



BRIGHT



YOUNG



Drainage Strategy Report

Lightridge Road, Fixby,
Huddersfield

For Mr & Mrs Morris

Date 26/06/2043

Ref **2929/DSR001**



Report Details

Client	Mr & Mrs Morris
Report Title	Drainage Strategy Report
Project	Lightridge Road, Fixby, Huddersfield
Ref.	2929/DSR001
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Quality Assurance

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Introduction

Bright Young Consulting Ltd has been commissioned by Mr and Mrs Morris to produce a Drainage Strategy for a proposed residential development at land at Lightridge Road, Fixby, Huddersfield.

Kirklees Council as Lead Local Flood Authority (LLFA) is a statutory consultee for 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 0.96 acres and is located off Lightridge Road, Fixby, Huddersfield.

A site location plan is included as Figure 1 below.

Figure 1 – Site Location Plan



The Site is predominantly surrounded by residential buildings with Fixby Junior and Infact School located approximately 50 m to the east.

The is currently occupied by a single residential property accessed from Lightridge Road.

Local Topography

A topographical survey undertaken for Orange Design Studios (Appendix A) shows that the site falls from northwest to southeast from a maximum level of approximately 166.50 AOD to a minimum level of approximately 163.50 AOD.

Topographic levels to metres Above Ordnance Datum (m AOD) have also been obtained from published data for the district surrounding the site (see figure 2). This data is in line with the topographical survey findings, with the site falling within a moderately steep valley running the length of Lightridge Road to a low point to the southwest along Netheroyd Hill Road.

Figure 2 – Contour Plan



Hydrology

The nearest watercourse is Alison Dyke situated approximately 130m southwest of the Site at its closest point. The watercourse flows in a southerly direction within Dick Wood. Alison Dyke eventually discharges to Blackhouse Dyke approximately 1km from the site.

Figure 3 – Watercourse location plan

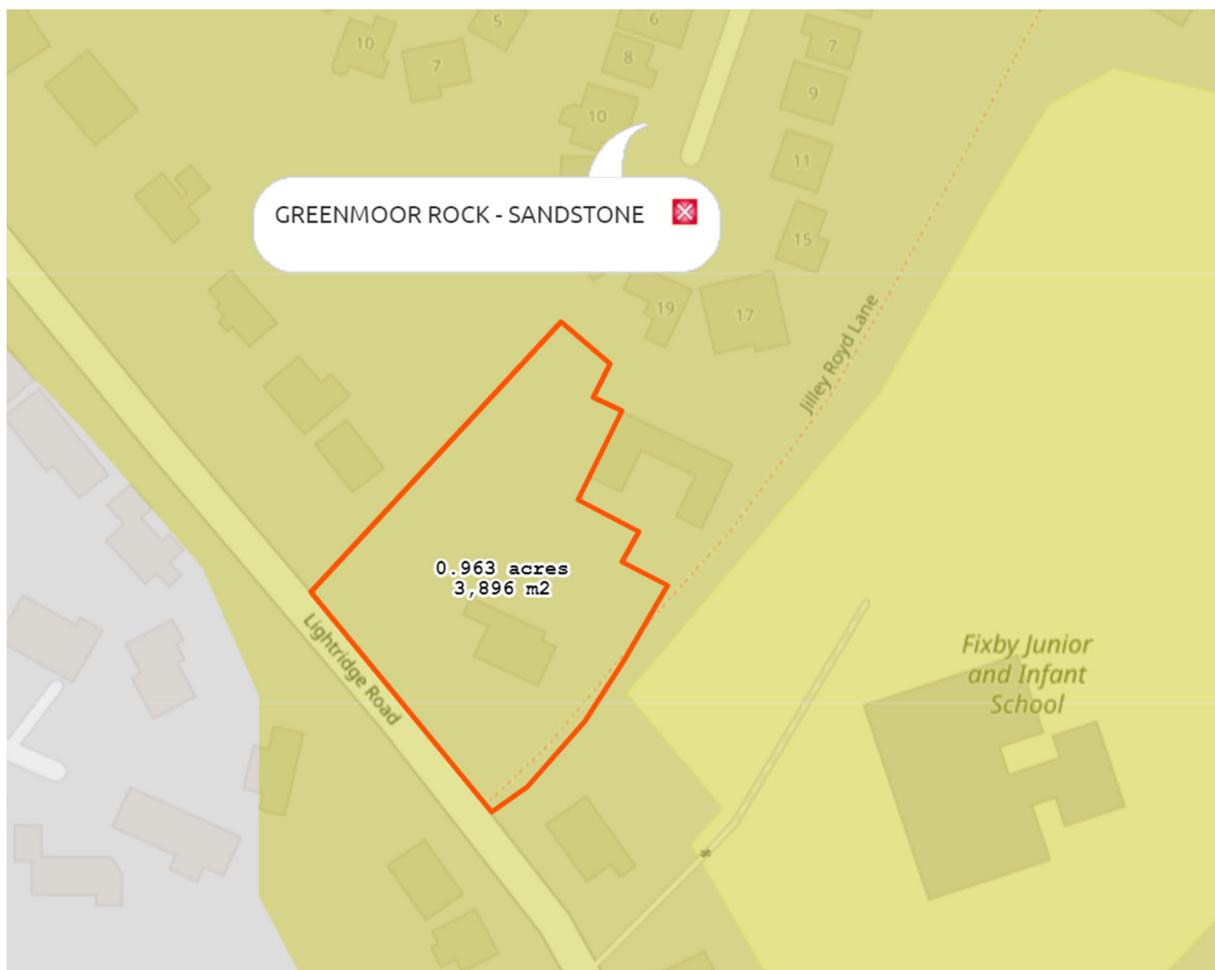


Geology

Published Geology

Reference to the British Geological Survey (BGS) online mapping indicates that the bedrock geology is predominately Greenmoor Rock Formation (sandstone). No superficial deposits are indicated to be present within the Site boundary.

Figure 4 – British Geological Survey Records



There are no publicly available historic BGS borehole records within close proximity to the Site.

Hydrogeology

According to the EA's hydrogeological data sets, the site is located over a moderately productive aquifer (within the underlying solid geology).

Local Drainage

Public Sewer Records

Public sewer records have been obtained from Yorkshire Water and are included in Appendix B. The Yorkshire Water sewer records show that there is 300mm diameter public combined sewer within Lightridge Road. The sewer flows in a south-easterly direction within the road.

The depth to invert of the sewer is recorded as between 1.75 and 1.91m.

Development Proposals

The proposed development is for the redevelopment of the Site to include 3 No new build dwellings.

The proposed development will result in an increase in hardstanding areas. Impermeable areas have been calculated at 1684 sq.m or 43% of the total site area with the balance becoming given over to soft landscaping.

Drainage Strategy

Introduction

The Site is currently occupied by a single residential property with extensive gardens. The proposed development is for the redevelopment of the Site to include 3 dwellings with an access court from Lightridge Road.

The proposed development will result in a hardstanding area of 1684 sq.m in the form of buildings and access road and external paved areas.

The increase in hardstanding area will result in an increase in surface water runoff rates and volumes. To ensure the proposed development will not increase flood risk elsewhere, surface water discharge from the Site will be controlled.

The below Drainage Strategy has been developed in line with Kirklees Local Plan and the WYCA Sustainable Drainage Systems Guidance.

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, the Site is underlain by Greenmoor Rock Sandstone. Greenmoor rock is extensively quarried in the local area and is not generally a suitable medium for infiltration solutions due to its fine structure and impermeable characteristics. In addition, the site topography is relatively steep, and water discharged to the ground will have a high probability of breaking out on adjacent land.

Surface Water Discharge to Watercourse

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

The Site is separated from all local watercourses 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. The 300mm diameter public combined sewer within Lightridge Road is the closest public sewer asset. A connection to the sewer appears to be the most feasible option and it is likely that a positive connect currently exists from the property.

The depth to invert of the 300mm diameter public combined sewer is recorded as between 1.75m and 1.91 bgl, therefore, a gravity fed connection is likely to be feasible. However, this will need to be tested prior to detailed design of the works, both to prove the detail and depth (expressed as an AOD) of any existing connections and manholes on the public sewer system.

Given it has been determined that infiltration is not possible at this site, and there are no watercourses within the boundary, discharge to the combined sewer at a restricted rate (detailed below) is the next viable alternative in line with the drainage hierarchy. Any discharge to the public sewer would need to be agreed with Yorkshire Water.

Surface Water Discharge

Subject to agreement with the LLFA and Yorkshire Water it is proposed that the maximum peak discharge rate from the site should be restricted to 2.5l/s. This is suggested as a practical minimum to avoid regular blockages in the necessary flow control device.

Attenuation Storage

In order to achieve a discharge rate of 2.5l/s, 110m³ of attenuation storage will be required. Storage estimates have been provided using MicroDrainage and are included in Appendix C. The storage estimates are based on storage within a proprietary tank system with a single outfall to the public sewer based 1:100 year plus 40% CC, an impermeable drainage area of 0.168ha, a design head of 2.4m and HydroBrake flow control.

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 precluded given the nature of the natural geology and the general landform which is steep and would most likely lead to groundwater breaking out at a lower level than the site.

Swales, Detention Basins and Ponds

Given the limited scale of the proposed development, insufficient space is available within the design of the Site to utilise a pond, basin or swale as an above ground attenuation feature.

Rainwater Harvesting

The attenuation benefits of providing rainwater harvesting are limited and would only be realised when the tanks were not full. However, the use of water butts is always recommended as a simple form of SuDS that can be incorporated without significant cost or associated maintenance issues.

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 in this instance.

Porous/Permeable Paving

Permeable paving could be incorporated within the none adopted roads which will mainly be trafficked by cars and light vans. Storage would be provided within the sub-grade material prior to controlled release to the main attenuation system. The amount of storage offered by permeable paving is subject to sub-grade depth and Site gradient. The use of permeable paving should be considered at the detailed design stage.

Underground Attenuation Tanks

Storage could be provided within underground attenuation tanks or within oversized pipes. Sufficient space for underground tanks is provided within the Site beneath the external paved areas. Three tanks are proposed – see Drainage Strategy plan (Appendix C).

Preferred Drainage Scheme

As soakaways are not feasible, surface water runoff will be discharged to the existing public combined sewer system located within the public highway at a rate of 2.5 l/s subject to agreement with the LLFA and YW.

Surface water runoff up to the 1 in 100 year plus 40% climate change allowance event will be attenuated on Site.

The proposed surface water drainage scheme will create betterment over the existing uncontrolled drainage scheme. The proposed drainage drawing and supporting MicroDrainage model are included as Appendix C.

Event Exceedance

Storage will be provided for the 1 in 100 year plus 40% CC event. Site levels will need to be fixed at detailed design stage to ensure that storm events in excess of the 1 in 100 year plus 40% CC event will not cause flooding within the development or across development boundaries. Finished floor levels will need to 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 1 - Pollution Hazard Indices

Land Use	Pollution	Total Suspended	Metals	Hydrocarbons
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	Hazard Level	Solids (TSS)		
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.

Where practical, runoff from roofs and roads will be directed to permeable pavements. Table 4 below demonstrates that this provides sufficient treatment for the level of contamination expected given the use of the Site.

Table 4 - SuDS Mitigation Indices

Type of SuDS	Mitigation Indices		
	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Permeable Pavement	0.7	0.6	0.7
Swale	0.5	0.6	0.6

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 26.3

It can be concluded that the inclusion of permeable paving will provide sufficient treatment and all surface water generated by the site is directed through at least one SuDS treatment train.

Maintenance

Maintenance of private drainage features such as permeable paving and attenuation tanks will be the responsibility of the purchasers. To ensure that the maintenance responsibilities are properly addressed in the long-term, it will be necessary to establish a site management company with a defined (and approved) drainage maintenance regime.

Foul Water Discharge

Foul flows should be discharged to the 300 mm public combined sewer in the public highway.

Conclusions and Recommendations

Conclusions

The proposed development is for the redevelopment of the Site to include 3No residential dwellings

The proposed development will increase impermeable drainage area in the form of buildings and external areas. This will result in an increase in surface water runoff. In order to ensure the surface water runoff will not increase flood risk elsewhere, flow control will be used, and attenuation provided.

All methods of surface water discharge have been assessed. As soakaways are not appropriate and there are no on-site or adjacent watercourses, discharge of surface water to the public combined sewer at a rate of 2.5 l/s is proposed.

Attenuation storage will be required on Site to restrict surface water discharge to 2.5l/s. Attenuation can be provided in the form of three attenuation tanks located beneath the proposed access court and private driveways. Porous surfacing will also be incorporated on all non-adoptable external areas to provide source control features.

Foul flows can be discharged to the 300 mm public combined sewer in the public highway.

Recommendations

Prior to completion of a detailed design for the drainage systems, it is recommended that the following issues are addressed:

- Carry out a drainage survey to establish full details of existing surface water and foul connections.
- Fix development levels to provide acceptable overland exceedance route and to ensure that gravity systems are viable
- Complete the detailed drainage design utilising the principles established in this drainage strategy report along with a detailed maintenance strategy for each of the approved drainage elements.

APPENDIX A – Topographical Information

APPENDIX B – Public sewer records and services information

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 45° 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 trial 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 Identifier



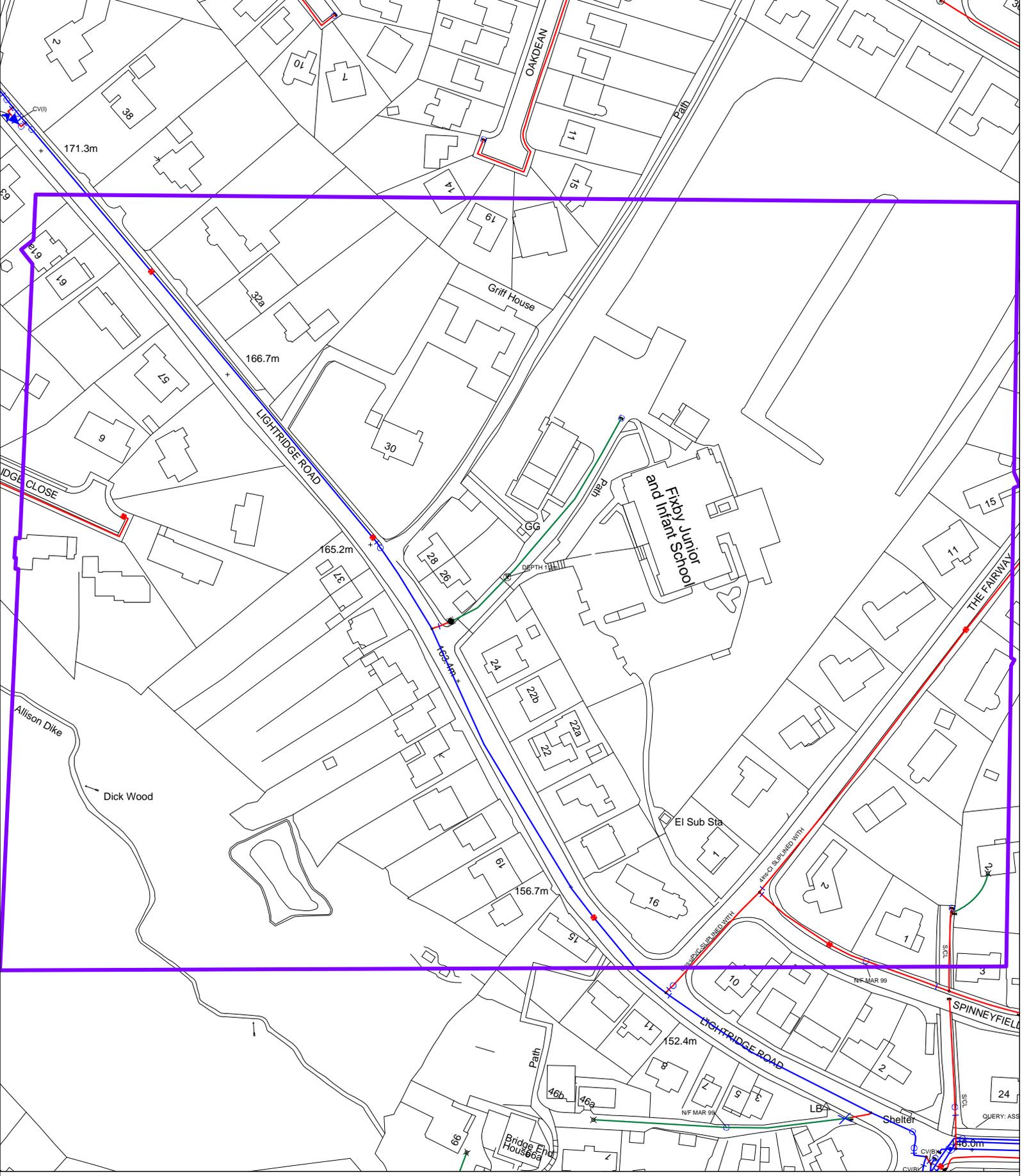
Sewer Legend

	Combined Sewer		S24 Combined Sewer
	Surface Water Sewer		S24 Surface Water Sewer
	Foul Sewer		S24 Foul Sewer
	Section 104 Sewer		Rising Main
	Overflow Sewer		Abandoned Sewer
		Syphone Sewer & Vacuum Sewer	
	Pumping Station		Public Sewer Treatment Works

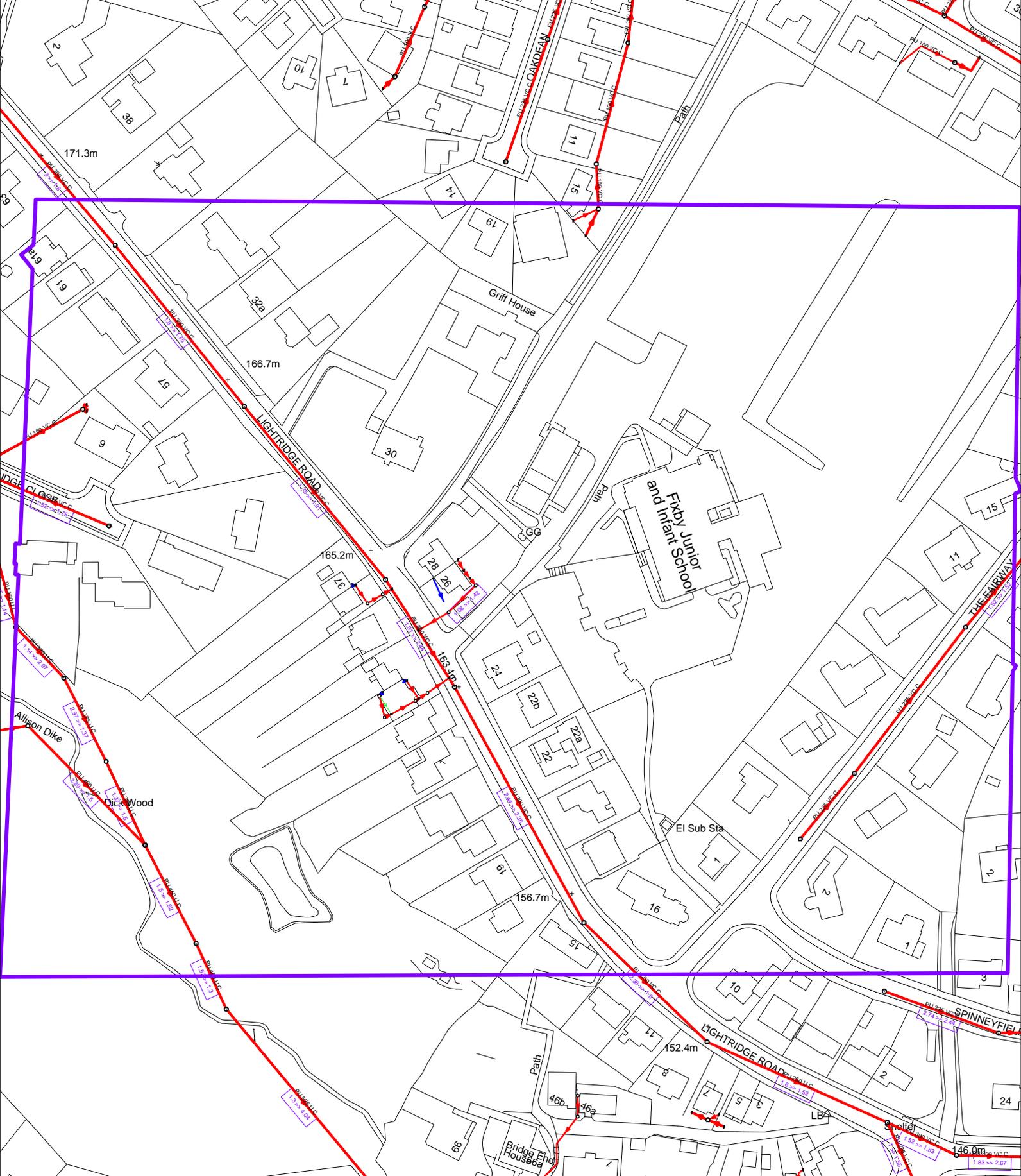
Please note that the direction of flow arrows may not always appear depending on the scale of the map.

Water Legend

	Water Main 4" and below
	Water Main 4" and above
	Raw Water Main
	Private Water Main
	Fire Hydrant
	Pumping Station
	The assets in this area are the responsibility of another Water Undertaker



Public Clean Water Network 03/06/2024 10:35:25 OS Grid Coordinates: 414037 : 419414 Map Name : SE1419SW svcGISSafeMovePD



Public Waste Water Network 03/06/2024 10:35:26 OS Grid Coordinates: 414037 : 419414 Map Name : SE1419SW svcGISSafeMovePD

APPENDIX C – Drainage strategy drawings and preliminary calculations

LIGHTRIDGE ROAD
FIXBY



Date 01/07/2024

Designed by HM

File FIXBY - STORAGE.SRCX

Checked by

Micro Drainage

Source Control 2020.1

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 376 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	164.269	0.169	0.0	2.5	2.5	46.6	O K
30 min Summer	164.325	0.225	0.0	2.5	2.5	62.1	O K
60 min Summer	164.384	0.284	0.0	2.5	2.5	78.1	O K
120 min Summer	164.417	0.317	0.0	2.5	2.5	87.5	O K
180 min Summer	164.433	0.333	0.0	2.5	2.5	91.8	O K
240 min Summer	164.441	0.341	0.0	2.5	2.5	93.9	O K
360 min Summer	164.443	0.343	0.0	2.5	2.5	94.5	O K
480 min Summer	164.442	0.342	0.0	2.5	2.5	94.1	O K
600 min Summer	164.438	0.338	0.0	2.5	2.5	93.2	O K
720 min Summer	164.433	0.333	0.0	2.5	2.5	91.9	O K
960 min Summer	164.421	0.321	0.0	2.5	2.5	88.4	O K
1440 min Summer	164.393	0.293	0.0	2.5	2.5	80.6	O K
2160 min Summer	164.350	0.250	0.0	2.5	2.5	68.9	O K
2880 min Summer	164.311	0.211	0.0	2.5	2.5	58.1	O K
4320 min Summer	164.250	0.150	0.0	2.5	2.5	41.4	O K
5760 min Summer	164.213	0.113	0.0	2.5	2.5	31.2	O K
7200 min Summer	164.195	0.095	0.0	2.3	2.3	26.2	O K
8640 min Summer	164.185	0.085	0.0	2.1	2.1	23.5	O K
10080 min Summer	164.178	0.078	0.0	1.9	1.9	21.5	O K
15 min Winter	164.290	0.190	0.0	2.5	2.5	52.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	138.943	0.0	46.3	18
30 min Summer	93.800	0.0	63.0	33
60 min Summer	60.628	0.0	83.1	62
120 min Summer	35.785	0.0	98.3	122
180 min Summer	26.303	0.0	108.4	182
240 min Summer	21.149	0.0	116.3	240
360 min Summer	15.561	0.0	128.3	332
480 min Summer	12.543	0.0	138.0	388
600 min Summer	10.619	0.0	146.0	450
720 min Summer	9.272	0.0	153.0	514
960 min Summer	7.485	0.0	164.7	648
1440 min Summer	5.548	0.0	183.0	920
2160 min Summer	4.121	0.0	205.2	1316
2880 min Summer	3.339	0.0	221.6	1676
4320 min Summer	2.480	0.0	246.4	2380
5760 min Summer	2.008	0.0	267.1	3056
7200 min Summer	1.706	0.0	283.6	3744
8640 min Summer	1.492	0.0	297.5	4416
10080 min Summer	1.332	0.0	309.1	5144
15 min Winter	138.943	0.0	52.0	18

LIGHTRIDGE ROAD
FIXBY

Date 01/07/2024

Designed by HM

File FIXBY - STORAGE.SRCX

Checked by

Micro Drainage

Source Control 2020.1

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m ³)	Status
30 min Winter	164.353	0.253	0.0	2.5	2.5	69.8	O K
60 min Winter	164.420	0.320	0.0	2.5	2.5	88.1	O K
120 min Winter	164.461	0.361	0.0	2.5	2.5	99.4	O K
180 min Winter	164.480	0.380	0.0	2.5	2.5	104.8	O K
240 min Winter	164.490	0.390	0.0	2.5	2.5	107.5	O K
360 min Winter	164.496	0.396	0.0	2.5	2.5	109.0	O K
480 min Winter	164.492	0.392	0.0	2.5	2.5	108.0	O K
600 min Winter	164.486	0.386	0.0	2.5	2.5	106.5	O K
720 min Winter	164.480	0.380	0.0	2.5	2.5	104.7	O K
960 min Winter	164.462	0.362	0.0	2.5	2.5	99.8	O K
1440 min Winter	164.414	0.314	0.0	2.5	2.5	86.6	O K
2160 min Winter	164.344	0.244	0.0	2.5	2.5	67.2	O K
2880 min Winter	164.283	0.183	0.0	2.5	2.5	50.6	O K
4320 min Winter	164.208	0.108	0.0	2.4	2.4	29.7	O K
5760 min Winter	164.186	0.086	0.0	2.1	2.1	23.7	O K
7200 min Winter	164.175	0.075	0.0	1.8	1.8	20.5	O K
8640 min Winter	164.167	0.067	0.0	1.6	1.6	18.5	O K
10080 min Winter	164.162	0.062	0.0	1.4	1.4	17.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
30 min Winter	93.800	0.0	70.7	33
60 min Winter	60.628	0.0	93.2	62
120 min Winter	35.785	0.0	110.1	120
180 min Winter	26.303	0.0	121.5	178
240 min Winter	21.149	0.0	130.3	234
360 min Winter	15.561	0.0	143.8	344
480 min Winter	12.543	0.0	154.6	446
600 min Winter	10.619	0.0	163.6	480
720 min Winter	9.272	0.0	171.4	556
960 min Winter	7.485	0.0	184.5	712
1440 min Winter	5.548	0.0	205.0	998
2160 min Winter	4.121	0.0	229.9	1404
2880 min Winter	3.339	0.0	248.3	1760
4320 min Winter	2.480	0.0	276.2	2376
5760 min Winter	2.008	0.0	299.2	3048
7200 min Winter	1.706	0.0	317.7	3744
8640 min Winter	1.492	0.0	333.3	4416
10080 min Winter	1.332	0.0	346.4	5144

LIGHTRIDGE ROAD
FIXBY



Date 01/07/2024

Designed by HM

File FIXBY - STORAGE.SRCX

Checked by

Micro Drainage

Source Control 2020.1

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 414164 419665 SE 14164 19665
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.185

Time (mins)		Area
From:	To:	(ha)
0	4	0.185

LIGHTRIDGE ROAD
FIXBY

Date 01/07/2024

Designed by HM

File FIXBY - STORAGE.SRCX

Checked by

Micro Drainage

Source Control 2020.1

Model Details

Storage is Online Cover Level (m) 165.400

Cellular Storage Structure

Invert Level (m) 164.100 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	290.0	290.0	0.401	0.0	317.3
0.400	290.0	317.2			

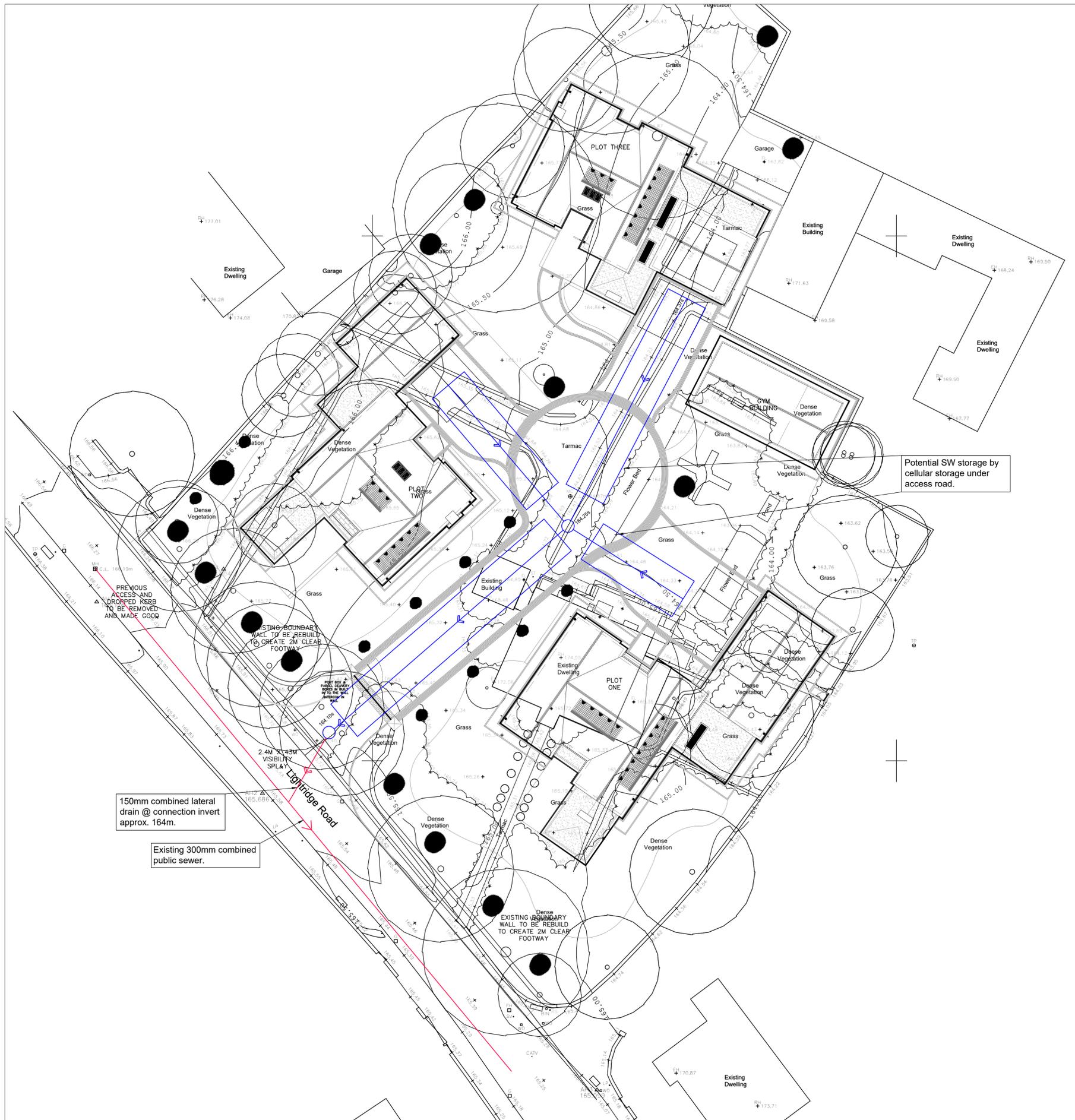
Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0082-2500-0500-2500
 Design Head (m) 0.500
 Design Flow (l/s) 2.5
 Flush-Flo™ Calculated
 Objective Minimise upstream storage
 Application Surface
 Sump Available Yes
 Diameter (mm) 82
 Invert Level (m) 164.100
 Minimum Outlet Pipe Diameter (mm) 100
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.500	2.5
Flush-Flo™	0.152	2.5
Kick-Flo®	0.349	2.1
Mean Flow over Head Range	-	2.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)						
0.100	2.4	1.200	3.7	3.000	5.7	7.000	8.6
0.200	2.5	1.400	4.0	3.500	6.2	7.500	8.9
0.300	2.3	1.600	4.3	4.000	6.6	8.000	9.2
0.400	2.3	1.800	4.5	4.500	6.9	8.500	9.5
0.500	2.5	2.000	4.7	5.000	7.3	9.000	9.8
0.600	2.7	2.200	5.0	5.500	7.6	9.500	10.0
0.800	3.1	2.400	5.2	6.000	8.0		
1.000	3.4	2.600	5.4	6.500	8.3		



DRAINAGE STRATEGY NOTES

PRE-DEVELOPMENT SITE - Existing run-off

Existing roof area = 168sq m
 @140l/s/hectare run-off to sewer = 2.35l/s
 -30% = 1.6l/s

Greenfield run-off rate = 0.4 hectares x
 5l/s/hectare = 2l/s
 x Post development % impermeable area =
 0.22% = 0.44l/s
 (Flow control too small and subject to
 blockage).

Suggest post-development flow to be 2.5l/s
 to allow a 75mm orifice in a hydrobrake flow
 control. Yorkshire water usually acceptable to
 this flow rate, but must be agreed with the
 LLFA, via the LPA.

POST-DEVELOPMENT SITE

Proposed run-off to combined sewer = 2.5l/s

Post development impermeable areas are:
 Plot 1 352 sq m; plot 2 283 sq m; plot 3 279
 sq m; gym 100 sq m; driveways 670 sq m.
 TOTAL 1684 sq m

Urban creep 10% Total Post-development =
 1850sq m.

CLIMATE CHANGE 40%

Storage needed = 110 Cubic metres. A large
 volume to be provided on site.

FOUL

To combined sewer in Lightridge Road.

LEVELS

Proposed levels will be critical to the
 successful implementation of the drainage
 strategy as the site falls away to the rear
 (north) of the site. This is away from the
 outfall to the combined public sewer and so
 pumping cannot be ruled out at this stage.

150mm combined lateral
 drain @ connection invert
 approx. 164m.

Existing 300mm combined
 public sewer.

Potential SW storage by
 cellular storage under
 access road.

1	First draft for discussion.	20/06/24
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Checked	Rev #	Description	Date
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Client
MR & MRS MORRIS

Job Title
**LIGHTRIDGE ROAD
FIXBY**

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Drawing Title
HIGHWAYS AND DRAINAGE

**LIGHTRIDGE ROAD FIXBY
DRAINAGE STRATEGY**

Scale 1:200 @ A1	Date JULY 2024	Drawn HM	Checked JB
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Drng No. 2929/100	Rev 1
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APPENDIX D – Limitations

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