BRIGHT YOUNG

Drainage Strategy Report

Station Road Skelmanthorpe

For Baile Homes

Date 24/03/2023

Ref **2779/DSR001**

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Introduction

Bright Young Consulting Ltd has been commissioned by Baile Homes to undertake a Drainage Strategy for a proposed residential development with two semi-detached houses at land off Station Road, Skelmanthorpe, Kirklees, West Yorkshire, England, HD8 9BA.

It is understood that a Drainage Strategy with appropriate consideration for Sustainable Drainage Systems (SuDS) in line with CIRIA SuDS (C753) Guidance is required for submission as part of the application.

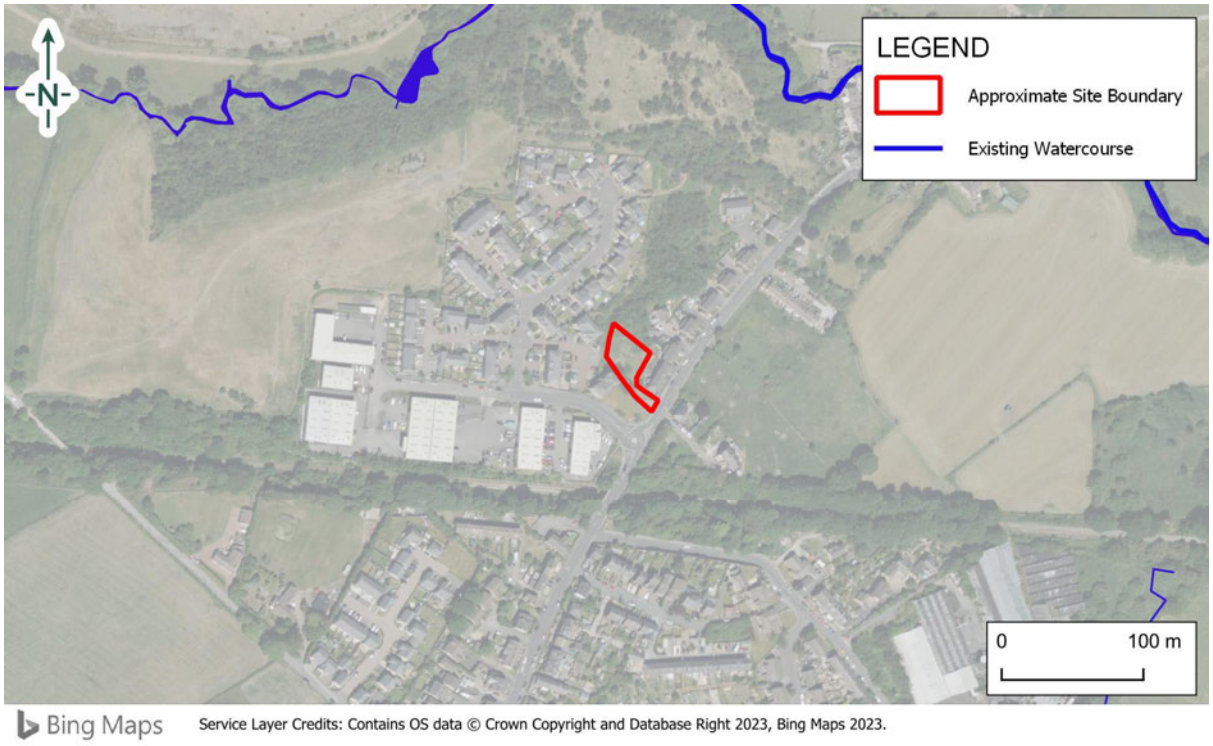
Kirklees Council as Lead Local Flood Authority (LLFA) is a statutory consultee for major planning applications in relation to surface water drainage, requiring that all planning applications are accompanied by a Sustainable Drainage Strategy. The aim of the Sustainable Drainage Strategy is to identify water management measures, including Sustainable Drainage Systems (SuDS), to provide surface water runoff reduction and treatment.

Existing Conditions

The site covers an area of approximately 900 m^2 and is located at National Grid Reference (NGR): 423113 , 411139.

A site location plan and an aerial image are included as Figure 1 below.

Figure 1 – Site Location Plan



Online mapping (including Google Maps and Google Streetview imagery, viewed March 2023) as well as the detail provided within the Lithos Geoenvironmental Appraisal (Report No. 4322/1, dated May 2022) indicates that the Site currently comprises a single parcel of land, stepped on three levels. The foundations of two semi-detached houses are present in the centre of site, evidence suggests these footings were placed c. 2009. It is understood that the Developer ran into difficulties in 2009 and the proposed build was terminated at DPC level. With the exception of the footings currently in place, the site has remained undeveloped throughout its history.

Mature and semi-mature trees are present along the northern boundary and extend north into a woodland area. Further semi-mature trees are present along the southern boundary, which are separated from the site by wooden post & wire fencing.

Garden walls and fences of adjacent houses on Station Road form the eastern boundary. The highest terrace on the site is at the same level as Station Road.

Vehicular access to the site is provided from Station Road to the south-east.

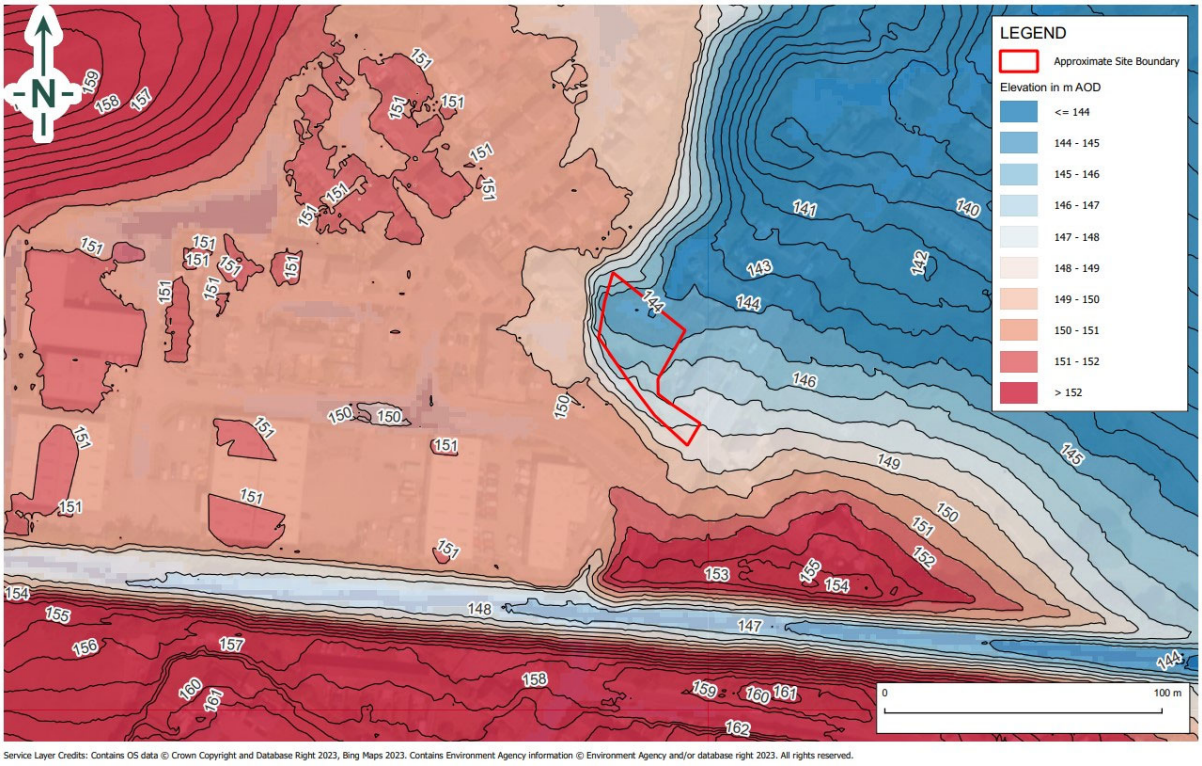
The Site is bordered to the east, west and south by residential dwellings and to the north by scrubland.

Local Topography

Topographic levels to an arbitrary Datum (AD) are provided as spot levels on the External Works Drawing included as Appendix X (Drawing No. 2779/101 rev 1 dated June 2022). The survey shows that the site has been terraced on three levels to create level platforms where the two former foundations are present there is an overall change in gradient falling west to east of approximately 3m.

Topographic levels to metres Above Ordnance Datum (m AOD) have also been derived from a 1m resolution Environment Agency (EA) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). The LiDAR plan (Figure 2) corroborates the topographical survey and identifies that the wider area falls significantly to the north-east with levels to the south-east and north east relatively flat at c.150 m AOD.

Figure 2 – 1m LiDAR Plan



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Hydrology

The nearest watercourse is the Baildon Dike which is located approximately 200m north of the Site at its closest point. The Baildon Dike flows in a easterly direction in the vicinity of the Site and becomes Park Gate Dike as it emerges from the easter extent of Station Road.

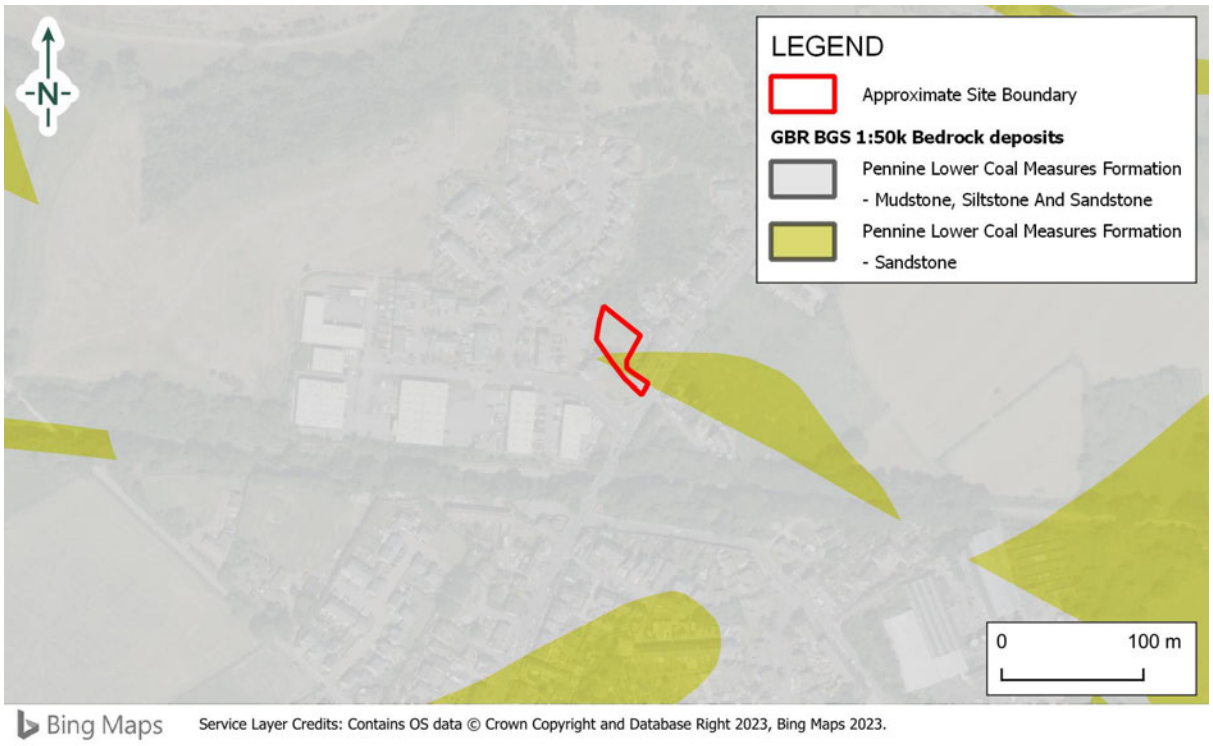
The Baildon Dike is classified as a Main River and therefore, falls within the EA's jurisdiction although it remains the responsibility of the riparian landowners through who's land it flows.

Geology

Published Geology

Reference to the British Geological Survey (BGS) online mapping (1:50,000 scale) indicates that the

site is not underlain by superficial Deposits, and is underlain directly onto the Pennine Lower Coal Measures Formation.



The geological mapping is available at a scale of 1:50,000 and as such may not be accurate on a site-specific basis.

There are no available historic BGS borehole records within the vicinity of the Site.

Recorded Geology

The Lithos Geoenvironmental Appraisal included a review of previous investigations. The report details that Baile Homes provided Lithos with a copy of the following reports:

- Contaminated Land Risk Assessment (Ref. CC/XM/SR/191009), issued by Contamination Consultants Ltd in October 2009.
- Site Walkover – Land to the rear of 59 and 61 Station Road, a letter issued by Soil Environment Services in November 2009.

Lithos commented that during the site walkover undertaken on the 11th of November 2009, four boreholes were undertaken to 1.2m depth. At the time of the walkover the land was being used as residential gardens to Nos.59 & 61 Station Road. The land was noted to slope steeply towards the northeast. No made ground was encountered within the boreholes, and therefore it was concluded there was no indications of made ground or contamination at the site.

Lithos further commented that, *'Whilst four boreholes were undertaken on the site during the walkover, they were terminated at very shallow depth.*

Furthermore, no evidence of chemical or geotechnical testing was undertaken, and consequently, the possibility of contamination at the site cannot be discounted.

Earthworks and the construction of foundations of two semi-detached houses has occurred since the issue of the two above reports, therefore further investigation is required.'

Lithos undertook further site investigation themselves on the 31st of March 2022 comprising seven trial pits with depths ranging from 0.4 to 3.6 m below ground level (bgl).

The encountered geology is detailed below:

Made Ground

Made Ground (including Made Ground Topsoil) underlies the majority of the site to an average depth of 0.8m. The majority of the made ground at this site comprised Made Ground Topsoil and Reworked Natural. Granular Made Ground was encountered in 3 pits (TPs 3, 4 & 5) between 0.5m and 1.4m depth. A cobblestone road was encountered at 0.4m in TP05.

Natural Ground

Natural Ground comprised Cohesive Residual Soils (Clays with gravels) to c. 2.5m, over Granular Residual Soils (sandy clayey Gravels). Coal Measures bedrock comprising Sandstone was encountered between 2.3m and 3.3m

Hydrogeology

According to the EA's Aquifer Designation data, obtained from MAGIC Map's online mapping viewed March 2023, indicates that the Pennine Lower Coal Measures Formation bedrock is classified as a Secondary A Aquifer.

Secondary A Aquifers are 'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers'; whereas.

The EA's 'Source Protection Zones' data, viewed from MAGIC Map's online mapping viewed March 2023, indicates that the site is not located within a Groundwater Source Protection Zone.

During the Lithos Site Investigation groundwater inflow was encountered in TP07 at 1.0m depth in Reworked Natural Ground.

Soakaway testing was undertaken in a single trial pit in November 2022. The Trial Pit was constructed and testing undertaken in line with the BRE365 methodology. The test failed as it did not reach its 75% effective depth within an 8hr period during the first test. The test results are provided as Appendix B.

Local Drainage

Public Sewer Records

Public sewer records have been obtained from Yorkshire Water (YW) and are included in Appendix C. The YW sewer records show that there is 225mm diameter surface combined sewer flowing in a north easterly direction adjacent to the site, within Station Road.

A 150 mm diameter public foul sewer is identified flowing eastward within Standback Way that eventually discharges to the aforementioned public combined sewer within Station Road adjacent to the Site access.

A 300mm public surface water sewer is shown to originate south of the Site within Standback Way flowing westward away from the Site in this location.

Cover and invert levels were not provided on the plans provided.

Development Proposals

It is understood that it is proposed to redevelop the site with two semidetached, three storey domestic dwellings with associated gardens and driveways. A site layout has been provided by A + DP Architecture (Drawing reference 0309D-25-P02, dated January 2007) which provided as Appendix D to this report.

The proposed development will result total hardstanding areas of approximately 510m^2.

Policy Context

Introduction

The aim of this section of the report is to discuss the main aspects of the local and national planning policies that are relevant to any proposed development on the Site and relevant guidance and legislation.

Local policy

The Kirklees Local Plan was adopted on 27 February 2019. It comprises the strategy and policies document, allocations and designations document and associated policies map. It contains the following policies relating to drainage;

Policy LP28 Drainage

The presumption is that Sustainable Drainage Systems (SuDS) will be used to assist in achieving the following on each site:

a) *for proposals on greenfield sites, typical greenfield run-off rates should not be exceeded;*
b) *for proposals on brownfield sites there should be a minimum 30% reduction in surface water run-off where previous positive surface water connections from the site can be proven. New connections will be subject to at least greenfield restrictions;*
c) *No negative impact on local water quality and improvements in water quality where practicable; d. Consider whether proposed open spaces and green infrastructure within sites can contribute to the sustainable drainage of the site.*

Local conditions including the existence of critical drainage areas may require a lower run-off rate to be agreed to reflect volume control, local surface water risks, water course capacity and flood risk further downstream.

There will be a general presumption against pumping surface water. It must also be demonstrated that the surface water management solution is designed to meet requirements over the lifetime of the development including evidence that management and maintenance arrangements have been secured to cover that period. This includes ensuring proposals to store water meet national standards and latest best practice.

Flow paths accommodating water from outside the site or due to an exceedance event should be designed to avoid buildings and curtilages.

Development will only be permitted if it can be demonstrated that the water supply and waste water infrastructure required is available or can be co-ordinated to meet the demand generated by the new development.

Policy LP29 Management of water bodies

Where it is proposed to develop a site already containing a water area, this should normally be retained as part of the proposal and include a future management plan for the maintenance of the

water area to ensure the safety of residents for the lifetime of the development. This includes bodies of water associated with existing buildings, even where they are remote from the building, and also includes ancillary elements linked to the operation of the water body.

Policy LP34 Conserving and enhancing the water environment.

Proposals will be supported which:

1. *Do not result in the deterioration of water courses or water bodies (including groundwater) and conserve and enhance: a. the natural geomorphology of watercourses, including reinstating watercourses to their natural state through removal of modifications resulting from past industrial uses; b. water quality; and c. the ecological value of the water environment, including the functionality of habitat networks.*
2. *Make positive progress towards achieving 'good status or potential' under the Water Framework Directive in surface and groundwater bodies.*
3. *Ensure Source Protection Zones are protected from contamination as a result of the proposal in line with national guidance.*
4. *Manage water demand and improve water efficiency through appropriate water conservation techniques including rainwater harvesting and grey-water recycling as well as considering water availability from surface water and groundwater sources.*
5. *Improve water quality through the incorporation of appropriately constructed and maintained Sustainable Drainage Systems and surface water management techniques taking into account the sensitivity of groundwater.*
6. *Dispose of surface water appropriately (in accordance with the Local Plan drainage policy) adhering to the following networks in order of preference:*
    a. *to an infiltration based system wherever possible (such as soakaways);*
    b. *discharge into a watercourse with the prior approval of the landowner, navigation authority or Environment Agency, where applicable. To comply with part a this must be following treatment where necessary or where no treatment is required to prevent pollution of the receiving watercourse;*
    c. *discharge to a public sewer.*

The West Yorkshire Combined Authority (WYCA) Sustainable Drainage Systems Guidance contains the following aims relating to managing flood risk and drainage:

- *Promote delivery of high performance sustainable drainage proposals that remain effective for the lifetime of the development, with such proposals considered from the outset by developers, consultees and approval bodies;*

- *Encourage sustainable development that is commensurate with the existing level of risk and that will be resilient to the predicted impacts of climate change;*
- *Encourage the use of sustainable techniques that have a benefit to the environment, including improvement to amenity and biodiversity, and the quality of runoff entering the drainage network and watercourses;*
- *Ensure that the current and future level of flood risk is not increased, and, where possible is decreased, to people, property and infrastructure through the implementation of the new development;*
- *Support an efficient and effective planning application process that enables developers to demonstrate that their proposals comply with flood risk policy, guidance and standards.*

Consultation

A consultation response to an earlier submission of detail for the Site, was received by the client from Kirklees council on the 15th of September 2022 stating that:

'If soakaways was applied for on the actual form and they don't work then it needs to come back in, looking at watercourse opportunities first and then sewer. I'd object to pumping surface water in the first instance. Can a gravity connection be achieved using requisition powers if needs be.'

This report seeks to fully detail the consideration of all alternative forms of surface water discharge in line with surface water drainage hierarchy.

The Site is not located within an Internal Drainage Board (IDB) District.

Drainage Strategy

Introduction

The proposed development is for the redevelopment of the site with two semidetached, three storey domestic dwellings with associated gardens and driveways.

Policy LP28 Drainage contains the following statement:

The presumption is that Sustainable Drainage Systems (SuDS) will be used to assist in achieving the following on each site:

- *for proposals on greenfield sites, typical greenfield run-off rates should not be exceeded;*
- *for proposals on brownfield sites there should be a minimum 30% reduction in surface water run-off where previous positive surface water connections from the site can be proven. New connections will be subject to at least greenfield restrictions;*
- *No negative impact on local water quality and improvements in water quality where practicable; d. Consider whether proposed open spaces and green infrastructure within sites can contribute to the sustainable drainage of the site.*

The proposed hardstanding area will result in an increase in surface water runoff rates and volumes. In order to ensure the proposed development contributes to a net reduction in flood risk to the area, surface water discharge from the Site will be controlled.

Drainage Hierarchy

The recommended surface water drainage hierarchy (Paragraph 080 of the NPPG: Flood Risk and Coastal Change) is to utilise soakaway systems or infiltration as the preferred option, followed by discharging to an appropriate watercourse. If this is not feasible, the final option is to discharge to an existing public sewer.

Surface Water Discharge to Soakaway

The first consideration for the disposal of surface water is infiltration (soakaways and permeable surfaces). As described above, proven ground conditions through Site Investigation show that the Site is underlain by a significant depth of Made Ground (between 0.5 m and 1.4 m) over Cohesive Residual Soils (Clays with gravels) to c. 2.5 m depth. During the Site Investigation works groundwater inflow was encountered in TP07 at 1.0m depth in Reworked Natural Ground. A BRE365 soakaway test was undertaken on the Site and failed.

Given the depth of Made Ground, the low permeability of the underlying deposits and the groundwater inflow, notwithstanding the sloped nature of the Site with the proposed development elevated above neighbouring properties, It can be concluded that soakaways are not suitable for the discharge of surface water runoff.

Surface Water Discharge to Watercourse

Where soakaways are not suitable a connection to watercourse is the next consideration.

The Site is separated from all local watercourses including the Baildon Dike by third party, urbanised land. Therefore, discharge to watercourse is not feasible.

Surface Water Discharge to Sewer

Where disposal of surface water to watercourse is not possible, a connection to the public sewer system is the final consideration.

There is a 300mm public surface water sewer is shown to originate south of the Site within Standback Way flowing westward away from the Site in this location however, the road in which the manhole is located is elevated approximately 1 m above the proposed access area in front of the buildings and any sewer would have to travel down the access to Station Road which is still lower. Therefore, a pumped discharge will be required. A direct connection to this sewer would require almost 125m length of rising main within the road and therefore is not considered to be the most practicable outfall for the Site.

Alternatively the 225mm diameter surface combined sewer flowing in a north easterly direction is immediately adjacent to the Site and therefore offers the preferred connection in this instance.

Any discharge to the public sewer would need to be agreed with YW.

Foul Water Discharge

Foul flows should be discharged to the 225 mm public combined sewer in Station Road via the combined package treatment plant which will discharge surface water flows.

Discharge Rates

It is proposed to discharge both surface water and foul via a pumped connection to the combined sewer in Station Road. Given the proposed discharge is to be pumped, the combined foul and surface water discharge rate is limited by the minimum acceptable rate (3.8l/s) allowable for an 80mm rising main, the smallest main recommended size for pumping without maceration.

Attenuation Storage

In order to achieve a discharge rate of 3.8l/s, 10.2m^3 of attenuation storage will be required. Storage estimates have been provided using MicroDrainage and are included in Appendix E. The storage estimates are based on storage within a proprietary tank system with a single outfall to the public sewer based on 1:100 year plus 30% CC, an impermeable drainage area of 0.051ha, a design head of 1.45m and pumped flow control.

Surface Water Pumping

A pumped solution will be required to achieve a connection to the public combined sewer immediately east of the Site access. In accordance with the Design and Construction Guidance for foul and surface water sewers offered for adoption under the Code for adoption agreements for water and sewerage companies operating wholly or mainly in England ("the Code"), 125m^3 of storage should be provided per hectare of impermeable drainage area. Storage is required to reduce the risk of flooding in the event of plant or power failure. Based on an impervious drainage area of 510m^2 a storage volume of 6.375m^3 would be required.

The total attenuation storage volume of 10.2m^3 required to accommodate the 1 in 100 year plus 30% climate change event can accommodate the 6.375m^3 required in the event of pumping system failure.

Provision of standby pumps, an automated pump exercise regime and a pump failure alarm system would limit the risk of pump failure.

Sustainable Drainage Systems

Attenuation storage should be provided in the form of Sustainable Drainage Systems (SuDS) where practical. The following SuDS options have been considered:

Soakaways

As described above, the use of soakaways is not considered to be feasible.

Swales, Detention Basins and Ponds

The Site is sloped and will be occupied by buildings, gardens and the access road and there is no space to accommodate above ground storage features such as ponds and basins.

Rainwater Harvesting

The attenuation benefits provided through the use of rainwater harvesting are considered to be limited and would only be realised when the tanks were not full. However, rainwater harvesting techniques could be incorporated within the final design.

Green Roofs

Green roofs are not identified on development plans. Given the nature of the proposed development, the significant additional cost involved in installing and maintaining green roofs and the additional works required to allow for the additional loading on the building, green roofs are not considered a practical option. The benefits achieved through installing a green roof would be disproportionate to the significant ongoing maintenance and construction costs involved.

Porous/Permeable Paving

The provision of storage within sub-grade material is only feasible in areas with a proposed gradient of <1 in 20 as detailed within CIRIA RP992/28 (Design Assessment Checklists for Permeable/Porous Pavement). Give the sloped nature of the site (1in 16), porous surfacing isn't proposed on this site.

Underground Attenuation Tanks

Storage could be provided within underground attenuation tanks or within oversized pipes. Sufficient space for underground tanks is provided within the northern extent beneath the proposed car parking area between the proposed building and Gillibrands Road.

Preferred Drainage Scheme

As soakaways are not considered to be appropriate on the site, surface water runoff will be discharged public combined sewer system located within Station Road via a pumped outfall at a rate of 3.8l/s. Surface water runoff up to the 1 in 100 year plus 30% climate change allowance event will be attenuated on Site. A total attenuation volume of 10.2m³ will be required to achieve the discharge rate and will be provided in the form of an attenuation tank installation located within the driveway.

The proposed surface water drainage layout, External Works and Drainage Details sheets are included as Appendix F. A propose geocellular tank is shown measuring 4m wide by 4m long by 0.4m deep, accounting for a porosity of 95% the tank will provide 12.16m^3 of attenuation.

Event Exceedance

Storage will be provided for the 1 in 100 year plus 40% CC event. Storm events in excess of the 1 in 100 year plus 40% CC event should be permitted to produce temporary shallow depth flooding within the service yard, access and landscaped areas. Finished floor levels will be set at a minimum of 150mm above surrounding ground levels ensuring exceedance flooding will not affect the buildings.

Surface Water Treatment

In accordance with the CIRIA C753 publication 'The SuDS Manual' (2015), Residential Roofs have a 'very low' pollution hazard level, with low traffic roads classified as having a 'low' pollution hazard level. Table 3 below shows the pollution hazard indices for each land use.

Table 3 - Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential Roofs	Very Low	0.2*	0.2	0.05
Low Traffic Roads	Low	0.5	0.4	0.4

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 26.2

* Indices values range from 0-1.

Given the nature and scale of the development, and the outfall to the combined sewer the gravel subbase of the geocellular crate system is considered to provide sufficient treatment for the level of contamination expected given the use of the Site.

Maintenance

Maintenance of communal drainage features such as permeable paving or an attenuation tank will be the responsibility of the Site owner. Maintenance of shared surface water drainage systems can be arranged through appointment of a Site management company.

Conclusions and Recommendations

Conclusions

The proposed development is for the redevelopment of the Site with two semidetached, three storey domestic dwellings with associated gardens and driveways.

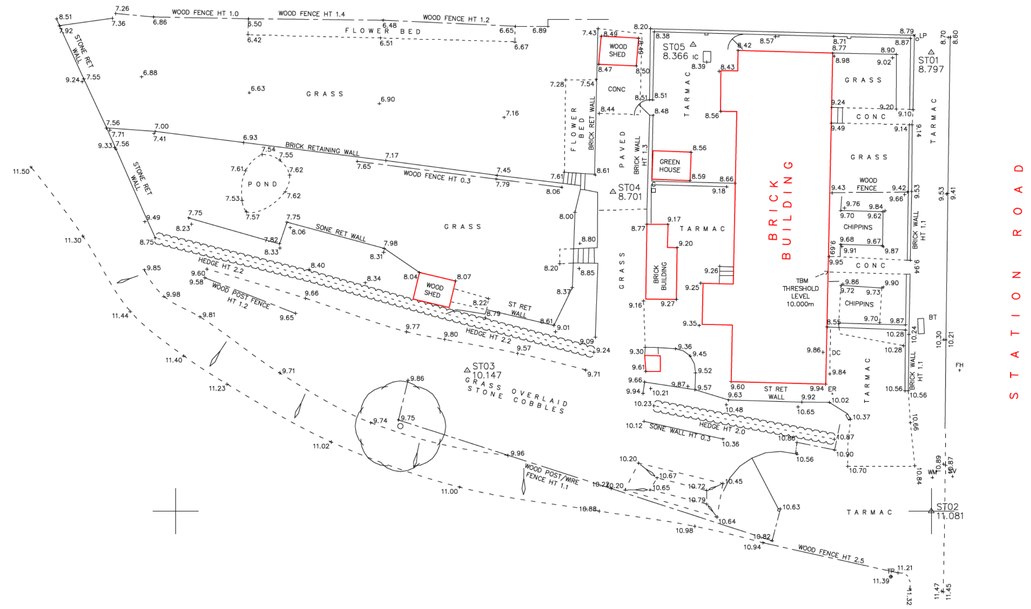
The proposed development will result in hardstanding areas measuring 510m^2. The proposed hardstanding areas will result in an increase in surface water runoff rates and volumes. In order to ensure the proposed development contributes to a net reduction in flood risk to the area, flow control will be used, and attenuation provided on Site to accommodate storm events up to and including the 1 in 100 year plus 30% climate change event.

All methods of surface water discharge have been assessed. As soakaways are not feasible, discharge of surface water to the public combined water sewer at a rate of 3.8/s is the most practical option.

Attenuation storage will be required on Site in order to restrict surface water discharge to 3.8l/s via a pumped outfall. Attenuation can be provided within a geocellular tank located within the driveway.

Foul flows should discharge to the aforementioned public combined sewer in Station Road via the same package pump system as the surface water.

Appendix A – Topographical Information



All drawings remain the property of Ellam Land Surveys until all payments have been received
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Appendix B – BRE365 Test Results

PERCOLATION TEST SHEET

METHOD from BRE DIGEST 365

- Excavate a soakage trial pit to the required depth (typically 1.5 – 2.5 m deep) using minimum width (0.3m) and length (1m). Carefully trim sides and bottom.
- Carefully measure size of pit and note sizes below.
- Fill soakaway hole briskly with water (from bowser) to at least three quarters full. Being careful not to wash away sides. Note: a 300mm wide, 1 metre long, 1.5 metre deep trench needs at least 350 litres (80 gallons) of water.
- Place straight edge over top of soakaway pit and measure (dip) to top of water.
- Record time versus dips in table below. Dip every 5 minutes for first hour then every hour until pit is one quarter full.
- Repeat test 3 times in total on the same or consecutive days.

DETAILS

SITE LOCATION Station Road Skelmanthorpe

DATE OF TEST 21/11/22

WEATHER CONDITIONS Overcast

SIZE OF PIT

LENGTH	WIDTH	DEPTH
1800mm	300 mm	1500 mm

TIME	DIP	TIME	DIP
8.00	500 mm	11.00	770mm
8.05	500 mm	12.00	820mm
8.10	510 mm	13.00	870mm
8.15	510 mm	14.00	900mm
8.20	520 mm	15.00	950mm
8.25	520 mm	16.00	1000mm
8.30	540mm		
8.35	550mm		
8.40	560 mm		
8.45	570mm		
8.50	580mm		
8.55	580mm		
9.00	590mm		
10.00	690mm		



Appendix C – Public sewer records

YORKSHIRE WATER
PROTECTION OF MAINS AND SERVICES

1. The position of Yorkshire Water Services Ltd (YWS) apparatus shown on the existing mains record drawing(s) indicates the ***general*** position and nature of our apparatus and the accuracy of this information cannot be guaranteed. Any damage to YWS apparatus as a result of your works may have serious consequences and you will be held responsible for all costs incurred. Prior to commencing major works, the exact location of apparatus must be determined on site, if necessary by excavating trial holes. The actual position of such apparatus and that of service pipes which have not been indicated must be established on site by contacting the Customer Helpline on 0845 124 24 24 for both water and sewerage.

2. The public sewer and water network is lawfully retained in its existing position and the sewerage and water undertaker is entitled to have it remain so without any disturbance. The provisions of section 159 of the Water Industry Act 1991 provides that the undertaker may "inspect, maintain, adjust, repair or alter" the network. Those rights are given to enable the undertaker to perform its statutory duties. Any development of the land or any other action that unacceptably hindered the exercise of those rights would be unlawful. The provisions contained in Section 185 of the Water Industry Act 1991 state that where it is reasonable to do so, a person may require the water supply undertaker to alter or remove a pipe where it is necessary to enable that person to carry out a proposed change of use of the land. The provisions contained in Section 185 also require the person making the request to pay the full cost of carrying out the necessary works.

3. Ground levels over existing YWS apparatus are to be maintained. Sewers in highways will ***generally*** be laid to give 1200mm of cover from finished ground level working to kerb races, other permanent identification of the limits of the road or to an agreed line and level. Substantial increases or decreases to this 1200mm depth of cover will result in the sewer being re-laid at your expense. Water mains and services will ***generally*** be laid with a minimum of 750mm depth of cover however some mains and services usually those installed over 50 years ago may have less ground cover.

4. If surface levels are to be decreased / increased significantly the effects on existing water supply apparatus will be carefully considered and if any alterations are necessary, the costs of the alterations will be recharged to you in full. Outlets on fire hydrants must be no more than 300mm below the new levels and all surface boxes must be adjusted as part of the scheme.

5. To enable future repair works to be carried out without hindrance; any pipe, cable, duct, etc. installed parallel to a water main or service pipe should not be installed directly over or within 300mm of a water main or service pipe or 1000mm of a waste water asset. Where a pipe, cable, duct, etc. crosses a main or service it should preferably cross perpendicular or at an angle of no less than 45o and with a minimum clearance of 150mm. These requirements apply to activities within an existing highway and are relevant to the installation of pipes, cables, ducts, etc. up to and including 250mm in diameter *(see illustration below)*. Necessary protection measures for installations greater than 250mm in diameter and/or in private land will need to be agreed on an individual basis. Installations within a new development site must comply with the National Joint Utilities Group publication Volume 2: NJUG Guidelines On The Positioning Of Underground Utilities Apparatus For New Development Sites.

6. All excavation works near to YW apparatus should be by hand digging only.

7. Backfilling with a suitable material to a minimum 300mm above YW apparatus is required.

8. Adequate support must be provided where any works pass under YW apparatus.

9. Jointing chambers, lighting columns and other structures must be installed in such a way that future repair or maintenance works to YW apparatus will not be hindered.

10. Apparatus such as; railings, sign posts, etc. must not be placed in such a way that they prevent access to or full operation of controlling valves, hydrants or similar apparatus. YWS surface boxes must not be covered or buried. Any adjustment, alteration or replacement of manhole covers must be agreed on site prior to the commencement of the works with a YWS Inspector who may be contacted via our Call Centre on 0845 124 24 24.

11. Explosives shall not be used within 100 metres of any Yorkshire Water Services apparatus or installations.

12. Vibrating plant should not be used directly over any apparatus. Movement or operation by vehicles or heavy plant is not to be permitted in the immediate vicinity of YWS plant or apparatus unless there has been prior consultation and, if necessary, adequate protection provided without cost to YWS.

13. ***Under no circumstances*** should thrust boring or similar trenchless techniques commence until the actual position of the Company's mains/services along the proposed route have been confirmed by trial holes.

14. Any alterations to the highway should be notified following the procedures outlined in the New Road and Street Works Act 1991 Code of Practice; Measures Necessary Where Apparatus Is Affected By Major Works (Diversionary Works).

15. You will be held responsible for any damage or loss to YWS apparatus during and after completion of work, caused by yourselves, your servant or agent. Any damage caused or observed to YWS plant or apparatus should be immediately reported to YWS. Should YW incur any costs as a result of non-compliance with the above, all costs will be rechargeable in full.

16. You should ensure that nothing is done on the site to prejudice the safety or operation of YWS employees, plant or apparatus.

17. In accordance with the New Roads and Street Works Act 1991, Chapter 22, Part 3, Section 80. The location of any identified YW asset "*which is not marked, or is wrongly marked, on the records made available*" should be communicated back to Yorkshire Water. The location of the apparatus should be identified on copies of the supplied plans which should be returned to Yorkshire Water (Asset Records Team) with photographic supporting evidence where possible.

18. The Government has decided that responsibility for private sewers serving two or more properties and lateral drains (the section of pipe beyond the boundary of a single property, connecting it to the public sewer) will be transferred to the water companies on Oct 1 2011.

Private pumping stations will also transfer during the period 1 October 2011 – 1 Oct 2016. Records of these assets may not yet be shown on the existing mains record drawing(s). If you encounter any of these assets you must inform Yorkshire Water Services Ltd (YWS).

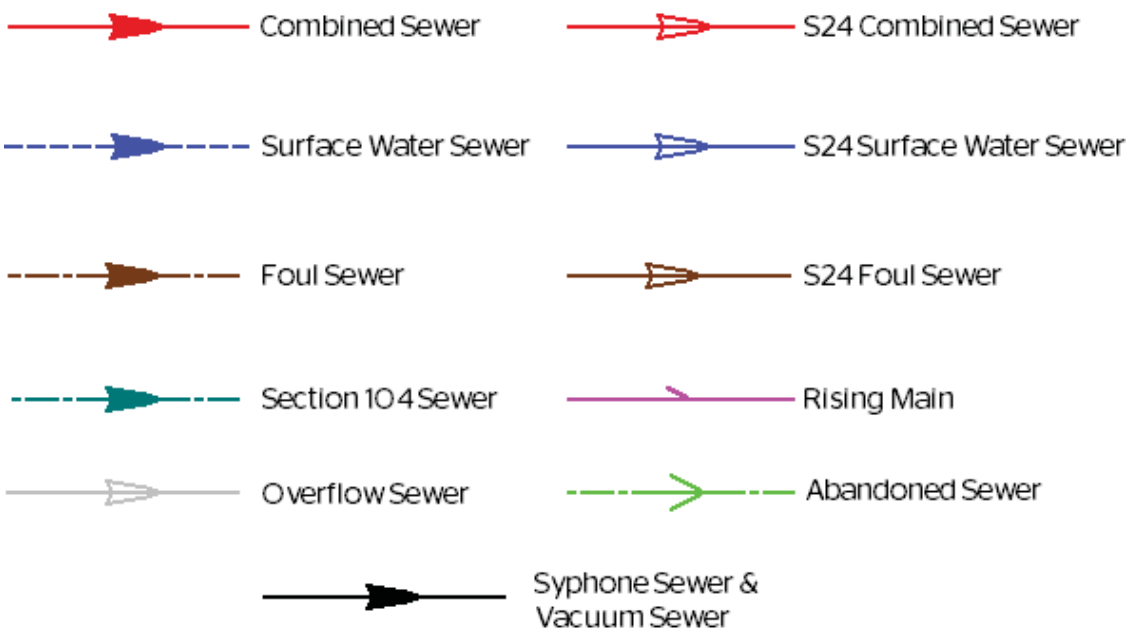
19. Please note that the information supplied on the enclosed plans is reproduced from Ordnance Survey material with the permission of the Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. Licence Number 1000019559.

20. This information is for guidance only and the position and depth of any YW apparatus is approximate only. Likewise, the nature and condition of any YW apparatus cannot be guaranteed. YW has no responsibility for recording the locations of privately owned apparatus. As of 1 October 2011, there may be some lateral drains and/or public sewers which are not documented on YW records but may still be present. For the avoidance of doubt, this information is not a substitute for appropriate professional and/or legal advice. YW accepts no responsibility for any inaccuracy or omissions in this information. The actual position of YW apparatus must be determined on site by excavating trail holes by hand. YW requires a minimum of two working days' written notice of the intention to excavate any trial holes before any excavation can be undertaken. If there are any queries in this respect please contact Yorkshire Water on 0845 124 24 24.

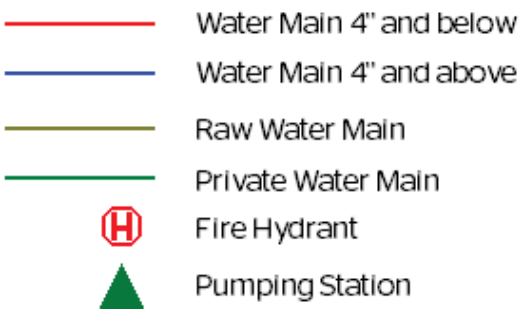
Property Identfier



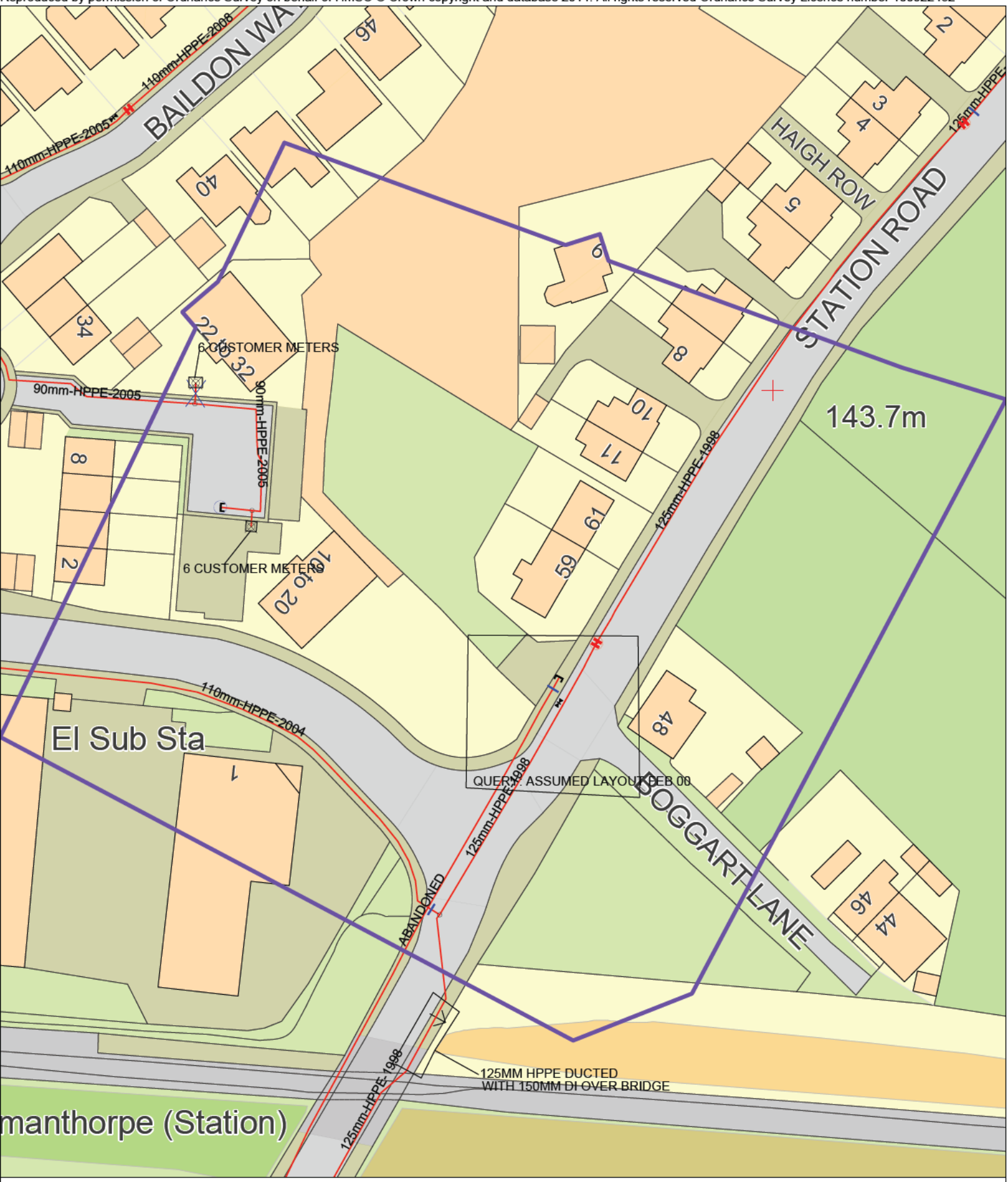
Sewer Legend



Water Legend



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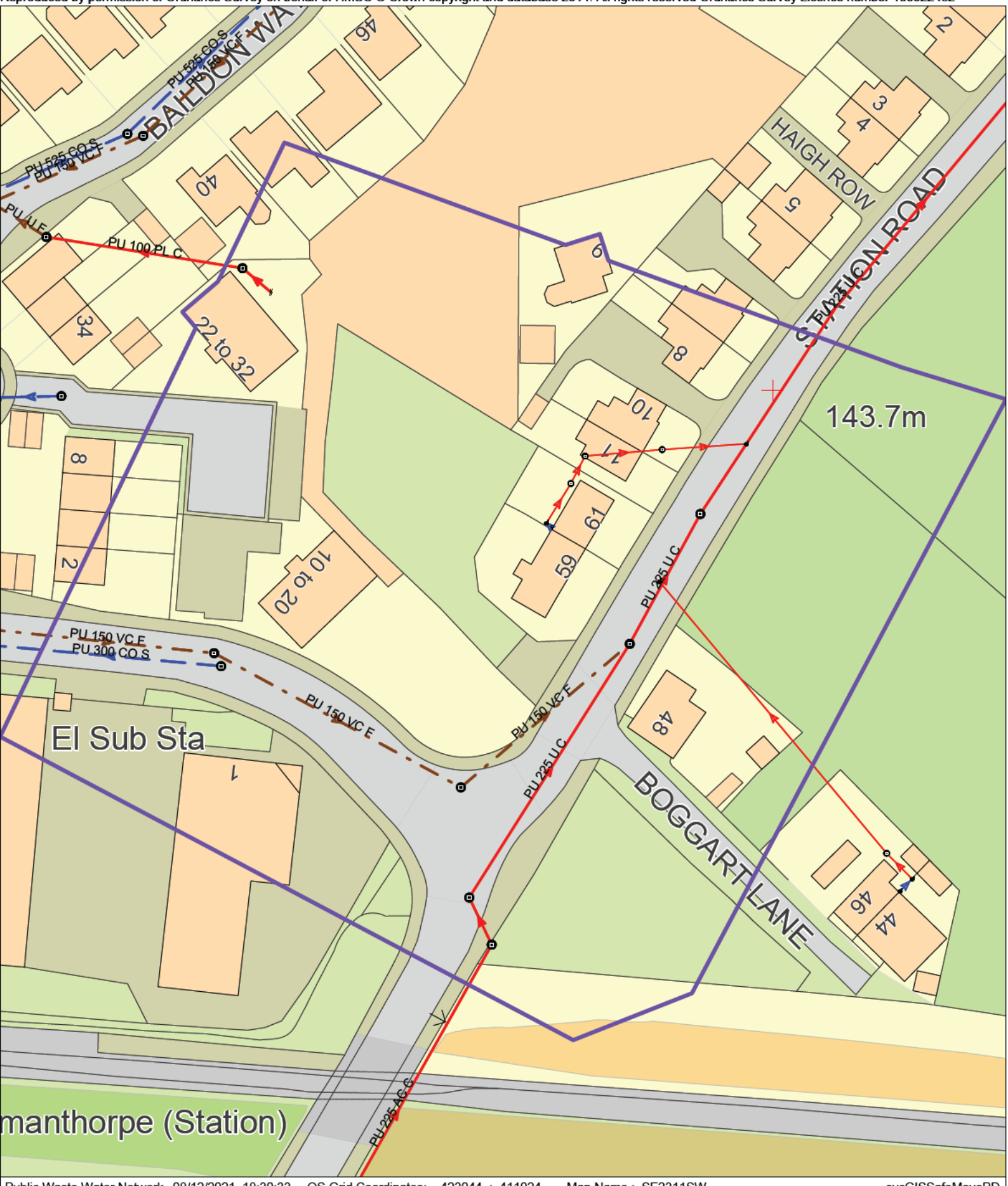


Public Clean Water Network 08/12/2021 18:30:31 OS Grid Coordinates: 423044 : 411024 Map Name : SE2311SW svcGISSafeMovePD

Registered office, Yorkshire water Services Limited. 1
Western House, Halifax Road, Bradford BD62SZ.
Registered in England and wales No. 2366682

SafeMove
A part of YorkshireWater

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Public Waste Water Network 08/12/2021 18:30:33 OS Grid Coordinates: 423044 : 411024 Map Name : SE2311SW svcGISSafeMovePD

Registered office, Yorkshire water Services Limited. 1
Western House, Halifax Road, Bradford BD62SZ.
Registered in England and wales No. 2366682

SafeMove
A part of YorkshireWater

Appendix D – Development Proposals

07/62/93753/E3

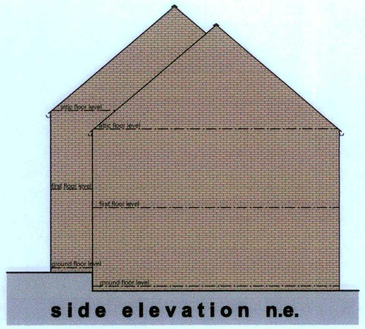
OFFICE COPY



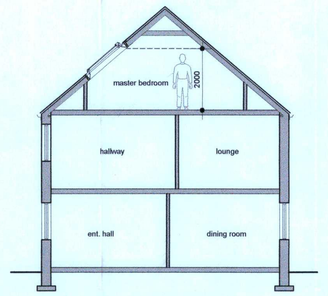
front elevation s.e.



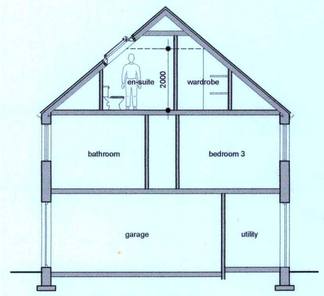
rear elevation n.w.



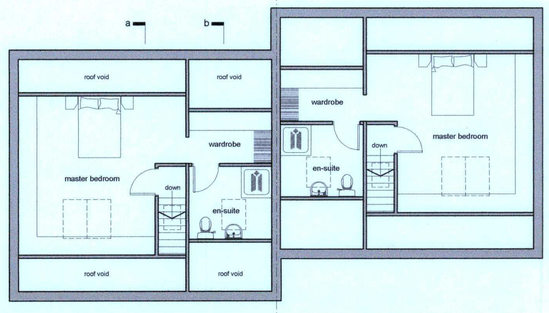
side elevation n.e.



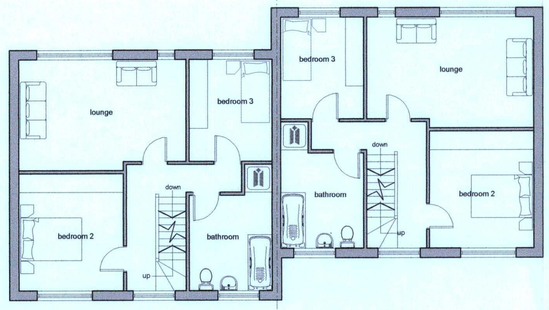
section a-a



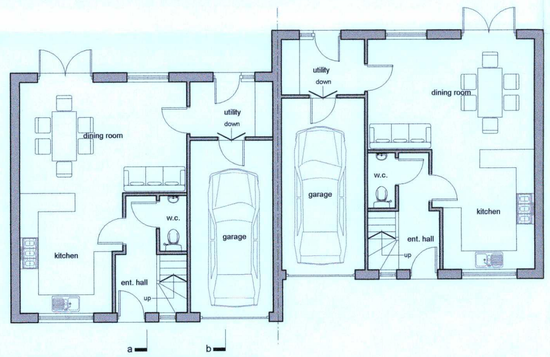
section b-b



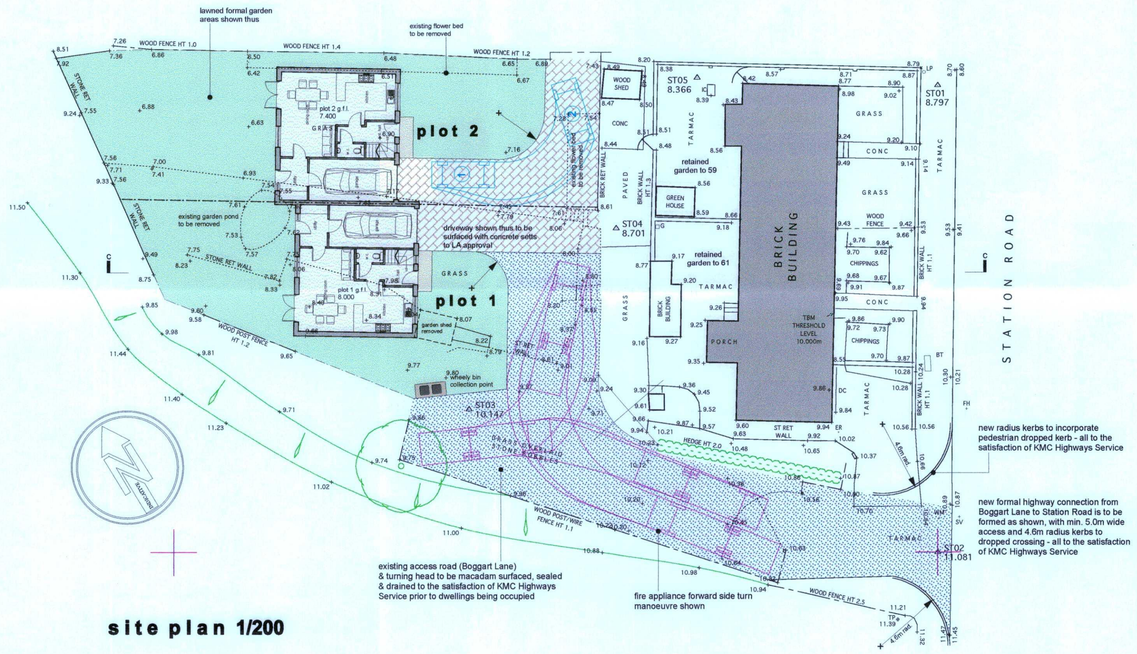
attic floor plan



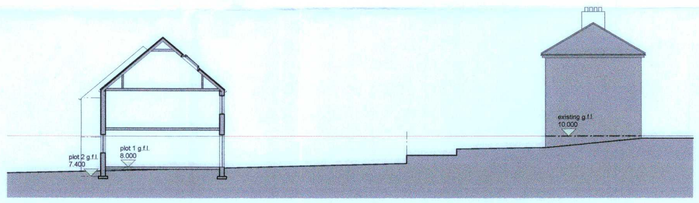
first floor plan



ground floor plan



site plan 1/200

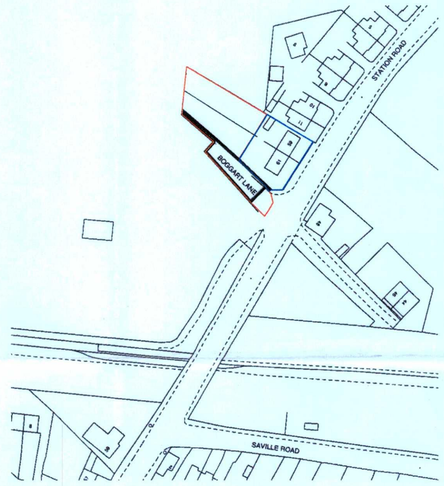


site section c-c

0m 0m 0m 0m — **Scale 1:50 Scale 1:100 Scale 1:200 Scale 1:1250** — 4m 8m 16m 100m

[When to scale of original plan, bar = 8cm]

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location plan 1/250

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status	description	date	dr by	app by
P02	Drawing updated to client instructions	23.08.07	JH	AS
P01	Drawing originated from 0309D-17-P02	10.08.07	JE	AS

A+DP
ARCHITECTURE AND DESIGN PARTNERSHIP
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TELEPHONE 01484 685411
FACSIMILE 01484 686290
E-MAIL admin@adp-architects.com

PROJECT DETAILS

Proposal for 2nr. dwellings to the rear of
59/61 Station Road Skelmanthorpe Huddersfield
for
Mr James Heath

DRAWING TITLE

general arrangement as proposed

KIRKLEES METROPOLITAN BOROUGH COUNCIL
05 SEP 2007
RECEIVED

SCALE	DATE	DRAWING NR
1:100	17 Jan. 07	0309D-25-P02

Appendix E – MicroDrainage Calculations

	STATION ROAD SKELMANTHORPE
Date 07/07/2022 11:36	Designed by HM
File SKELMANTHORPE.SRCX	Checked by
Micro Drainage	Source Control 2020.1

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 22 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	6.295	0.495	0.0	3.8	3.8	7.5	O K
30 min Summer	6.360	0.560	0.0	3.8	3.8	8.5	O K
60 min Summer	6.370	0.570	0.0	3.8	3.8	8.7	O K
120 min Summer	6.297	0.497	0.0	3.8	3.8	7.6	O K
180 min Summer	6.197	0.397	0.0	3.8	3.8	6.0	O K
240 min Summer	6.097	0.297	0.0	3.8	3.8	4.5	O K
360 min Summer	5.940	0.140	0.0	3.8	3.8	2.1	O K
480 min Summer	5.844	0.044	0.0	3.8	3.8	0.7	O K
600 min Summer	5.802	0.002	0.0	3.8	3.8	0.0	O K
720 min Summer	5.800	0.000	0.0	3.4	3.4	0.0	O K
960 min Summer	5.800	0.000	0.0	2.7	2.7	0.0	O K
1440 min Summer	5.800	0.000	0.0	2.0	2.0	0.0	O K
2160 min Summer	5.800	0.000	0.0	1.4	1.4	0.0	O K
2880 min Summer	5.800	0.000	0.0	1.1	1.1	0.0	O K
4320 min Summer	5.800	0.000	0.0	0.8	0.8	0.0	O K
5760 min Summer	5.800	0.000	0.0	0.7	0.7	0.0	O K
7200 min Summer	5.800	0.000	0.0	0.6	0.6	0.0	O K
8640 min Summer	5.800	0.000	0.0	0.5	0.5	0.0	O K
10080 min Summer	5.800	0.000	0.0	0.4	0.4	0.0	O K
15 min Winter	6.380	0.580	0.0	3.8	3.8	8.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	115.731	0.0	11.1	16
30 min Summer	77.804	0.0	14.9	26
60 min Summer	49.937	0.0	19.1	44
120 min Summer	30.956	0.0	23.8	78
180 min Summer	23.058	0.0	26.3	110
240 min Summer	18.577	0.0	28.3	142
360 min Summer	13.656	0.0	31.2	200
480 min Summer	10.974	0.0	33.6	254
600 min Summer	9.254	0.0	35.4	306
720 min Summer	8.046	0.0	36.9	0
960 min Summer	6.447	0.0	39.5	0
1440 min Summer	4.709	0.0	43.2	0
2160 min Summer	3.432	0.0	47.3	0
2880 min Summer	2.739	0.0	50.3	0
4320 min Summer	1.989	0.0	54.8	0
5760 min Summer	1.583	0.0	58.1	0
7200 min Summer	1.325	0.0	60.8	0
8640 min Summer	1.147	0.0	63.2	0
10080 min Summer	1.015	0.0	65.2	0
15 min Winter	115.731	0.0	12.3	16

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	STATION ROAD SKELMANTHORPE
Date 07/07/2022 11:36	Designed by HM
File SKELMANTHORPE.SRCX	Checked by
Micro Drainage	Source Control 2020.1

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	6.469	0.669	0.0	3.8	3.8	10.2	O K
60 min Winter	6.467	0.667	0.0	3.8	3.8	10.1	O K
120 min Winter	6.337	0.537	0.0	3.8	3.8	8.2	O K
180 min Winter	6.175	0.375	0.0	3.8	3.8	5.7	O K
240 min Winter	6.024	0.224	0.0	3.8	3.8	3.4	O K
360 min Winter	5.823	0.023	0.0	3.8	3.8	0.3	O K
480 min Winter	5.800	0.000	0.0	3.3	3.3	0.0	O K
600 min Winter	5.800	0.000	0.0	2.8	2.8	0.0	O K
720 min Winter	5.800	0.000	0.0	2.4	2.4	0.0	O K
960 min Winter	5.800	0.000	0.0	1.9	1.9	0.0	O K
1440 min Winter	5.800	0.000	0.0	1.4	1.4	0.0	O K
2160 min Winter	5.800	0.000	0.0	1.0	1.0	0.0	O K
2880 min Winter	5.800	0.000	0.0	0.8	0.8	0.0	O K
4320 min Winter	5.800	0.000	0.0	0.6	0.6	0.0	O K
5760 min Winter	5.800	0.000	0.0	0.5	0.5	0.0	O K
7200 min Winter	5.800	0.000	0.0	0.4	0.4	0.0	O K
8640 min Winter	5.800	0.000	0.0	0.3	0.3	0.0	O K
10080 min Winter	5.800	0.000	0.0	0.3	0.3	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	77.804	0.0	16.6	29
60 min Winter	49.937	0.0	21.3	48
120 min Winter	30.956	0.0	26.7	84
180 min Winter	23.058	0.0	29.7	118
240 min Winter	18.577	0.0	31.9	148
360 min Winter	13.656	0.0	35.1	198
480 min Winter	10.974	0.0	37.6	0
600 min Winter	9.254	0.0	39.6	0
720 min Winter	8.046	0.0	41.4	0
960 min Winter	6.447	0.0	44.2	0
1440 min Winter	4.709	0.0	48.4	0
2160 min Winter	3.432	0.0	52.9	0
2880 min Winter	2.739	0.0	56.3	0
4320 min Winter	1.989	0.0	61.3	0
5760 min Winter	1.583	0.0	65.1	0
7200 min Winter	1.325	0.0	68.1	0
8640 min Winter	1.147	0.0	70.7	0
10080 min Winter	1.015	0.0	73.1	0

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	STATION ROAD SKELMANTHORPE
Date 07/07/2022 11:36 File SKELMANTHORPE.SRCX	Designed by HM Checked by
Micro Drainage	Source Control 2020.1

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.051

Time (mins) From:	To:	Area (ha)
0	4	0.051

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Model Details

Storage is Online Cover Level (m) 7.250

Cellular Storage Structure

Invert Level (m) 5.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	16.0	16.0	0.801	0.0	28.8
0.800	16.0	28.8			

Pump Outflow Control

Invert Level (m) 5.400

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.8000	0.900	3.8000	1.700	3.8000	2.500	3.8000
0.200	3.8000	1.000	3.8000	1.800	3.8000	2.600	3.8000
0.300	3.8000	1.100	3.8000	1.900	3.8000	2.700	3.8000
0.400	3.8000	1.200	3.8000	2.000	3.8000	2.800	3.8000
0.500	3.8000	1.300	3.8000	2.100	3.8000	2.900	3.8000
0.600	3.8000	1.400	3.8000	2.200	3.8000	3.000	3.8000
0.700	3.8000	1.500	3.8000	2.300	3.8000		
0.800	3.8000	1.600	3.8000	2.400	3.8000		

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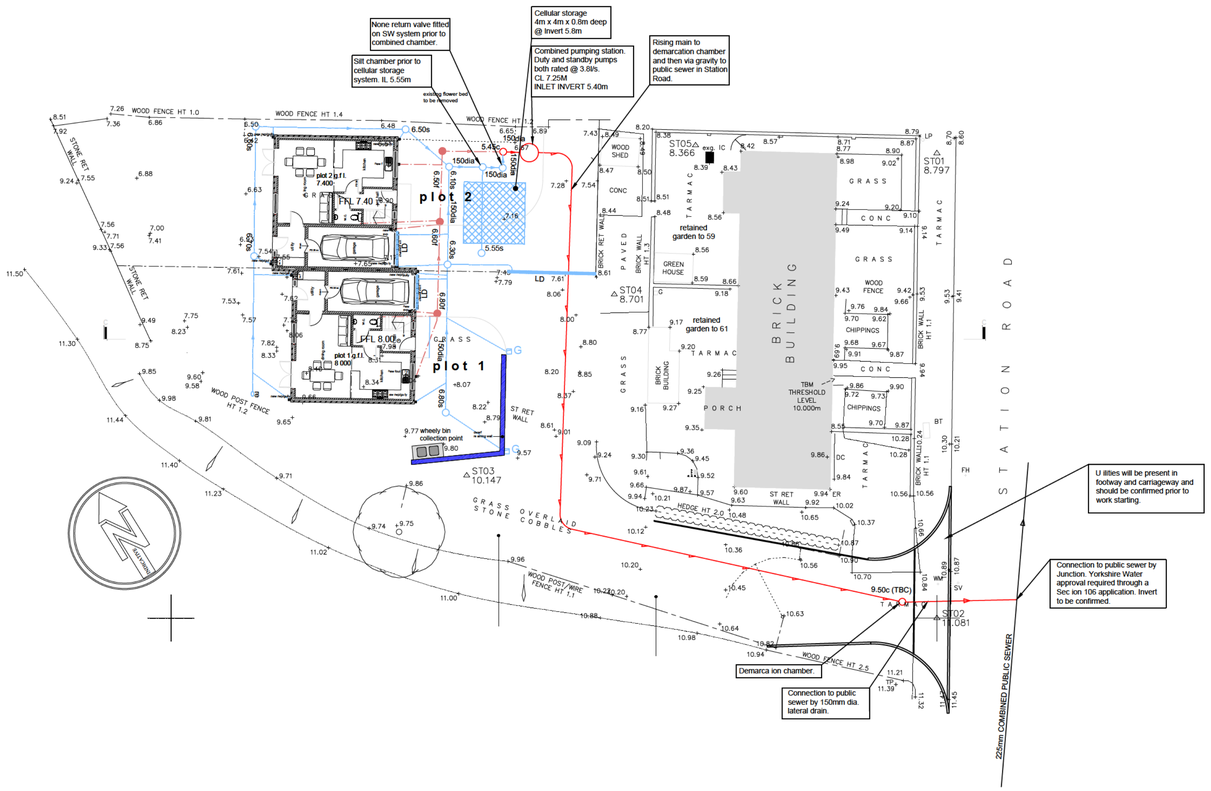
Appendix F – Proposed Drainage Layout and Details

N

KEY

- Surface water drain with chamber and invert level.
- Surface water drain with rodding eye.
- Foul water drain with chamber and invert level.
- Combined water drain with chamber and invert level.
- Rising main - size to be agreed with pump installer.
- Cellular storage system.

All gravity drainage to be 100mm diameter.



	1	First Issue for discussion.	02/06/22
Checked	Rev #	Description	Date

Client

BAILE HOMES

Job Title

STATION ROAD
SKELMANTHORPE

BRIGHT YOUNG Consulting Limited
The Media Centre, 7 Northumberland Street, Huddersfield, HD1 1RL
Email: info@brightyoung.co.uk
Web: www.brightyoung.co.uk
Tel: 01484 487950
Fax: 01484 603519

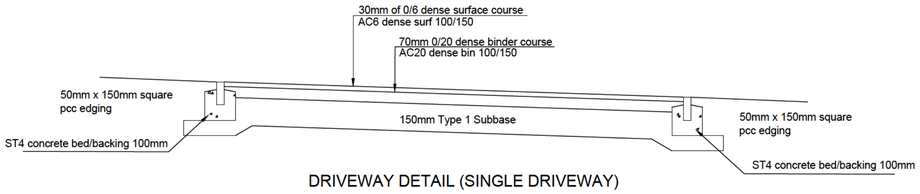
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HIGHWAYS AND DRAINAGE

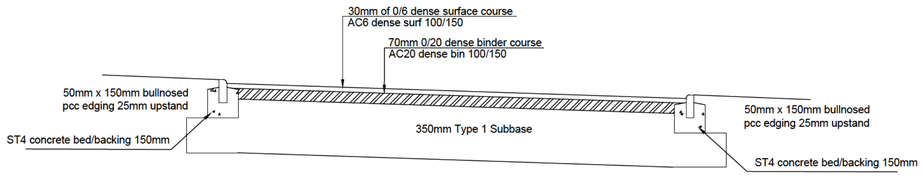
DRAINAGE LAYOUT

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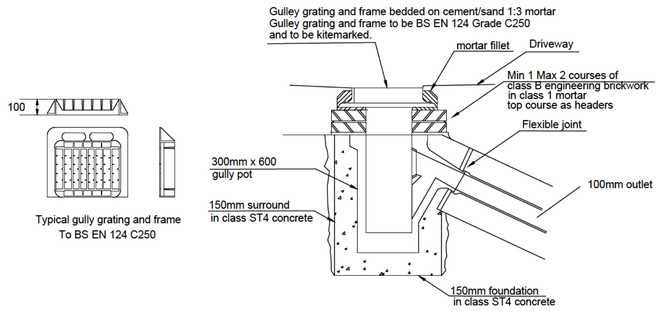
Drg No.	Rev
2779/100	1



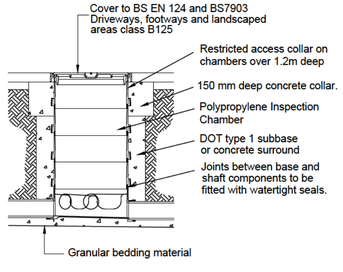
DRIVEWAY DETAIL (SINGLE DRIVEWAY)



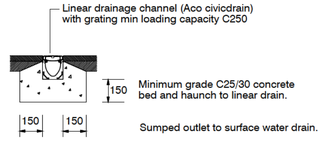
SHARED ACCESS DRIVEWAY FROM STATION ROAD



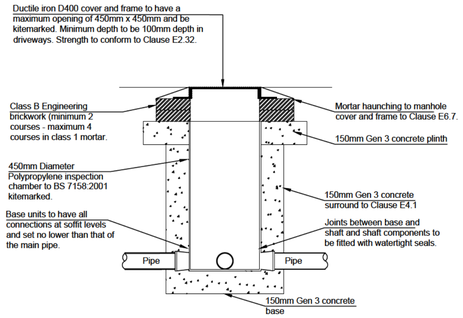
DETAIL OF GULLY TO DRIVEWAY



TYPICAL CHAMBER DETAIL (PPIC)



LINEAR DRAIN TO DRIVEWAYS

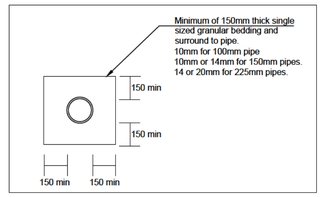


DEMARCATION CHAMBER DETAIL

DIAMETER	GRADIENT	
	FOUL	SW
100mm	1:80	1:100
150mm	1:150	1:150

Vitrified clay pipes to BS EN 295 Kitemarked.
Unplasticised PVC pipes to BS 4660:200 & bs en 1401-1 Kitemarked.
Structural wall unplasticised PVC pipes to WIS 4-35-01 Kitemarked.

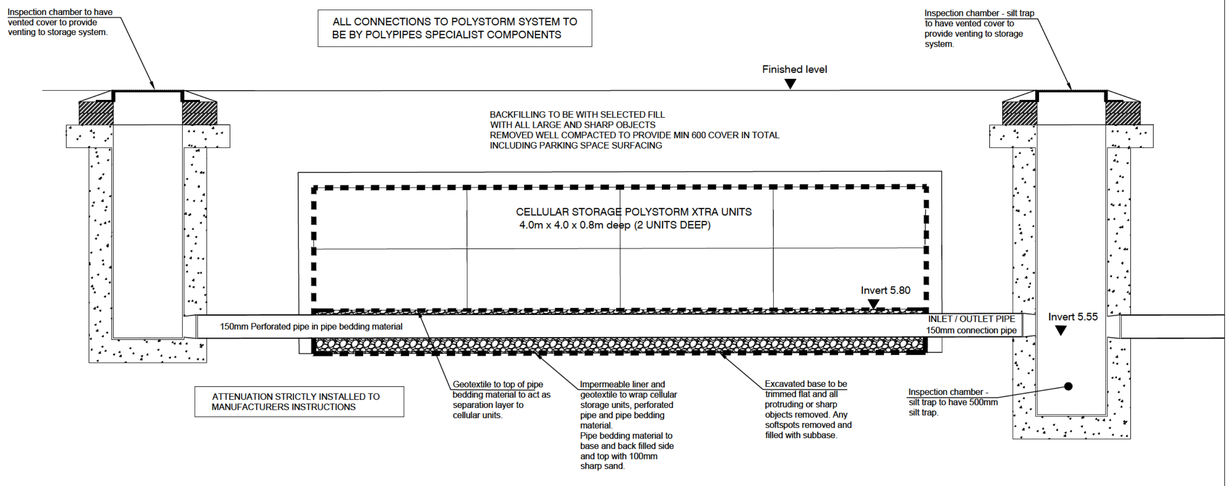
DRAIN PIPES DETAILS



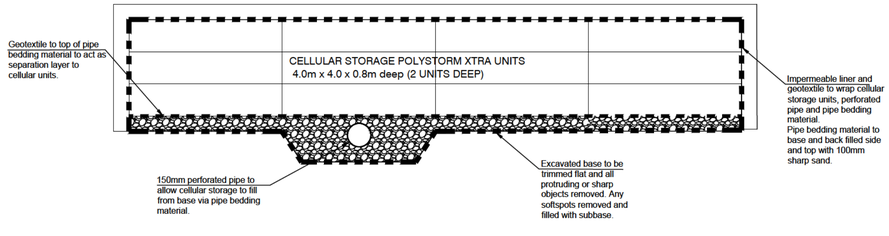
DRAIN BEDDING DETAIL

SURFACE	CLASS	LOADING
Road	D400	Vehicle impact
Driveway	B125	Car loading only
Footways/Gardens	Min A15	Pedestrian/cyclist only

CHAMBERS COVERS AND FRAMES



TYPICAL CELLULAR STORAGE DETAIL - TYPICAL LONG SECTION



TYPICAL CELLULAR STORAGE DETAIL - CROSS SECTION

Checked	Rev #	Description	Date
	2	Single driveway materials amended.	12/07/22
	1	First Issue for approvals.	06/07/22

Client

BAILE HOMES

Job Title

STATION ROAD
SKELMANTHORPE

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Drawing Title

HIGHWAYS AND DRAINAGE

DRAINAGE
DRIVEWAYS
TYPICAL DETAILS

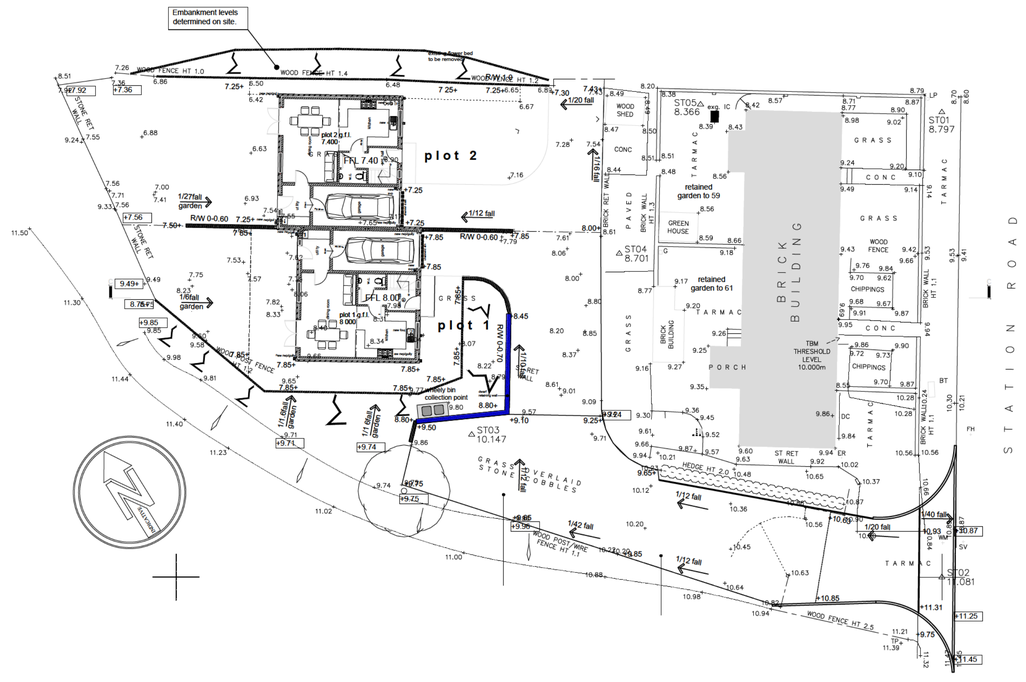
Scale	Date	Drawn	Checked
1:20 @ A1	JUNE 2022	HM	JB

Drg No.	Rev
2779/102	2

N

EXTERNAL WORKS KEY

160.70+	Proposed spot level
+160.40	Existing spot level
R/W 0-0.75	Retaining wall with retained height in metres
U/B 0.40	Under build with minimum height in metres
	Graded embankment slope 1:3 unless shown otherwise
1/10 fall	Average gradient to driveway / footpa h
1/10 fall garden	Average gradient to garden. If none shown garden less than 1/20 fall.
FFL 20.20	Finished floor level.



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HIGHWAYS AND DRAINAGE

EXTERNAL WORKS

Scale	Date	Drawn	Checked
1:200 @ A1	JUNE 2022	HM	JB

Drg No.	Rev
2779/101	1

Appendix F – Limitations

The discussion, conclusions and recommendations contained in this Report represent the professional opinions of Bright Young Consulting Limited (BYC), based upon the information listed in the Report, exercising the duty of care required of an experienced Engineering Consultant. BYC does not warrant the accuracy of the information or data forming the basis of the report and will not be responsible for any opinions which BYC has expressed, or conclusions which it has reached in reliance upon information which is subsequently proven to be inaccurate.

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