

FLOOD RISK ASSESSMENT

Proposed Residential Development, Denby Lane, Grange Moor

Reference	FRA/RWO/Y20054.100
Date	November 2023
Version	2

4 Park Place
Leeds
LS1 2RU

Tel: +44 (0) 113 5323500
info@rwo.group
www.rwo.group



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CONFIDENTIALITY STATEMENT

This report is addressed to and may be relied upon by the following:

Yorkshire County Properties
Tandem Industrial Estate
Wakefield Road
Huddersfield
HD5 0AL

This report has been prepared for the sole use and reliance of the above-named parties. This report shall not be relied upon or transferred to any other parties without the express written authorisation of RWO Group. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party.

DOCUMENT HISTORY

VERSION	PURPOSE/DESCRIPTION	DATE
1	Final Issue	24.11.2023
2	Appendix C updated.	

1.0 EXECUTIVE SUMMARY

This assessment has looked at the implications of the proposed development in relation to flood risk.

The site is in Flood Zone 1, placing the risk of flooding for dwellings as low. The site covers an area of approximately 0.6 hectares.

The requirements for managing the surface water have been discussed with Kirklees Council, and where required the relevant local authority guidance and the Kirklees LLFA standards has been referred to.

Other flood risks have been reviewed and are either low risks or based upon the proposed site layout will be in areas which can be managed and therefore have a low risk of flooding to the proposed development.

The surface water from the development will discharge to the existing adopted YW surface water sewer in the junction of Denby Lane and Denby Park Drive. This sewer eventually discharges to watercourse circa 35m to the North East of the development. A direct connection cannot be made to the water course due to having to cross third party land. Surface water attenuation is to be provided in the form of an online attenuation tank constructed using crates. The development will be restricted to 3.5 L/Sec. Surface water attenuation will be required for all storm values up to and including the 100yr + 45 Climate Change.

By ensuring that the discharge rate is restricted there will be no increase in the flood risk to third parties. This will offer an improved position to the catchment downstream by capturing controlling and conveying flows at a controlled discharge rate. The proposed method of discharge and rate (3.5 L/Sec) has been agreed with Kirklees Council

In order to ensure that the risk to third party land flooding is not increased the proposed drainage system will be designed in accordance with the requirements of Ofwat and shall demonstrate that:

- No surcharge of pipes occurs in the 1 in 2-year rainfall event.
- No surface flooding occurs in 1 in 30-year rainfall event.
- No flooding to buildings and adjacent properties occurs in 1 in 100-year rainfall event with a 45% allowance for climate change.

Any flooding for the 100-year event with climate change will need to be stored on site to protect third party land from potential overland flows.

Foul water from the development site is proposed to discharge without restriction into existing public foul water sewer on Denby Lane adjacent to the South East corner of the site in accordance with the Pre-Development Enquiry Response from Yorkshire Water.

A maintenance regime and strategy will be required to determine the details for inspection and maintenance of the attenuation tank this will be maintained by a management company on behalf of the developer if they are not to be adopted by the Local Authority or Water Authority.

Surface water will be managed during the construction phase by a series of interceptor drains and sumps, with the attenuation tank being constructed as early as practicable.

2.0 INTRODUCTION

RWO Associates Limited (RWO) has been instructed by Yorkshire County Properties to prepare a Flood Risk Assessment to support a planning application for a proposed residential development at Denby Lane, Grange Moor.

The development proposal will consist of 10 new dwellings and associated highways, drainage, and associated infrastructure.

This document reviews the risks of flooding in accordance with current guidance and identifies the risk of flooding along with proposed mitigation. To undertake the flood risk assessment a site walkover has been undertaken along with utilising the topographical survey and flood data obtained.

The aim of the drainage strategy is to demonstrate that there is a viable strategy for managing surface and foul water at the site within the policy and planning requirements.

This strategy considers: -

- Identify existing site drainage characteristics.
- Describe and assess the proposed development.
- Assess the flood risk in accordance with the Department of Communities and Local Government (DCLG) Technical Guidance and the National Planning Policy Framework (NPPF February 2019)
- Consider existing information provided through discussions with the Environment Agency (EA), the Lead Local Flood Authority (LLFA) and Northumbrian Water Limited (NWL) to develop a strategy for the proposed development to be produced and identify any mitigation measures required.
- The destination of surface water emanating from impermeable areas of the development
- What restriction in rate of discharge is required and surface water storage requirements
- How foul water from the site will be managed.
- Surface water management during the construction phase.

This strategy has been prepared following discussions with both Kirklees Council and Yorkshire Water.

3.0 THE SITE

The proposed development site is located to the North of Denby Lane. The site centred ordnance survey reference for the site is 422349, 416217 with an area of circa 1.48 acres. Figure 1 below shows an aerial photo of the site, a location plan is included in Appendix A.

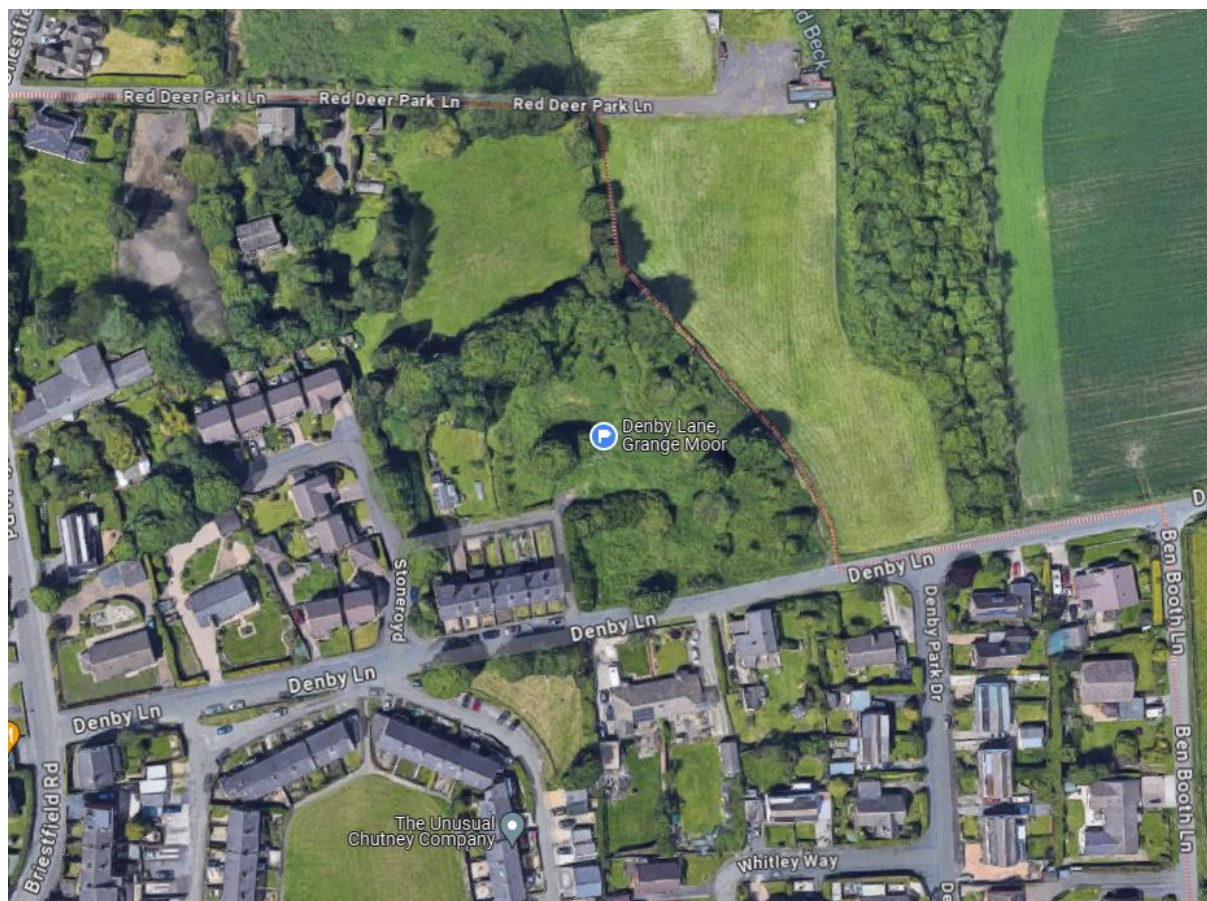


Figure 1 – Site Location (Blue flag indicates approximate centre of site)

The site is currently heavily overgrown, with a block of existing residential terraced houses to the South West to the North and East is grassed land with a public right of way on the eastern boundary. On the southern boundary is Denby Lane where the development will be accessed from

The site has a high point in the North West quarter of circa 218.9m, falling South Eastwards to the boundary in the South East corner circa 216.1m. There is a approx. 1 in 3 batter on the North and East boundary varying from 0.8m to 1.5m. A topographic survey drawing is included in Appendix B.

4.0 EXISTING DRAINAGE

An existing 150mm combined public combined water sewer crosses the site from West to East, this is to be diverted to allow the construction. There is also a 150mm combined public sewer within the site on the Southern boundary, subject to survey this will remain in situ and the fore mentioned sewer to be diverted into it if condition and levels allow. At present this is shown as the diversion route until the drainage is confirmed in this location.

A private soakaway is shown on the Yorkshire Water records on site, this has been investigated and is confirmed to drop into the existing Yorkshire water combined sewer which is to be diverted under a Section 185 application.

Yorkshire Water records can be found in Appendix C along with LLFA correspondence.

5.0 PROPOSED DEVELOPMENT

It is proposed to construct a new residential development consisting of 10 dwellings along with associated infrastructure including new roads, sewers, and services. The site will be accessed from Denby Lane.

The proposed development site is in Flood Zone 1.

The highways within the site will be offered for adoption under Section 38 agreement with the Highway Authority (Kirklees Council) and the foul and surface water drainage networks will be offered for adoption under a Section 104 agreement with Yorkshire Water.

A proposed site layout is located in appendix a and a topographical survey is included in appendix C.

6.0 FLOOD RISK

The site under consideration is located within Flood Zone 1 on the latest version of the Indicative Floodplain Maps produced by the Environment Agency [EA].

Flood Zone 1 is defined in National Planning Policy Framework's (NPPF) Technical Guidance as a low-risk area, which comprises land assessed as having less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).

NPPF Technical Guidance states that all uses of land are appropriate in Flood Zone 1.

As the site is located within Flood Zone 1 and has a site area greater than 1.0 Ha other sources of flooding should be considered.

The proposed site usage falls within the 'more vulnerable' category as identified in the NPPF Table 2: Flood risk vulnerability classification. However, the exception test will not need to be considered based on the NPPF Table 3: Flood risk vulnerability and flood zone 'compatibility'.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	x	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	x	x	x	✓*

Key:

✓ Development is appropriate

x Development should not be permitted.

Table 1 – 'National Planning Policy Framework Table 3: Flood risk vulnerability and flood zone compatibility'

Essential infrastructure • Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind Turbines.
Highly Vulnerable • Police stations, ambulance stations and fire stations and command centres and telecommunication installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as "essential infrastructure").
More vulnerable • Hospitals. • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for <u>dwelling houses</u>, student halls of residence, drinking establishments, nightclubs and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravans and camping, <i>subject to a specific warning and evacuation plan</i>.
Less vulnerable • Police, ambulance and fire stations which are <i>not</i> required to be operational during flooding. • Buildings used for shops, financial, professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in "more vulnerable", and assembly and leisure. • Land and buildings used for agricultural and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals workings and processing (except for sand and gravel working). • Water treatment works which do not need to remain operational during times of flood. • Sewerage treatment works (if adequate measures to control pollution and manage sewerage during flooding events are in place).
Water-compatible development • Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel working. • Docks, marinas and wharves. • Navigation facilities. • Ministry of defence installations. • Ship building, repairing, dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water based recreation (excluding sleeping accommodation). • Lifeguard and coastal stations. • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, <i>subject to specific warning and evacuation plan</i>.

Table 2 – 'National Planning Policy Framework Table 2: Flood risk vulnerability classification'

Flooding from Watercourse or Sea

The site is identified as being in Flood Zone 1 on the Environment Agency planning flood maps and as such the proposed development site is at low risk of flooding from watercourse or sea.

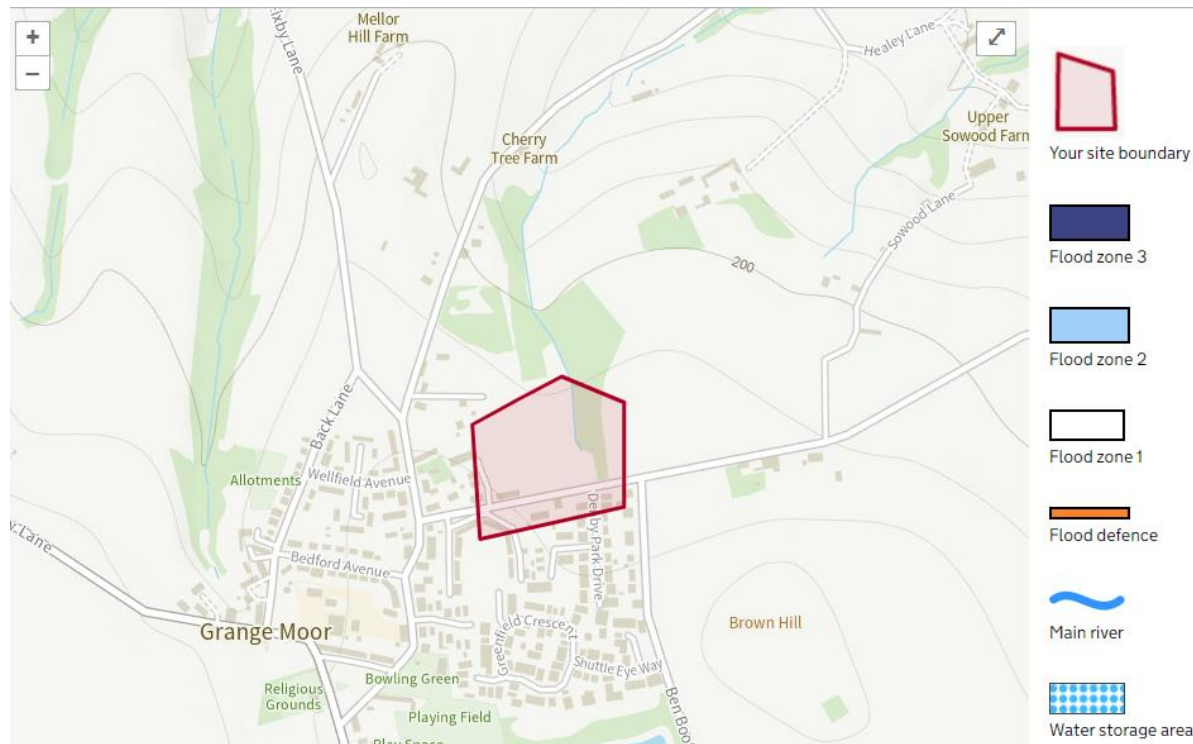


Figure 1 – Environment Agency Planning Flood Map (Extract date 22.11.2023)

Based on the proposed dwellings being in Flood Zone 1 there is a low risk of flooding associated with watercourse flooding.

Surface Water (Pluvial) Flooding

The Environment Agency surface water flood maps have been reviewed to assess the risk of flooding from surface water in relationship to the proposed development site.

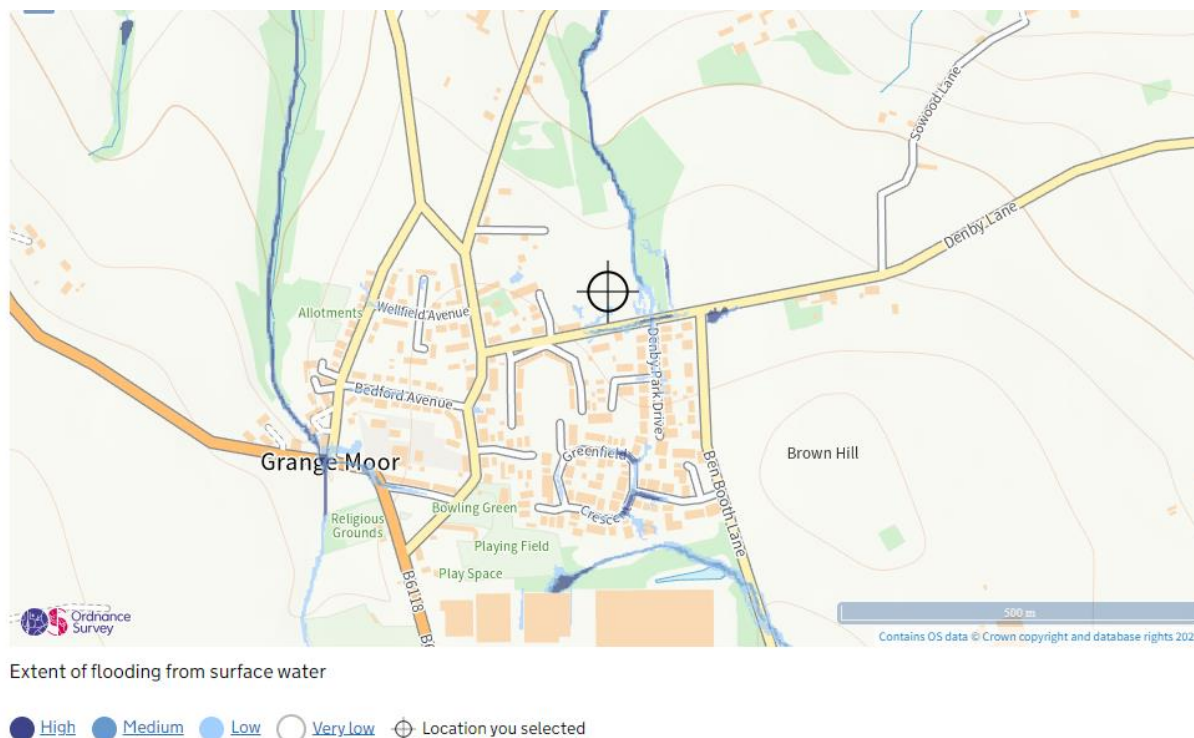


Figure 2 – Environment Agency Surface Water Flood Map (Extract date 22.11.2023)

The Gov.uk Surface Water Flood Map below indicates there are two areas at low to risk from surface water flooding within the proposed development boundary to the South where the parallel to Denby Road and where the site dog legs on Western boundary. The location of the flooding is where there are no plots proposed.

Due to the location of the flooding and the low risk the risk of flooding from this source is therefore considered manageable and low, however, to mitigate any risk it is recommended that the FFL's (Finished Floor Levels) be raised by a minimum of 300mm above existing ground levels.

The Topographical Survey in Appendix B identifies the level difference across the site and boundaries.

Other Sources of Flooding

Reservoir flood maps have been reviewed to identify the risk of reservoir failure flooding for the proposed development site. Based upon the map the risk of flooding from this source can be deemed very low.

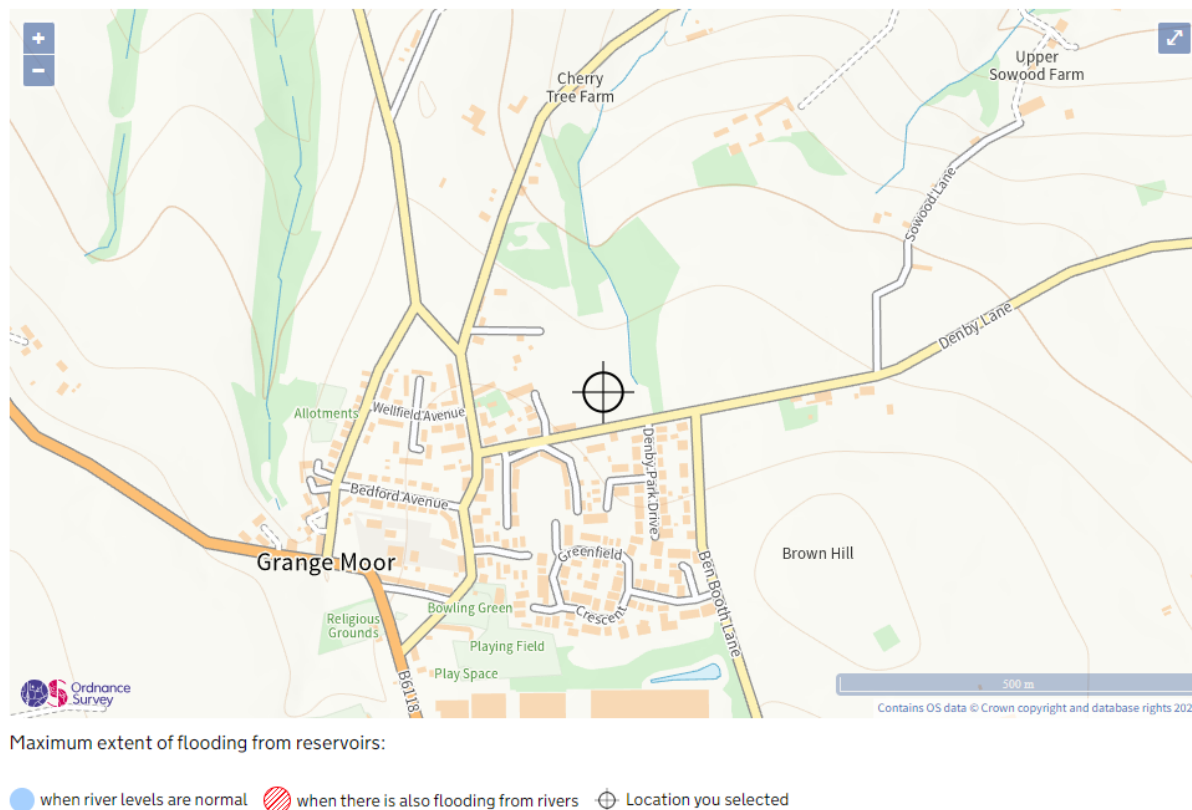


Figure 4 – Reservoir Failure Flood Map

7.0 SURFACE AND FOUL WATER DRAINAGE

Surface Water Drainage

The disposal of surface water shall be in accordance with the Requirement H3 of Building Regulations 2010. This establishes a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to soakaway/infiltration system, watercourse, and public sewer in that priority order. However due to the existing YW sewer being located circa 25m from the site it makes practical sense to utilise the existing sewer as otherwise a sewer and headwall would have to be constructed across third party land, and the existing sewer discharges into the water course.

The discharge of surface water drainage via infiltration methods is not suitable.

In accordance with Kirklees Council correspondence the proposed development should be restricted to a discharge rate of 3.5 L/second for all events up to and including the 100-year return period.

The attenuation volumes have been confirmed via source control Micro Drainage calculations and have been undertaken for the 2yr, 30yr, 100yr, and 100yr + 45 Climate Change events to identify the required surface water attenuation volumes.

Onsite attenuation will be required for all storm values up to and including the 100yr + 45 Climate Change and will be accommodated via an online tank. The flow rate is not restricted prior to entering the attenuation tank but the flow is restricted to greenfield run off prior to leaving the site. The flow is to be restricted by a flow control device within a manhole [the flow control unit is to be maintained by a management company].

By ensuring that the discharge rate is restricted there will be no increase in the flood risk to third parties. This will offer an improved position to the catchment downstream by capturing controlling and conveying flows at a controlled discharge rate.

The main consideration in terms of flood risk is to third party land. In order to ensure that the risk to third party land flooding is not increased the proposed drainage system will be designed in accordance with the requirements of Ofwat and shall demonstrate that:

- No surcharge of pipes occurs in the 1 in 2-year rainfall event.
- No surface flooding occurs in 1 in 30-year rainfall event.
- No building or third-party flooding for the 1 in 100-year event with a 45% allowance for climate change, with an allowance for urban creep in accordance with LASOO.

Any flooding for the 100-year event with climate change will need to be stored on site to protect third party land from potential overland flows.

A maintenance regime and strategy will be required to determine the details for inspection and maintenance of the attenuation tank this will be maintained by a management company on behalf of the developer if they are not to be adopted by the Local Authority or Water Authority.

The principles form the basis of the Surface Water Management Plan (SWMP) and will ensure that surface water from the development site will be collected, attenuated and conveyed in such a way that it manages the flows in accordance with best practices.

Foul Water Drainage

Discharge rates from the development of 100 dwellings are estimated in accordance with the Ofwat recommendation of 4000L/dwelling/day resulting in a discharge of 0.462 litres/second peak foul discharge.

Foul water from the development site is proposed to discharge without restriction into existing public foul water sewer on Denby Lane adjacent to the South East corner of the site in accordance with the Pre-Development Enquiry Response from Yorkshire Water.

8.0 ROLES AND RESPONSIBILITIES

Body/Authority	Responsibility
Environment Agency	- Predicting flooding from statutory main rivers and the sea including the location, timing, and magnitude. - Issuing of Flood Warnings to partner agencies and ensuring that the public are warned and informed. - Maintenance and operation of sea and river flood defences. Check defences and undertake essential repairs as required. - Monitor and clear blockages of culverts and repair breaches of defences. - Support the Police and Local Authority by providing materials, equipment and manpower as far as resources and other duties permit. - Advisory role in dealing with pollution issues following flooding.
Local Authority	- Providing support to the emergency services. - Mitigation of the effects of an emergency on people, including emergency feeding, accommodation and welfare. - Co-ordination of the voluntary sector response. - Information services to the public and media. - Flood alleviation measures where possible. - Environmental health advice.
Police	- Coordination of the emergency services at a major flood event, as well as helping to save lives and protect property. - Establishment of cordons where practical to facilitate the work of the emergency services. - In conjunction with other emergency services, to evacuate people from properties at risk, if necessary. - Collation and dissemination of casualty information.
Fire & rescue	- Saving life and rescuing trapped persons. - Provide monitoring procedures in respect of health and safety of those persons operating within an established cordon. - Carry out essential damage control measures including pumping out flood water and salvage work. - Rendering humanitarian services in support of the local authority.
Utility Companies	- In the event of a flood, will secure their services and equipment to ensure continuity of supply. - Repair services disrupted by flood. - Provide alternative means of supply during service disruption if life and death health risks are identified.
Met Office	The Met office issues the severe warnings for heavy rain, snow, severe gales etc. These warnings are delivered directly to local Authorities, the emergency services and the media.

Figure 5 – Role & Responsibilities

9.0 CONSTRUCTION SURFACE WATER MANAGEMENT

To manage surface water during construction two processes are proposed.

- Interceptor drains with sumps constructed within each phase/parcel of development,
- The proposed tank to be constructed at the start of construction works.

Interceptor drains will collect and capture overland flows once site topsoil strip has been undertaken and allow the flows to be conveyed to the basin. The interceptor drains will ensure that the overland flows are managed. Sumps will be formed at low points on the interceptor drains, and this will allow debris and potential pollutants to be captured.

The tank will act as a final phase of protection to the downstream network and provide attenuation.

An indicative surface water construction management drawing will be procured prior to construction.

10.0 CONCLUSIONS

This assessment has looked at the implications of a proposed residential development in relation to drainage strategy and flood risk.

The site is in flood zone 1, placing the risk of flooding for dwellings as low. The site covers an area of approximately 0.6 hectares.

The requirements for managing the surface water have been discussed and agreed with Kirklees council, and where required the relevant local authority guidance.

Following consideration of the drainage hierarchy, surface water from the development will discharge to the existing adopted YW surface water sewer on the junction Denby Lane and Denby Park Drive. This sewer discharges to watercourse circa 30m to the East of the development and is therefore more practical than constructing a sewer across third party land. Surface water attenuation is to be provided in the form of an online tank. The development will be restricted to the existing greenfield run-off rate of 3.5 L/Sec. As surface water discharge from the site will be restricted, on site surface water attenuation will be required for all storm values up to and including the 100yr + 45 Climate Change.

By ensuring that the discharge rate is restricted there will be no increase in the flood risk to third parties. This will offer an improved position to the catchment downstream by capturing controlling and conveying flows at a controlled discharge rate. The proposed method of discharge and rate (3.5 l/s) will be in accordance with the Kirklees Council design standards.

In order to ensure that the risk to third party land flooding is not increased the proposed drainage system will be designed in accordance with the requirements of Ofwat and shall demonstrate that:

- No surcharge of pipes occurs in the 1 in 2-year rainfall event.
- No surface flooding occurs in 1 in 30-year rainfall event.
- No flooding to buildings and adjacent properties occurs in 1 in 100-year rainfall event with a 45% allowance for climate change, with an allowance for urban creep in accordance with the LLFA Standards.

Any flooding for the 100-year event with climate change will be stored on site to protect third party land from potential overland flows.

Foul water from the development site is proposed to discharge without restriction into existing public foul water sewer on Denby Lane adjacent to the South East corner of the site in accordance with the Pre-Development Enquiry Response from Yorkshire Water.

A maintenance regime and strategy will be required to determine the details for inspection and maintenance of the attenuation tank this will be maintained by a management company on behalf of the developer if they are not to be adopted by the Local Authority or Water Authority.

Surface water will be managed during the construction phase by a series of interceptor drains and sumps, with the attenuation tank being constructed as early as practicable.



Paul Smith
For and behalf of RWO Group
November 2023

Appendix A Site Location Plan



KEY

PLANNING APPLICATION SITE
BOUNDARY

GRID REFERENCE:

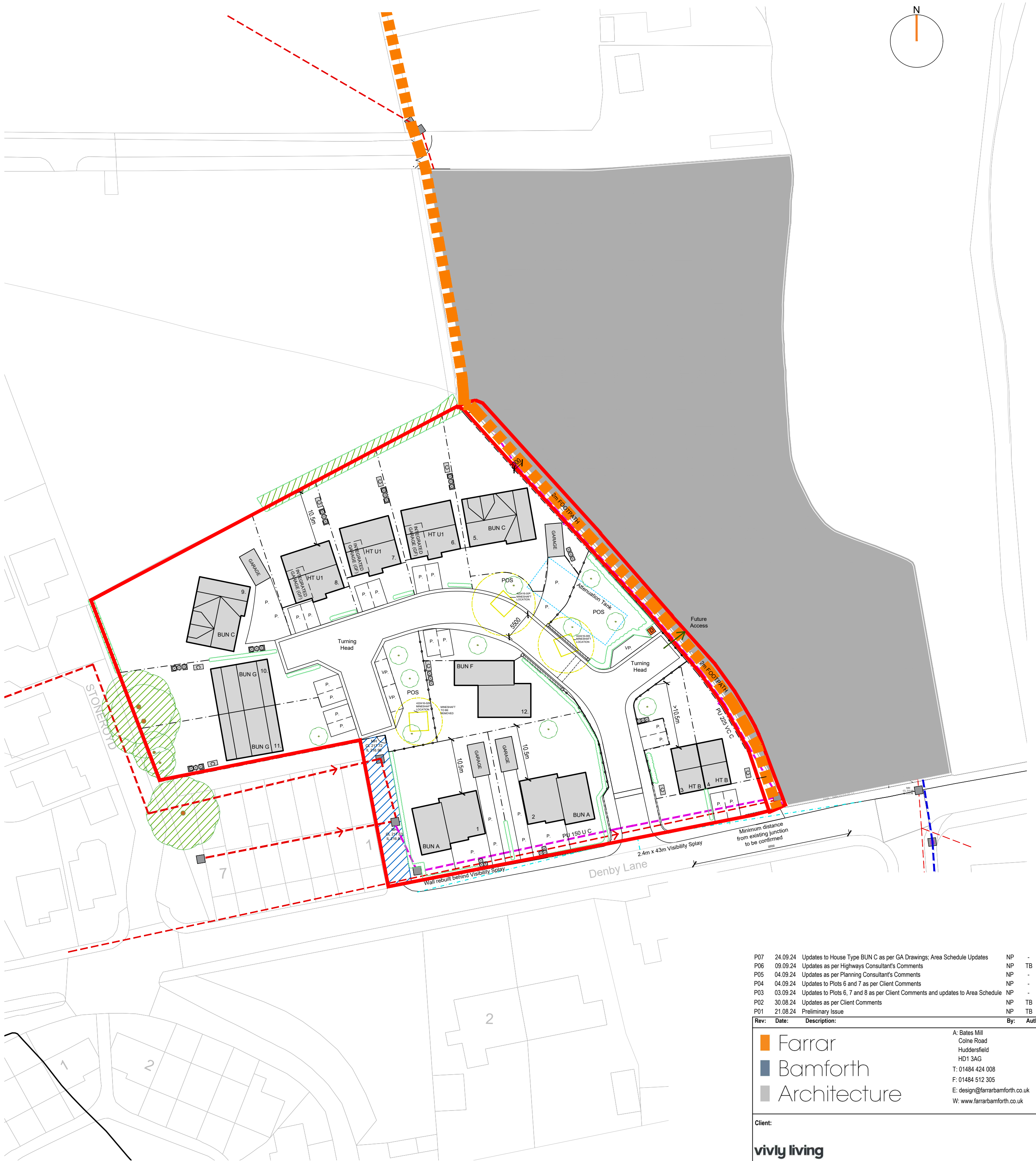
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ALL LEVELS ARE TO GPS

17.11.2023	FIRST ISSUE	PAS	PAS	1
Date	Revisions	Drawn	Checked	Rev
Dwg Status		PRELIMINARY		
NORTH EAST 0191 2585632		 CONSULTING ENGINEERS WWW.RWO.GROUP INFO@RWO.GROUP		
YORKSHIRE 0113 5323500				
Client				
YORKSHIRE COUNTY PROPERTIES				
Project		DENBY LANE GRANGE MOOR		
Title		SITE LOCATION PLAN		
DO NOT SCALE	Scale @ A3: 1:1000	Drawn PAS	Checked PAS	Date 17.11.2023
Job No	Y22054	Dwg No	D800	Rev 1

Appendix B Topographical Survey

Appendix C Indicative Site Layout



1 Proposed Site Layout

1 : 500

KEY

- Site Boundary
- Existing Trees
- Existing Shrubbery
- Proposed Trees
- Public Footpath
- Relocated Combined Sewer
- Surface Water
- Abandoned Surface Water
- Underground Electric Cables
- Shared Access
- Shaft - backfilled
- Shaft - capped
- Low Stone Wall
- Proposed Shrubbery
- Timber Fence
- Estate Style Fence - Colour Grey
- Man Hole
- Defibrillator
- Household Wheelie Bin
- Secure Cycle Locker
- Attenuation Tank Location
- Services, Planting, Attenuation Tank and Boundary Treatments indicative only - please refer to separate Consultants' drawings.

AREA SCHEDULE:

HT	NO.	SQFT	TOTAL SQFT
BUNA	2	1053	2106
BUNC	2	1520	3040
BUNF	1	1038	1038
BUNG	2	1599	3198
U1	3	1717	5151
B	2	777	1554

1: 500
0 10 20 30 40 50
m

P07	24.09.24	Updates to House Type BUN C as per GA Drawings; Area Schedule Updates	NP	-
P06	09.09.24	Updates as per Highways Consultant's Comments	NP	TB
P05	04.09.24	Updates as per Planning Consultant's Comments	NP	-
P04	04.09.24	Updates to Plots 6 and 7 as per Client Comments	NP	-
P03	03.09.24	Updates to Plots 6, 7 and 8 as per Client Comments and updates to Area Schedule	NP	-
P02	30.08.24	Updates as per Client Comments	NP	TB
P01	21.08.24	Preliminary Issue	NP	TB

Rev:	Date:	Description:	By:	Auth:
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Farrar

Bamforth

Architecture

A: Bates Mill
Colne Road
Huddersfield
HD1 3AG
T: 01484 424 008
F: 01484 512 305
E: design@farrarbamforth.co.uk
W: www.farrarbamforth.co.uk

Client:

vivly living

VIVLY LIVING (YORKSHIRE COUNTRY PROPERTIES)

Project Name:

RESIDENTIAL DEVELOPMENT

Project Address:

DENBY LANE, GRANGE MOOR

Reference:

Project	Originator	Functional	Spatial	Form	Discipline	Number
22D26	FBA	ZZ	XX	DR	A	0719

Title:

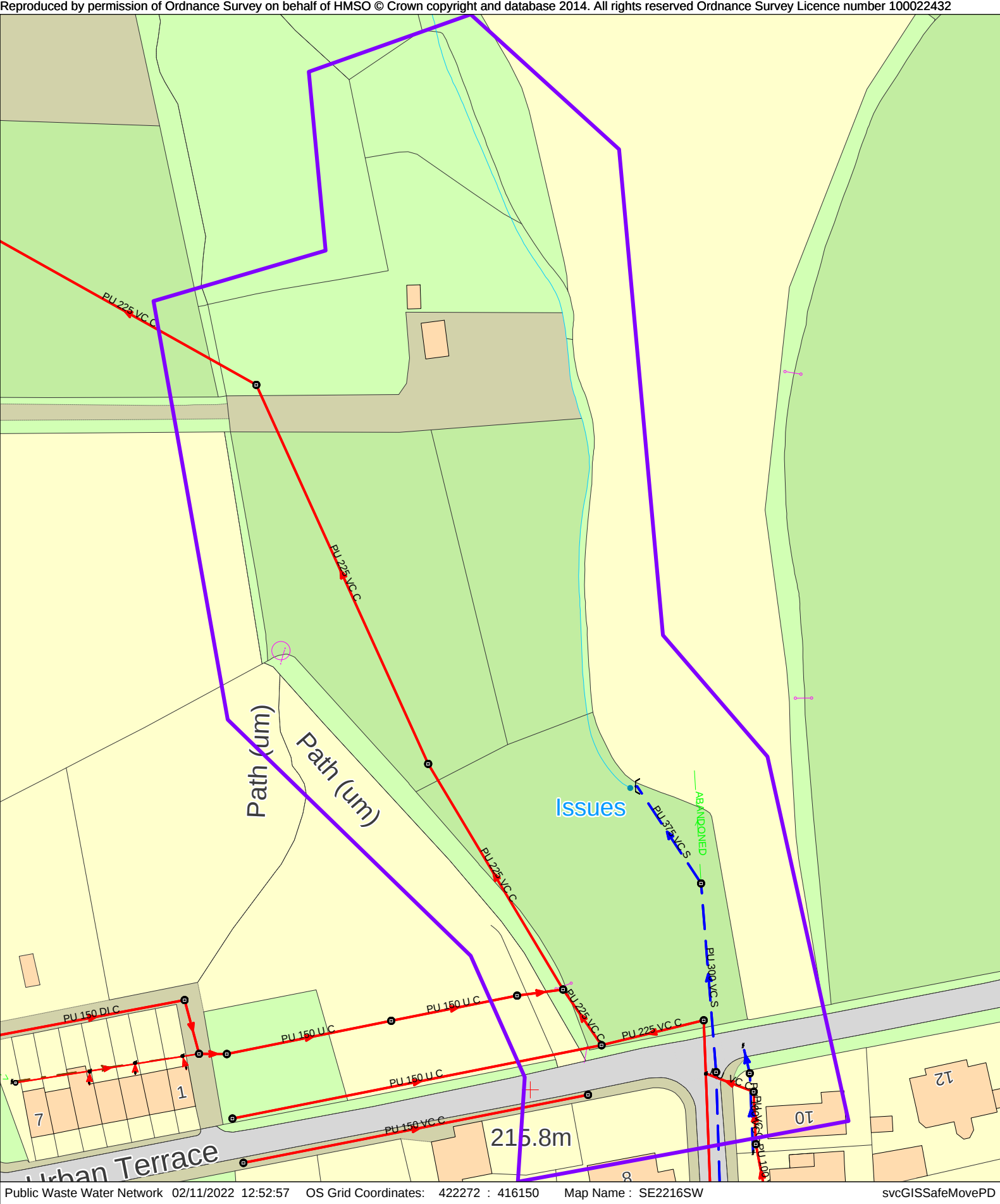
SITE LAYOUT - PLANNING SIM. 11

Status:	Code	Description	Revision:	Code
A3	DEVELOPED DESIGN	P07		

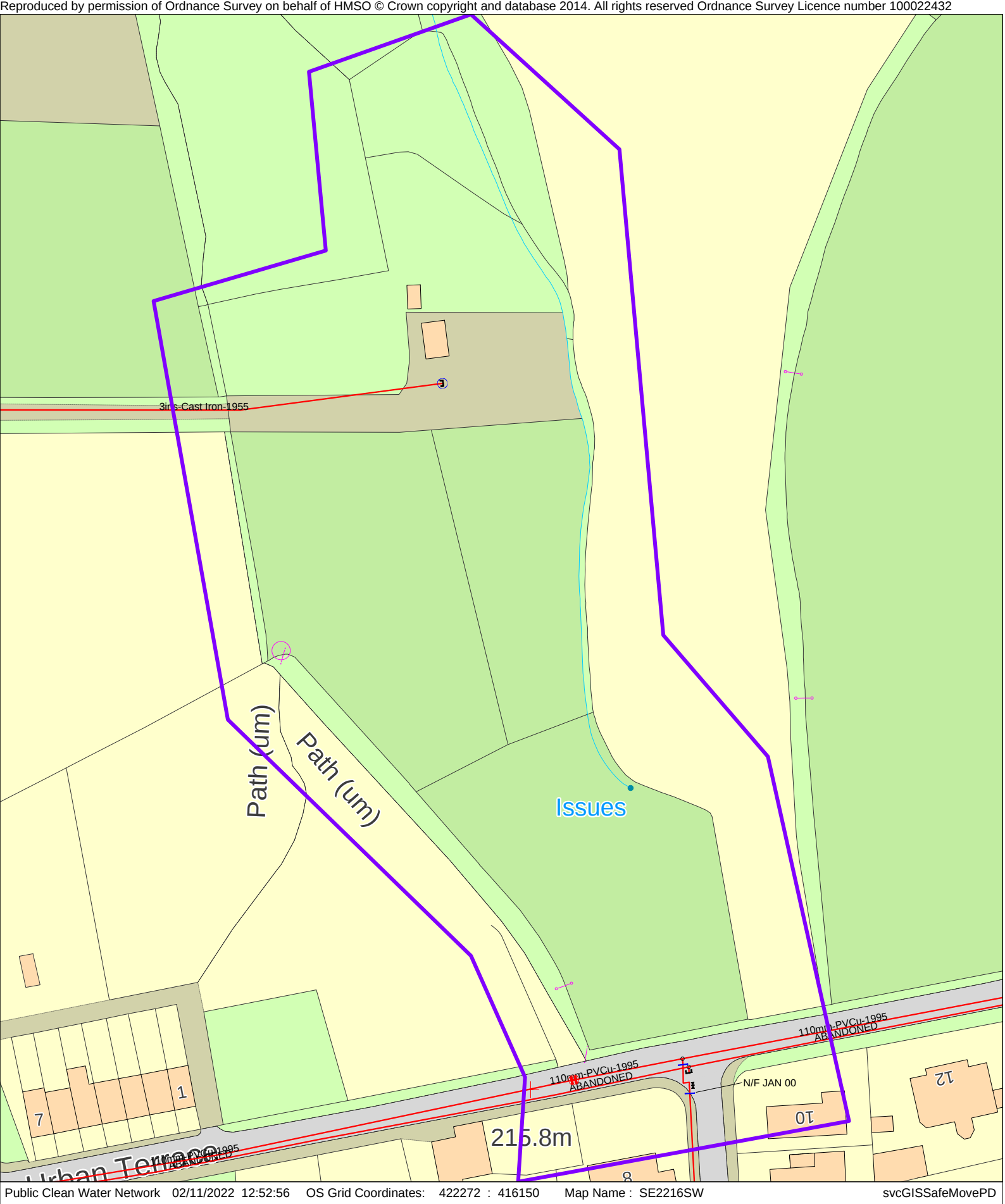
Created By:	Authorised By:	Date:	Scale at A2:
NP	TB	AUG. 2024	1:500

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Appendix D Yorkshire Water Sewer Records/LLFA Correspondence



Public Waste Water Network 02/11/2022 12:52:57 OS Grid Coordinates: 422272 : 416150 Map Name : SE2216SW svcGISSafeMovePD



Public Clean Water Network 02/11/2022 12:52:56 OS Grid Coordinates: 422272 : 416150 Map Name : SE2216SW svcGISSafeMovePD

Paul Smith

Subject: FW: Y22054 Sent 2023-11-17 Grange Moor, Drainage

From: Martin Stephenson <Martin.Stephenson@kirklees.gov.uk>
Sent: Friday, November 17, 2023 1:00 PM
To: Paul Smith <psmith@rwo.group>; Oliver Bottomley <oliver@yorkshirecountryproperties.co.uk>
Cc: Alex Erskine <aerskine@rwo.group>
Subject: RE: Y22054 Sent 2023-11-17 Grange Moor, Drainage

Hi Paul

Responses below:

How much climate change do you require, and urban creep etc. **45% CC (upper limit) until advised otherwise, no urban creep**

For the purposes of schematic design, as discussed, I am working on 3.5 L/Sec discharge rate. **OK**

Regards

Martin Stephenson
Principal Flood Risk Officer
Flood Risk and Drainage Management
Civic Centre 1
Huddersfield
High Steet
HD1 2NF

T: 01484 22 1000 (Ext. 75870)
E: martin.stephenson@kirklees.gov.uk

From: Paul Smith <psmith@rwo.group>
Sent: Friday, November 17, 2023 12:42 PM
To: Martin Stephenson <Martin.Stephenson@kirklees.gov.uk>; Oliver Bottomley <oliver@yorkshirecountryproperties.co.uk>
Cc: Alex Erskine <aerskine@rwo.group>
Subject: Y22054 Sent 2023-11-17 Grange Moor, Drainage

CAUTION: External email. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Martin,

Good to speak to you earlier, and thanks for your input on this development.

Can I just ask your parameters on surface water design please.

How much climate change do you require, and urban creep etc.

For the purposes of schematic design, as discussed, I am working on 3.5 L/Sec discharge rate.



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4 Park Place
Leeds
LS1 2RU

Tel: +44 (0) 113 5323500
info@rwo.group
www.rwo.group



19 & 20 Brenkley Way
Seaton Burn
Newcastle upon Tyne
NE13 6DS

Tel: +44[0]191 2585632
info@rwo.group
www.rwo.group

