage Strategy

6.15 The overall drainage strategy has been based on the land use table, discharge rates and the current site layout presented in **Appendix B**. In accordance with the National SuDS standards, the strategy involves conveying surface water flows to a series of attenuation tanks, prior to outfalling into an attenuation basin within the southern boundary of the site.

6.16 Due to the topography of the site the drainage system has been designed with a number of flow controls after each geo-cellular tank to allow the retention of water and the utilisation of storage at differing site levels.

Attenuation Tank 1:

6.17 Surface water flows for an impermeable area plus urban creep of 0.082ha will be conveyed to the proposed Attenuation Tank 1 onsite. A storage volume of 47.78m³ is required within Attenuation Tank 1 to allow sufficient time for water to discharge at 1.5l/s into Attenuation Basin 1 and cater for all events up to and including the 1%AEP40CC.

Attenuation Tank 2:

6.18 Surface water flows for an impermeable area plus urban creep of 0.125ha will be conveyed to the proposed Attenuation Tank 2 onsite. A storage volume of 76.36m³ is required within Attenuation Tank 2 to allow sufficient time for water to discharge at 2.0l/s into Attenuation Basin 1 and cater for all events up to and including the 1%AEP40CC.

Attenuation Tank 3:

6.19 Surface water flows for an impermeable area plus urban creep of 0.144ha and attenuation from tanks 1 and 2 will be conveyed to the proposed Attenuation Tank 3 onsite. A storage volume of 250.96m³ is required within Attenuation Tank 3 to allow sufficient time for water to discharge at 1.8l/s into Attenuation Basin 1 and cater for all events up to and including the 1%AEP40CC.

Attenuation Basin 1:

6.20 Surface water flows for an impermeable area plus urban creep of 0.300ha and attenuation from attenuation tanks 1 - 3 will be conveyed to the proposed Attenuation Basin 1 onsite. A storage volume of 407.77m³ is required within Attenuation Basin 1 to allow sufficient time for water to discharge at 0.6l/s into Attenuation Basin 1 and cater for all events up to and including the 1%AEP40CC. The attenuation basin has been designed to accommodate a 1:3 gradient for the internal slopes, whilst a gabion structure will be constructed for the external batters due to topographical and RPA constraints.

6.21 In total a storage volume of 782.87m³ would be required within the storage features to accommodate the 1%AEP40CC storm event. The results of this analysis are shown in Table 6.3. The calculations for the proposed design can be seen in **Appendix G**, and a drainage strategy based on the principles above is shown in drawing 29161_01_230_01a in **Appendix H**.

Table 6.3: Discharge Rates and Storage Requirements

	Impermeable Area Plus Urban Creep	Discharge Rate	Max Storage Requirements (1%AEP45CC)
Attenuation Tank 1	0.082ha	1.5l/s into Attenuation Tank 3	47.78m ³
Attenuation Tank 2	0.125ha	2.0l/s into Attenuation Tank 3	76.36m ³
Attenuation Tank 3	0.144ha and attenuation from Tanks 1 and 2	1.8l/s into Attenuation Basin 1	250.96m ³
Attenuation Basin 1	0.300ha and attenuation from Tank 3	0.6l/s	407.77m ³
Total	0.651ha	-	782.87m³

6.22 Permeable paving will be proposed on-site within car parking spaces. These features will provide extra storage on-site, act as a first treatment stage for any run-off and will ensure adequate surface water treatment is provided. These features have been excluded from the calculations at this stage.

6.23 A drainage strategy based on the principles above is shown in drawing 29161_01_010_01a in **Appendix H**.

Applicable SuDS Techniques

6.24 The National Standards for Sustainable drainage systems (Ref. 16) that deals with SuDS cover a whole range of sustainable approaches to surface water drainage management including:

- source control measures including rainwater recycling and drainage;
- filter strips and swales, which are vegetated features that hold and drain water downhill mimicking natural drainage patterns;
- filter drains and porous pavements to allow rainwater and run-off to infiltrate into permeable material below ground and provide storage if needed; and
- basins and ponds to hold excess water after rain and allow controlled discharge that avoids flooding.

6.25 Each of the five SuDS considerations listed above is discussed below in Table 6.4, with reference to their suitability for the proposed development.

Table 6.4: Suitability of SuDS techniques

	COMPONENT	SUITABILITY	REASON
Source Control	Rainwater Harvesting	Yes	Rainwater harvesting could be used across the site but has not been included within the calculations
	Green Roofs	No	Green roofs are generally not suitable for residential developments.
	Bio-retention Systems/ Rain Gardens	Yes	Rain gardens could be used across the site within open space but has not been included within the calculations
Proprietary Systems	Proprietary bio-retention systems	No	More appropriate SuDS features can be accommodated within the development and are preferred.
Infiltration Devices	Permeable Paving	Yes	Permeable paving is suitable for the proposed development within private roads and shared spaces.
	Infiltration trenches/ Soakaways	No	Infiltration has been proven to be unfeasible at the proposed development.
Filtration	Open Swales, Filter Strips/ Drains	No	This would not be appropriate given the scope and scale of the development.
Retention/ Detention	Detention Basin, Attenuation Pond/ Tanks	Yes	The proposed attenuation tanks and basin will provide surface water storage and treatment prior to discharging from the site.

Surface Water Quality

- 6.26 The SuDS Manual CIRIA document C753 (Ref. 10), indicates the minimum treatment indices appropriate for contributing pollution hazards for different land use classifications. To deliver adequate treatment, the selected SuDS components should have a total pollution mitigation index (for each contaminant) that equals or exceeds the pollution hazard index.
- 6.27 Surface water runoff from residential roofs will have a very low pollution hazard level, while the residential parking areas will have a low pollution hazard level. The pollution hazard indices, mitigation indices of each SuDS component and the accompanying calculations are provided in Table 6.5.

Table 6.5: SuDS Mitigation Indices (Extract from CIRIA 753 Table 26.3)

SuDS Component	Mitigation Indices		
	<i>Total Suspended Solids</i>	<i>Metal</i>	<i>Hydrocarbons</i>
Residential Roofs	0.2	0.2	0.05
Residential Parking Areas	0.5	0.4	0.4
Attenuation Basin	0.5	0.5	0.6
Permeable Paving	0.7	0.6	0.7
SuDS Mitigation Index	0.85	0.8	0.95
Mitigation Requirement Met?	Yes	Yes	Yes

- 6.28 For the very low to low pollution hazard levels generated at the site, the proposed attenuation basin and permeable paving would provide sufficient treatment in accordance with the Simple Index Approach.

Exceedance and Flow Routing

- 6.29 The risk of overland flooding from adjacent land to dwellings is very low. The design of levels and features on the site will follow best practice by ensuring any overland flow on the site is routed safely away from dwellings and to areas of the lowest risk on site. Any surcharging and subsequent flooding of sewers will be mitigated by the flood routing described above. The exceedance flows will remain within the site and will flow away from the proposed dwellings.
- 6.30 The drainage strategy drawing 29161_01_230_01a in **Appendix H** has been updated to decrease the design outflow from 2.0l/s to the QBAR Greenfield Rate of 0.6l/s, reducing the rate to the pre-development discharge rate. Surface water from the existing greenfield land is likely to outfall into the existing sewer within High Street, which has been proven to connect to the pond adjacent to Pondside. Therefore, the likelihood of flood risk being increased elsewhere will be low. This is in accordance with Paragraphs 181, 182 and 187 of the National Planning Policy Framework (NPPF).

Maintenance and Management

- 6.31 An integrated approach to the maintenance and management of SuDS systems is a requirement of the NPPF and by the Flood & Water Management Act 2010. The aim of a maintenance and management plan is to ensure a clear understanding of responsibilities and to implement a maintenance regime for all new drainage systems throughout the development's lifetime, ensuring they continue to function as required.
- 6.32 The surface water drainage network is to be offered to AW for adoption.
- 6.33 All private drainage systems, including the SuDS features, will be maintained by the landowner, or an appointed management company.
- 6.34 A proposed maintenance schedule that breaks down the maintenance requirements of the various proposed assets can be found in **Appendix I**.

7.0 FOUL WATER STRATEGY

- 7.1 According to The Building Regulations (2010), foul water drainage from new developments should be discharged into the following in order of priority:
- A public sewer, or;
 - A private sewer communicating with a public sewer, or;
 - A septic tank which has an appropriate form of secondary treatment, or;
 - A cesspool.
- 7.2 Sewer records and a developer enquiry have been obtained from Anglian Water (AW), see **Appendix E**. The documents show there are no surface water sewers within the vicinity of the site. There is a foul water sewer within Milksey Lane, which flows south towards the George and Dragon public house.
- 7.3 The developer enquiry states that a gravity connection into Manhole 1001 within High Street is achievable and there is capacity within their system. The proposed connections are shown on drawing 29161_01_230_01a in **Appendix H**. The AW foul water sewer flows into a Thames Water (TW) Recycling Centre. Further confirmation from Thames Water is required to confirm capacity within the Recycling Centre.

8.0 CONCLUSION AND SUMMARY

8.1 MEC has been commissioned by Gade Homes to undertake a Flood Risk Assessment for a proposed residential development at Milksey Lane, Graveley. This assessment has been undertaken to ascertain the constraints of the development to the site and to assess the impact of the design, concerning flood risk.

- The site is located within Flood Zone 1 and is therefore compatible with a “more vulnerable” development use in line with policy guidance.
- The site is at very low risk of surface water flooding.
- The risk of flooding from all other sources is low.
- Groundwater was not encountered during ground investigations.
- A CCTV survey of the highway's sewer system showed connectivity from the two manholes located within the treeline on the easternmost boundary of the site. The sewer runs along High Street and into the surface water ponds located adjacent to Pondsides, south of Oak Lane.
- Existing runoff conditions have been calculated using the FEH method within Flow Causeway. For an impermeable area of 0.59ha, the QBAR Greenfield Rate has been calculated as 0.6l/s.
- In accordance with the National SuDS Standards, the strategy involves conveying surface water flows to a series of attenuation features, which will then discharge into the existing highways surface water sewer within High Street, at a controlled discharge rate of 0.6l/s.
- In total a storage volume of 782.87m³ would be required within the attenuation basins to accommodate the 1%AEP40CC storm event.
- The drainage strategy has been updated to decrease the design outflow from 2.0l/s to the QBAR Greenfield Rate of 0.6l/s, reducing the rate to the pre-development discharge rate. Surface water from the existing greenfield land is likely to outfall into the existing sewer within High Street, which has been proven to connect to the pond adjacent to Pondsides. Therefore, the likelihood of flood risk being increased elsewhere will be low. This is in accordance with Paragraphs 181, 182 and 187 of the National Planning Policy Framework (NPPF).
- Additional drainage features, such as permeable paving, will be used across the site and will provide extra storage on-site. Permeable paving will serve as the first treatment stage for any runoff and ensure adequate surface water treatment is provided. These features have been excluded from calculations at this stage.
- Foul water from the site will discharge via gravity into the existing public foul water sewer within High Street, at Manhole 1001, which Anglian Water have confirmed is acceptable. Further confirmation from Thames Water is required to confirm capacity within the Recycling Centre.

8.2 With the above measures in place, the development of the site will not create any flood risk issues for the wider area.



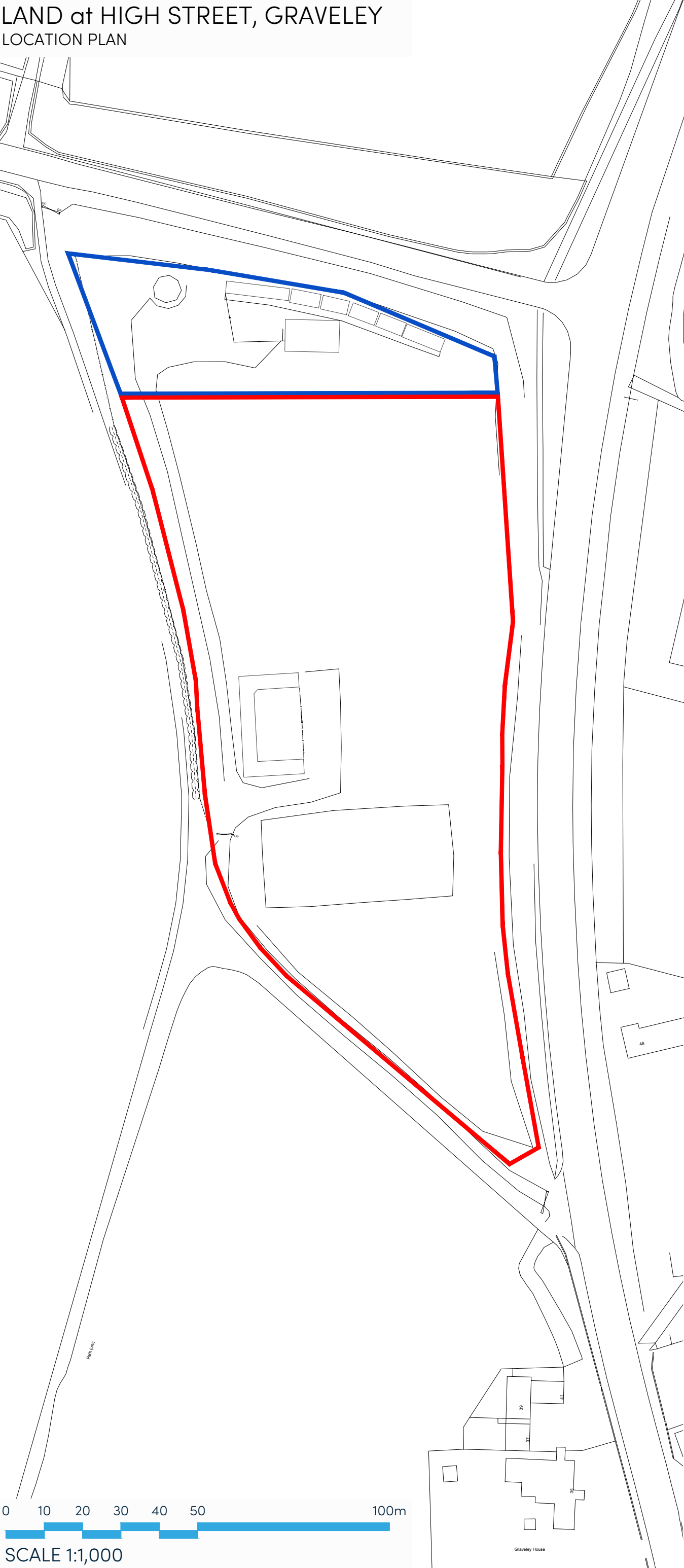
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APPENDICES



APPENDIX A

LAND at HIGH STREET, GRAVELEY
LOCATION PLAN



Rev	Date	Amendment	Initials
-----	------	-----------	----------

Project:
LAND AT HIGH STREET,
GRAVELEY, HITCHIN, SG4 7LA

Client:
GADE HOMES

Drawing:
LOCATION PLAN

Drawing no:
24.2039.0001

Rev:

Scale@A3: 1:1000 Date: NOV '24 Drawn: CT Checked: -



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PRELIMINARY



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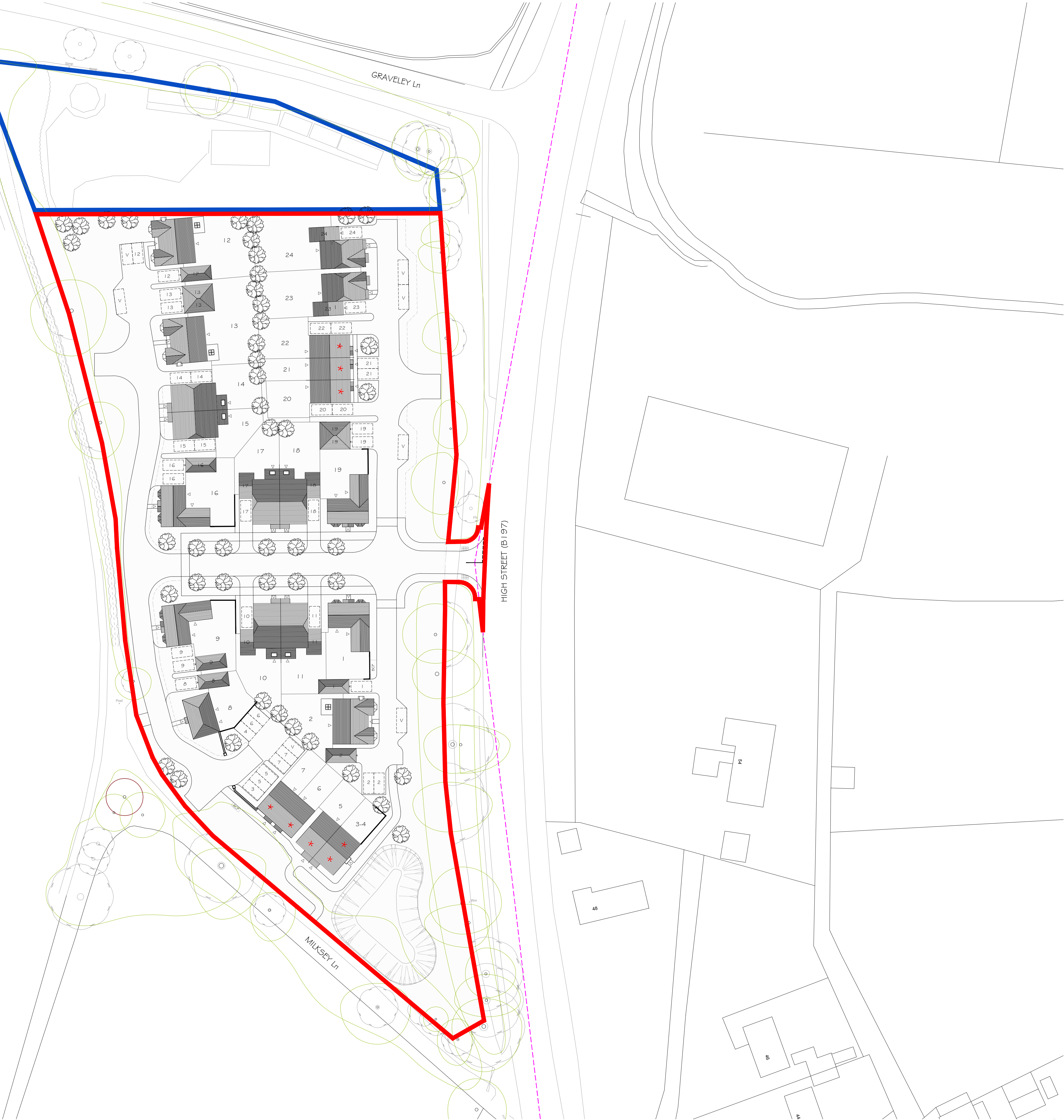
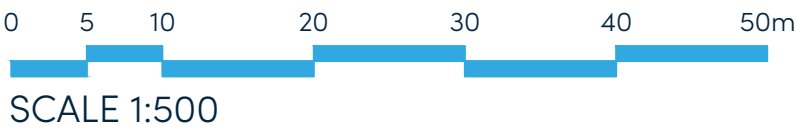
APPENDICES



APPENDIX B



KEY	
	Affordable Houses
	Indicative Tree Planting



H	08/09/25	ATTENUATION BASIN & FOOTPATH UPDATE	CT
G	11/08/25	PARKING SPACE No's & FOOTPATH	CT
F	05/08/25	AMENDED FOLLOWING LPA DISCUSSIONS	CT
E	10/03/25	AMENDED RED LINE BOUNDARY	EBC
D	30/01/25	AMENDED TITLE BLOCK	EBC
C	14/01/25	ROAD ADJACENT TO PLOT 8 ADJUSTED	CT
B	08/01/25	AMENDED TO HIGHWAYS COMMENTS	CT
A	18/12/24	AMENDED TO CLIENT COMMENTS	CT

Project:			
LAND AT HIGH STREET, GRAVELEY, HITCHIN, SG4 7LA			
Client:			
GADE HOMES			
Drawing:			
PROPOSED SITE LAYOUT			
Drawing no:		Rev:	
24.2039.1000			H
Scale@A1: 1:500	Date: NOV '24	Drawn: CT	Checked: _

finc

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PLANNING



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APPENDICES



APPENDIX C

LEGEND			
	Buildings		Overhead Cable
	Wind		Flow
	Arrow/Line		Concave angle
	Convex angle		Line marking
	Depth hole		Curved arrow
	Dashed line		Dashed arrow
	Triangle		Station and Level
	Station and Level		Station and Name
	Station and Name		Tree
	Tree		Bus Stop
	Bus Stop		Underground
	Underground		Edge Level
	Edge Level		Slope Level
	Slope Level		Flat Roof Level
	Flat Roof Level		Water
	Water		Interconnection
	Interconnection		Wind Map
	Wind Map		Roofing
	Roofing		Beds
	Beds		Fence
	Fence		Chain Link
	Chain Link		Wooden Fence
	Wooden Fence		Concrete Fence
	Concrete Fence		Solid Pathside
	Solid Pathside		Inspection chamber
	Inspection chamber		Ballast
	Ballast		Reinforced slab
	Reinforced slab		Void
	Void		Gravel layer
	Gravel layer		Mould
	Mould		Ground Level
	Ground Level		Line
	Line		Horizontal line
	Horizontal line		Internal floor
	Internal floor		Trench
	Trench		Sight post
	Sight post		Electricity
	Electricity		Ballast
	Ballast		Electricity
	Electricity		Electricity
	Electricity		Electricity
	Electricity		Electricity
	Electricity		Electricity
	Electricity		

Drainage information (where applicable) has been visually inspected from the surface and therefore no allowance has been made for any sub surface entry into manholes, chambers or voids. Therefore any details relating to depths, sizes, ETC will be

Should there be any conflict between the details indicated on this drawing and those indicated on other drawings, the engineer should be informed prior to construction on site.

Visible features in the vicinity of the boundaries, as shown on this survey may not

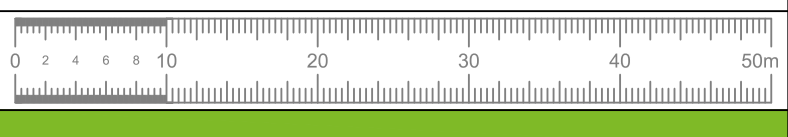
THIS SURVEY HAS BEEN ORIENTATED TO THE ORDNANCE SURVEY (O.S.) NATIONAL GRID (OSGB36) VIA GLOBAL NAVIGATION SATELLITE SYSTEMS (GNSS) AND THE

A TRUE OSGB36 COORDINATE HAS BEEN ESTABLISHED NEAR TO THE SITE CENTRE VIA A TRANSFORMATION USING THE OSTN15 & OSGM15

TRANSFORMATION MODELS. THE SURVEY HAS BEEN CORRELATED TO THIS POINT AND A FURTHER ONE OR MORE OSG836 POINTS ESTABLISHED TO CREATE A TRUE O.S. BEARING FOR ANGLE ORIENTATION.

A SCALE FACTOR OF 1,000,000 HAS BEEN APPLIED TO THIS SURVEY.

Station	Easting	Northing	Level
AX1	522976.673	228290.658	109.962
AX2	522985.353	228252.514	108.650
AX3	522991.818	228226.103	107.636
AX4	523081.928	228093.346	98.164
AX5	523076.177	228154.659	99.953
AX6	523076.003	228206.610	102.028
AX7	523076.888	228248.378	103.958
ST01	523118.277	227975.156	95.616



01283 550969
info@axis-surveys.com

www.axis-surveys.com

Laurus House, First Avenue, Centrum 100

CLIENT **Gade Homes**

PROJECT
Land at Milksey Lane,
Graveley, Hitchin, SG4 7LA

TITLE Topographical Survey

SCALE @A0	1:500	DATE	August 2024	
DRAWN	LB	CHECKED	JL	
REF NO.	4367		STATUS Final	SHEET 1/1



MEC
Consulting Group

APPENDICES



APPENDIX D

Our Ref: KB/48759

Your Ref:

07 February 2018

Paul Smith
PCS Homebuild Ltd
39 Upperfield Road
Welwyn Garden City
Hertford
AL7 3LP

BY EMAIL ONLY TO:

paulsmith.welwynservices@live.co.uk

Dear Paul,

Re: Milksey Lane, Graveley –Infiltration Testing

As you are aware we recently attended the above site to undertake soil infiltration tests. The findings of this testing are summarised in this letter and shall be read in accordance with our limitations of investigation, which are enclosed.

Project Understanding

It is our understanding that the site will be developed for residential use, with the proposed site layout to comprise 10no. detached dwellings with associated gardens and access roads. A proposed development plan is enclosed as drawing no. SM1/17/02.

Infiltration testing was undertaken at the site to provide information for consideration in the drainage strategy for the proposed scheme.

Site Location & Description

The site was located at Milksey Lane, Graveley, Hitchin, SG4 7LA. At the time of the investigation, the site comprised stables with a number of stable buildings and grassed paddocks observed to be present on site. A site location plan is presented as Figure 1 and is enclosed.

Fieldwork

The fieldwork on which the report is based was undertaken on 29th January 2017 and comprised the mechanical excavation of 3no. trial pits (TP1 – TP3). An exploratory hole location plan is enclosed as Figure 2 and indicates the location of the trial pits with respect to existing site layout.

Cont'd.../

5 Quern House, Mill Court
Great Shelford Cambridge
CB22 5LD

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www.rj.uk.com



also at: London 020 7448 9910, Colchester 01206 228800, Bristol 01172 020070 and
Norwich 01603 230240
Richard Jackson is a trading name of Richard Jackson Ltd. Registration No. 2744316 England.
Registered Office 847 The Crescent, Colchester, CO4 9YQ.

Soakage tests were undertaken in each of the trial pits in accordance with BRE Digest 365 (2016). Disturbed samples were recovered from throughout the depths of each exploratory hole for record keeping purposes. The exploratory hole logs are enclosed and give descriptions and depths of strata encountered, together with details of samples taken and other relevant information.

Where applicable, investigative techniques, sampling and logging of soils complied with the requirements of British Standard BS5930:- 'Code of Practice for Site Investigations' (2015).

Trial Pitting

A mechanical excavator was used to form 3no. trial pits (TP1-TP3) to depths of between 1.70m below ground level (bgl) (TP2) and 2.00m bgl (TP1). Trial pits were positioned to provide representative coverage of the site.

Soakage tests were undertaken in each of the trial pits as discussed below.

Infiltration Testing

Infiltration testing was undertaken in each of the 3no. trial pits (TP1 – TP3) in accordance with current guidance as detailed in BRE Digest 365, 'Soakaway Design' (2016).

Trial pits were filled with clean water from a water tanker and the fall in water level in the trial pits was monitored at regular intervals.

A single infiltration test was undertaken in each of the 3no. trial pits. Repeat tests were not undertaken due to the observed poor infiltration and associated time constraints.

Infiltration rates have not been determined for the encountered soils due to insufficient observed infiltration.

Table 1, provides a summary of the duration of monitoring and the observed fall in water level. Full results of the infiltration testing are enclosed.

Trial Pit	Monitoring Period Duration (mins)	Observed change in water level (cm)
TP1	300	-1
TP2	272	-1
TP3	240	+3

Ground Conditions

This investigation encountered the following sequence of strata from ground level:

- Topsoil/Made Ground
- Lowestoft Formation

Topsoil/Made Ground

Topsoil was encountered from the surface in 2no. trial pits (TP2 & TP3) to a depth of 0.20m bgl. The topsoil was encountered as a dark brown slightly gravelly slightly silty sand in TP2 and as a brown slightly sandy slightly gravelly clay in TP3. The gravel was recorded to comprise flint in both trial pits and rootlets were recorded within the topsoil.

Made ground was encountered from the surface to a depth of 0.70m bgl in TP1. The made ground comprised grey sandy gravelly clay with gravel of brick, chalk and flint, overlying soft brown gravelly clay with gravel of brick, concrete, chalk and flint with cobbles of brick and concrete.

Lowestoft Formation

Soils interpreted to represent the Lowestoft Formation were encountered beneath the topsoil/made ground to the maximum depth of this investigation 2.00m (TP1). These soils were typically encountered as firm to stiff grey/brown gravelly clay with gravel of flint and chalk.

Groundwater

Groundwater was not encountered in the trial pits during excavation.

Summary

On the basis of the findings of this investigation, the Lowestoft Formation is not considered an appropriate stratum for the adoption of infiltration drainage.

Alternative methods of surface water disposal should be investigated.

General

We trust that the above is clear and acceptable, however, should you have any further questions or queries please do not hesitate to contact us.

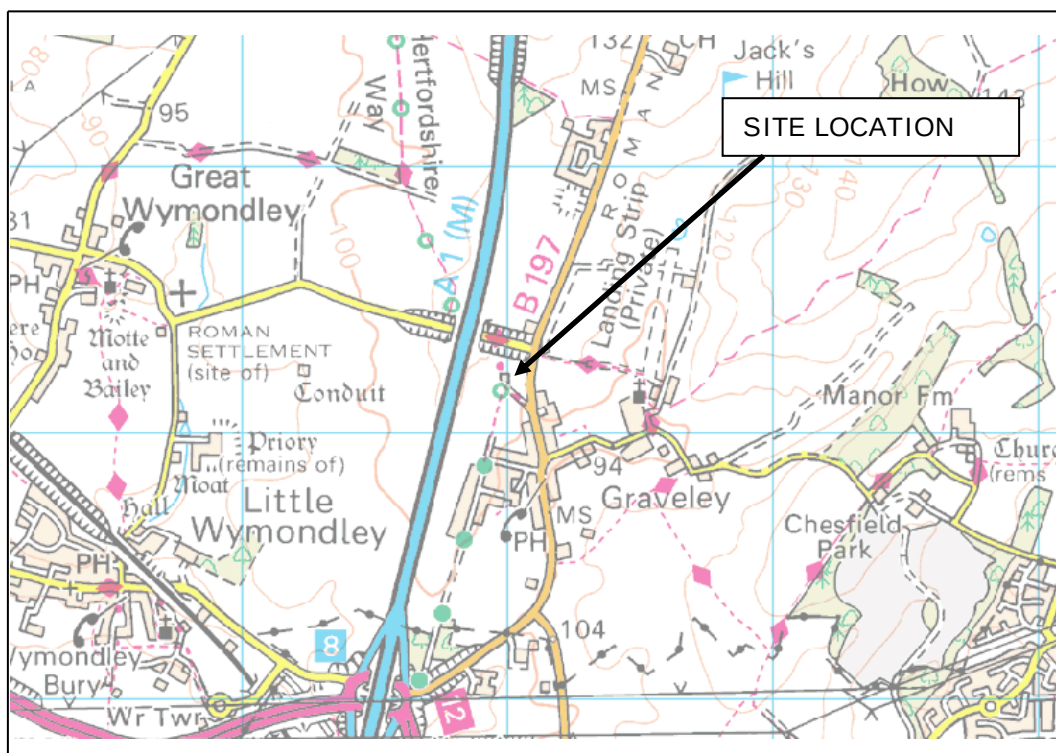
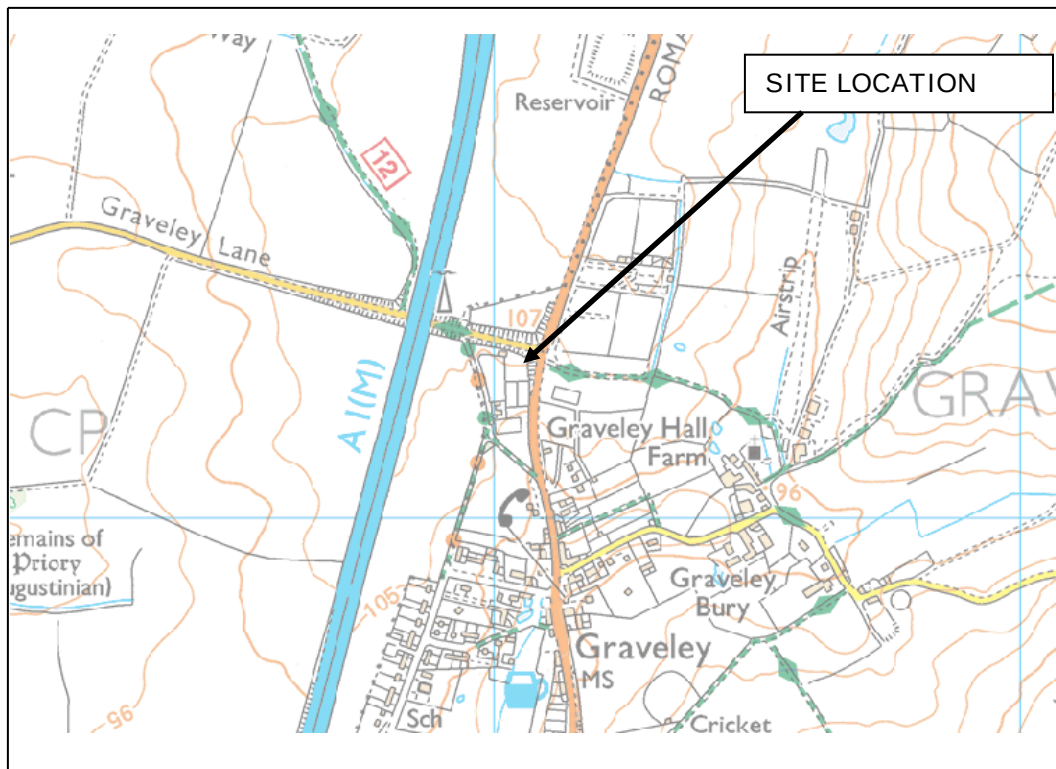
Yours sincerely



Katherine Brightwell BSc (Hons)
Graduate Geotechnical Engineer

on behalf of Richard Jackson Limited

Enc. Figure 1 – Site Location Plan
 Figure 2 – Exploratory Hole Location Plan
 Figure 3 – Proposed Development Plan (drawing no. SM1/17/02)
 Trial Pit Logs
 Infiltration Test Results
 Limitations of Investigation



REPRODUCED FROM ORDNANCE SURVEY MAP WITH THE PERMISSION OF THE CONTROLLER OF HER MAJESTY'S STATIONARY OFFICE, © CROWN COPYRIGHT RICHARD JACKSON LTD – ACC No. 100002572



consulting civil & structural engineers
5 Quern House, Mill Court, Gt Shelford,
Cambridge CB22 5LD
Tel: 012223 314794

Milksey Lane, Graveley, Hitchin,
SG4 7LA

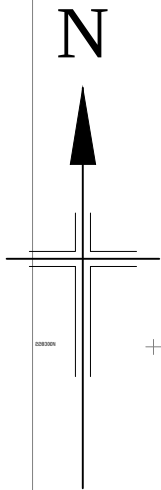
SITE LOCATION PLAN

FIGURE 1

SCALE: N.T.S.

JOB NO: 48759

DO NOT SCALE



KEY:

■: SOAKAGE TEST LOCATIONS
(TP1, TP2 & TP3)

REV	DATE	DESCRIPTION	DRAWN	CHKD
REVISIONS				

This drawing is to be read in conjunction with all other Engineer's drawings and all other project information. Any discrepancy between the Engineer's drawings and other project information is to be reported to the Engineer immediately.



Project
MILKSEY LANE, GRAVELEY,
HITCHIN, SG4 7LA

Title
EXPLORATORY HOLE
LOCATION PLAN

Client
PCS HOMEBUILD LTD

Scale 1:1000 @ A3	Drawn MW	Date FEB 2018
Job Manager BF	Checked KB	Approved KB

847, The Crescent, Colchester, Essex CO4 9YQ
Suite 409, 1 Allie Street, London E1 8DE
York House, 3 Station Court, Great Shelford, Cambs CB22 5NE
6 The Old Church, St. Matthews Road, Norwich, Norfolk NR1 1SP
The Wheelhouse, Bonds Mill, Stonehouse, Gloucestershire GL10 3RF
Email Address: mail@rj.uk.com

Tel: 01206 228800
Tel: 020 7448 9910
Tel: 01223 314794
Tel: 01603 230240
Tel: 01172 020070
Website: http://www.rj.uk.com

Drawing No. 48759-G-FIG02	Revision
-------------------------------------	----------

☒ INFORMATION	☐ APPROVAL	☐ COSTING
☐ TENDER	☐ CONSTRUCTION	☐ AS CONSTRUCTED



No.	Date	Revision	Initial

Project

RESIDENTIAL DEVELOPMENT
ON LAND AT MILKSEY LANE,
GRAVELEY, HERTS SG4 7LA

Client

MR PAUL SMITH

Drawing

PROPOSED SITE PLAN

Scale 1:500 @ A1 Drawn C.R.

Checked Date Sept 17

Drawing No.

SMI/17/02

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Project Name: Milksey Lane				Project No. 48759		Co-ords: Orientation:		Dimensions (m) 1.40		Date 29/01/2018	
Location: Graveley, Hitchin, SG4 7LA						Level (m, aOD):				Scale 1:20	
Client: PCS Homebuild Ltd						Depth (m): 2.00				Logged KB	

Ground water	Samples & In Situ Testing			Level (m)	Depth (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	D1			0.25		Grey sandy gravelly CLAY. Gravel of sub-angular to sub-rounded fine to coarse brick, chalk and flint. MADE GROUND Soft brown gravelly slightly cobbly CLAY. Gravel of angular to sub-rounded fine to coarse brick, concrete, chalk and flint with cobbles of brick and concrete. MADE GROUND <i>...fragments of plastic sheeting at 0.70m bgl</i> Soft dark brown slightly gravelly sandy CLAY. Gravel of fine to medium sub-rounded to sub-angular flint and chalk. LOWESTOFT FORMATION Firm to stiff greyish brown mottled light brown slightly sandy gravelly CLAY. Gravel of sub-angular to sub-rounded fine to coarse flint and chalk. LOWESTOFT FORMATION	1
	0.50	D2			0.75			
	0.80	D3			1.00			
					2.00		End of Pit at 2.000m	2
								3
								4

Groundwater: Groundwater not encountered.				Key			
Stability: Stable sides				D	Disturbed	IVN	Hand Vane
Remarks: Soakage test undertaken.				B	Bulk	PID	PID Reading
				ES	Environmental	PP	Pocket Penetrometer
					Groundwater strike		Standing water level



Project Name: Milksey Lane				Project No. 48759		Co-ords: Orientation:		Dimensions (m) 1.50		Date 29/01/2018	
Location: Graveley, Hitchin, SG4 7LA						Level (m, aOD):				Scale 1:20	
Client: PCS Homebuild Ltd						Depth (m): 1.70				Logged KB	

Ground water	Samples & In Situ Testing			Level (m)	Depth (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.50	D1			0.20		Dark brown slightly silty slightly gravelly SAND with rootlets. Gravel of sub-angular to sub-rounded fine to medium flint. TOPSOIL	
					0.70		Soft brown slightly sandy slightly gravelly CLAY. Gravel of sub-angular to sub-rounded fine to medium flint and chalk. LOWESTOFT FORMATION	
	1.20	D2			1.70		Firm to stiff greyish brown gravelly CLAY. Gravel of sub-angular to sub-rounded fine to coarse flint and chalk. LOWESTOFT FORMATION	
							End of Pit at 1.700m	

Groundwater: Groundwater not encountered.				Key			
Stability: Stable sides				D	Disturbed	IVN	Hand Vane
Remarks: Soakage test undertaken.				B	Bulk	PID	PID Reading
				ES	Environmental	PP	Pocket Penetrometer
					Groundwater strike		Standing water level



Project Name: Milksey Lane		Project No. 48759		Co-ords: Orientation:		Dimensions (m) 1.30		Date 29/01/2018		
Location: Graveley, Hitchin, SG4 7LA				Level (m, aOD):		0.55		Scale 1:20		
Client: PCS Homebuild Ltd				Depth (m): 1.85				Logged KB		
Ground water	Samples & In Situ Testing			Level (m)	Depth (m)	Legend	Stratum Description			
	Depth	Type	Results							
	1.50	D1			0.20		Brown slightly sandy slightly gravelly CLAY with roots. Gravel of sub-angular to sub-rounded fine flint. TOPSOIL Firm orange brown mottled grey slightly gravelly CLAY with occasional black organic matter. Gravel of angular to sub-rounded fine to coarse flint and rare fine chalk. LOWESTOFT FORMATION			
					1.85					
							End of Pit at 1.850m			
Groundwater: Groundwater not encountered.							Key			
Stability: Stable sides.							D	Disturbed	IVN	Hand Vane
Remarks: Soakage test undertaken.							B	Bulk	PID	PID Reading
							ES	Environmental	PP	Pocket Penetrometer
								Groundwater strike		Standing water level

$$\text{Soil infiltration Rate (f)} = V_{p_{75-25}} / (a_{p_{50}} * t_{p_{75-25}})$$

<u>Soakaway TP1 - Test 1</u>	
<u>Trial Pit Dimensions</u>	
Length (m)	1.40
Width (m)	0.60
Depth (m)	2.00
Effective Depth (m)	0.80
tp ₇₅ (mins)	Not reached
tp ₂₅ (mins)	Not reached
<u>Calculations</u>	
V _{p₇₅₋₂₅}	0.336
a _{p₅₀}	2.44
tp ₇₅₋₂₅	N/A
f = N/A m/s	

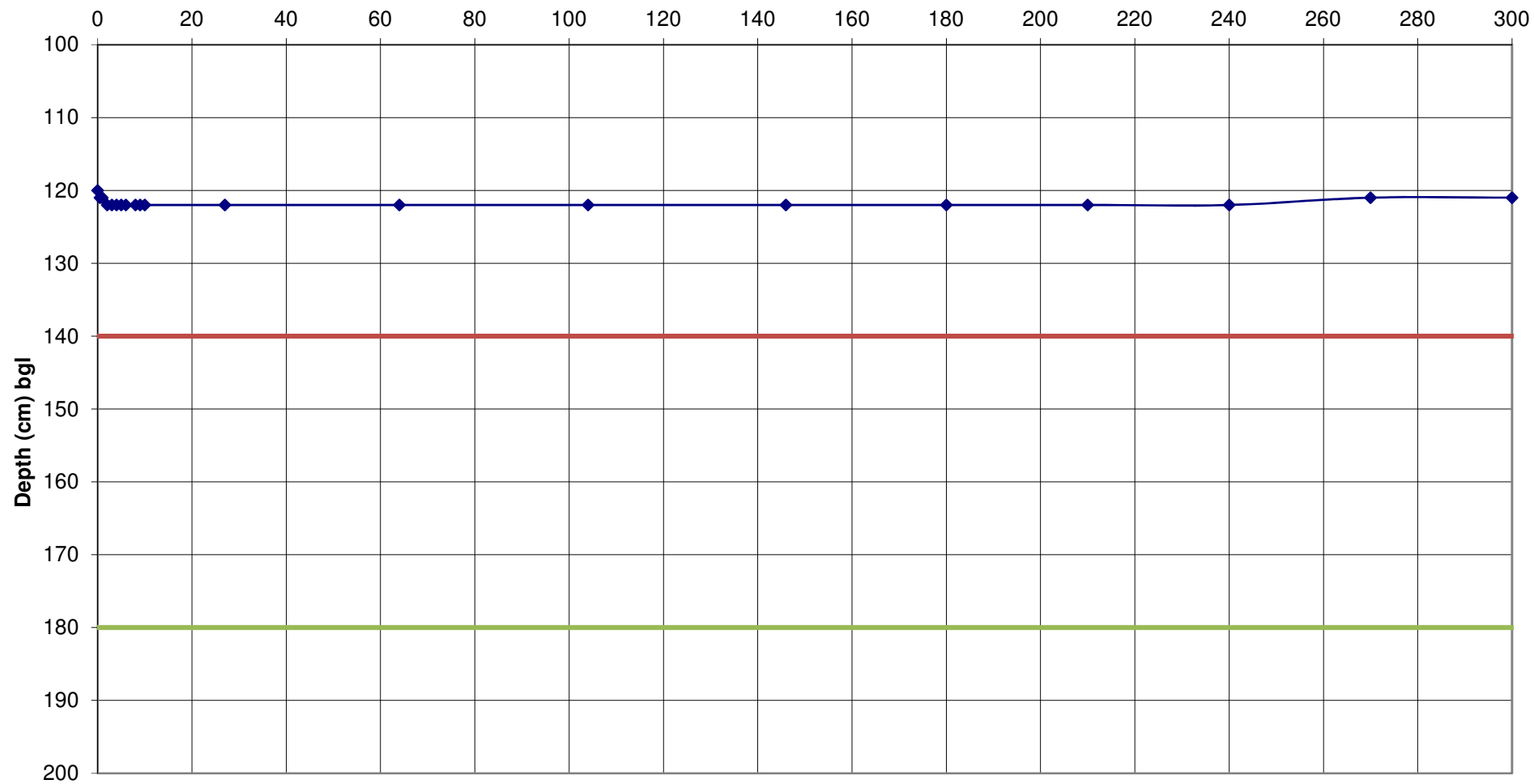
<u>Soakaway TP2 - Test 1</u>	
<u>Trial Pit Dimensions</u>	
Length (m)	1.50
Width (m)	0.60
Depth (m)	1.70
Effective Depth (m)	0.80
tp ₇₅ (mins)	Not reached
tp ₂₅ (mins)	Not reached
<u>Calculations</u>	
V _{p₇₅₋₂₅}	0.36
a _{p₅₀}	2.58
tp ₇₅₋₂₅	N/A
f = N/A m/s	

<u>Soakaway TP3 - Test 1</u>	
<u>Trial Pit Dimensions</u>	
Length (m)	1.30
Width (m)	0.55
Depth (m)	1.85
Effective Depth (m)	0.55
tp ₇₅ (mins)	Not reached
tp ₂₅ (mins)	Not reached
<u>Calculations</u>	
V _{p₇₅₋₂₅}	0.196625
a _{p₅₀}	1.7325
tp ₇₅₋₂₅	N/A
f = N/A m/s	

Milksey Lane, Graveley, Hitchin - TP1 - Test 1

Measured data 25% Empty 75% Empty

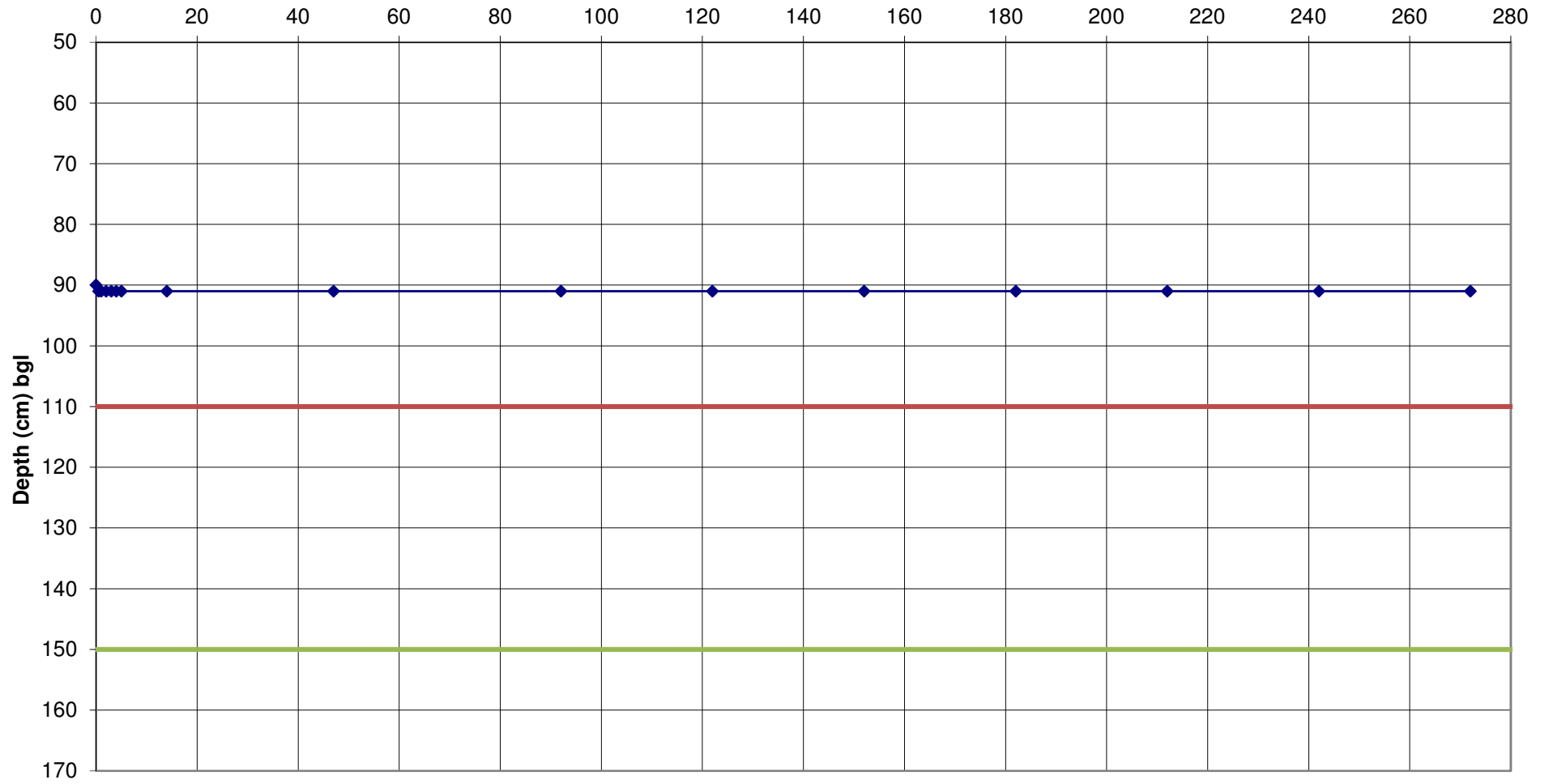
Time (min)



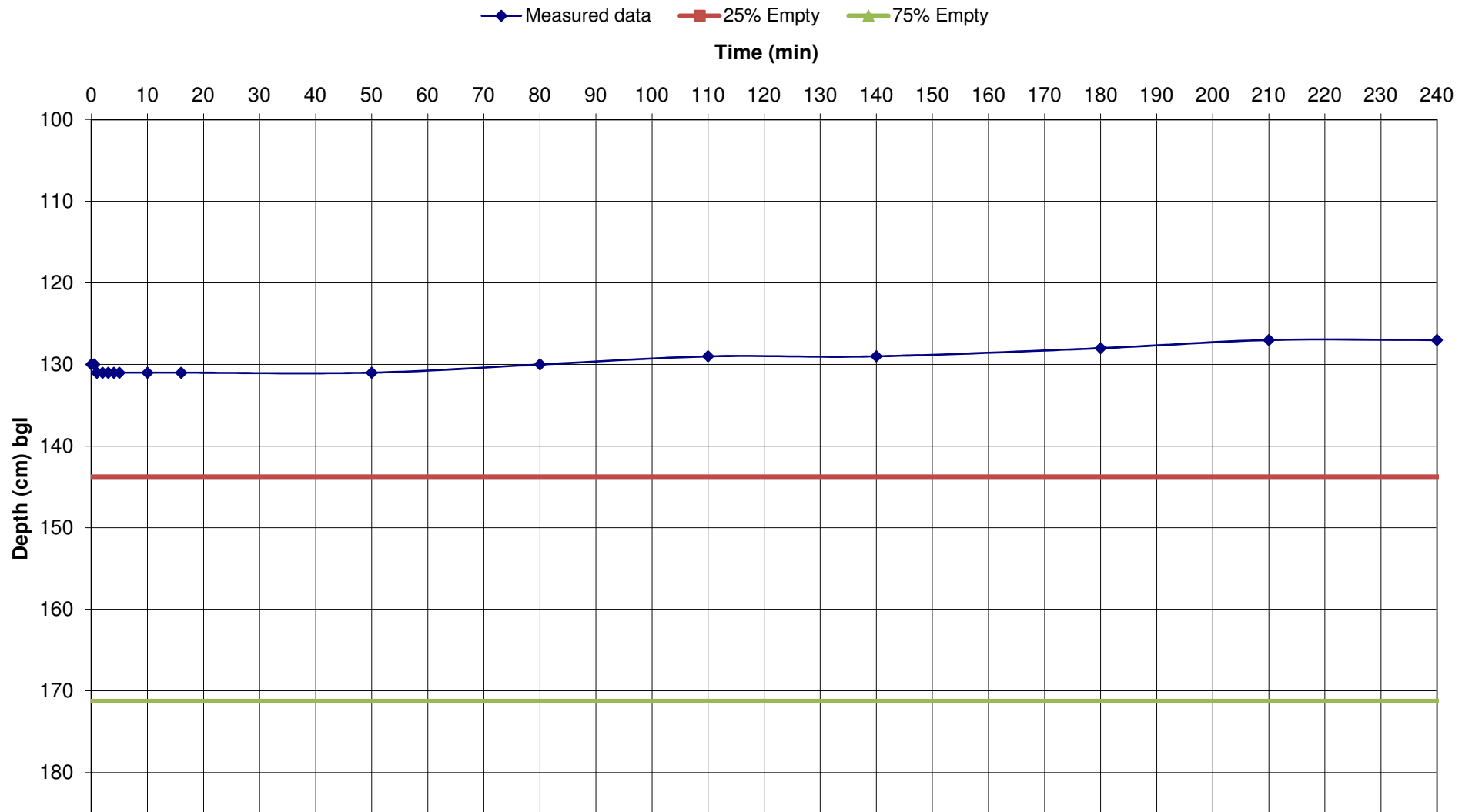
Milksey Lane, Graveley, Hitchin - TP2 - Test 1

—◆— Measured data —■— 25% Empty —▲— 75% Empty

Time (min)



Milksey Lane, Graveley, Hitchin - TP3 - Test 1



Limitations of Investigation

This report is based on the results of the exploratory boreholes, the laboratory testing carried out on samples recovered from those boreholes and on details of the scheme provided by the Client.

This report has been prepared for the benefit of PCS Homebuild Ltd, and its contents should not be relied upon by others without the written authority of Richard Jackson Ltd. If any unauthorised third party makes use of this report they do so at their own risk and Richard Jackson Ltd owes them no duty of care or skill.

All information provided by others is taken as being in good faith as being accurate, but Richard Jackson Ltd cannot, and does not, accept any liability for the detailed accuracy, errors or omissions in such information.

Subsoils are by their nature hidden from view and no investigation can be exhaustive to the extent that all soil conditions are revealed. Conditions may well be present beneath the site which was not evident from the investigations carried out.

Geological data, with the exception of geological maps held by Richard Jackson Ltd, Ordnance Survey maps and aerial photographs have not been inspected, nor has any other data relating to site conditions past or present, or any information regarding underground services, other than as indicated.

Groundwater levels can be subject to considerable seasonal variations, and the conditions encountered in the exploratory holes may not reflect long-term conditions.

There can be no guarantee that the samples analysed represent the highest concentrations of contamination present beneath the site. The chemical analysis results have been assessed to standards appropriate at the time of investigation.

Unless a greater period of retention of samples is agreed, it is our normal practice to discard all samples one month after submission of our final report.

5 Quern House Mill Court
Great Shelford Cambridge
CB22 5LD

Telephone: 01206 228800
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also at: London 020 7448 9910, Cambridge 01223 314794, Bristol 01172 020070 and
Norwich 01603 230240
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Registered Office 847 The Crescent, Colchester, CO4 9YQ.

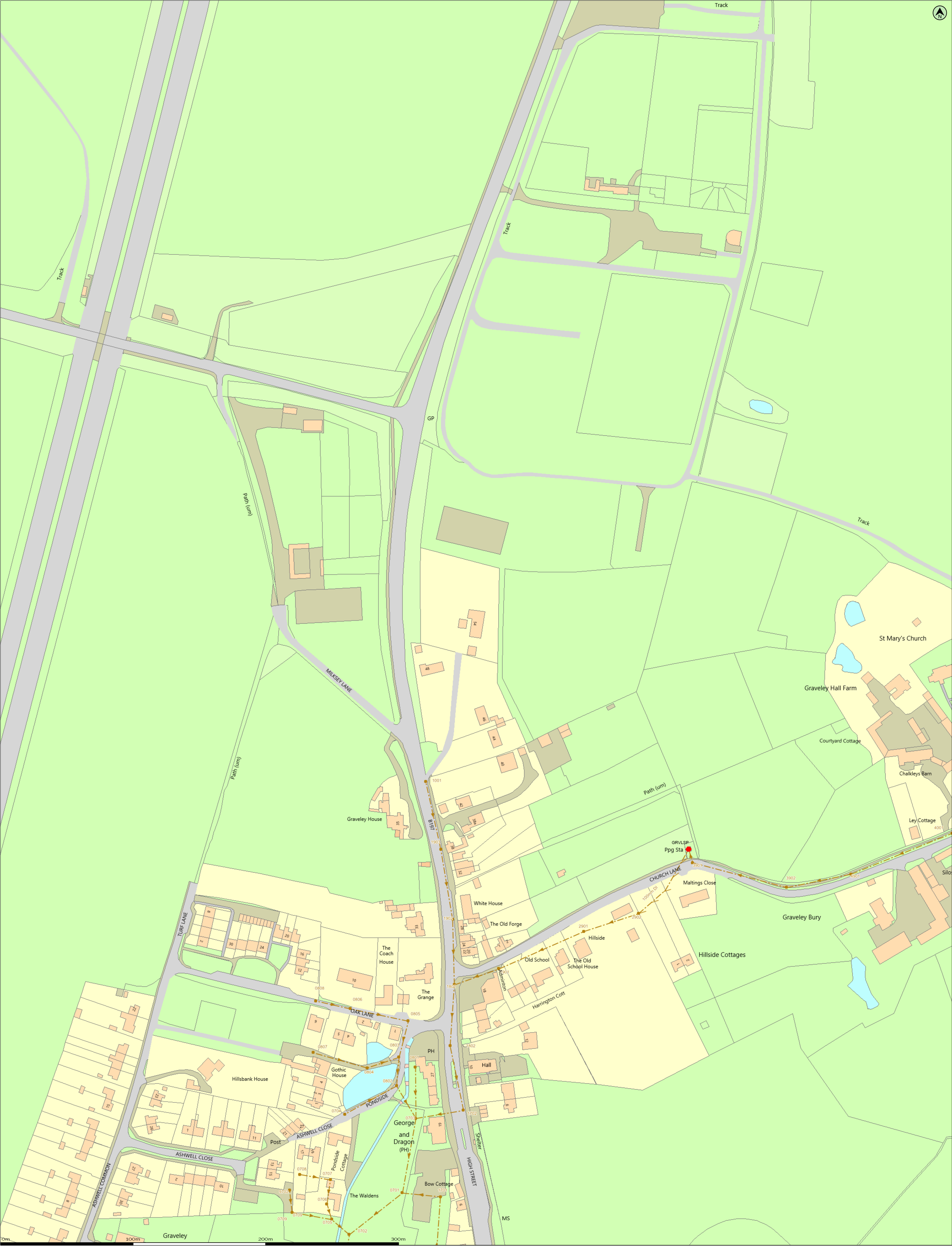


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APPENDICES



APPENDIX E



© Crown copyright and database rights 2018 Ordnance Survey 100019209
Data updated: 04/03/18

Scale: 1:1250
Map Centre: 523140.228162

Date: 27/02/18
Our Ref: 254887 - 1

Wastewater Plan A1
Powered by digimap

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

*Colour denotes effluent type

markgeddes@rj.uk.com	
milksey lane	



This plan is provided by Anglian Water pursuant to its obligations under the Water Industry Act 1991 sections 126 or 129. 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 2018 Ordnance Survey 100022432. 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.



Tier 1 Pre-Planning Assessment Report

Domestic Foul Water Drainage Feasibility Study

Anglian Water Reference Number:	PPE-0230412
Report Engineer:	Maks Zdunek
Publication Date:	07/08/2025
Expiration Date:	07/08/2026
Site Name:	29161 Milksey Lane, Graveley
Development Details:	24 Dwellings
Site National Grid Reference:	TL2301928211
Development Type:	Greenfield
Planning Application Status:	N/A

This report has been produced for M-EC and is to be submitted as part of a developed drainage strategy should planning permission be sought.

Anglian Water will use this report as the basis for any forthcoming planning application response relevant to this application.

Anglian Water cannot reserve capacity and therefore you are recommended to formally apply for a connection at your earliest convenience. Please note that available capacity in both the receiving network and water recycling centre (WRC) can be reduced at any time due to increased requirements from existing businesses and houses as well as from new housing and new commercial developments.



Summary

Easements

We have assessed above and below ground operational assets in relation to your proposed development site

Water Recycling Centre (WRC)

We have assessed the receiving water recycling centre to determine whether it can process the increased flows and effluent quality arising from your development and continue to meet its permitted discharge consents.

Our reference data tables are updated in April each year (following submission to regulators). Previously identified headroom may no longer be available.

Foul Drainage Network - Sustainable Point of Connection (SPOC)

We have assessed the receiving foul water drainage system to identify a sustainable point of connection for your site to connect to the public sewerage network without causing a detriment to the operation of the system.

Indicative costs –

The network infrastructure charge per dwelling is set for the 2025-26 charging period at £403.00. For a development of 24 dwellings the total infrastructure charge will total £9,672.00 excluding VAT.

Section 1 - Anglian Water Assets and Easements

The comments contained within this report relate to the public water mains and sewers indicated on our records. Your attention is drawn to the disclaimer in the useful information section of this report.

Pipes - We have not identified pipework infrastructure within the boundaries of your site

Operational Assets – We do not have operational assets within 20 m of your site

Source Protection Zone (SPZ) – Your site does not sit within an identified SPZ

The proposed development site boundary is highlighted on Anglian Water's asset record in figure 1. Additionally, it is highly recommended that you carry out a thorough investigation of your proposed working area to establish whether any unmapped public or private sewers and lateral drains are in existence.

Any potential instances of asset encroachment are to be identified and addressed at planning. Anglian Water are unable to permit development either over or within the easement strip without prior consent. The extent of asset easements are available in table 1. Please be aware that the existing water mains/public sewers should be located in highway or open space and not in private gardens. This is to ensure available access for any future maintenance and repair and this should be taken into consideration when planning your site layout.

Used Water Easements – Measured either side of the centre line (m)						
	Depth to Invert (m)					
Sewer Diameter(mm)	< 3	3 - 4	4 - 5	5 - 6	6 - 7.5	> 7.5
< 150	3.0	3.0	4.0	5.0	6.0	4.0
150 - 299	3.0	3.0	4.0	5.0	6.0	4.0
300 - 449	3.0	3.0	4.0	5.0	6.0	4.0
450 - 600	3.5	4.0	5.0	6.0	6.0	4.0
601 - 749	3.5	4.0	5.0	6.0	6.0	4.0
750 - 924	4.0	5.0	5.0	6.5	6.5	5.0
925 - 1000	5.0	5.0	6.0	6.5	6.5	5.0

Table 1: Anglian Water used water asset easements

If it is not possible to avoid our assets then these may need to be diverted in accordance with Section 185 of the Water Industry Act (1991). You will need to make a formal application if you would like a diversion to be considered; please note that in some instances assets cannot be diverted; it is therefore vital to engage with our Drainage team prior to finalising site layout. The Drainage team can be contacted by calling 03456 066 087.

Due to the private sewer transfer in October 2011 many newly adopted public used water assets and their history are not indicated on our records. You also need to be aware that your development site may contain private water mains, drains or other assets not shown on our records. These are private assets and not the responsibility of Anglian Water but that of the landowner.

For your information, please be aware:

- Anglian Water does not permit existing assets to be located within the curtilage of the proposed development buildings and we do not permit permeable paving or suds features over our assets. These assets should be located in areas of public open space and/or adoptable highways to ensure on-going maintenance and access is possible. We strongly recommend that the applicant reviews the site layout plan and take the above in consideration to reflect the easement required for the sewer which is 3m either side of the sewers.
- Development is not permissible either over or within the established easement strip of any public asset without Anglian Water's granted prior consent.
- A new developments site layout must adhere to the required easements. You may also discuss potential diversions with us.
- Please be aware that existing water mains/public sewers should be located in highway or open space and not in private gardens or curtilages.
- Rising mains may not be located under play equipment or SUDS features. This is to ensure available access for any future maintenance and repair and this should be taken into consideration when planning your site layout.
- No significant planting can be located in the designated easement strip, to ensure that root intrusion does not pose a risk to our assets. Where necessary and to maintain the aesthetics of the proposed landscaping, ornamental/low lying hedges or similar are considered acceptable, but should be limited.
- In any case where site levels are to be altered within an easement strip, Anglian Water will request a CCTV survey is undertaken to understand the existing condition of the affected sewer and potential impact of this proposal. The footage and accompanying report should be provided to Anglian Water alongside any observations or recommendations (should these be identified) by your designer. In addition, the manholes in this area would also need to be raised to finished level. Anglian Water would expect photographs confirming the existing construction of these chambers and a design drawing which illustrates how this outcome will be achieved whilst maintaining compliance with Design and Construction Guidance (DCG) standards.
- Anglian Water will expect confirmation of the established measures that will allow 24 hour unencumbered access for assets within the vicinity of the development. It is beneficial to understand how awareness of Anglian Water's need for access to provide this in perpetuity will be established going forward. It can be assumed that plot transfers (if appropriate) will contain covenants/rights relating to these assets; we would appreciate clarification on this point.
- It is the developer's responsibility to ensure the correct sight surveys are completed i.e. trial holes, to ascertain the exact location of Anglian Water assets. You should then present your findings to Anglian Water – we may need to complete formal risk assessments (at the developers cost) for certain asset types.

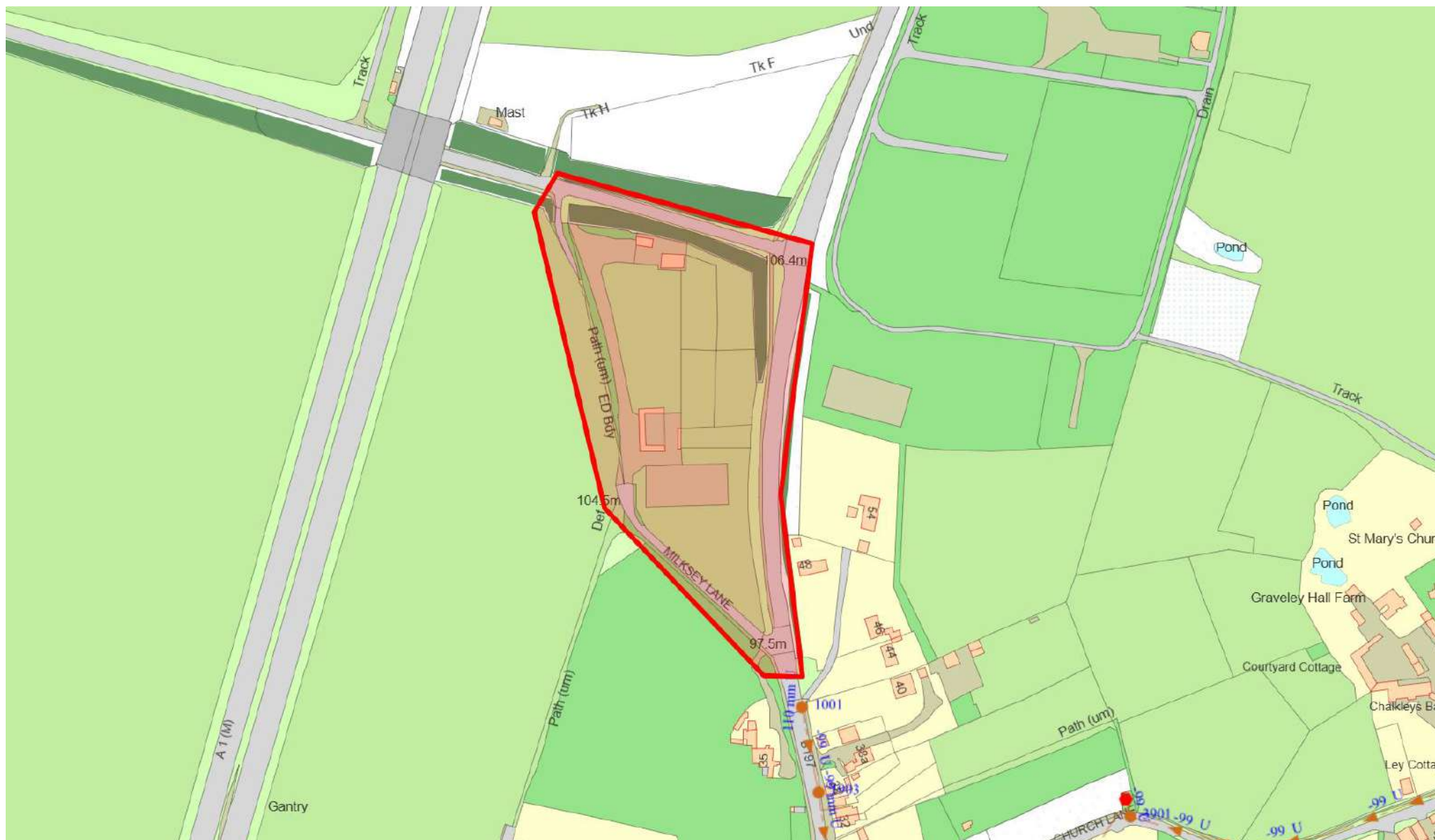


Figure 1: The site boundary for the proposed development as shown on Anglian Water asset records.

Section 2 – Used Water Assessment

In examining the used water system we assess the ability for your site to connect to the public sewerage network without causing a detriment to the operation of the system. We also assess the receiving water recycling centre and determine the headroom available to manage the increased effluent flows and effluent quality from your development.

Water Recycling Centre

The foul drainage from this development is in the catchment of Thames Water, we are therefore not able to comment on the capacity of this Water Recycling Centre and you would be advised to contact Thames Water to understand the capacity or any constraints therein.

Used Water Network

Our assessment has been based on development flows connecting to the nearest foul water sewer of the same size or greater pipe diameter to that required to drain the site. The infrastructure to convey foul water flows to the receiving sewerage network is the responsibility of the developer. Conveyance to the connection point is considered as Onsite Work and includes all work carried out upstream from of the point of connection, including making the connection to our existing network.

This connection point has been determined in reference to the calculated discharge flow and on this basis, a 150mm internal diameter pipe is required to drain the development site. We have assessed the sustainable point of connection, which is to the 150mm sewer at MH1001 located in High Street at National Grid reference (NGR) TL 23101 28043. Anglian Water has assessed the local foul sewerage network up to the point where the network comes under Thames Water ownership and determined that the additional foul flow from the proposed development would not create an unacceptable risk of flooding to our existing customers and the environment. Anglian Water cannot reserve capacity and therefore you are recommended to formally apply for a connection at your earliest convenience.

Please note that available capacity in our network can be reduced at any time due to increased requirements from existing businesses and houses as well as from new housing and new commercial developments.

Please note that Anglian Water will request a suitably worded condition at planning application stage to ensure this strategy is implemented to mitigate the risk of flooding.

Trade Effluent

It is noted that there are no specified trade effluent requirements for the proposed development site. Should this be required in the future, please submit a Tier 2 PPE assessment.

Used Water Budget Costs

For a development site that benefits from full planning permission, infrastructure charges are raised on a standard basis of one charge per new connection, one each for water supply and drainage connections.

Infrastructure charges are applied to each new property connecting to the public water and sewerage network. The infrastructure charge type is set out in Section 146(2) of the Water Industry Act 1991.

The charge should be paid by any party that wishes to build or develop a property and is payable upon request of connection.

The sewerage infrastructure charge per dwelling is set for the 2025-26 charging period at £403.00. For a development of 24 dwellings the total infrastructure charge will total £ 9,672.00.

Please note that you should also budget for infrastructure charges on non-household premises where applicable and these will be calculated according to the number and type of water fittings in the premises. This is called the “relevant multiplier” method of calculating the charge. The relevant multiplier will be applied to the figures set out in our 2025-26 Developer Charging Arrangements to arrive at the amount payable. Details of the relevant multiplier for each fitting can be found on our website.

Environmental Incentives

Following regulatory guidance and changes to the charging rules the Infrastructure Charge for connections to our water network will no longer attract an income offset discount after 31st March 2025. This will be replaced with a new Environmental Incentive Scheme (EIS) aimed at promoting water efficiency and sustainability.

Anglian Water's EIS has been developed in accordance with the Environmental Incentive Common Framework (EICF), which was released by Ofwat in December 2024. For this charging year, 2025-26, and in accordance with Ofwat guidance, only household properties will be eligible for our EIS. We will continue to reassess this for future charging years.

There are two elements to our EIS

Water Environmental Incentive

The applicant must demonstrate the newly connected property is designed to achieve consumption of 90 litres per person per day (pppd) or less.

Post property connection, we will conduct compliance audits on the first connected property and 10% of the remaining properties on a random basis.

Sewerage Environmental Incentive.

Post property connection for redeveloped brownfield sites we will complete a site inspection to confirm the removal of surface water flows.

Environmental Component

This charge is used solely to fund the Environmental Incentive and is uniformly applied upon connection of each developed property; this includes connections which do not qualify for the Environmental Incentive.

Environmental Incentives	Charge per property
Water Environmental Incentive	-500
Environmental Incentive Component Charge Water	100
Additional Water EIS Audit (per premises)	84
Sewerage Environmental Incentive (50% of Sewerage Infra)	-202
Environmental Incentive Component Charge Sewerage	0

Our EIS will be available between 1st April 2025 and 31st March 2030 and during this period, we reserve the right to make any amendments to the EIS as we may see fit, including amendments to the value of both Environmental Incentives and the Component Charges. The EIS may close on 31st March 2030, therefore to qualify for the Environmental Incentives, your plot must be connected to our network, and validated by us. Please refer to our Developer Charging [Arrangements](#) for full details. To learn more or apply for our environmental incentive scheme please visit our website [Water Environmental Incentive Scheme](#)



Figure 2: Showing your water recycling foul point of connection

Section 3 – Useful Information

Water Industry Act – Key used water sections

Section 98:

This provides you with the right to requisition a new public sewer. The new public sewer can be constructed by Anglian Water on your behalf. Alternatively, you can construct the sewer yourself under section 30 of the Anglian Water Authority Act 1977.

Section 102:

This provides you with the right to have an existing sewerage asset vested by us. It is your responsibility to bring the infrastructure to an adoptable condition ahead of the asset being vested.

Section 104:

This provides you with the right to have a design technically vetted and an agreement reached that will see us adopt your assets following their satisfactory construction and connection to the public sewer.

Section 106:

This provides you with the right to have your constructed sewer connected to the public sewer.

Section 185:

This provides you with the right to have a public sewerage asset diverted. Details on how to make a formal application for a new sewer, new connection or diversion are available on our website or via our Development Services team on 0345 60 66 087.

Surface Water Drainage

All surface water must be managed in line with Building Regs / Sewer Sector Guidance (SSG). Our guidance document and Surface Water policy (insert website link) detail our requirements and expectations. You must explore all on-site options per the SUDS hierarchy before speaking to us about a possible connection to our SW drainage network. We recommend that you contact the Local Authority and Lead Local Flood Authority (LLFA) for your site to discuss your application.

Sustainable drainage systems

Some existing urban drainage systems have additional risks of flooding, pollution or damage to the environment and are not resilient to climate change in the long term. Our preferred method of surface water disposal is through the use of Sustainable Drainage Systems or SuDS. SuDS are a range of techniques that aim to mimic the way surface water drains in natural systems within urban areas. For more information on SuDS, please visit our [website](#).

Private sewer transfers

Sewers and lateral drains connected to the public sewer on the 1 July 2011 transferred into Water Company ownership on the 1 October 2011. This follows the implementation of the Floods and Water Management Act (FWMA). This included sewers and lateral drains that were subject to an existing Section 104 Adoption Agreement and those that were not. There were exemptions and the main non-transferable assets were as follows: Surface water sewers and lateral drains that do not discharge to the public sewer, e.g. those that discharged to a watercourse.

Foul sewers and lateral drains that discharged to a privately owned sewage treatment/collection facility. Pumping stations and rising mains will transfer between 1 October 2011 and 1 October 2016.

The implementation of Section 42 of the FWMA will ensure that future private sewers will not be created. It is anticipated that all new sewer applications will need to have an approved section 104 application ahead of a section 106 connection.

It is anticipated that all new sewer applications will need to have an approved Section 104 application ahead of a Section 106 connection.

Encroachment

Anglian Water operates a risk based approach to development encroachment on our above and below ground infrastructure and assets.

Locating our assets

Maps detailing the location of our water and used water infrastructure including both underground assets and above ground assets such as pumping stations and recycling centres are available from digdat.

All requests from members of the public or non-statutory bodies for maps showing the location of our assets will be subject to an appropriate administrative charge.

We have more information on our website

Charging arrangements

Our charging arrangements and summary for this year's water and used water connection and infrastructure charges can be found on our website [link added here](#)

Section 4 - Disclaimer

The information provided in this report is based on data currently held by Anglian Water Services Limited ('Anglian Water') or provided by a third party. Accordingly, the information in this report is provided with no guarantee of accuracy, timeliness, completeness and is without indemnity or warranty of any kind (express or implied).

This report should not be considered in isolation and does not nullify the need for the enquirer to make additional appropriate searches, inspections and enquiries. Anglian Water supports the plan led approach to sustainable development that is set out in the National Planning Policy Framework ('NPPF') and any infrastructure needs identified in this report must be considered in the context of current, adopted and/or emerging local plans. Where local plans are absent, silent or have expired these needs should be considered against the definition of sustainability holistically as set out in the NPPF.

Whilst the information in this report is based on the presumption that proposed development obtains planning permission, nothing in this report confirms that planning permission will be granted or that Anglian Water will be bound to carry out the works/proposals contained within this report.

No liability whatsoever, including liability for negligence is accepted by Anglian Water or its partners, employees or agents, for any error or omission, or for the results obtained from the use of this report and/or its content.

Furthermore, in no event will any of those parties be liable to the applicant or any third party for any decision made or action taken as a result of reliance on this report.

This report is valid from the date issued and the enquirer is advised to resubmit their request for an up to date report should there be a delay in submitting any subsequent application for water supply/sewer connection(s). Our pre-planning reports are valid for 12 months. Please note Anglian Water cannot reserve capacity and available capacity in our network can be reduced at any time due to increased requirements from existing businesses and houses as well as from new housing and new commercial developments.



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APPENDICES



APPENDIX F

Drainage Report

Prepared For

Site

**Land off Milksey Lane
High Street
Graveley
Essex**

AXIS SURVEYS

liam@axis-surveys.com

01283 550929

Land Off Milksey Lane - CCTV Survey Report : 04/02/22

Name : AXIS SURVEYS
 Contact : Liam Booth
 Location : Larus House, First Avenue
 Town : Burton On Trent
 Region : Staffordshire
 Postcode : DE14 2WH
 Email : liam@axis-surveys.com
 Contact Number : 01283 550929
 Surveyor :
 Valid Certification No :

Client Information

Name :
 Contact :
 Location :
 Town :
 Region :
 Postcode :
 Tel :
 Mobile :
 Email :
 Fax :

Site Information

Name : Land off Milksey Lane
 Contact :
 Location : High Street
 Town : Graveley
 Region : Essex
 Postcode :
 Tel :
 Mobile :
 Email :
 Fax :

Total Defects for Project



Total DRB Grades for Project



Report interpretation.

Overview:

Each section of the drainage system is allocated a score indicating areas that require attention. These areas are detailed in the Overview section on the following page and also at the bottom right of the first few pages. We use colour coding as an indicator of severity. Additional information concerning rehabilitation options/recommendations is included in the Overview page, which can also be used as an, "at a glance" indication of system condition. More in depth information for each section, including images can be found later in the report. Grade indicators are as follows:

Grade A: Drain is serviceable no recommendations required

Grade B: There is an issue that might require remedial works

Grade C: There is a defect that requires remedial works, the drain is not serviceable.

Observations:

Each section of drainage reported on (manhole to manhole for example), contains detailed information about that drain and any observations made concerning condition are detailed below the header section. The observations are colour coded and given a severity score, with more significant defects being given a higher score, using a scale from 1 to 5 as detailed below:

Severity 1 to 2: These defects may require remedial monitoring

Severity 3: These defects probably require some form of remedial works

Severity 4 to 5: Defects that will require remedial repair or replacement

General:

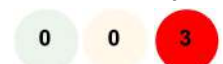
The information provided is relevant at the time of survey. The coding system in this report is based on the Manual of Sewer Condition Classification, 5th edition (MSCC5) domestic codes (BS EN 13508-1:2003). This is the official standard for the water industry.

The severity system is based on significant experience in general practice and the 1 -5 grades represent the severity of individual defects: 5 representing a more serious defect.

Any queries relating to this report please email enquiries@uklandandunderground.co.uk

Total Defects for Project

Total DRB Grades for Project



Overview

Section: 1 From: MH01 (x) To: MH02	DRB Grade C	Structural Grade: 3 Service Grade: 5 DRB Grade: C Pipe Size: 225 Material: Vitrified Clay (i.e. all clayware) Use: Surface Water
Section: 2 From: MH01 (a) To: EOT	DRB Grade C	Structural Grade: 4 Service Grade: 5 DRB Grade: C Pipe Size: 225 Material: Vitrified Clay (i.e. all clayware) Use: Surface Water
Section: 3 From: MH02 (x) To: MAIN CONNECTION	DRB Grade C	Structural Grade: 2 Service Grade: 5 DRB Grade: C Pipe Size: 225 Material: Vitrified Clay (i.e. all clayware) Use: Surface Water

Total Defects for Project



Total DRB Grades for Project



Section 1 - From MH01 (x) Downstream To MH02

04-02-2022

Client:	Location (Street Name):	City/Town/Village	Location Type:	Land Ownership	Cust Job Ref.	Contr. Job Ref.	Surveyors Name:	Date:	Time:
Liam Booth			RD	PU				04/02/2022	13:55

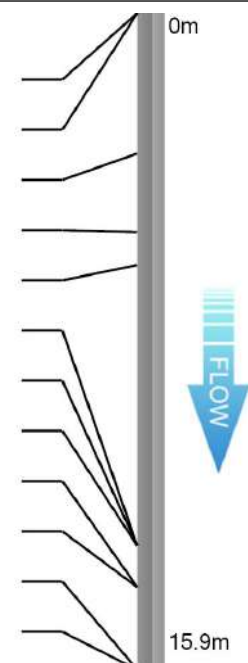
Start Node Ref:	MH01 (x)	Finish Node (2) Ref:	MH02	Direction:	D	Height/Dia:	225	Cleaned:	N
Start Node Depth:	0.00	Finish Node Depth:	0.00	Use:	S	Width:	0	Flow Control:	N
Start Node Coordinate:		Finish Node Coordinate:		Material:	VC	Shape:	C	Length:	15.9

Node 1 Ref:	Node 3 Ref:	Lining Material:	Drainage Area:
Node 1 Coordinate:	Node 3 Coordinate:	Lining Type:	Division/District:
Lat. Inspection Start Point:		Type of Drain:	Inspection Stage:
Longitudinal Location of Start of Lateral:	Circumferential Location of Start if Lateral:	Year Constructed:	Critical Drain Sewer:
			A
			A

Pipe Length Ref:	MH01 (x)X	Video Image	Photographic Image	Client Defined
Inspection Method:	B	Storage Media	PHD	Client Def. 1
Inspection Purpose:	A	Location System	B	Client Def. 2
Standard:	BS EN 13508-2:2003+A1:2011	Format	AVI	Client Def. 3
Pipe Unit Length:		Filename	MH01 (x) - MH02 141347.avi	Client Def. 4
Weather:	D	Volume Ref		Client Def. 5
Temperature:				

General Remarks

Position	Code	Description	CD	Pic	Video Ref	
00.0	MH	Start node type, manhole			0:00:00	
00.0	WL	Water level 0%		0_1	0:00:00	
03.4	RTJ	Roots tap at joint		0_2	0:00:30	
05.3	RFJ	Roots fine at joint		0_3	0:00:41	
06.1	RFJ	Roots fine at joint		0_4	0:00:47	
12.9	OBX	Other obstacles, other object in invert 07-08 10%		0_5	0:01:34	
12.9	CC	Crack, circumferential 08-10		0_6	0:01:35	
12.9	CS	Cracks spiral 03-05		0_7	0:01:35	
13.9	RFJ	Roots fine at joint		0_8	0:01:42	
13.9	DES	Settled deposits fine 10%		0_9	0:01:42	
15.9	WL	Water level 0%		0_1	0:01:57	
15.9	MHF	Finish node type, manhole		0_9		



Total Defects for section

DRB Grade for Section



Descriptive Report with Remarks and Observation Images

Section 1

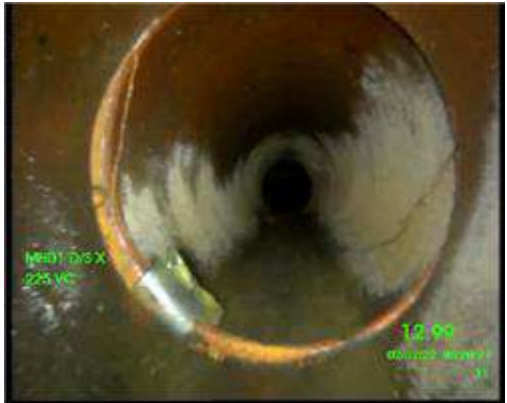
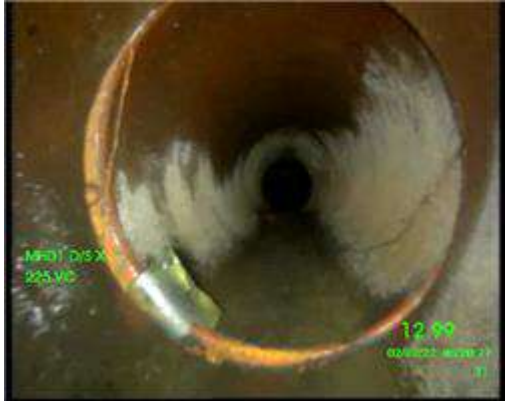
Pos	Video Ref	Code	Cont.	Description	Image
00.0m	0:00:00	MH		Start node type, manhole, reference MH01 (x) MH01 (x)	
00.0m	0:00:00	WL		Water level: 0% Height/Diameter	Image Provided - Ref: 0_1 
03.4m	0:00:30	RT		Roots tap at joint - Severity 3	Image Provided - Ref: 0_2 
05.3m	0:00:41	RF		Roots fine at joint - Severity 1	Image Provided - Ref: 0_3 

Total Defects for section

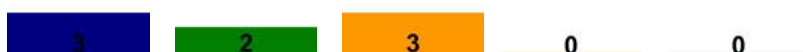


DRB Grade for Section



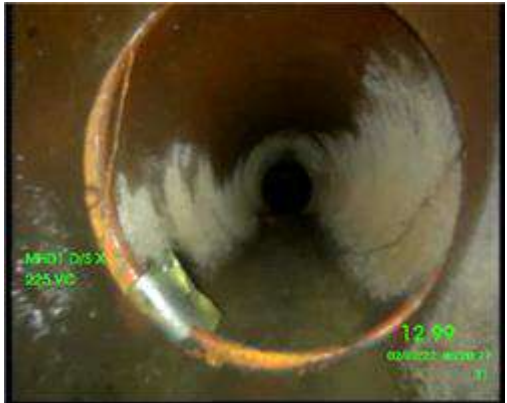
Pos	Video Ref	Code	Cont.	Description	Image
06.1m	0:00:47	RF		Roots fine at joint - Severity 1	Image Provided - Ref: 0_4 
12.9m	0:01:34	OBX		Other obstacles, other object in invert from 07 o'clock to 08 o'clock: 10% cross-sectional area loss - Severity 3 POSSIBLE PIECE OF GLASS	Image Provided - Ref: 0_5 
12.9m	0:01:35	CC		Crack, circumferential from 08 o'clock to 10 o'clock - Severity 2	Image Provided - Ref: 0_6 

Total Defects for section

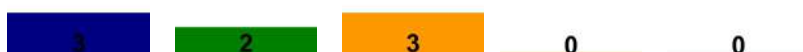


DRB Grade for Section



Pos	Video Ref	Code	Cont.	Description	Image
12.9m	0:01:35	CS		Cracks spiral from 03 o'clock to 05 o'clock - Severity 3	Image Provided - Ref: 0_7 
13.9m	0:01:42	RF		Roots fine at joint - Severity 1	Image Provided - Ref: 0_8 
13.9m	0:01:42	DES		Settled deposits fine: 10% cross-sectional area loss - Severity 2	Image Provided - Ref: 0_9 

Total Defects for section



DRB Grade for Section



Pos	Video Ref	Code	Cont.	Description	Image
15.9m	0:01:57	WL		Water level: 0% Height/Diameter	Image Provided - Ref: 0_10 
15.9m		MHF		Finish node type, manhole, reference MH02 MH02	Image Provided - Ref: 0_9999 

Total Defects for section



DRB Grade for Section



Section 2 - From MH01 (a) Upstream To EOT

04-02-2022

Client:	Location (Street Name):	City/Town/Village	Location Type:	Land Ownership	Cust Job Ref.	Contr. Job Ref.	Surveyors Name:	Date:	Time:
Liam Booth			RD	PU				04/02/2022	13:55

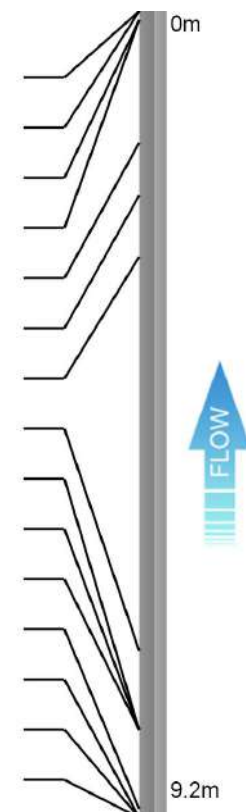
Start Node Ref:	MH01 (a)	Finish Node (2) Ref:	EOT	Direction:	U	Height/Dia:	225	Cleaned:	N
Start Node Depth:	0.00	Finish Node Depth:	0.00	Use:	S	Width:	0	Flow Control:	N
Start Node Coordinate:		Finish Node Coordinate:		Material:	VC	Shape:	C	Length:	9.2

Node 1 Ref:	Node 3 Ref:	Lining Material:	Drainage Area:
Node 1 Coordinate:	Node 3 Coordinate:	Lining Type:	Division/District:
Lat. Inspection Start Point:		Type of Drain:	Inspection Stage:
Longitudinal Location of Start of Lateral:	Circumferential Location of Start if Lateral:	Year Constructed:	Critical Drain Sewer:
			A
			A

Pipe Length Ref:	EOTX	Video Image	Photographic Image	Client Defined
Inspection Method:	B	Storage Media	PHD	Client Def. 1
Inspection Purpose:	A	Location System	B	Client Def. 2
Standard:	BS EN 13508-2:2003+A1:2011	Format	AVI	Client Def. 3
Pipe Unit Length:		Filename	MH01 (x) - MH02 141347.avi	Client Def. 4
Weather:	D	Volume Ref		Client Def. 5
Temperature:				

General Remarks

Position	Code	Description	CD	Pic	Video Ref	
00.0	MH	Start node type, manhole			0:00:00	
00.0	WL	Water level 0%		2_1	0:00:00	
00.1	JDM	Joint displaced medium		2_2	0:00:00	
00.1	LR	Line of drain/sewer deviates right		2_3	0:00:00	
01.5	JDM	Joint displaced medium		2_4	0:00:07	
02.1	JDM	Joint displaced medium		2_5	0:00:11	
02.8	OBI	Other obstacle, protruding through wall 11-12 60%		2_6	0:00:26	
07.3	FM	S1 Fracture multiple 12-12	S1	2_7	0:00:42	
08.2	B	Broken pipe 11-01		2_8	0:00:46	
08.2	H	Hole in drain/sewer 11-01		2_9	0:00:46	
08.2	FM	Fracture multiple 05-07		2_1	0:00:46	
09.1	WL	Water level 0%		2_1	0:01:39	
09.2	FM	F1 Fracture multiple 12-12	F1	2_-	0:00:42	
09.2	SC	Shape and/or size drain/sewer changes		2_1	0:01:32	
09.2	SA	Survey abandoned		2_9		



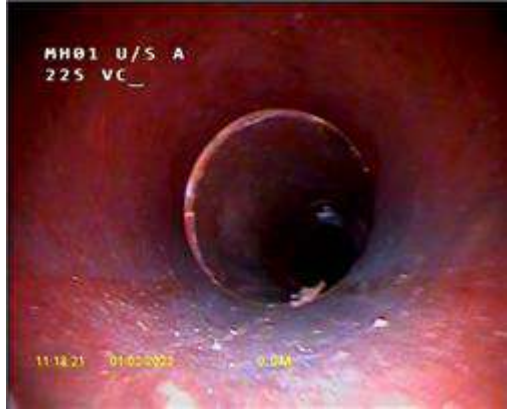
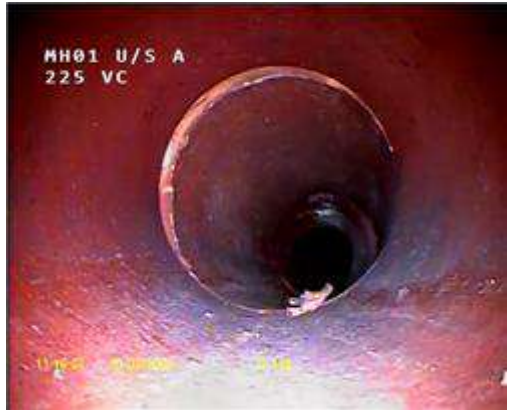
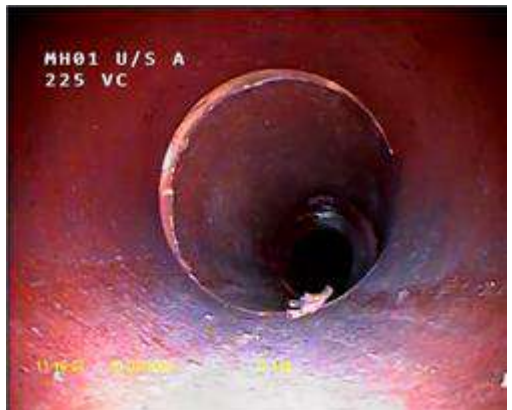
Total Defects for section

DRB Grade for Section



Descriptive Report with Remarks and Observation Images

Section 2

Pos	Video Ref	Code	Cont.	Description	Image
00.0m	0:00:00	MH		Start node type, manhole, reference MH01 (a)	
00.0m	0:00:00	WL		Water level: 0% Height/Diameter	Image Provided - Ref: 2_1 
00.1m	0:00:00	JDM		Joint displaced medium - Severity 2	Image Provided - Ref: 2_2 
00.1m	0:00:00	LR		Line of drain/sewer deviates right	Image Provided - Ref: 2_3 

Total Defects for section



DRB Grade for Section



Pos	Video Ref	Code	Cont.	Description	Image
01.5m	0:00:07	JDM		Joint displaced medium - Severity 2	Image Provided - Ref: 2_4 
02.1m	0:00:11	JDM		Joint displaced medium - Severity 2	Image Provided - Ref: 2_5 
02.8m	0:00:26	OBI		Other obstacle, protruding through wall from 11 o'clock to 12 o'clock: 60% cross-sectional area loss - Severity 4	Image Provided - Ref: 2_6 

Total Defects for section



DRB Grade for Section



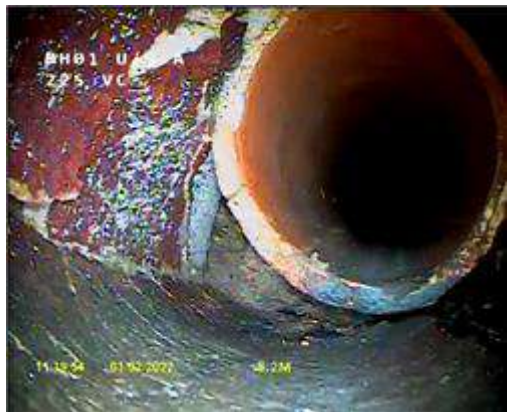
Pos	Video Ref	Code	Cont.	Description	Image
07.3m	0:00:42	FM	S1	Fracture multiple 7.3m - 9.2m from 12 o'clock to 12 o'clock - Severity 4	Image Provided - Ref: 2_7 
08.2m	0:00:46	B		Broken pipe from 11 o'clock to 01 o'clock - Severity 4	Image Provided - Ref: 2_8 
08.2m	0:00:46	H		Hole in drain/sewer from 11 o'clock to 01 o'clock - Severity 3	Image Provided - Ref: 2_9 

Total Defects for section



DRB Grade for Section



Pos	Video Ref	Code	Cont.	Description	Image
08.2m	0:00:46	FM		Fracture multiple from 05 o'clock to 07 o'clock - Severity 4	Image Provided - Ref: 2_10 
09.1m	0:01:39	WL		Water level: 0% Height/Diameter	Image Provided - Ref: 2_12 
09.2m	0:00:42	FM	F1	Fracture multiple Defect End from 12 o'clock to 12 o'clock - Severity 4	
09.2m	0:01:32	SC		Shape and/or size drain/sewer changes: Shape Changes To: 150mm Diameter	Image Provided - Ref: 2_11 

Total Defects for section



DRB Grade for Section



Pos	Video Ref	Code	Cont.	Description	Image
09.2m		SA		Survey abandoned EOT	Image Provided - Ref: 2_9999 

Total Defects for section



DRB Grade for Section



Section 3 - From MH02 (x) Downstream To MAIN CONNECTION

04-02-2022

Client:	Location (Street Name):	City/Town/Village	Location Type:	Land Ownership	Cust Job Ref.	Contr. Job Ref.	Surveyors Name:	Date:	Time:
Liam Booth			RD	PU				04/02/2022	13:55

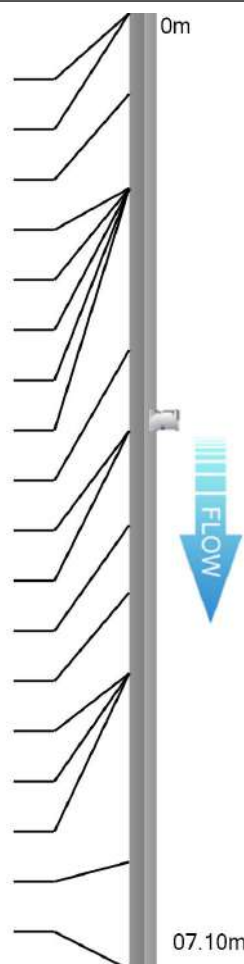
Start Node Ref:	MH02 (x)	Finish Node (2) Ref:	MAIN CONNECTION	Direction:	D	Height/Dia:	225	Cleaned:	N
Start Node Depth:	0.00	Finish Node Depth:	0.00	Use:	S	Width:	0	Flow Control:	N
Start Node Coordinate:		Finish Node Coordinate:		Material:	VC	Shape:	C	Length:	14

Node 1 Ref:	Node 3 Ref:	Lining Material:	Drainage Area:
Node 1 Coordinate:	Node 3 Coordinate:	Lining Type:	Division/District:
Lat. Inspection Start Point:		Type of Drain:	Inspection Stage:
Longitudinal Location of Start of Lateral:	Circumferential Location of Start if Lateral:	Year Constructed:	Critical Drain Sewer:
			A
			A

Pipe Length Ref:	MH02 (x)X	Video Image	Photographic Image	Client Defined
Inspection Method:	B	Storage Media	PHD	Client Def. 1
Inspection Purpose:	A	Location System	B	Client Def. 2
Standard:	BS EN 13508-2:2003+A1:2011	Format	AVI	Client Def. 3
Pipe Unit Length:		Filename	MH01 (x) - MH02 141347.avi	Client Def. 4
Weather:	D	Volume Ref		Client Def. 5
Temperature:				

General Remarks

Position	Code	Description	CD	Pic	Video Ref	
00.0	MH	Start node type, manhole			0:00:00	
00.0	WL	Water level 0%		1_1	0:00:00	
00.6	DEE	Attached deposits, encrustation 02-08 10% at joint		1_2	0:00:09	
01.3	CC	Crack, circumferential 12-03		1_3	0:00:24	
01.3	CC	Crack, circumferential 10-01		1_4	0:00:24	
01.3	OJM	Open joint medium		1_5	0:00:24	
01.3	DEE	Attached deposits, encrustation 10-01 5% at joint		1_6	0:00:26	
01.3	DEE	Attached deposits, encrustation 07-09 10% at joint		1_7	0:00:31	
02.5	DEE	Attached deposits, encrustation 10-02 5% at joint		1_8	0:00:36	
03.1	DEE	Attached deposits, encrustation 11-09 10% at joint		1_9	0:00:41	
03.1	JN	Junction 11 : 150mm Diameter		1_1	0:00:41	
03.8	DEE	Attached deposits, encrustation 07-10 5% at joint		1_1	0:00:46	
04.3	DEE	Attached deposits, encrustation 01-09 5% at joint		1_1	0:00:51	
04.9	DEE	Attached deposits, encrustation 10-12 5% at joint		1_1	0:00:55	
04.9	DEE	Attached deposits, encrustation 03-09 5% at joint		1_1	0:00:55	
04.9	RF	Roots fine		1_1	0:00:55	
06.3	DEE	Attached deposits, encrustation 12-05 5% at joint		1_1	0:01:06	
07.1	RM	Roots mass 20%		1_1	0:01:13	

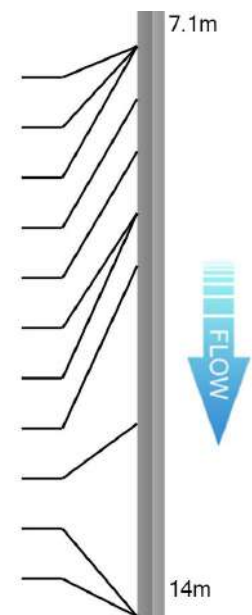


Total Defects for section

DRB Grade for Section



Position	Code	Description	CD	Pic	Video Ref
07.5	JDM	Joint displaced medium		1_1	0:01:16
07.5	DEE	Attached deposits, encrustation 03-05 5% at joint		1_1	0:01:16
07.5	DEE	Attached deposits, encrustation 06-11 5% at joint		1_2	0:01:16
08.1	DER	Settled deposits coarse 5%		1_2	0:01:21
08.7	DEE	Attached deposits, encrustation 03-05 10% at joint		1_2	0:01:26
09.4	JDM	Joint displaced medium		1_2	0:01:32
09.4	DEE	Attached deposits, encrustation 07-10 5% at joint		1_2	0:01:32
10.0	DES	Settled deposits fine 5%		1_2	0:01:37
11.8	DEE	Attached deposits, encrustation 06-09 10%		1_2	0:01:50
14.0	WL	Water level 0%		1_2	0:02:13
14.0	BRF	Finish node type, major connection without			



Total Defects for section

DRB Grade for Section



Descriptive Report with Remarks and Observation Images

Section 3

Pos	Video Ref	Code	Cont.	Description	Image
00.0m	0:00:00	MH		Start node type, manhole, reference MH02 (x) MH02 (x)	
00.0m	0:00:00	WL		Water level: 0% Height/Diameter	Image Provided - Ref: 1_1 
00.6m	0:00:09	DEE		Attached deposits, encrustation from 02 o'clock to 08 o'clock: 10% cross-sectional area loss at joint - Severity 3	Image Provided - Ref: 1_2 
01.3m	0:00:24	CC		Crack, circumferential from 12 o'clock to 03 o'clock - Severity 2	Image Provided - Ref: 1_3 

Total Defects for section



DRB Grade for Section



Pos	Video Ref	Code	Cont.	Description	Image
01.3m	0:00:24	CC		Crack, circumferential from 10 o'clock to 01 o'clock - Severity 2	Image Provided - Ref: 1_4 
01.3m	0:00:24	OJM		Open joint medium - Severity 2	Image Provided - Ref: 1_5 
01.3m	0:00:26	DEE		Attached deposits, encrustation from 10 o'clock to 01 o'clock: 5% cross-sectional area loss at joint - Severity 3	Image Provided - Ref: 1_6 

Total Defects for section



DRB Grade for Section



Pos	Video Ref	Code	Cont.	Description	Image
01.3m	0:00:31	DEE		Attached deposits, encrustation from 07 o'clock to 09 o'clock: 10% cross-sectional area loss at joint - Severity 3	Image Provided - Ref: 1_7 
02.5m	0:00:36	DEE		Attached deposits, encrustation from 10 o'clock to 02 o'clock: 5% cross-sectional area loss at joint - Severity 3	Image Provided - Ref: 1_8 
03.1m	0:00:41	DEE		Attached deposits, encrustation from 11 o'clock to 09 o'clock: 10% cross-sectional area loss at joint - Severity 3	Image Provided - Ref: 1_9 

Total Defects for section



DRB Grade for Section



Pos	Video Ref	Code	Cont.	Description	Image
03.1m	0:00:41	JN		Junction at 11 o'clock: 150mm Diameter	Image Provided - Ref: 1_10 
03.8m	0:00:46	DEE		Attached deposits, encrustation from 07 o'clock to 10 o'clock: 5% cross-sectional area loss at joint - Severity 3	Image Provided - Ref: 1_11 
04.3m	0:00:51	DEE		Attached deposits, encrustation from 01 o'clock to 09 o'clock: 5% cross-sectional area loss at joint - Severity 3	Image Provided - Ref: 1_12 

Total Defects for section



DRB Grade for Section



Pos	Video Ref	Code	Cont.	Description	Image
04.9m	0:00:55	DEE		Attached deposits, encrustation from 10 o'clock to 12 o'clock: 5% cross-sectional area loss at joint - Severity 3	Image Provided - Ref: 1_13 
04.9m	0:00:55	DEE		Attached deposits, encrustation from 03 o'clock to 09 o'clock: 5% cross-sectional area loss at joint - Severity 3	Image Provided - Ref: 1_14 
04.9m	0:00:55	RF		Roots fine - Severity 1	Image Provided - Ref: 1_15 

Total Defects for section



DRB Grade for Section



Pos	Video Ref	Code	Cont.	Description	Image
06.3m	0:01:06	DEE		Attached deposits, encrustation from 12 o'clock to 05 o'clock: 5% cross-sectional area loss at joint - Severity 3	Image Provided - Ref: 1_16 
07.1m	0:01:13	RM		Roots mass: 20% cross-sectional area loss - Severity 4	Image Provided - Ref: 1_17 
07.5m	0:01:16	JDM		Joint displaced medium - Severity 2	Image Provided - Ref: 1_18 

Total Defects for section



DRB Grade for Section



Pos	Video Ref	Code	Cont.	Description	Image
07.5m	0:01:16	DEE		Attached deposits, encrustation from 03 o'clock to 05 o'clock: 5% cross-sectional area loss at joint - Severity 3	Image Provided - Ref: 1_19 
07.5m	0:01:16	DEE		Attached deposits, encrustation from 06 o'clock to 11 o'clock: 5% cross-sectional area loss at joint - Severity 3	Image Provided - Ref: 1_20 
08.1m	0:01:21	DER		Settled deposits coarse: 5% cross-sectional area loss - Severity 3	Image Provided - Ref: 1_21 

Total Defects for section



DRB Grade for Section



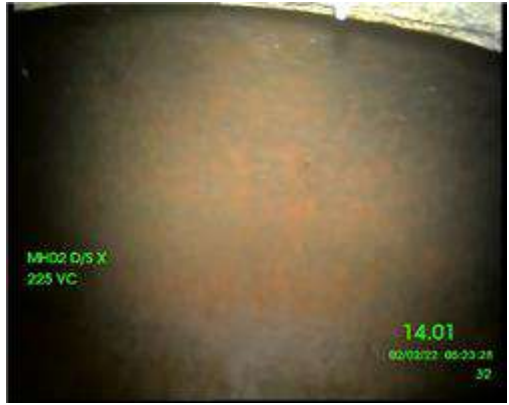
Pos	Video Ref	Code	Cont.	Description	Image
08.7m	0:01:26	DEE		Attached deposits, encrustation from 03 o'clock to 05 o'clock: 10% cross-sectional area loss at joint - Severity 3	Image Provided - Ref: 1_22 
09.4m	0:01:32	JDM		Joint displaced medium - Severity 2	Image Provided - Ref: 1_23 
09.4m	0:01:32	DEE		Attached deposits, encrustation from 07 o'clock to 10 o'clock: 5% cross-sectional area loss at joint - Severity 3	Image Provided - Ref: 1_24 

Total Defects for section



DRB Grade for Section



Pos	Video Ref	Code	Cont.	Description	Image
10.0m	0:01:37	DES		Settled deposits fine: 5% cross-sectional area loss - Severity 2	Image Provided - Ref: 1_25 
11.8m	0:01:50	DEE		Attached deposits, encrustation from 06 o'clock to 09 o'clock: 10% cross-sectional area loss - Severity 3	Image Provided - Ref: 1_26 
14.0m	0:02:13	WL		Water level: 0% Height/Diameter	Image Provided - Ref: 1_27 
14.0m		BRF		Finish node type, major connection without manhole, reference MAIN CONNECTION MAIN CONNECTION	

Surveyor Certificate





Project

Project Name: Milksey Lane
Project Description: CCTV Survey, Trace & Map
Project Status: Complete
Project Date: 11/21/2024
Inspection Standard: MSCC5 Sewers & Drainage GB (SRM5 Scoring)



AQUATECH DRAIN SERVICES

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Milksey Lane

Project Number

Project Date
11/21/2024

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Project Information

Project Name
Milksey Lane

Project Number

Project Date
11/21/2024

Client

Company: MEC Consulting Group
Department: The Old Chapel
Street: Station Road
Town or City: Hugglescote
County: Leicestershire
Post Code: LE67 2GB
Phone: 01530 264753



Site

Street: Milksey Lane
Town or City: Graveley
County: Hertfordshire
Post Code: SG4



Contractor

Company: Aquatech Drain Services Ltd
Description: Drainage Contracor
Contact: Connor
Street: Holmbush Lane
Town or City: Woodmancote
County: East Sussex
Post Code: BN5 9TL
Phone: 01273 933705
Email: contact@aquatechdrains.co.uk



Scoring Summary

Project Name
Milksey Lane

Project Number

Project Date
11/21/2024

Structural Defects

Section	PLR	Grade	Description
All inspected pipes are in an acceptable structural condition (< grade 3).			

Service / Operational Condition

Grade 3: Best practice suggests consideration should be given to maintenance activities in the medium term.

Grade 4: Best practice suggests consideration should be given to maintenance activity to avoid potential blockages.

Grade 5: Best practice suggests that this pipe is at a high risk of backing up or causing flooding.

Section	PLR	Grade	Description
3	SW3X	3	Multiple defects
4	SW4X	4	Roots, tap at joint, finish
5	SW3X	3	Roots, mass at joint, 60% cross-sectional area loss, finish

Abandoned Surveys

Section	PLR	Description
3	SW3X	Survey abandoned
5	SW3X	Survey abandoned

Information

These scoring summaries are based on the SRM grading from the WRc.

Project Summary

Project Name
Milksey Lane

Project Number

Project Date
11/21/2024

Pipe Summary

No.	Type	PLR	Upstream Node	Downstream Node	Road	Town	Use	Mat.	Profile	Length
1	SEC	SW2X	SW2	SW1	Milksey Lane	Graveley	S	CO	Circular 375mm	45.30 m
2	SEC	SW2X	SW2	SW1	Milksey Lane	Graveley	S	CO	Circular 375mm	31.30 m
3	SEC	SW3X	SW3	SW2	Milksey Lane	Graveley	S	VC	Circular 300mm	28.90 m
4	SEC	SW4X	SW4	SW3	Milksey Lane	Graveley	S	CO	Circular 300mm	55.90 m
5	SEC	SW3X	SW3	SW2	Milksey Lane	Graveley	S	VC	Circular 300mm	14.10 m
Total:										175.50 m

Pipe Levels

No.	PLR	Upstream Node	Upstream C.L.	Upstream I.L.	Upstream I.D.	Downstream Node	Downstream C.L.	Downstream I.L.	Downstream I.D.
1	SW2X	SW2			1,530.000 m	SW1			1,240.000 m
2	SW2X	SW2			1,530.000 m	SW1			1,240.000 m
3	SW3X	SW3			1,660.000 m	SW2			1,530.000 m
4	SW4X	SW4			1,790.000 m	SW3			1,660.000 m
5	SW3X	SW3			1,660.000 m	SW2			1,530.000 m

Pipe Summary by Profile

Profile	Total Length	No. Pipes
Circular 300mm	28.90 m	
Circular 300mm	55.90 m	
Circular 300mm	14.10 m	
Circular 300mm =	98.90 m	3
Circular 375mm	45.30 m	
Circular 375mm	31.30 m	
Circular 375mm =	76.60 m	2
Total =	175.50 m	5

Project Summary

Project Name
Milksey Lane

Project Number

Project Date
11/21/2024

Inspection Summary

Pipe No.	Insp. No.	Upstream Node	Downstream Node	Dir.	Operator	Insp. Date	Insp. Time	Str	Ser	Final Observation	Length
1	1	SW2	SW1	DS	Gg	29/11/2024	8:06	1	2	OCF, Unable to push rod further	45.30 m
2	1	SW2	SW1	US	Gg	29/11/2024	8:18	1	2	OCF, Cross over point from section 1	31.30 m
3	1	SW3	SW2	US	Gg	29/11/2024	8:26	1	4	SA, Unable to proceed.	28.90 m
4	1	SW4	SW3	DS	Gg	29/11/2024	8:48	1	4	ICF	55.90 m
5	1	SW3	SW2	DS	Gg	29/11/2024	8:38	1	4	SA, Unable to proceed.	14.10 m
Total:											175.50 m

Project Summary

Project Name
Milksey Lane

Project Number

Project Date
11/21/2024

Defect Summary

Defect Summary				CCTV Drainage Survey Observation Count																				
				General				Structural Condition								Service Condition						Misc		
Sect. No.	Insp. No.	Upstream Node	Downstream Node	Insp. Length (m)	No. Grade 4/5 Obs.	Survey Abandoned	Camera Under Water	Cracks	Fractures	Broken	Deformed	Collapsed	Holes	Surface Damage	Displaced Joints	Open Joints	Roots	Infiltration	Encrustation	Silt	Grease	Obstruction	Water Level	Line Deviates
1	1	SW2	SW1	45.3													7						1	
2	1	SW2	SW1	31.3													2						1	
3	1	SW3	SW2	28.9		1											8						1	
4	1	SW4	SW3	55.9	1										1		19						1	1
5	1	SW3	SW2	14.1		1											4						1	
Total:				175.5	1	2											40						5	1

Cleaning Summary

Project Name
Milksey Lane

Project Number

Project Date
11/21/2024

Pipe Summary

No.	Type	PLR	Upstream Node	Downstream Node	Road	Town	Use	Mat.	Profile	Length
1	SEC	SW2X	SW2	SW1	Milksey Lane	Graveley	S	CO	Circular 375mm	45.30 m
2	SEC	SW2X	SW2	SW1	Milksey Lane	Graveley	S	CO	Circular 375mm	31.30 m
3	SEC	SW3X	SW3	SW2	Milksey Lane	Graveley	S	VC	Circular 300mm	28.90 m
4	SEC	SW4X	SW4	SW3	Milksey Lane	Graveley	S	CO	Circular 300mm	55.90 m
5	SEC	SW3X	SW3	SW2	Milksey Lane	Graveley	S	VC	Circular 300mm	14.10 m
Total:										175.50 m

Pipe Summary by Profile

Profile	Total Length	No. Pipes
Circular 300mm	28.90 m	
Circular 300mm	55.90 m	
Circular 300mm	14.10 m	
Circular 300mm =	98.90 m	3
Circular 375mm	45.30 m	
Circular 375mm	31.30 m	
Circular 375mm =	76.60 m	2
Total =	175.50 m	5

Cleaning Summary

Pipe No.	Cln. No.	Dir.	Operator	Cln. Date	Cln. Time	Method	Contamination	Scale	No. Clns	Complete	Comments	Cln. Length
1	1	DS	Gg	29/11/2024	8:06	N				Yes		45.30 m
2	1	US	Gg	29/11/2024	8:18	N				Yes		31.30 m
3	1	US	Gg	29/11/2024	8:26	N				No		28.90 m
4	1	DS	Gg	29/11/2024	8:48	N				Yes		55.90 m
5	1	DS	Gg	29/11/2024	8:38	N				No		14.10 m
Total:												175.50 m

Cleaning Summary

Project Name
Milksey Lane

Project Number

Project Date
11/21/2024

Cleaning Summary by Profile

Profile		Total Length	No. Cleans
Circular 300mm		28.90 m	
Circular 300mm		55.90 m	
Circular 300mm		14.10 m	
Circular 300mm	=	98.90 m	3
Circular 375mm		45.30 m	
Circular 375mm		31.30 m	
Circular 375mm	=	76.60 m	2
Total	=	175.50 m	5

Defect Grade Description (Section)

Project Name
Milksey Lane

Project Number

Project Date
11/21/2024

- | | |
|----|---|
| 1: | <p>Brick: Minor structural defects.</p> <p>Other: Minor structural defects, i.e. open or displaced joints without additional characteristics.</p> <p>Acceptable structural condition.</p> |
| 2: | <p>Brick: Circumferential cracking. Single longitudinal crack. Surface mortar loss (depth missing < 15 mm). Surface damage - spalling slight (breaking away of small fragments from the surface). Surface damage - wear slight (increased roughness).</p> <p>Other: Circumferential cracking. Surface damage - spalling slight (breaking away of small fragments from the surface). Surface damage - wear slight (increased roughness).</p> <p>Minimal collapse likelihood in the short term but potential for further deterioration.</p> |
| 3: | <p>Brick: Total mortar loss (depth missing > 50 mm) without other defects. More than one longitudinal crack (at a single location). Multiple cracking. Single bricks displaced. Deformation < 5%, no fracture and only moderate mortar loss. Surface damage - spalling medium (large areas of chipped brick). Surface damage - wear medium (entire surface of brick is missing).</p> <p>Other: Fracture with no deformation or deformation < 5%. Longitudinal cracking or multiple cracking. Minor loss of level. Severe joint defects i.e. Surface damage - spalling medium. Surface damage - wear medium.</p> <p>Collapse unlikely in the near future but further deterioration likely.</p> |
| 4: | <p>Brick: Total mortar loss (depth missing > 50mm) with deformation > 10%; deformation up to 10% and fractured; displaced or hanging brickwork; small number of missing bricks; dropped invert (drop > 20mm); moderate loss of level; surface damage - large spalling (entire surface of brick is missing); surface damage - large wear (entire surface of brick is missing).</p> <p>Other: Broken; deformation up to 10% and broken; fracture with deformation 5-10%; multiple fractures; serious loss of level; serious joint defects with voids or soil visible (open joint with > 50mm soil or void visible or joint displacement > 25% of diameter); surface damage - entire area of pipe surface is missing or severely worn.</p> <p>Collapse likely in the foreseeable future.</p> |
| 5: | <p>Brick: Already collapsed; missing Invert; deformation > 10% and fractured; displaced or hanging brickwork and deformation < 10%; extensive areas of missing brickwork.</p> <p>Other: Already collapsed; deformation > 10% and broken; extensive areas of pipe fabric missing; fractures with deformation > 10%</p> <p>Collapsed or collapse imminent.</p> |

Section Profile - 11/29/2024 - SW2X

Project Name
Milksey Lane

Project Number

Project Date
11/21/2024

Circular, 300 mm

Item No.	Upstream Node	Downstream Node	Date	Road	Material	Total Length	Inspected Length
3	SW3	SW2	11/29/2024	Milksey Lane	Vitrified clay	28.90 m	28.90 m
4	SW4	SW3	11/29/2024	Milksey Lane	Concrete	55.90 m	55.90 m
5	SW3	SW2	11/29/2024	Milksey Lane	Vitrified clay	14.10 m	14.10 m

Total: 3 Inspections x Circular 300 mm, 0 mm = 98.90 m Total Length and 98.90 m Inspected Length

Circular, 375 mm

Item No.	Upstream Node	Downstream Node	Date	Road	Material	Total Length	Inspected Length
1	SW2	SW1	11/29/2024	Milksey Lane	Concrete	45.30 m	45.30 m
2	SW2	SW1	11/29/2024	Milksey Lane	Concrete	31.30 m	31.30 m

Total: 2 Inspections x Circular 375 mm, 0 mm = 76.60 m Total Length and 76.60 m Inspected Length

Total: 5 Inspections = 175.50 m Total Length and 175.50 m Inspected Length

Section Summary

Project Name
Milksey Lane

Project Number

Project Date
11/21/2024

Number of sections	5
Total length of sections	175.50 m
Total length of inspected sections	175.50 m
Total length of not inspected sections	0.00 m
Number of abandoned inspections	2
Number of section inspection photos	61
Number of section inspection videos	5
Number of section inspection scans	0
Number of section inclination measurements	0

PLR:	SW2X	Upstream Node:	SW2
Inspection Direction:	Downstream	Downstream Node:	SW1
Inspected Length:	45.30 m	Dia/Height:	375 mm
Total Length:	45.30 m	Material:	Concrete

No.	m+	Code	Observation
1	0.00	IC	Start node, inspection chamber, reference: SW2
2	0.00	WL	Water level, 5% of the vertical dimension
3	18.20	RFJ	Roots, fine at joint, start
4	25.50	RFJ	Roots, fine at joint, finish
5	28.00	RFJ	Roots, fine at joint
6	32.00	RFJ	Roots, fine at joint, start
7	33.50	RFJ	Roots, fine at joint, finish
8	34.00	RFJ	Roots, fine at joint, start
9	35.00	JN	Junction at 2 o'clock, 250mm dia
10	36.60	RFJ	Roots, fine at joint, finish
11	45.30	OCF	Finish node, other special chamber, reference: SW1

PLR:	SW2X	Upstream Node:	SW2
Inspection Direction:	Upstream	Downstream Node:	SW1
Inspected Length:	31.30 m	Dia/Height:	375 mm
Total Length:	31.30 m	Material:	Concrete

No.	m+	Code	Observation
1	0.00	IC	Start node, inspection chamber, reference: SW1
2	0.00	WL	Water level, 5% of the vertical dimension
3	19.00	JN	Junction at 2 o'clock, 150mm dia
4	21.60	JN	Junction at 2 o'clock, 150mm dia
5	22.40	CN	Connection other than junction at 1 o'clock, 150mm dia

Section Summary

Project Name Milksey Lane	Project Number	Project Date 11/21/2024
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No.	m+	Code	Observation
6	23.10	RFJ	Roots, fine at joint
7	30.30	RFJ	Roots, fine at joint
8	31.00	JN	Junction at 10 o'clock, 150mm dia
9	31.30	OCF	Finish node, other special chamber, reference: SW2

PLR:	SW3X	Upstream Node:	SW3
Inspection Direction:	Upstream	Downstream Node:	SW2
Inspected Length:	28.90 m	Dia/Height:	300 mm
Total Length:	28.90 m	Material:	Vitrified clay

No.	m+	Code	Observation
1	0.00	IC	Start node, inspection chamber, reference: SW2
2	0.00	WL	Water level, 5% of the vertical dimension
3	3.10	JN	Junction at 1 o'clock, 150mm dia
4	7.40	RFJ	Roots, fine at joint
5	8.90	CXD	Connection defective, connecting pipe is damaged at 1 o'clock, 150mm dia
6	8.90	RMJ	Roots, mass at joint, 10% cross-sectional area loss
7	9.20	DEX	Settled deposits, other, 10% cross-sectional area loss
8	13.20	JN	Junction at 10 o'clock, 150mm dia
9	15.00	RFJ	Roots, fine at joint
10	23.80	RM	Roots, mass, 10% cross-sectional area loss, start
11	26.80	RM	Roots, mass, 20% cross-sectional area loss, change
12	28.10	RM	Roots, mass, 40% cross-sectional area loss, change
13	28.70	CXI	Connection defective, connecting pipe is intruding at 9 o'clock, 150mm dia, intrusion: 5%
14	28.80	RM	Roots, mass, 50% cross-sectional area loss, change
15	28.90	RM	Roots, mass, 50% cross-sectional area loss, finish
16	28.90	SA	Survey abandoned

PLR:	SW4X	Upstream Node:	SW4
Inspection Direction:	Downstream	Downstream Node:	SW3
Inspected Length:	55.90 m	Dia/Height:	300 mm
Total Length:	55.90 m	Material:	Concrete

No.	m+	Code	Observation
1	0.00	IC	Start node, inspection chamber, reference: SW4
2	0.00	WL	Water level, 5% of the vertical dimension
3	0.80	RFJ	Roots, fine at joint
4	2.60	RFJ	Roots, fine at joint
5	4.30	RFJ	Roots, fine at joint
6	7.50	MCVC	Pipe material changes to vitrified clay at this point
7	7.50	JDM	Joint displaced, medium
8	7.50	LL	Line deviates left
9	7.50	RFJ	Roots, fine at joint
10	15.80	RFJ	Roots, fine at joint
11	16.90	JN	Junction at 10 o'clock, 150mm dia
12	16.90	RF	Roots, fine, start
13	20.00	JN	Junction at 10 o'clock, 150mm dia

Section Summary

Project Name Milksey Lane	Project Number	Project Date 11/21/2024
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No.	m+	Code	Observation
14	23.70	RF	Roots, fine, finish
15	31.30	RFJ	Roots, fine at joint
16	32.80	RFJ	Roots, fine at joint
17	33.50	RFJ	Roots, fine at joint
18	44.50	RTJ	Roots, tap at joint, start
19	45.30	RTJ	Roots, tap at joint, finish
20	45.30	RMJ	Roots, mass at joint, 15% cross-sectional area loss, start
21	45.70	RMJ	Roots, mass at joint, 5% cross-sectional area loss, change
22	46.90	RMJ	Roots, mass at joint, 20% cross-sectional area loss, change
23	47.50	RMJ	Roots, mass at joint, 10% cross-sectional area loss, change
24	52.10	RMJ	Roots, mass at joint, 10% cross-sectional area loss, finish
25	52.60	RFJ	Roots, fine at joint
26	55.20	RFJ	Roots, fine at joint
27	55.90	ICF	Finish node, inspection chamber, reference: SW3

PLR:	SW3X	Upstream Node:	SW3
Inspection Direction:	Downstream	Downstream Node:	SW2
Inspected Length:	14.10 m	Dia/Height:	300 mm
Total Length:	14.10 m	Material:	Vitrified clay

No.	m+	Code	Observation
1	0.00	IC	Start node, inspection chamber, reference: SW3
2	0.00	WL	Water level, 0% of the vertical dimension
3	0.50	RMJ	Roots, mass at joint, 10% cross-sectional area loss, start
4	3.50	RMJ	Roots, mass at joint, 30% cross-sectional area loss, change
5	7.10	RMJ	Roots, mass at joint, 60% cross-sectional area loss, change
6	10.30	JN	Junction at 9 o'clock, 225mm dia
7	14.10	RMJ	Roots, mass at joint, 60% cross-sectional area loss, finish
8	14.10	SA	Survey abandoned

Defect Grade Description (Node)

Project Name
Milksey Lane

Project Number

Project Date
11/21/2024

- | | |
|-----------|--|
| 1: | <p>Brick: No structural defects.</p> <p>Other Materials: No structural defects.</p> <p>Acceptable structural condition.</p> |
| 2: | <p>Brick: Circumferential cracking; single longitudinal crack; surface mortar loss (depth missing < 15mm); surface damage - slight spalling (breaking away of small fragments from the surface); surface damage - slight wear (increased roughness).</p> <p>Other Materials: Circumferential crack; moderate joint defects (i.e. medium open joint or medium displaced joint); surface damage - slight spalling (breaking away of small fragments from the surface) or slight wear (increased roughness).</p> <p>Minimal collapse likelihood in the short term but potential for further deterioration.</p> |
| 3: | <p>Brick: Medium mortar loss (depth missing 15-50mm) without other defects; more than one longitudinal crack (at a single location); multiple cracking; single bricks displaced; deformation < 5%; no fracture and only moderate mortar loss; surface damage - medium spalling (large areas of chipped brick); surface damage - medium wear (large area of brick surface is missing).</p> <p>Other Materials: Fracture with no deformation or deformation < 5%; longitudinal cracking or multiple cracking; minor loss of level; severe joint defects (i.e. large open joint or large displaced joint); surface damage - partial area of pipe surface is missing or worn.</p> <p>Collapse unlikely in the near future but further deterioration likely</p> |
| 4: | <p>Brick: Total mortar loss (depth missing > 50mm) with deformation > 10%; deformation up to 10% and fractured; displaced or hanging brickwork; small number of missing bricks; dropped invert (drop > 20mm); moderate loss of level; surface damage - large spalling (entire surface of brick is missing); surface damage - large wear (entire surface of brick is missing).</p> <p>Other Materials: Broken; deformation up to 10% and broken; fracture with deformation 5-10%; multiple fractures; serious loss of level; serious joint defects with voids or soil visible (open joint with > 50mm soil or void visible or joint displacement > 25% of diameter); surface damage - entire area of pipe surface is missing or severely worn.</p> <p>Collapse likely in the foreseeable future</p> |
| 5: | <p>Brick: Already collapsed; missing Invert; deformation > 10% and fractured; displaced or hanging brickwork and deformation < 10%; extensive areas of missing brickwork.</p> <p>Other Materials: Already collapsed; deformation > 10% and broken; extensive areas of pipe fabric missing; fractures with deformation > 10%</p> <p>Collapsed or collapse imminent</p> |

Node Profile

Project Name
Milksey Lane

Project Number

Project Date
11/21/2024

Node No.	Node ID	Town or Village	Road	Node Depth	Date
1	SW2				11/29/2024
2	SW1				11/29/2024
3	SW3				11/29/2024
4	SW4				11/29/2024

Total: 4 Nodes

Completed section inspection

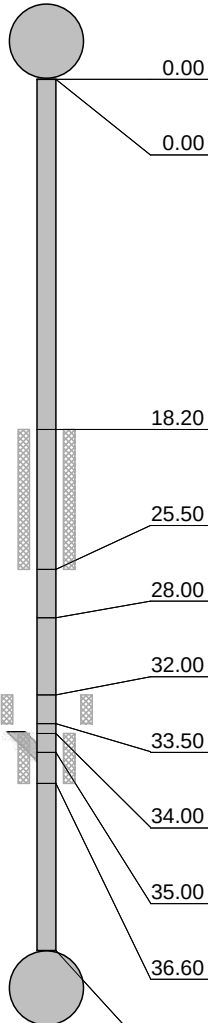


Item No.	Insp. No.	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
1	1	29/11/24	8:06	Not Specified	No Rain Or Snow	No	SW2X
Operator		Vehicle		Camera	Preset Length	Legal Status	Alternative ID
GG		Not Specified		Pearpoint P340	Not Specified	Highways Drainage	Not Specified

Town or Village:	Graveley	Inspection Direction:	Downstream	Upstream Node:	SW2
Road:	Milksey Lane	Inspected Length:	45.30 m	Upstream Pipe Depth:	1530.000 m
Location:	Footway	Total Length:	45.30 m	Downstream Node:	SW1
Surface Type:	Asphalt Footway	Joint Length:		Downstream Pipe Depth:	1240.000 m
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	375 mm		
Flow Control:	No flow control	Material:	Concrete		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Routine inspection	Lining Material:	No Lining		

Comments:

Recommendations:

Scale:	1:393	Position [m]	Code	Observation	MPEG	Photo	Grade																																												
Depth: 1530.00 m SW2  0.00 0.00 18.20 25.50 28.00 32.00 33.50 34.00 35.00 36.60 45.30 SW1 Depth: 1240.00 m <table><tr><td>IC</td><td>Start node, inspection chamber, reference: SW2</td><td>00:00:00</td><td></td></tr><tr><td>WL</td><td>Water level, 5% of the vertical dimension: Running live</td><td>00:00:01</td><td></td></tr><tr><td>S01</td><td>RFJ</td><td>Roots, fine at joint, start</td><td>00:00:51</td></tr><tr><td>F01</td><td>RFJ</td><td>Roots, fine at joint, finish</td><td>00:01:30</td></tr><tr><td></td><td>RFJ</td><td>Roots, fine at joint</td><td>00:01:50</td></tr><tr><td>S02</td><td>RFJ</td><td>Roots, fine at joint, start</td><td>00:02:21</td></tr><tr><td>F02</td><td>RFJ</td><td>Roots, fine at joint, finish</td><td>00:02:48</td></tr><tr><td>S03</td><td>RFJ</td><td>Roots, fine at joint, start</td><td>00:03:00</td></tr><tr><td></td><td>JN</td><td>Junction at 2 o'clock, 250mm dia</td><td>00:03:10</td></tr><tr><td>F03</td><td>RFJ</td><td>Roots, fine at joint, finish</td><td>00:03:41</td></tr><tr><td>OCF</td><td>Finish node, other special chamber, reference: SW1: Unable to push rod further</td><td>00:05:22</td><td></td></tr></table>								IC	Start node, inspection chamber, reference: SW2	00:00:00		WL	Water level, 5% of the vertical dimension: Running live	00:00:01		S01	RFJ	Roots, fine at joint, start	00:00:51	F01	RFJ	Roots, fine at joint, finish	00:01:30		RFJ	Roots, fine at joint	00:01:50	S02	RFJ	Roots, fine at joint, start	00:02:21	F02	RFJ	Roots, fine at joint, finish	00:02:48	S03	RFJ	Roots, fine at joint, start	00:03:00		JN	Junction at 2 o'clock, 250mm dia	00:03:10	F03	RFJ	Roots, fine at joint, finish	00:03:41	OCF	Finish node, other special chamber, reference: SW1: Unable to push rod further	00:05:22	
IC	Start node, inspection chamber, reference: SW2	00:00:00																																																	
WL	Water level, 5% of the vertical dimension: Running live	00:00:01																																																	
S01	RFJ	Roots, fine at joint, start	00:00:51																																																
F01	RFJ	Roots, fine at joint, finish	00:01:30																																																
	RFJ	Roots, fine at joint	00:01:50																																																
S02	RFJ	Roots, fine at joint, start	00:02:21																																																
F02	RFJ	Roots, fine at joint, finish	00:02:48																																																
S03	RFJ	Roots, fine at joint, start	00:03:00																																																
	JN	Junction at 2 o'clock, 250mm dia	00:03:10																																																
F03	RFJ	Roots, fine at joint, finish	00:03:41																																																
OCF	Finish node, other special chamber, reference: SW1: Unable to push rod further	00:05:22																																																	
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade																																										
0	0.0	0.0	0.0	1.0	4	1.0	0.3	14.0	2.0																																										

Section Pictures - 11/29/2024 - SW2X

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
1	Downstream	SW2X		



SW2.JPG, 00:00:00, 0.00 m
 Start node, inspection chamber, reference: SW2



71a36dd9-3d53-40b7-b06d-b984787a84b6.png, 00:00:01, 0.00 m
 Water level, 5% of the vertical dimension, Running live



b2a526c9-151c-40f6-809e-3401277c87f8.png, 00:00:51, 18.20 m
 Roots, fine at joint, start



7b70e5a9-b297-4289-a504-2282be5e6a94.png, 00:01:30, 25.50 m
 Roots, fine at joint, finish



29270812-47d4-47e3-94d8-0189b74d66e6.png, 00:01:50, 28.00 m
 Roots, fine at joint



f2520338-991b-4d49-a4b7-b083027ddd3.png, 00:02:21, 32.00 m
 Roots, fine at joint, start

Section Pictures - 11/29/2024 - SW2X

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
1	Downstream	SW2X		



93e7a674-413d-43cd-a0ed-10f057f7ce26.png, 00:02:48,
33.50 m
Roots, fine at joint, finish



d3dc2325-8fee-4084-b3ff-8aad911865d1.png, 00:03:00, 34.00
m
Roots, fine at joint, start



f539d5c1-cff1-4d3c-b9ef-aa45644b736d.png, 00:03:10, 35.00
m
Junction at 2 o'clock, 250mm dia



eb8eaf-11ce-49ac-99d1-1b747c865bb6.png, 00:03:41,
36.60 m
Roots, fine at joint, finish



c820a393-d13f-4672-aaae-d84b78635713.png, 00:05:22,
45.30 m
Finish node, other special chamber, reference: SW1, Unable

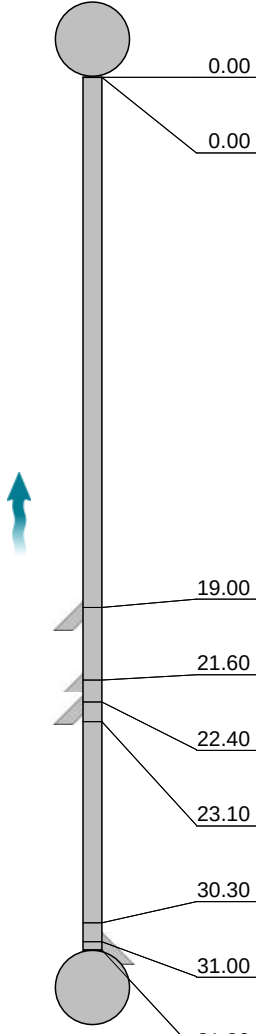
Completed section inspection



Item No. 2	Insp. No. 1	Date 29/11/24	Time 8:18	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR SW2X
Operator GG		Vehicle Not Specified		Camera Pearpoint P340	Preset Length Not Specified	Legal Status Highways Drainage	Alternative ID Not Specified

Town or Village:	Graveley	Inspection Direction:	Upstream	Upstream Node:	SW2
Road:	Milksey Lane	Inspected Length:	31.30 m	Upstream Pipe Depth:	1530.000 m
Location:	Footway	Total Length:	31.30 m	Downstream Node:	SW1
Surface Type:	Asphalt Footway	Joint Length:		Downstream Pipe Depth:	1240.000 m
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	375 mm		
Flow Control:	No flow control	Material:	Concrete		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Routine inspection	Lining Material:	No Lining		

Comments:
Recommendations:

Scale: 1:271	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: 1240.00 m SW1						
						
	0.00	IC	Start node, inspection chamber, reference: SW1	00:00:01		
	0.00	WL	Water level, 5% of the vertical dimension: Running live	00:00:01		
	19.00	JN	Junction at 2 o'clock, 150mm dia	00:01:20		
	21.60	JN	Junction at 2 o'clock, 150mm dia	00:01:34		
	22.40	CN	Connection other than junction at 1 o'clock, 150mm dia	00:01:43		
	23.10	RFJ	Roots, fine at joint	00:01:48		2
	30.30	RFJ	Roots, fine at joint	00:02:26		2
	31.00	JN	Junction at 10 o'clock, 150mm dia	00:02:32		
	31.30	OCF	Finish node, other special chamber, reference: SW2: Cross over point from section 1	00:02:45		
SW2 Depth: 1530.00 m						

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	2	1.0	0.1	2.0	2.0

Section Pictures - 11/29/2024 - SW2X

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
2	Upstream	SW2X		



SW1.JPG, 00:00:01, 0.00 m
Start node, inspection chamber, reference: SW1



bbc34e50-7b20-4962-8c3e-7d5df5e63530.png, 00:00:01, 0.00 m

Water level, 5% of the vertical dimension, Running live



cc336df9-275d-4a12-b918-de934bef365d.png, 00:01:20, 19.00 m

Junction at 2 o'clock, 150mm dia



078ccda-603a-4452-89f4-d46438b8e00f.png, 00:01:34, 21.60 m

Junction at 2 o'clock, 150mm dia



1a8d78c2-db60-4994-8570-c8d9b8ef25bd.png, 00:01:43, 22.40 m

Connection other than junction at 1 o'clock, 150mm dia



6d8b6261-9768-4338-a8de-f9a113c922da.png, 00:01:48, 23.10 m

Roots, fine at joint

Section Pictures - 11/29/2024 - SW2X

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
2	Upstream	SW2X		



22677a1c-9702-415a-b762-6022f4cc53ea.png, 00:02:26,
30.30 m
Roots, fine at joint



a02fb6f8-db22-495e-b60a-9fe1844e9d07.png, 00:02:32, 31.00
m
Junction at 10 o'clock, 150mm dia



6587682b-d075-46d0-bbc0-423006ded360.jpg, 00:02:45,
31.30 m
Finish node, other special chamber, reference: SW2, Cross

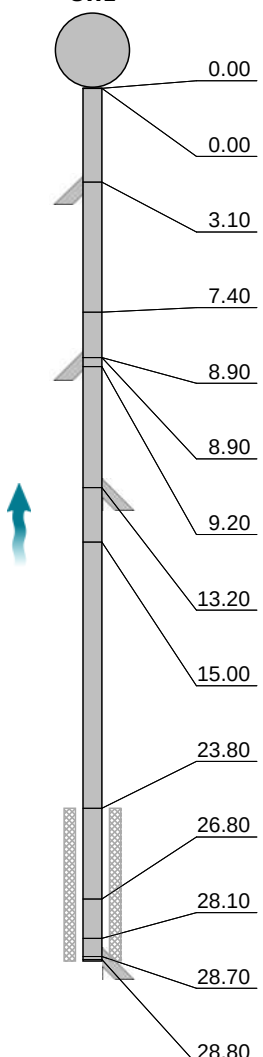
Abandoned section inspection



Item No. 3	Insp. No. 1	Date 29/11/24	Time 8:26	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR SW3X
Operator GG		Vehicle Not Specified		Camera Pearpoint P340	Preset Length Not Specified	Legal Status Highways Drainage	Alternative ID Not Specified

Town or Village:	Graveley	Inspection Direction:	Upstream	Upstream Node:	SW3
Road:	Milksey Lane	Inspected Length:	28.90 m	Upstream Pipe Depth:	1660.000 m
Location:	Footway	Total Length:	28.90 m	Downstream Node:	SW2
Surface Type:	Asphalt Footway	Joint Length:		Downstream Pipe Depth:	1530.000 m
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	300 mm		
Flow Control:	No flow control	Material:	Vitrified clay		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Routine inspection	Lining Material:	No Lining		

Comments:
Recommendations:

Scale: 1:250	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: 1530.00 m SW2 						
	0.00	IC	Start node, inspection chamber, reference: SW2	00:00:00		
	0.00	WL	Water level, 5% of the vertical dimension: Running live	00:00:00		
	3.10	JN	Junction at 1 o'clock, 150mm dia	00:00:33		
	7.40	RFJ	Roots, fine at joint	00:00:53		2
	8.90	CXD	Connection defective, connecting pipe is damaged at 1 o'clock, 150mm dia	00:01:07		
	8.90	RMJ	Roots, mass at joint, 10% cross-sectional area loss	00:01:10		3
	9.20	DEX	Settled deposits, other, 10% cross-sectional area loss: Leaves	00:01:16		3
	13.20	JN	Junction at 10 o'clock, 150mm dia	00:01:38		
	15.00	RFJ	Roots, fine at joint	00:01:50		2
	23.80	S01 RM	Roots, mass, 10% cross-sectional area loss, start	00:02:37		
	26.80	C01 RM	Roots, mass, 20% cross-sectional area loss, change	00:03:05		
	28.10	C01 RM	Roots, mass, 40% cross-sectional area loss, change	00:03:26		
	28.70	CXI	Connection defective, connecting pipe is intruding at 9 o'clock, 150mm dia, intrusion: 5%	00:03:34		3
	28.80	C01 RM	Roots, mass, 50% cross-sectional area loss, change	00:03:43		

Abandoned section inspection



Item No. 3	Insp. No. 1	Date 29/11/24	Time 8:26	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR SW3X
Operator GG		Vehicle Not Specified		Camera Pearpoint P340	Preset Length Not Specified	Legal Status Highways Drainage	Alternative ID Not Specified

Scale:	Position [m]	Code	Observation	MPEG	Photo	Grade
1:250	28.90 F01	RM	Roots, mass, 50% cross-sectional area loss, finish	00:03:43		3
	28.90	SA	Survey abandoned: Unable to proceed.	00:03:43		



STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	6	6.0	1.2	34.0	4.0

Section Pictures - 11/29/2024 - SW3X

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
3	Upstream	SW3X		



99624c56-6d41-4af9-ad73-06a8ec7e4514.png, 00:00:00, 0.00
m
Water level, 5% of the vertical dimension, Running live



401ab29a-4c70-4d57-8003-c0800992f88c.png, 00:00:33, 3.10
m
Junction at 1 o'clock, 150mm dia



185b37ec-0349-4d34-8897-50f622d61a30.png, 00:00:53, 7.40
m
Roots, fine at joint



b65f7ef7-e37d-4f68-8e9d-51e517b19886.png, 00:01:07, 8.90
m
Connection defective, connecting pipe is damaged at 1 o'clock,



a74bc132-76af-4b72-b59a-9b0d10c1e1bd.png, 00:01:10, 8.90
m
Roots, mass at joint, 10% cross-sectional area loss



035ad4f6-410a-4705-9adf-9434a6787c09.png, 00:01:16, 9.20
m
Settled deposits, other, 10% cross-sectional area loss, Leaves

Section Pictures - 11/29/2024 - SW3X

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
3	Upstream	SW3X		



ced530b9-5c45-4fb0-bd8a-c44cf9934782.png, 00:01:38, 13.20 m
Junction at 10 o'clock, 150mm dia



76ad6ec8-b119-4354-9085-b3d31c6acbea.png, 00:01:50, 15.00 m
Roots, fine at joint



f4683594-3657-44ac-96e9-ee69abbc467a.png, 00:02:37, 23.80 m
Roots, mass, 10% cross-sectional area loss, start



834ecfe2-25ef-439e-99da-13f364f33e35.png, 00:03:05, 26.80 m
Roots, mass, 20% cross-sectional area loss, change



17d09909-7178-4815-81a0-ae1a1d9967ac.png, 00:03:26, 28.10 m
Roots, mass, 40% cross-sectional area loss, change



c149e879-bbbf-4cb7-8b94-35e5cef6f891.png, 00:03:34, 28.70 m
Connection defective, connecting pipe is intruding at 9 o'clock,

Section Pictures - 11/29/2024 - SW3X

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
3	Upstream	SW3X		



60fcfc24-6691-4d58-9d84-d8bf17bcf9fa.png, 00:03:43, 28.90
m

Roots, mass, 50% cross-sectional area loss, finish

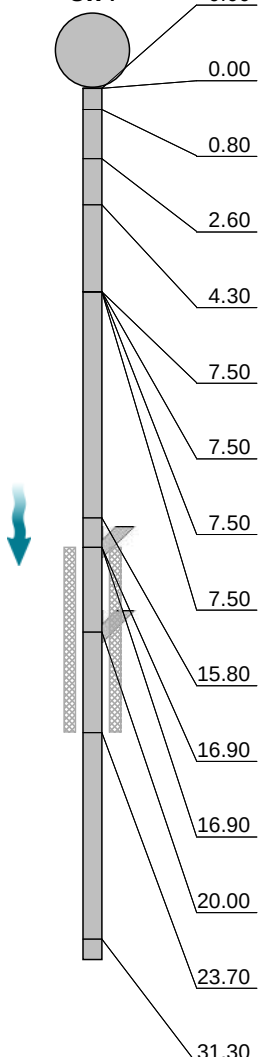
Completed section inspection



Item No. 4	Insp. No. 1	Date 29/11/24	Time 8:48	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR SW4X
Operator GG		Vehicle Not Specified		Camera Pearpoint P340	Preset Length Not Specified	Legal Status Highways Drainage	Alternative ID Not Specified

Town or Village:	Graveley	Inspection Direction:	Downstream	Upstream Node:	SW4
Road:	Milksey Lane	Inspected Length:	55.90 m	Upstream Pipe Depth:	1790.000 m
Location:	Woodland	Total Length:	55.90 m	Downstream Node:	SW3
Surface Type:	Overgrown	Joint Length:		Downstream Pipe Depth:	1660.000 m
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	300 mm		
Flow Control:	No flow control	Material:	Concrete		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Routine inspection	Lining Material:	No Lining		

Comments:
Recommendations:

Scale: 1:278	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: 1790.00 m 						
	0.00	IC	Start node, inspection chamber, reference: SW4	00:00:01		
	0.00	WL	Water level, 5% of the vertical dimension: Running live	00:00:01		
	0.80	RFJ	Roots, fine at joint	00:00:19		2
	2.60	RFJ	Roots, fine at joint	00:00:31		2
	4.30	RFJ	Roots, fine at joint	00:00:40		2
	7.50	MCVC	Pipe material changes to vitrified clay at this point	00:00:52		
	7.50	JDM	Joint displaced, medium	00:00:52		1 / 3
	7.50	LL	Line deviates left	00:00:52		
	7.50	RFJ	Roots, fine at joint	00:00:56		2
	15.80	RFJ	Roots, fine at joint	00:01:27		2
	16.90	JN	Junction at 10 o'clock, 150mm dia	00:01:31		
	16.90 S01	RF	Roots, fine, start	00:01:31		
	20.00	JN	Junction at 10 o'clock, 150mm dia	00:01:47		
	23.70 F01	RF	Roots, fine, finish	00:01:59		2
	31.30	RFJ	Roots, fine at joint	00:02:30		2

Completed section inspection



Item No.	Insp. No.	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
4	1	29/11/24	8:48	Not Specified	No Rain Or Snow	No	SW4X
Operator		Vehicle		Camera	Preset Length	Legal Status	Alternative ID
GG		Not Specified		Pearpoint P340	Not Specified	Highways Drainage	Not Specified

Section Pictures - 11/29/2024 - SW4X

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
4	Downstream	SW4X		



SW4.JPG, 00:00:01, 0.00 m
Start node, inspection chamber, reference: SW4



b08ece61-0da9-461a-8232-b92f97f60bf7.png, 00:00:01, 0.00 m

Water level, 5% of the vertical dimension, Running live



56f930ac-49f6-4b96-ada8-41c19fa769e6.png, 00:00:19, 0.80 m

Roots, fine at joint



072a555f-51a2-4a4f-8c8c-0cdd0f3fb631.png, 00:00:31, 2.60 m

Roots, fine at joint



16363fe1-2ee0-4494-bdf9-0540b0de48e2.png, 00:00:40, 4.30 m

Roots, fine at joint



901fc6c2-b364-4fae-8fd9-338f3b128fc0.png, 00:00:52, 7.50 m

Line deviates left

Section Pictures - 11/29/2024 - SW4X

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
4	Downstream	SW4X		



a0bce399-a450-4d3d-a9e2-3ac84516f48a.png, 00:01:27,
15.80 m
Roots, fine at joint



777f24de-9b4a-467c-a4c1-97b24560e6a4.png, 00:01:31,
16.90 m
Junction at 10 o'clock, 150mm dia



2f2d61b5-d4e9-458a-92f8-9caf123dfb0f.png, 00:01:47, 20.00
m
Junction at 10 o'clock, 150mm dia



1961e4e5-49af-4402-9bc2-7fe234b19399.png, 00:01:59,
23.70 m
Roots, fine, finish



630009ea-0182-45c2-8f0f-673835fbabb3.png, 00:02:30, 31.30
m
Roots, fine at joint



ced64048-de0d-4066-a821-b95732ef483e.png, 00:02:35,
32.80 m
Roots, fine at joint

Section Pictures - 11/29/2024 - SW4X

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
4	Downstream	SW4X		



bafb911b-6cbc-4a8f-9351-8adddeb6f59d.png, 00:02:38, 33.50 m
Roots, fine at joint



e6347e56-5449-4c1b-87a2-0c68d97f732a.png, 00:03:57, 44.50 m
Roots, tap at joint, start



2ac8cc72-35a9-48b6-8983-1817bcbaa44d.png, 00:04:03, 45.30 m
Roots, mass at joint, 15% cross-sectional area loss, start



79ca1f7a-4d21-486e-864e-0eff7670a4b5.png, 00:04:17, 45.70 m
Roots, mass at joint, 5% cross-sectional area loss, change



5aaf0228-9991-490b-b1c3-98dcc6b319a3.png, 00:04:52, 46.90 m
Roots, mass at joint, 20% cross-sectional area loss, change



6d0965e6-bcb2-4139-864b-f7b8d1967d73.png, 00:05:12, 47.50 m
Roots, mass at joint, 10% cross-sectional area loss, change

Section Pictures - 11/29/2024 - SW4X

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
4	Downstream	SW4X		



e827a749-dd39-424b-93f7-14ef3a2b5b4b.png, 00:06:21,

52.60 m

Roots, fine at joint



b464b4d0-19c6-4f8d-9bc6-851798832103.png, 00:07:05,

55.20 m

Roots, fine at joint



37a45ecf-ce0b-435f-bd45-ba3228d86827.png, 00:07:20,

55.90 m

Finish node, inspection chamber, reference: SW3

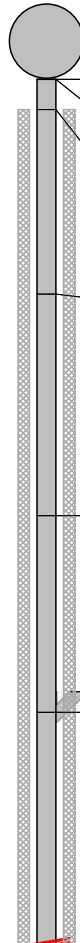
Abandoned section inspection



Item No. 5	Insp. No. 1	Date 29/11/24	Time 8:38	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR SW3X
Operator GG		Vehicle Not Specified		Camera Pearpoint P340	Preset Length Not Specified	Legal Status Highways Drainage	Alternative ID Not Specified

Town or Village:	Graveley	Inspection Direction:	Downstream	Upstream Node:	SW3
Road:	Milksey Lane	Inspected Length:	14.10 m	Upstream Pipe Depth:	1660.000 m
Location:	Woodland	Total Length:	14.10 m	Downstream Node:	SW2
Surface Type:	Overgrown	Joint Length:		Downstream Pipe Depth:	1530.000 m
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	300 mm		
Flow Control:	No flow control	Material:	Vitrified clay		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Routine inspection	Lining Material:	No Lining		

Comments:
Recommendations:

Scale:	1:123	Position [m]	Code	Observation	MPEG	Photo	Grade		
Depth: 1660.00 m SW3 									
	0.00	IC	Start node, inspection chamber, reference: SW3	00:00:01					
	0.00	WL	Water level, 0% of the vertical dimension	00:00:01					
	0.50	S01	RMJ	Roots, mass at joint, 10% cross-sectional area loss, start	00:00:08				
	3.50	C01	RMJ	Roots, mass at joint, 30% cross-sectional area loss, change	00:00:35				
	7.10	C01	RMJ	Roots, mass at joint, 60% cross-sectional area loss, change	00:01:04				
	10.30	JN	Junction at 9 o'clock, 225mm dia	00:01:40					
	14.10	F01	RMJ	Roots, mass at joint, 60% cross-sectional area loss, finish	00:02:25		3		
	14.10	SA	Survey abandoned: Unable to proceed.	00:02:25					
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	1	4.0	4.0	56.0	4.0

Section Pictures - 11/29/2024 - SW3X

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
5	Downstream	SW3X		



SW3.JPG, 00:00:01, 0.00 m
Start node, inspection chamber, reference: SW3



9de1fb91-efca-4e0c-b9ff-25405ad3fe57.png, 00:00:01, 0.00 m
Water level, 0% of the vertical dimension



d75d1e6c-e1ee-4a24-8fba-f6bf955d0141.png, 00:00:08, 0.50 m
Roots, mass at joint, 10% cross-sectional area loss, start



03c760a4-c011-424d-a0e7-884292924b45.png, 00:00:35, 3.50 m
Roots, mass at joint, 30% cross-sectional area loss, change



eb2e7dfa-f1ef-47fd-8f0b-1463f61647f4.png, 00:01:04, 7.10 m
Roots, mass at joint, 60% cross-sectional area loss, change



4eba2138-032a-41ca-878b-b013038afdcd.png, 00:01:40, 10.30 m
Junction at 9 o'clock, 225mm dia

Section Pictures - 11/29/2024 - SW3X

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
5	Downstream	SW3X		



27453663-1dad-437a-b28e-5b72162ce29a.png, 00:02:25,
14.10 m

Survey abandoned, Unable to proceed.

Disclaimer

Although every effort has been made to produce a thorough and precise report, Aquatech Drain Services Ltd cannot be held liable for any discrepancies or omissions. Furthermore Aquatech Drain Services Ltd cannot be held responsible for any actions taken based on the information supplied within this report.

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THE DATA PRESENTED IN THIS DRAWING HAS BEEN COLLECTED USING A COMBINATION OF THE FOLLOWING: CONSULTATION OF UTILITY ASSET INFORMATION, VISUAL SURVEY & INSPECTION OF MANHOLES AND INSPECTION CHAMBERS, ELECTROMAGNETIC LOCATION TECHNIQUES, GROUND PENETRATING RADAR, AND, WHERE APPLICABLE, TRIAL HOLE EXCAVATIONS. THESE TECHNIQUES HAVE BEEN DEPLOYED IN ACCORDANCE WITH THE BS PAS128 SPECIFICATION FOR UNDERGROUND UTILITY DETECTION, VERIFICATION AND LOCATION USING THE SEARCH METHODOLOGIES DEEMED APPLICABLE AT TIME OF SITE VISIT.

UNLESS OTHERWISE STATED, ALL UTILITIES SHOWN ON THIS PLAN HAVE BEEN SURVEYED USING APPROVED DETECTORS AND THE CONNECTIONS BETWEEN INSPECTION CHAMBERS, IF UNABLE TO BE DETECTED, ARE GENERALLY ASSUMED TO BE DIRECT UNLESS THERE ARE INDICATIONS TO THE CONTRARY. THE DETECTION CONFIDENCE FOR EACH UTILITY SEGMENT IS DEPICTED IN LINE WITH THE PAS128 SCHEME OUTLINED BELOW. INFORMATION DEPICTED AS QLC OR QLD CANNOT BE GUARANTEED AS IT IS BASED ON HISTORIC UTILITY RECORDS WHICH CAN BE INACCURATE AND INCOMPLETE. PIPE SIZES NOT OBTAINED BY VISUAL SURVEY WILL HAVE BEEN OBTAINED FROM RECORD DRAWINGS OR MARKER PLATES WHERE AVAILABLE, WHERE SPECIFIED. DEPTH ESTIMATIONS ARE GENERALLY TO THE TOP OF THE SERVICE. DEPTHS TO GRAVITY SEWERS AND DRAINS ARE GENERALLY TO INVERT LEVELS UNLESS OTHERWISE STATED.

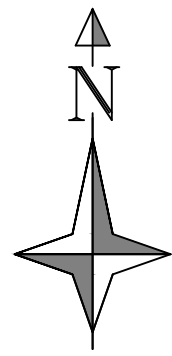
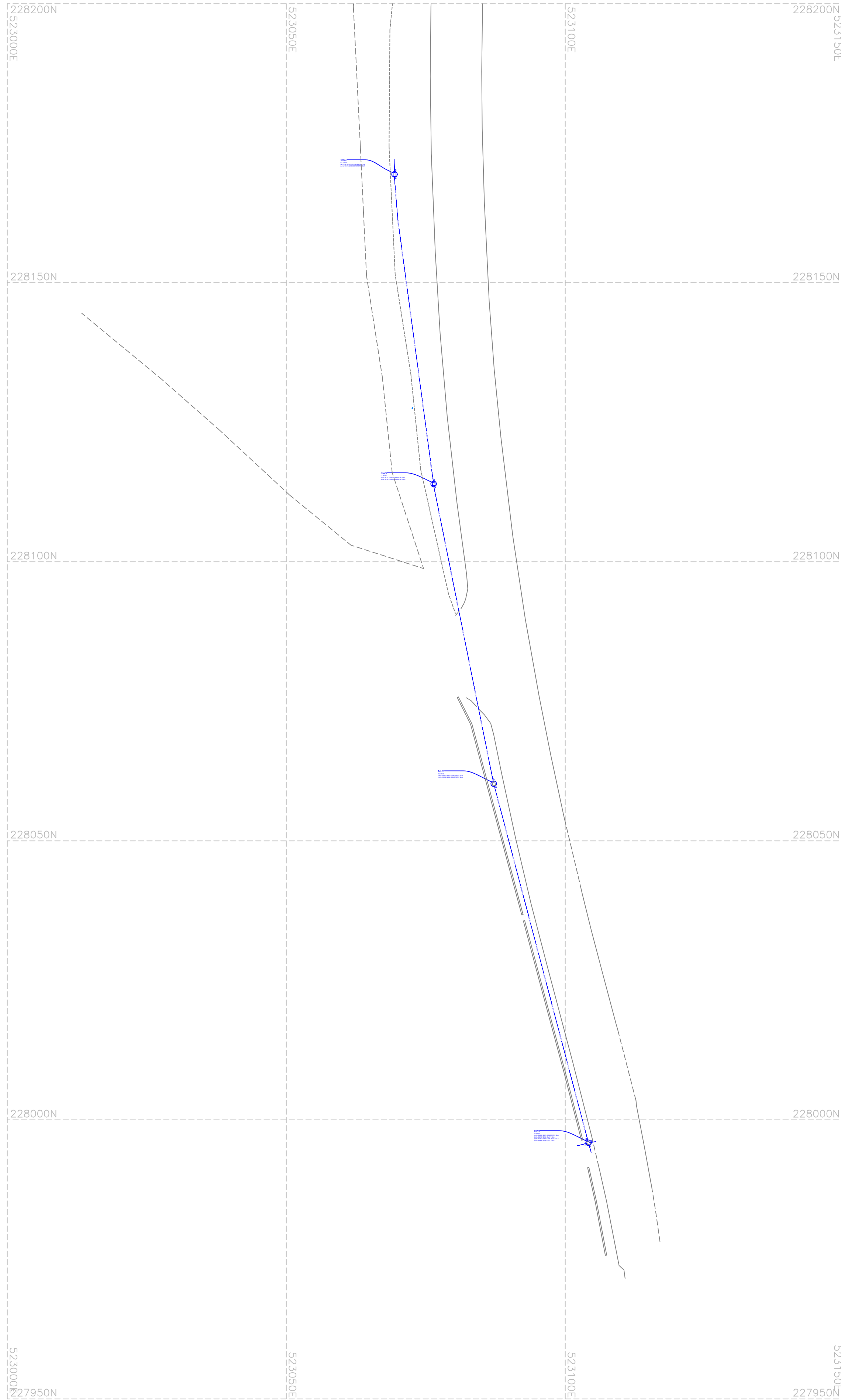
THE UTILITY ROUTES DEPICTED MAY REFLECT THE ROUTES OF MULTIPLE CABLES OR PIPES. IT IS NOT ALWAYS POSSIBLE TO DIFFERENTIATE BETWEEN BURIED CONSTRUCTION FEATURES, UTILITIES AND OTHER SUBSURFACE LINEAR FEATURES. THEREFORE, IT IS POSSIBLE THAT SOME FEATURES SHOWN ARE NOT UTILITY RELATED, AND DUE TO THE LIMITATIONS OF ELECTROMAGNETIC TECHNIQUES ALL UTILITY IDENTIFICATIONS SHOULD BE TREATED WITH CAUTION AND VERIFIED PRIOR TO USE DURING DESIGN/BUILDING WORKS.

IF THE LOCATION OR DEPTH OF UTILITIES AND FEATURES IS OF PARTICULAR IMPORTANCE TO A PROJECT THEN IT IS RECOMMENDED THAT DISCUSSIONS ARE HELD WITH MEC CONSULTING GROUP REGARDING ANY POSSIBLE LIMITATIONS OR ANOMALIES.

PLEASE NOTE THAT NOT ALL BURIED PIPES, CABLES AND DUCTS CAN BE DETECTED AND MAPPED IN CONSIDERATION OF THEIR DEPTH, LOCATION, MATERIAL TYPE, GEOLOGY AND PROXIMITY TO OTHER UTILITIES. EVEN AN APPROPRIATE AND PROFESSIONALLY EXECUTED SURVEY MAY NOT BE ABLE TO ACHIEVE A 100% DETECTION RATE. WHERE AN AREA OF UTILITIES IS UNLIKELY TO AFFECT CLIENT PROJECT REQUIREMENTS, IT IS STRONGLY RECOMMENDED THAT A PAS128 QUALITY LEVEL A VERIFICATION SURVEY IS CARRIED OUT.

NO UTILITY MAPPING SURVEY CAN BE CONSIDERED A 100% ACCURATE DEPICTION OF THE SUB-SURFACE ENVIRONMENT, AND THE USE OF THESE DRAWINGS DOES NOT REMOVE THE REQUIREMENT FOR THE USE OF SAFE DIGGING TECHNIQUES AT ALL TIMES, IN LINE WITH THE REQUIREMENTS OF HSG47 AND CURRENT CDM REGULATIONS.

BOUNDARIES SHOWN ARE PHYSICAL SITE FEATURES AND MAY NOT REPRESENT LEGAL OWNERSHIP.



UTILITY MAPPING LEGEND

AC	ASBESTOS CEMENT	LP	LAMP POST
AR	ASSUMED ROUTE	MH	MANHOLE
AV	AIR VALVE	MKR	UTILITY MARKER POST
BL	BED LEVEL	MW	MONITORING WELL
BB	BASE BEND	OH	OVERHEAD
BD	BACK DROP	OSA	OFF SURVEY AREA
BH	BORHOLE	PE	POLYETHYLENE
BR	BRICK	PL	PLASTIC
BT	BT INSPECTION CHAMBER	PM	PARKING METER
CI	CAST IRON	PR	PIPE RISER
CL	COVER LEVEL	PVC	POLYVINYL CHLORIDE
CR	CABLE RISER	RE	RODDING EYE
CTV	CABLE TV INSPECTION CHAMBER	RWP	RAIN WATER PIPE
CP	CATCHPIT	S/A	SOAKAWAY
D	DEPTH	SI	SPUN IRON
DI	DUCTILE	ST	STOP TAP
DP	DOWN PIPE	SV	SLUICE VALVE
ED	EMPTY DUCT	SVP	SOIL VENT PIPE
EOSC	END OF TRENCH SCAR	TE	TRAPPED EXIT
EOT	END OF TRACE	TFR	TAKEN FROM RECORD
EP	ELECTRIC POST	TL	TRAFFIC LIGHT
ER	EARTH ROD	TP	TELEGRAPH POST
FH	FIRE HYDRANT	UTCCTV	UNABLE TO CCTV
FL	FLOOD LIGHT	UTF	UNABLE TO FIND
GPR	GROUND PENETRATING RADAR	UTL	UNABLE TO LIFT
GRP	GLASS REINFORCED PLASTIC	UTS	UNABLE TO SURVEY
GV	GAS VALVE	UTT	UNABLE TO TRACE
GY	GULLY	VC	VITRIFIED CLAY
HL	HIGH LEVEL	VP	VENT PIPE
HOR	HEAD OF RUN	VR	VAPOUR RECOVERY
IB	ILLUMINATION BOLLARD	WL	WATER LEVEL
IC	INSPECTION CHAMBER	WM	WATER METER
IL	INVERT LEVEL	WO	WASH OUT VALVE
JB	JUNCTION BOX	WSC	WATER SERVICE COVER

SEWER IDENTIFICATION

CWS B2>>	COMBINED WATER SEWER
FWS B2>>	FOUL WATER SEWER
SWS B2>>	SURFACE WATER SEWER
UWS B2>>	UNKNOWN WATER SEWER

SUB-SURFACE KEY

ELEC B2	ELECTRIC CABLE
HV B2	ELECTRIC HIGH VOLTAGE
LV B2	ELECTRIC LOW VOLTAGE
BT B2	TELECOMMS CABLE
CATV B2	CABLE TELEVISION
COMM B2	COMMUNICATION CABLE
FO B2	FIBRE OPTIC
WATER B2	WATER PIPE
GAS B2	GAS PIPE
FWS B2>>	FOUL WATER DRAINAGE
SWS B2>>	SURFACE WATER DRAINAGE
CWS B2>>	COMBINED DRAINAGE
UWS B2>>	UNIDENTIFIED DRAINAGE
FU B2	FUEL PIPE
UN B2	UNIDENTIFIED SERVICE
GPR B2	GPR LINEAR FEATURE
GPR AREA ANOMALY	
GPR AREA ANOMALY - REBAR	
OVERHEAD CABLE	
CABLE/PIPE RISER	END OF TRACE
BACKDROP/TRAPPED EXIT	CHANGE IN QUALITY
ANOMALY FOUND WITH GPR	START OF RUN
PIPE DIAMETER (mm)	BLOCKED RUN
SURVEY BOUNDARY	SURVEY BOUNDARY
GPR SURVEY AREA	
VEGETATED AREA	

UTILITY CONFIDENCE LEVELS

QL-A	HORIZONTAL AND VERTICAL POSITION VERIFIED VISUALLY HA +/-25MM VA +/-50MM
QL-B1	HORIZONTAL AND VERTICAL POSITION DETECTED BY MULTIPLE METHODS METHODS HA +/-150MM OR +/-15% OF DEPTH
QL-B2	HORIZONTAL AND VERTICAL POSITION DETECTED BY A SINGLE METHOD METHOD HA +/-250MM OR +/-40% OF DETECTED DEPTH
QL-B3	HORIZONTAL POSITION DETECTED BY A SINGLE METHOD HA +/-500MM DEPTH UNDEFINED
QL-B4	UTILITY IS SUSPECTED TO EXIST BUT HAS NOT BEEN DETECTED. ASSUMED ROUTE HORIZONTAL & DEPTH UNDEFINED
QL-C	UNDERGROUND UTILITY PLOTTED FROM UTILITY RECORD DATA ONLY, BUT WITH SITE RECONNAISSANCE TO MATCH UTILITY RECORD WITH PHYSICAL UTILITY STREET FURNITURE AS A BEST FIT
QL-D	DESKTOP UTILITY RECORD SEARCH, THOROUGH DESKTOP SEARCH OF ALL STATUTORY ASSET OWNERS TO SUPPLY THEIR RECORD DATA
QL-S	SEWER CONNECTION CONFIRMED VIA ACOUSTIC TESTING ONLY, HORIZONTAL AND VERTICAL POSITION ASSUMED TO BE MOST DIRECT ROUTE

REV	FIRST ISSUE	GS	JD	RC	22.11.24
REV	AMENDMENTS	DRN	CHK	APP	DATE

PROJECT:

MILKSEY LANE
GRAVELEY

DRAWING TITLE:

DRAINAGE CCTV SURVEY

CLIENT:

GADE HOMES LTD

DRAWING NUMBER:

29161_06_200_01

REVISION:	SHEET SIZE:	SCALE:
—	A1	1:500

STATUS:

FOR INFORMATION

MEC
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MEC
Consulting Group

APPENDICES



APPENDIX G

Doc. Ref.	29161-CALC-0101
Sheet	1 of 8
Engineer	Z. Jordan
Date	12 Aug 25
Revision	Rev A

DESIGN CALCULATIONS FRONT SHEET

SCHEME	Milksey Lane, Graveley
CLIENT	Gade Homes
ASPECTS OF SCHEME TO BE DESIGNED	Surface Water Sewer Design Surface water attenuation design and simulation results for the 50%AEP, 3.3%AEP35CC and 1%AEP40CC event for the development site.
CODES OF PRACTICE, DESIGN SPECIFICATIONS & BRITISH STANDARDS	- Design and analysis of urban storm drainage. Wallingford Procedure Vol.1 - Sustainable Drainage Systems- Non-Statutory technical standards for Sustainable drainage systems- 2015 - The SuDS Manual – CIRIA C753
NOTES	Existing runoff conditions have been calculated using Flow Causeway to calculate the Greenfield Discharge rate for the impermeable area of 0.59ha, the QBAR Greenfield rate has been calculated at 0.6l/s. The strategy involves conveying surface water flows to a series of attenuation features, which will then discharge into the existing highways surface water sewer within High Street, at a controlled discharge rate of 0.6l/s. The calculations for the attenuation storage have been carried out using Flow Causeway.

INDEX

Pages	Calculations	Checked by	Date
2 - 8	Surface Water Sewer design details for the 50%, 3.3%AEP35CC and 1%AEP40CC simulation results	RC	12.08.2025

**Design Settings**

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
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)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
Tank 1	0.082	5.00	108.500	1200	522992.237	228259.170	1.600
HydroBrake 1			108.500	1200	522993.913	228252.540	1.700
Tank 2	0.125	5.00	108.000	1200	523052.792	228228.742	1.600
HydroBrake 2			108.000	1200	523051.486	228209.993	1.700
Pipe 1			106.840	1200	522992.975	228208.108	1.840
Pipe 2			105.890	1200	522995.284	228186.776	1.740
Tank 3	0.144	5.00	105.860	1200	523016.920	228166.335	2.200
HydroBrake 3			105.860	1200	523009.392	228159.034	2.300
Basin	0.300	5.00	101.500	1200	523059.503	228115.433	1.700
HydroBrake 4			101.500	1200	523067.096	228112.747	2.505
Outfall			100.550	1200	523076.400	228114.062	3.230

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	Tank 1	HydroBrake 1	6.839	0.600	106.900	106.800	0.100	68.4	225	5.07	50.0
1.001	HydroBrake 1	Pipe 1	44.442	0.600	106.800	105.000	1.800	24.7	225	5.35	50.0
2.000	Tank 2	HydroBrake 2	18.794	0.600	106.400	106.300	0.100	187.9	225	5.33	50.0
2.001	HydroBrake 2	Pipe 1	58.541	0.600	106.300	105.000	1.300	45.0	225	5.83	50.0
1.002	Pipe 1	Pipe 2	21.457	0.600	105.000	104.150	0.850	25.2	225	5.97	50.0
1.003	Pipe 2	HydroBrake 3	31.123	0.600	104.150	103.560	0.590	52.8	225	6.25	50.0
3.000	Tank 3	HydroBrake 3	10.487	0.600	103.660	103.560	0.100	104.9	225	5.14	50.0
1.004	HydroBrake 3	Basin	66.424	0.600	103.560	99.800	3.760	17.7	225	6.61	50.0
1.005	Basin	HydroBrake 4	8.054	0.600	99.800	98.995	0.805	10.0	450	6.63	50.0
1.006	HydroBrake 4	Outfall	9.396	0.600	98.995	97.320	1.675	5.6	225	6.66	50.0

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	1.583	63.0	14.8	1.375	1.475	0.082	0.0
1.001	2.644	105.1	14.8	1.475	1.615	0.082	0.0
2.000	0.950	37.8	22.6	1.375	1.475	0.125	0.0
2.001	1.954	77.7	22.6	1.475	1.615	0.125	0.0
1.002	2.614	103.9	37.4	1.615	1.515	0.207	0.0
1.003	1.805	71.7	37.4	1.515	2.075	0.207	0.0
3.000	1.276	50.7	26.0	1.975	2.075	0.144	0.0
1.004	3.128	124.4	63.4	2.075	1.475	0.351	0.0
1.005	6.456	1026.8	117.6	1.250	2.055	0.651	0.0
1.006	5.561	221.1	117.6	2.280	3.005	0.651	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	6.839	68.4	225	Circular	108.500	106.900	1.375	108.500	106.800	1.475
1.001	44.442	24.7	225	Circular	108.500	106.800	1.475	106.840	105.000	1.615
2.000	18.794	187.9	225	Circular	108.000	106.400	1.375	108.000	106.300	1.475
2.001	58.541	45.0	225	Circular	108.000	106.300	1.475	106.840	105.000	1.615
1.002	21.457	25.2	225	Circular	106.840	105.000	1.615	105.890	104.150	1.515
1.003	31.123	52.8	225	Circular	105.890	104.150	1.515	105.860	103.560	2.075
3.000	10.487	104.9	225	Circular	105.860	103.660	1.975	105.860	103.560	2.075
1.004	66.424	17.7	225	Circular	105.860	103.560	2.075	101.500	99.800	1.475
1.005	8.054	10.0	450	Circular	101.500	99.800	1.250	101.500	98.995	2.055
1.006	9.396	5.6	225	Circular	101.500	98.995	2.280	100.550	97.320	3.005

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	Tank 1	1200	Manhole	Adoptable	HydroBrake 1	1200	Manhole	Adoptable
1.001	HydroBrake 1	1200	Manhole	Adoptable	Pipe 1	1200	Manhole	Adoptable
2.000	Tank 2	1200	Manhole	Adoptable	HydroBrake 2	1200	Manhole	Adoptable
2.001	HydroBrake 2	1200	Manhole	Adoptable	Pipe 1	1200	Manhole	Adoptable
1.002	Pipe 1	1200	Manhole	Adoptable	Pipe 2	1200	Manhole	Adoptable
1.003	Pipe 2	1200	Manhole	Adoptable	HydroBrake 3	1200	Manhole	Adoptable
3.000	Tank 3	1200	Manhole	Adoptable	HydroBrake 3	1200	Manhole	Adoptable
1.004	HydroBrake 3	1200	Manhole	Adoptable	Basin	1200	Manhole	Adoptable
1.005	Basin	1200	Manhole	Adoptable	HydroBrake 4	1200	Manhole	Adoptable
1.006	HydroBrake 4	1200	Manhole	Adoptable	Outfall	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
Tank 1	522992.237	228259.170	108.500	1.600	1200		0	1.000	106.900	225
HydroBrake 1	522993.913	228252.540	108.500	1.700	1200		1	1.000	106.800	225
							0	1.001	106.800	225
Tank 2	523052.792	228228.742	108.000	1.600	1200		0	2.000	106.400	225
HydroBrake 2	523051.486	228209.993	108.000	1.700	1200		1	2.000	106.300	225
							0	2.001	106.300	225
Pipe 1	522992.975	228208.108	106.840	1.840	1200		1	1.001	105.000	225
							2	2.001	105.000	225
							0	1.002	105.000	225
Pipe 2	522995.284	228186.776	105.890	1.740	1200		1	1.002	104.150	225
							0	1.003	104.150	225
Tank 3	523016.920	228166.335	105.860	2.200	1200		0	3.000	103.660	225

**Manhole Schedule**

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
HydroBrake 3	523009.392	228159.034	105.860	2.300	1200		1	3.000	103.560	225
							2	1.003	103.560	225
							0	1.004	103.560	225
Basin	523059.503	228115.433	101.500	1.700	1200		1	1.004	99.800	225
							0	1.005	99.800	450
HydroBrake 4	523067.096	228112.747	101.500	2.505	1200		1	1.005	98.995	450
							0	1.006	98.995	225
Outfall	523076.400	228114.062	100.550	3.230	1200		1	1.006	97.320	225

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	2 year (l/s)	0.6
Summer CV	1.000	Drain Down Time (mins)	240	30 year (l/s)	1.7
Winter CV	1.000	Additional Storage (m³/ha)	0.0	100 year (l/s)	2.3
Analysis Speed	Normal	Check Discharge Rate(s)	✓	Check Discharge Volume	x

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0	100	40	0	0
30	35	0	0				

Pre-development Discharge Rate

Site Makeup	Greenfield	Region	5	QMed	0.6
Greenfield Method	FEH	QBar/QMed conversion factor	1.124	QBar	0.6
Positively Drained Area (ha)	0.592	Growth Factor 2 year	0.89	Q 2 year (l/s)	0.6
SAAR (mm)	610	Growth Factor 30 year	2.55	Q 30 year (l/s)	1.7
Host	1	Growth Factor 100 year	3.56	Q 100 year (l/s)	2.3
BFIHost	0.693	Betterment (%)	0		

Node HydroBrake 1 Online Hydro-Brake® Control

Flap Valve	✓	Objective	(CL) Minimise blockage risk
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	106.800	Product Number	CTL-SCL-0057-1500-0900-1500
Design Depth (m)	0.900	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.5	Min Node Diameter (mm)	1200

Node HydroBrake 2 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	106.300	Product Number	CTL-SHE-0069-2000-0900-2000
Design Depth (m)	0.900	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

**Node HydroBrake 3 Online Hydro-Brake® Control**

Flap Valve	x	Objective	(CL) Minimise blockage risk
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	103.560	Product Number	CTL-SCL-0054-1800-1700-1800
Design Depth (m)	1.700	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.8	Min Node Diameter (mm)	1200

Node HydroBrake 4 Online Hydro-Brake® Control

Flap Valve	✓	Objective	(CL) Minimise blockage risk
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	98.995	Product Number	CTL-SCL-0028-6000-2205-6000
Design Depth (m)	2.205	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	0.6	Min Node Diameter (mm)	1200

Node Tank 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	106.900
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	62.0	0.0	0.800	62.0	0.0	0.801	0.0	0.0

Node Tank 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	106.400
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	100.0	0.0	0.800	100.0	0.0	0.801	0.0	0.0

Node Tank 3 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	103.660
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	170.0	0.0	1.600	170.0	0.0	1.601	0.0	0.0

Node Basin Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	99.800
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	149.9	0.0	0.500	244.1	0.0	1.000	353.2	0.0	1.500	476.5	0.0
0.100	167.1	0.0	0.600	264.8	0.0	1.100	376.7	0.0	1.600	502.9	0.0
0.200	185.5	0.0	0.700	286.1	0.0	1.200	400.8	0.0	1.700	529.8	0.0
0.300	204.5	0.0	0.800	307.9	0.0	1.300	425.5	0.0			
0.400	224.0	0.0	0.900	330.3	0.0	1.400	450.7	0.0			

**Results for 2 year Critical Storm Duration. Lowest mass balance: 99.00%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute summer	Tank 1	124	107.018	0.118	7.9	7.0984	0.0000	OK
180 minute summer	HydroBrake 1	120	107.026	0.226	5.4	0.2558	0.0000	SURCHARGED
180 minute summer	Tank 2	124	106.530	0.130	8.4	12.4677	0.0000	OK
180 minute summer	HydroBrake 2	124	106.531	0.231	2.9	0.2611	0.0000	SURCHARGED
180 minute summer	Pipe 1	120	105.028	0.028	3.5	0.0318	0.0000	OK
180 minute summer	Pipe 2	120	104.184	0.034	3.5	0.0379	0.0000	OK
480 minute winter	Tank 3	472	104.030	0.370	5.3	60.2383	0.0000	SURCHARGED
480 minute winter	HydroBrake 3	472	104.030	0.470	3.4	0.5320	0.0000	SURCHARGED
1440 minute winter	Basin	1680	100.517	0.717	4.2	156.4865	0.0000	SURCHARGED
1440 minute winter	HydroBrake 4	1680	100.516	1.521	1.0	1.7201	0.0000	SURCHARGED
15 minute summer	Outfall	1	97.320	0.000	0.4	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)
180 minute summer	Tank 1	1.000	HydroBrake 1	5.4	0.333	0.086	0.2081	
180 minute summer	HydroBrake 1	Hydro-Brake®	Pipe 1	1.5				
180 minute summer	Tank 2	2.000	HydroBrake 2	2.9	0.222	0.076	0.5963	
180 minute summer	HydroBrake 2	Hydro-Brake®	Pipe 1	2.0				
180 minute summer	Pipe 1	1.002	Pipe 2	3.5	1.064	0.033	0.0701	
180 minute summer	Pipe 2	1.003	HydroBrake 3	3.5	0.231	0.048	0.6762	
480 minute winter	Tank 3	3.000	HydroBrake 3	-2.1	0.101	-0.042	0.4171	
480 minute winter	HydroBrake 3	Hydro-Brake®	Basin	1.3				
1440 minute winter	Basin	1.005	HydroBrake 4	1.0	0.134	0.001	1.2761	
1440 minute winter	HydroBrake 4	Hydro-Brake®	Outfall	0.5				43.3



Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	Tank 1	176	107.482	0.582	11.3	34.9131	0.0000	SURCHARGED
180 minute winter	HydroBrake 1	176	107.482	0.682	6.3	0.7708	0.0000	SURCHARGED
180 minute winter	Tank 2	176	106.983	0.582	17.2	55.9949	0.0000	SURCHARGED
180 minute winter	HydroBrake 2	176	106.982	0.682	2.5	0.7716	0.0000	SURCHARGED
720 minute winter	Pipe 1	345	105.028	0.028	3.5	0.0319	0.0000	OK
960 minute winter	Pipe 2	1035	104.863	0.713	3.5	0.8059	0.0000	SURCHARGED
960 minute winter	Tank 3	1035	104.862	1.202	7.3	195.4917	0.0000	SURCHARGED
960 minute winter	HydroBrake 3	1035	104.862	1.302	3.5	1.4726	0.0000	SURCHARGED
1440 minute summer	Basin	1680	101.020	1.220	12.1	331.3105	0.0000	SURCHARGED
1440 minute winter	HydroBrake 4	1680	101.019	2.024	0.9	2.2892	0.0000	SURCHARGED
15 minute summer	Outfall	1	97.320	0.000	0.5	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)
180 minute winter	Tank 1	1.000	HydroBrake 1	6.3	0.326	0.100	0.2720	
180 minute winter	HydroBrake 1	Hydro-Brake®	Pipe 1	1.5				
180 minute winter	Tank 2	2.000	HydroBrake 2	2.5	0.256	0.066	0.7475	
180 minute winter	HydroBrake 2	Hydro-Brake®	Pipe 1	2.0				
720 minute winter	Pipe 1	1.002	Pipe 2	3.5	1.065	0.033	0.4573	
960 minute winter	Pipe 2	1.003	HydroBrake 3	3.5	0.185	0.048	1.2378	
960 minute winter	Tank 3	3.000	HydroBrake 3	-2.3	0.138	-0.045	0.4171	
960 minute winter	HydroBrake 3	Hydro-Brake®	Basin	1.6				
1440 minute summer	Basin	1.005	HydroBrake 4	1.4	0.056	0.001	1.2761	
1440 minute winter	HydroBrake 4	Hydro-Brake®	Outfall	0.6				49.3

**Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.00%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	Tank 1	176	107.696	0.796	14.5	47.7782	0.0000	SURCHARGED
180 minute winter	HydroBrake 1	176	107.696	0.896	4.3	1.0131	0.0000	SURCHARGED
240 minute winter	Tank 2	236	107.194	0.794	17.9	76.3555	0.0000	SURCHARGED
240 minute winter	HydroBrake 2	236	107.194	0.894	2.5	1.0110	0.0000	SURCHARGED
1440 minute winter	Pipe 1	1440	105.204	0.204	3.5	0.2308	0.0000	OK
1440 minute winter	Pipe 2	1440	105.204	1.054	3.5	1.1917	0.0000	SURCHARGED
1440 minute winter	Tank 3	1440	105.203	1.543	6.5	250.9615	0.0000	SURCHARGED
1440 minute winter	HydroBrake 3	1440	105.203	1.643	3.4	1.8584	0.0000	SURCHARGED
1440 minute winter	Basin	1680	101.198	1.398	10.7	407.7708	0.0000	SURCHARGED
1440 minute winter	HydroBrake 4	1680	101.197	2.202	1.3	2.4900	0.0000	SURCHARGED
15 minute summer	Outfall	1	97.320	0.000	0.5	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)
180 minute winter	Tank 1	1.000	HydroBrake 1	4.3	0.337	0.069	0.2720	
180 minute winter	HydroBrake 1	Hydro-Brake®	Pipe 1	1.5				
240 minute winter	Tank 2	2.000	HydroBrake 2	2.5	0.255	0.066	0.7475	
240 minute winter	HydroBrake 2	Hydro-Brake®	Pipe 1	2.0				
1440 minute winter	Pipe 1	1.002	Pipe 2	3.5	1.059	0.033	0.8330	
1440 minute winter	Pipe 2	1.003	HydroBrake 3	3.4	0.202	0.048	1.2378	
1440 minute winter	Tank 3	3.000	HydroBrake 3	-2.3	0.119	-0.045	0.4171	
1440 minute winter	HydroBrake 3	Hydro-Brake®	Basin	1.8				
1440 minute winter	Basin	1.005	HydroBrake 4	1.3	0.110	0.001	1.2761	
1440 minute winter	HydroBrake 4	Hydro-Brake®	Outfall	0.6				50.9

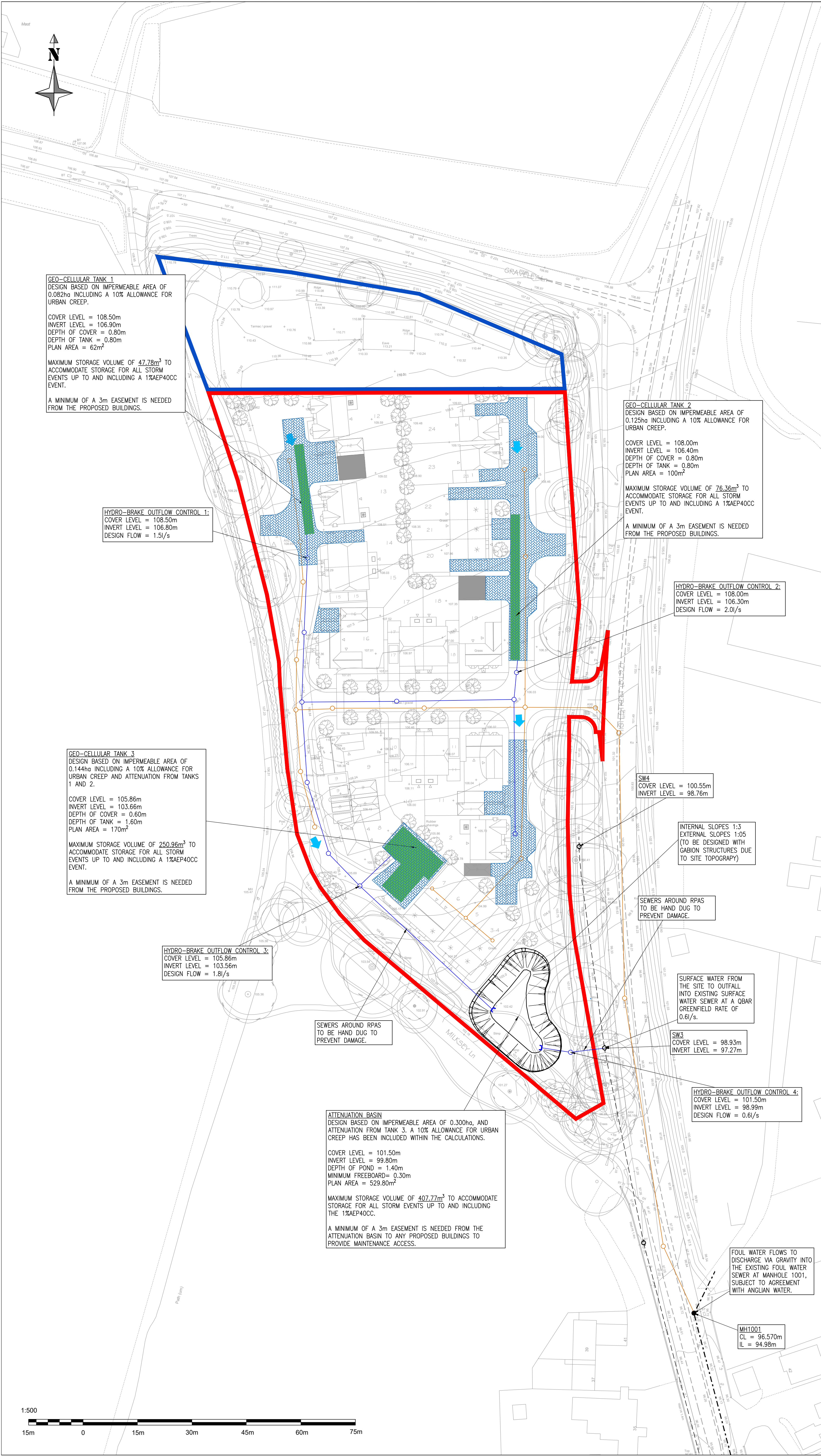


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APPENDICES



APPENDIX H



NOTES:

- DO NOT SCALE THIS DRAWING.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERS, ARCHITECTS AND SPECIALIST DESIGN DRAWINGS AND DETAILS.
- ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
- THIS DRAWING IS FOR STRATEGY PURPOSES ONLY AND IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.
- DESIGN BASED ON EXISTING LEVELS AND SUBJECT TO CHANGE WITH EXTERNAL WORKS DESIGN / CONFIRMATION OF FFLS.
- DRAINAGE STRATEGY IS SUBJECT TO AGREEMENT WITH RELEVANT THIRD PARTIES, INCLUDING ENVIRONMENT AGENCY, LOCAL PLANNING AUTHORITY, LEAD LOCAL FLOOD AUTHORITY AND WATER AUTHORITY.
- CONCRETE PROTECTION TO BE PROVIDED TO ANY PIPES WITH LOW COVER.
- THE DRAINAGE STRATEGY WILL NEED UPDATING IF THE LAYOUT IS REVISED.
- SURFACE WATER FLOWS WILL DISCHARGE FROM THE SITE AT THE QBAR GREENFIELD RATE OF 0.6l/s, ENSURING THERE IS NOT AN INCREASE IN SURFACE WATER RUNOFF FROM THE PROPOSED DEVELOPMENT.
- SURFACE WATER FLOWS FROM THE SITE WILL DISCHARGE INTO THE EXISTING HIGHWAYS SURFACE WATER SEWER NETWORK THAT HAS BEEN PROVEN TO OUTFALL INTO SURFACE WATER PONDS LOCATED ADJACENT TO PONDSEIDE, SOUTH OF OAK LANE.
- FOUL WATER FROM THE SITE WILL DISCHARGE VIA GRAVITY INTO THE FOUL WATER SEWER WITHIN HIGH STREET, AT MANHOLE 1001.

KEY

- SITE BOUNDARY
- LAND UNDER APPLICANTS CONTROL
- PROPOSED SURFACE WATER SEWER
- PROPOSED FOUL WATER SEWER
- EXISTING HIGHWAYS SURFACE WATER SEWER
- EXISTING PUBLIC FOUL WATER SEWER
- PROPOSED ATTENUATION BASIN
- PROPOSED PERMEABLE PAVING
- PROPOSED OVERLAND FLOW ROUTES

PROJECT: MILKSEY LANE, GRAVELEY

DRAWING TITLE: DRAINAGE STRATEGY

CLIENT: GADE HOMES LTD

DRAWING NUMBER: 29161_01_230_01

REVISION:	A	SHEET SIZE:	A1	SCALE:	1:500
STATUS: FOR INFORMATION / APPROVAL					

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A	UPDATES BASED ON LLFA COMMENTS	ZJ	RG	TR	15.09.25
-	FIRST ISSUE	ZJ	RG	TR	19.12.24
REV:	AMENDMENTS:	DRN	CHK	APP	DATE:

PROJECT:



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APPENDICES



APPENDIX I

MAINTENANCE AND MANAGEMENT

A proposed maintenance plan is shown in the table below and breaks down the maintenance requirements of the various proposed assets in accordance with the CIRIA C753 SuDS Manual guidance.

Table 1.1: Proposed Maintenance Regime

Drainage Asset	Responsible Organisation	Maintenance Work	Frequency
Pipework / Manholes	Private Ownership / Management Company	Inspect pipework and clear blockages	Annually or after severe storms.
		Inspect manholes and clear blockages	
		Repair any defects in the network	
		Inspect flow control, ensure operating freely and pivoting bypass door and penstock valve operating correctly	
Headwalls	Private Ownership / Management Company	Inspect the structure and remove any debris/litter on the structure.	Annually or after severe storms
		Replace malfunctioning parts or structures	As required
Flow Control Chamber	Private Ownership / Management Company	Inspect structure and remove excessive silt build-up	Monthly during construction and then annually or after severe storms
		Inspect pipework and manholes also clear blockages	Annually or after severe storms
		Inspect manholes and clear blockages	
		Inspect flow control, ensure operating freely and pivoting bypass door and penstock valve operating correctly	
		Replace malfunctioning parts or structures	
		Inspect for evidence of poor operation	6 monthly
		Inspect sediment accumulation rates and establish appropriate removal frequencies	
		Test control structure to ensure operating as per original design	5 yearly
Trees	Private Ownership / Management Company	Remove litter and debris	Monthly or as required
		Manage other vegetation and remove nuisance plants	
		Inspect inlets and outlets	Monthly
		Check tree health and manage tree appropriately	Annually or as required
		Remove silt build-up from inlets and surface and replace mulch as necessary	
		Water	
		Inspect silt accumulation rates and establish appropriate removal frequencies	Half-yearly



Permeable Pavements	Private Ownership / Management Company	Brushing and vacuuming (standard cosmetic sweep over the whole surface)	Once a year after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging of manufacturer's recommendations.
		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 sweeping	
		Remediate any landscaping which, through vegetation maintenance of soil slip, has been raised to within 50 mm of the level of the paving	
		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	
		Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required
		Initial inspection	Monthly for 3 months after installation
		Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	3 monthly, 48 hours after large storms in first 6 months
		Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
		Monitor inspection chambers	
Attenuation Storage Tanks	Private Ownership / Management Company	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)	Monthly
		For systems where rainfall infiltrates into the tank from above, check the surface of the filter for blockages by sediment, algae or other matter; remove and replace surface infiltration medium as necessary	Annually
		Remove the sediment from pre-treatment structures and/or internal forebays	
		Repair/rehabilitate inlets, outlets, overflows and vents	As required
		Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
		Survey inside of the tank for sediment build-up and remove if necessary	Every 5 years or as required



Attenuation Basins	Private Ownership / Management Company	Remove litter and debris	Monthly
		Cut grass – for spillways and access routes	
		Cut grass – meadow grass in and around the basin	
		Manage other vegetation and remove nuisance plants	
		Inspect inlets, outlets and overflows for blockages, and clean if required	
		Inspect banksides, structures for silt accumulation. Establish appropriate silt removal frequencies	Annually
		Check any penstocks and other mechanical devices	
		Tidy all dead growth before the start of the growing season	
		Remove the sediment from inlets, outlets and forebay	
		Manage wetland plants in outlet pool – where provided	



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APPENDICES



APPENDIX J

Alex Howard
Local Planning Authority
North Herts Council
Council Offices
Gernon Road
Letchworth Garden City
Hertfordshire
SG6 3JF

**Lead Local Flood Authority
Growth and Environment
Hertfordshire County Council
Post Point CHN 215
Farnham House
Six Hills Way, Stevenage
HERTFORDSHIRE, SG1 2ST
www.hertfordshire.gov.uk**

Contact: Flood Risk Management Team
Email: FRMConsultations@hertfordshire.gov.uk

Date 3 June 2025

Dear Alex

RE: 25/00571/FP – Erection of 24 dwellings including creation of vehicular access off High Street, associated parking, drainage, amenity space and landscaping – Land North of Milksey Lane, Graveley

Thank you for your consultation on the above site, received on 31 March 2025. We have reviewed the application as submitted and wish to make the following comments.

This is a Full Planning Application for the erection of 24 dwellings at Land North of Milksey Lane.

We are concerned that there is no in principle agreement from Thames Water confirming sufficient capacity within the sewer system for this development. We are also concerned that there is limited explanation on how greenfield runoff volumes will not increase flood risk elsewhere due to the QBAR rate being raised from 0.6 l/s to 2 l/s.

We **object** to this planning application in the absence of an acceptable Drainage Strategy relating to:

- The proposed SuDS are likely to increase the risk of flooding elsewhere.
- The development is not in accordance with NPPF, PPG or North Herts local policies including NE8 and NE9.

Reason

To prevent flooding in accordance with National Planning Policy Framework paragraphs 181, 182 and 187 by ensuring the satisfactory management of local flood risk, surface water flow paths, storage and disposal of surface water from the site in a range of rainfall events and ensuring the SuDS proposed operates as designed for the lifetime of the development.

We will consider reviewing this objection if the issues highlighted on the accompanying Planning Application Technical Response document are adequately addressed.

Informative

Please note if, you the Local Planning Authority review the application and decide to grant planning permission, notify the us (the Lead Local Flood Authority), by email at FRMConsultations@hertfordshire.gov.uk.

Yours sincerely

Ellie

Ellie Miller
SuDS and Watercourses Support Officer
Growth and Environment

Annex

The following documents have been reviewed.

- Report: Flood Risk and Drainage, prepared by MEC Consulting Group, December 2024, REF 29161-FLD-0101



CIVIL ENGINEERING



TRANSPORT



FLOOD RISK & DRAINAGE



STRUCTURES



GEO-ENVIRONMENTAL



ACOUSTIC AIR



UTILITIES



GEOMATICS



LIGHTING



EXPERT WITNESS



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