TOPPING ENGINEERS

CONSULTING CIVIL & STRUCTURAL ENGINEERS

FLOOD RISK ASSESSMENT

LOCATION:

Land at Millstones
Oxspring, Sheffield, S36 8WZ

CLIENT: Yorkshire Land Limited

DOCUMENT REF:
19347-FRA-001

REVISION/DATE:
Revision E

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CONTENTS & AMENDMENT HISTORY

Revision	Description	Date	Author	Checked
A	First Issue	Oct 2020	T Andrews	T Moorhouse
B	Updated to suit EA comments	Jan 2021	T Andrews	T Moorhouse
C	Updated to suit EA comments	Jan 2021	T Andrews	T Moorhouse
D	Updated with new layout	May 2023	P Beeley	J Sellers
E	Development boundary made clearer	Nov 2023	P Beeley	J Sellers

1.0 INTRODUCTION

This Flood Risk Assessment (FRA) is compliant with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance. The FRA has been produced on behalf Yorkshire Land Limited in respect of a planning application for the proposed residential scheme on the land at Millstones.

Site Name	Land at Millstones
Location	Oxspring, Sheffield, S36 8WZ
NGR (approx.)	427039,402188
Application Site Area (ha)	0.3 ha
Development Type	Residential
NPPF Vulnerability	Low
EA Flood Zone	Flood Zone 1,2 & 3
EA Office	Yorkshire
Local Planning Authority	Barnsley Council

Table 1.1 - Site Summary

1.1 SOURCES OF DATA

The report is based on the following information:

i. Site Location Plan by mbooth design (Appendix A)
ii. Site Plan by Syndicate Design
iii. Environment Agency information
iv. Barnsley Council Strategic Flood Risk Assessment

1.2 EXISTING SITE

The site in question is located in the South Yorkshire Village of Oxspring. More accurately the site is bounded by the River Don to the south and rural land to the north and west.

The River Don lies to the south of the site and is lower than the proposed dwellings.

From the topographical survey (Appendix B) it can be seen that the site falls towards the river from the north. The highest point of the development area has a level of 180.720 AOD. Contrastingly the lowest point on the site is 174.290 AOD. The lower parts of the site are outside the development boundary.

Figure 1.1 - Site Location

1.3 PROPOSED DEVELOPMENT

The proposed development is set to consist of a residential scheme along with suitable access and parking areas.

1.4 FLOOD RISK PLANNING POLICY

National Planning Policy Framework

The NPPF sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. Planning Practice Guidance is also available online.

The Planning Practice Guidance sets out the vulnerability to flooding of different land uses. It encourages development to be located in areas of lower flood risk where possible and stresses the importance of preventing increases in flood risk off site to the wider catchment area.

The Planning Practice Guidance also states that alternative sources of flooding, other than fluvial (river flooding), should also be considered when preparing a Flood Risk Assessment.

This Flood Risk Assessment is written in accordance with the NPPF and the Planning Practice Guidance.

Flood Zones

The Flood Zone Map for Planning has been prepared by the Environment Agency. This identifies areas potentially at risk of flooding from fluvial or tidal sources. An extract from the mapping is included as Figure 1.2.

Figure 1.2 - Environment Agency Flood Zone Mapping

The development site is shown to be located within Flood Zone 1 (Low Probability) therefore the site is considered to be low risk of flooding. Flood Zone 1 is defined as land assessed as having less than a 0.1% annual probability of flooding from fluvial and tidal sources.

The southern extents of the site outside of the development are shown to be in Flood Zone 2 (medium probability) is defined as land assessed as having an annual probability of flooding of 0.1% to 1.0% and Flood Zone 3 (high probability) is defined as land assessed as having an annual probability of flooding greater than 1.0%.

Table 2 of the Planning Practice Guidance classifies land use. Under these classifications the proposed residential scheme is considered to be 'More Vulnerable' to the potential impacts of flooding.

Table 3 of the Planning Practice Guidance identifies that any development is considered appropriate within Flood Zone 1.

Flood Risk Vulnerability Classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable
Flood Zone 1	✓	✓	✓	✓
Flood Zone 2	✓	✓	Exception test required	✓
Flood Zone 3a	Exception test required	✓	**x**	Exception test required
Flood Zone 3b	Exception test required	✓	**x**	**x**

1.5 OTHER RELEVANT POLICY AND GUIDANCE

Strategic Flood Risk Assessment

The Barnsley Council Flood Risk Assessment (SFRA) was prepared to review flood risks on a much wider scale to assess the potential for new development within the study area. The SFRA was used as an evidence base for Local Development Frameworks for each Local Planning Authority.

The SFRA therefore aims to bring together all available flood risk information for a variety of sources to provide a robust assessment. The SFRA therefore is useful for this site-specific FRA by highlighting available data and instances of known flooding in the area. Although written under the guidance of Planning Policy Statement 25, the SFRA is still considered to include relevant information.

2.0 POTENTIAL SOURCES OF FLOOD RISK

The table below identifies the potential sources of flood risk to the site, and the impacts which the development could have in the wider catchment prior to mitigation. These are discussed in greater detail in the forthcoming section. The mitigation measures proposed to address flood risk issues and ensure the development is appropriate for its location are discussed within Section 3.0.

Flood Source	Potential Risk				Description
	High	Medium	Low	None	
Fluvial			X		The development part of the site is positioned within Flood Zone 1.
Tidal				X	There are no tidal influences effecting the site.
Canals				X	None present.
Groundwater			X		Ground conditions are not conducive to fluctuating groundwater levels.
Reservoirs and waterbodies			X		The site is shown to fall inside the area at risk of reservoir flooding.
Sewers			X		The site in question is higher than the surrounding sewers therefore there is a very low risk.
Pluvial runoff			X		The site is not shown to be at risk of surface water flooding.
Effect of Development on Wider Catchment				X	The impermeable area is being increased but the flows will be attenuated on site.

Table 2.1 - Pre-Mitigation Sources of Flood Risk

2.1 FLUVIAL FLOOD RISK

The site is shown to be in flood zone 1 and therefore the risk of the development flooding is of a low risk.

2.2 GROUNDWATER FLOOD RISK

Subject to completion of site investigation to confirm we would assume that natural ground water level is located well below the site surface and the nature of the strata means it is unlikely that there will be perched water above this level.

We therefore do not consider there is a risk of groundwater flooding affecting the development subject to final confirmation upon completion of suitable site investigation.

2.3 FLOOD RISK FROM RESERVOIRS & LARGE WATERBODIES

Reservoir failure flood risk mapping has been prepared by the Environment Agency, this shows the largest area that might be flooded if a reservoir were to fail and release the water it holds. The map displays a worst-case scenario and is only intended as a guide. An extract from the mapping is included as Figure 2.1.

Figure 2.1 - Environment Agency Reservoir Failure Flood Risk Map

Flood maps indicate the site is at risk of reservoir flooding, these include Winscar Reservoir and Ingbirchworth Reservoir. Both these Reservoirs are owned and maintained by Yorkshire Water and subject to regular inspections and maintenance.
A breach of these reservoirs is unlikely.

2.4 FLOOD RISK FROM SEWERS

The site in question lies above any main roads which is potentially where any Yorkshire Water sewers will lie.

As such, it is considered that there is no risk of flooding from sewers.

2.5 PLUVIAL FLOOD RISK

Risk of flooding from surface water mapping has been prepared by the Environment Agency, this shows the potential flooding which could occur when rainwater does not drain away through the normal drainage systems or soak into the ground but lies on or flows over the ground instead. An extract from the mapping is included as Figure 2.2.

Figure 2.2 - Risk of Flooding from Surface Water Mapping

The mapping produced by the Environment Agency shows that there are no areas of surface water flooding on the site.

As such the risk of surface water flooding is negligible.

2.6 EFFECT OF DEVELOPMENT ON WIDER CATCHMENT

2.6.1 Development Drainage

The current site is considered to be greenfield. This results in the amount of impermeable area on this site being increased. Therefore, it is proposed that the site will be attenuated at greenfield discharge rates. This will also follow the SuDs hierarchy for the disposal of surface water drainage from the site.

3.0 FLOOD RISK MITIGATION

Section 2.0 has identified the sources of flooding which could potentially pose a risk to the site and the proposed development. This section of the FRA sets out the mitigation measures which are to be considered within the proposed development detail design to address and reduce the risk of flooding to within acceptable levels.

3.1 SITE ARRANGEMENTS

3.1.1 Sequential Arrangement

The Flood Zone mapping shows the developed part of the site to be in Flood Zone 1.

3.1.2 Finished Levels

The online Flood Zone mapping show the development site to be in Flood Zone 1 with the southern extents of the site outside the development being in Flood Zone 2 and 3.

Product 4 data has been received from the Environment Agency (see Appendix D).

The nearest node point to the stie is DON18_24186.

The defended 1 in 100 (1.0%) years Flood Level is 175.624.
The defended 1 in 1000 (0.1%) Flood Level is 176.654.

The undefended 1 in 100 (1.0%) Flood Level is 175.625.
The undefended 1 in 1000 (0.1%) Flood Level is 176.655.

The original Flood Zone Mapping Plan does not reflect the actual extent of flooding based on the accurate topographical survey information.

The maps were therefore challenged in September 2022.

A revised map was issued in April 2023. This can be seen in Appendix E.

The proposed site development can be seen on the site plan (see Appendix C).

The proposed Floor Levels range from 180.20 down to 179.100. The 176.650 on AOD contour line is clearly shown on the site plan. This coincides with the development boundary.

The lowest floor level of 179.100 is set 3.475m above the 1 in 100 years Flood Level and 2.445m above the 1 in 1000 year Flood Level. This gives adequate freeboard to take account for the effects of climate change.

The site is located within an Environment Agency Flood Alert area. Although the properties are safely above the predicated flood levels we recommend that the residents register for this service.

A safe evacuation route is available to the north and east along Millstones towards Bower Hill.

4.0 CONCLUSIONS AND RECOMMENDATIONS

This Flood Risk Assessment (FRA) is compliant with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance. The FRA has been produced on behalf of Yorkshire Land Limited.

This report demonstrates that the proposed development is not at significant flood risk, and simple mitigation measures have been recommended to address any residual risks that may remain. The identified risks and mitigation measures are summarised within Table 4.1.

Flood Source	Proposed Mitigation Measure
Fluvial	The development site is shown to be in Flood Zone 1.
Impact of the Development	Strategic surface water drainage strategy prepared for wider development will ensure a sustainable approach to surface water management.

Table 4.1 - Summary of Flood Risk Assessment

In compliance with the requirements of National Planning Policy Framework, and subject to the mitigation measures proposed, the development could proceed without being subject to significant flood risk. Moreover, the development will not increase flood risk to the wider catchment area as a result of suitable management of surface water runoff discharging from the site.

5.0 APPENDICES

Appendix A – Site Location Plan

Appendix B – Topographical Survey

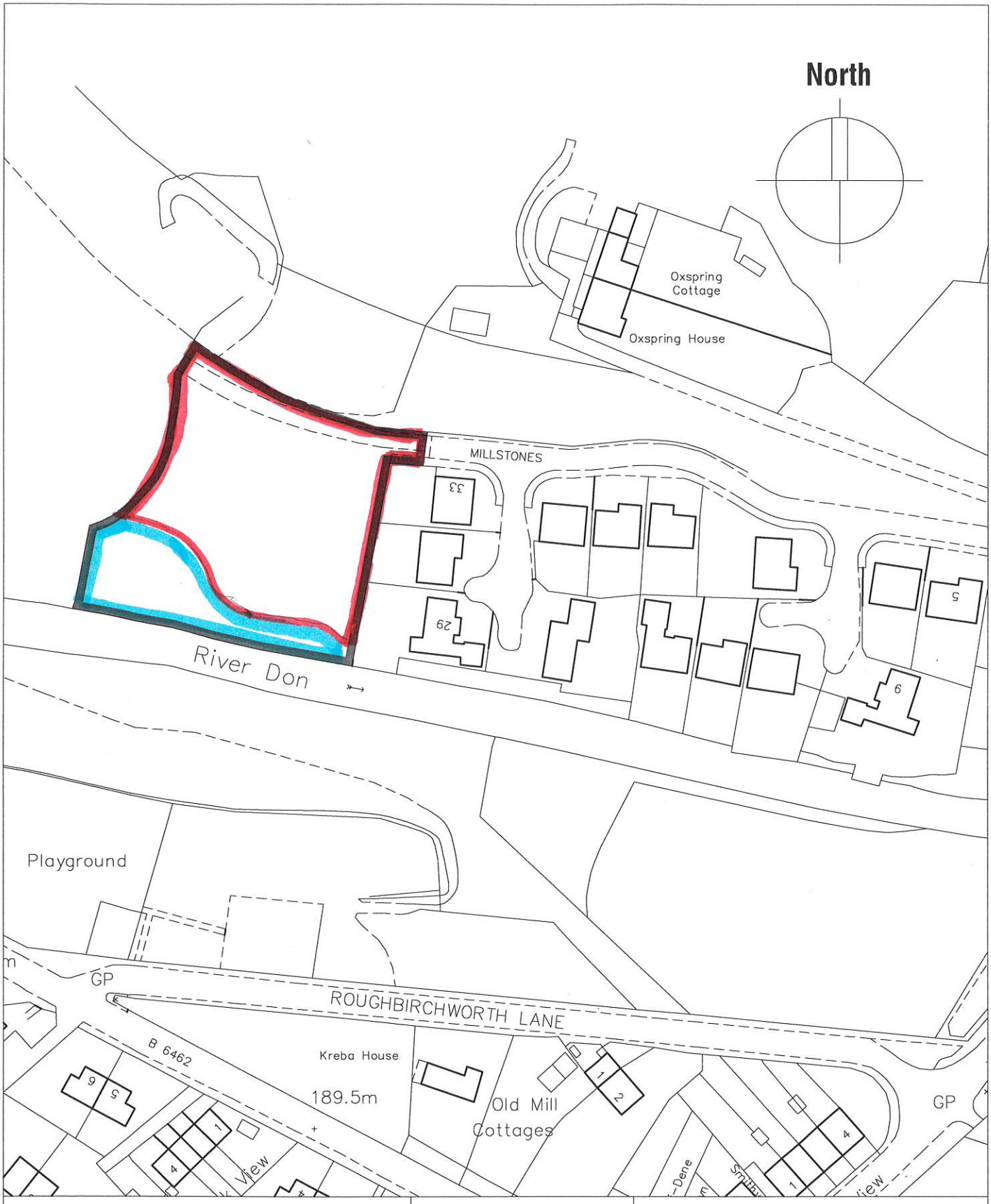
Appendix C – Site Plan

Appendix D – Environment Agency Product 4 Data

Appendix E – Updated Flood Map 2023

Appendix A

Site Plan Location



Land at Millstones
Oxspring
Sheffield

LOCATION PLAN

Scale 1:1250

Date May 2019

Ref 18.24

Drwg No **OS1**

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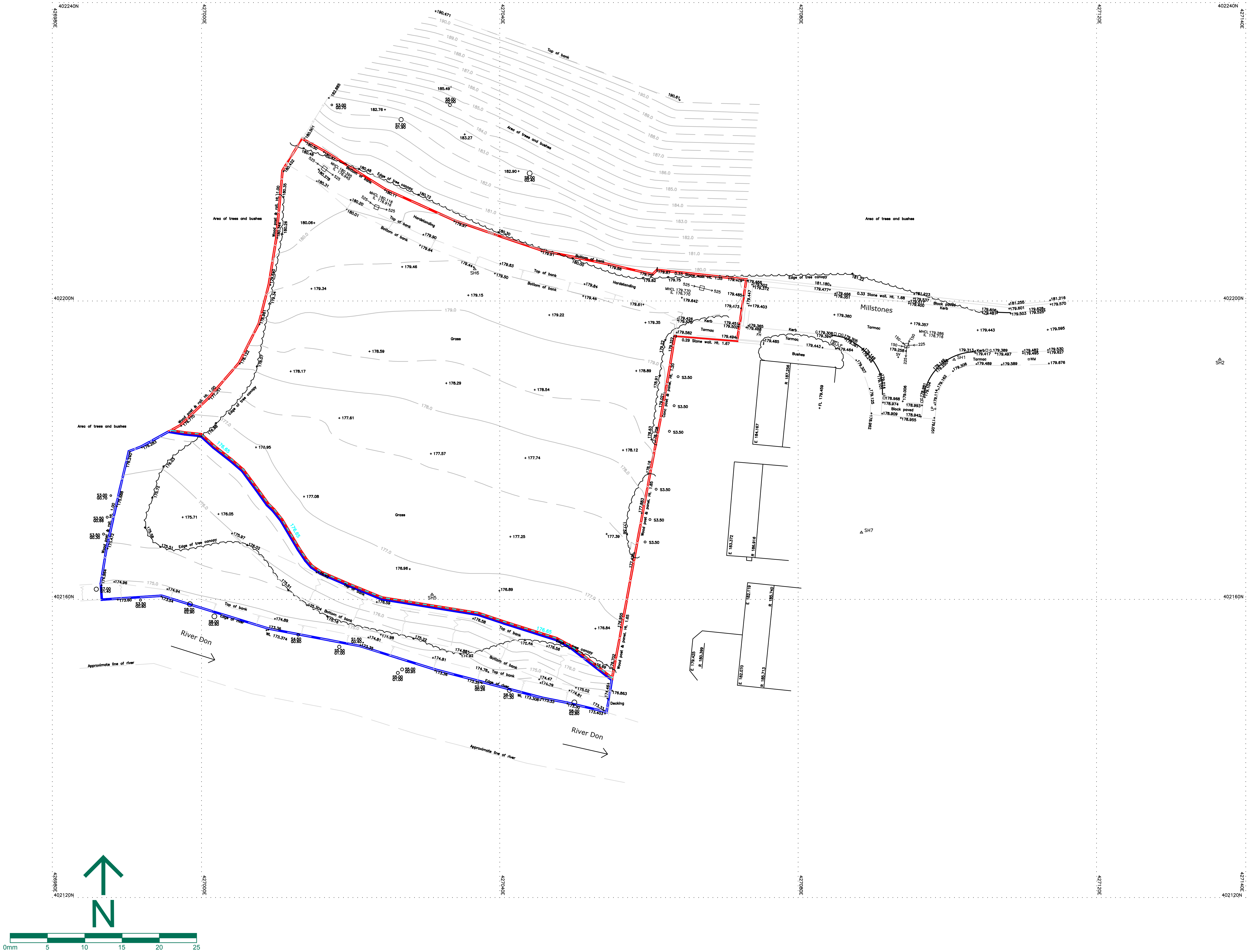
Appendix B

Topographical Survey

EXISTING SITE PLAN
Scale 1:500



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Date 28/02/23
Drawn MF
Checked
Drawing No. MSO-001
Rev. A

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architectural solutions

Drawing : EXISTING SITE PLAN

Client :

Project : LAND OFF MILLSTONES OXSPRING SHEFFIELD

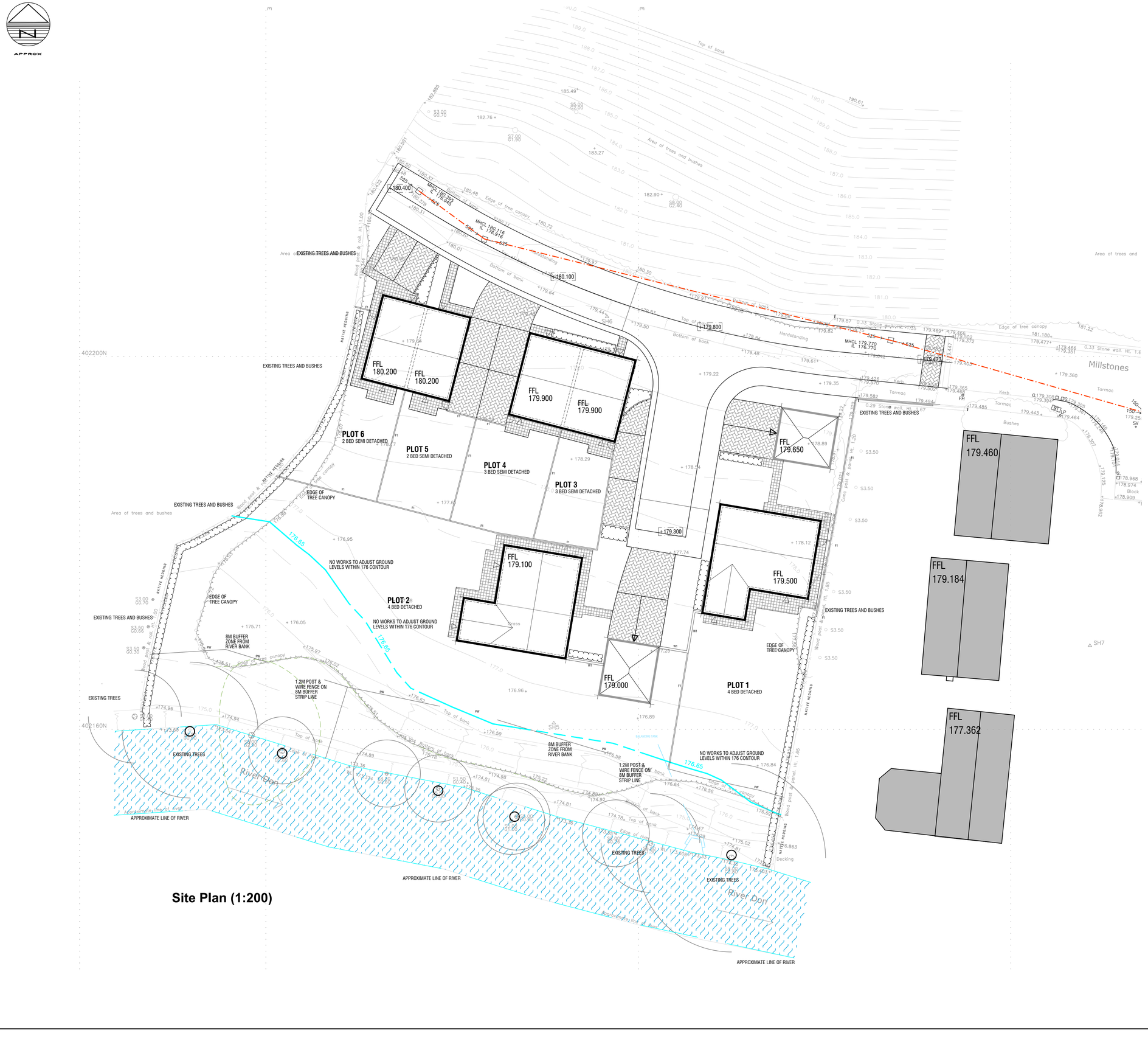
Appendix C

Site Plan

Notes:

1. This drawing is to be read in conjunction with all relevant architect's and engineer's drawings.

2. It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement.



No.	Revision	Date	Drwn

Status

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Client

Yorkshire Land Limited

Project

Land at Millstones
Oxspring, Sheffield, S36 8WZ

Drawing title

Site Plan

Drawn	Chkd	Date	Scale
PB		May 2023	As Shown @ A1
Contract No.		Drg No.	Revision
19347		DR-C-0102	

Appendix D

Environment Agency Product 4 Data

2012 Sheffield River Don Defended Max flows - RFI/2020/200560 (Flow - m³s)						
	Annual Exceedance Probability (AEP)					
Node Point	4% AEP (1 in 25)	2% AEP (1 in 50)	1.33% AEP (1 in 75)	1% AEP (1 in 100)	0.5% AEP (1 in 200	0.1% AEP (1 in 1000)
DON18_24602	43.479	53.604	54.897	55.745	66.656	105.251
DON18_24418	43.484	53.291	54.647	55.486	66.627	105.254
DON18_24186	43.477	53.147	54.556	55.4	66.618	105.233
DON17_24006u	43.47	53.118	54.538	55.38	66.607	105.239
DON17_24006u	43.47	53.118	54.538	55.38	66.607	105.239
DON17_24006d	43.47	53.118	54.538	55.38	66.607	105.239
DON17_23976u	43.468	53.116	54.534	55.379	66.608	105.24
DON17_23976u	43.468	53.116	54.534	55.379	66.608	105.24
DON17_23976d	43.468	53.116	54.534	55.379	66.608	105.24

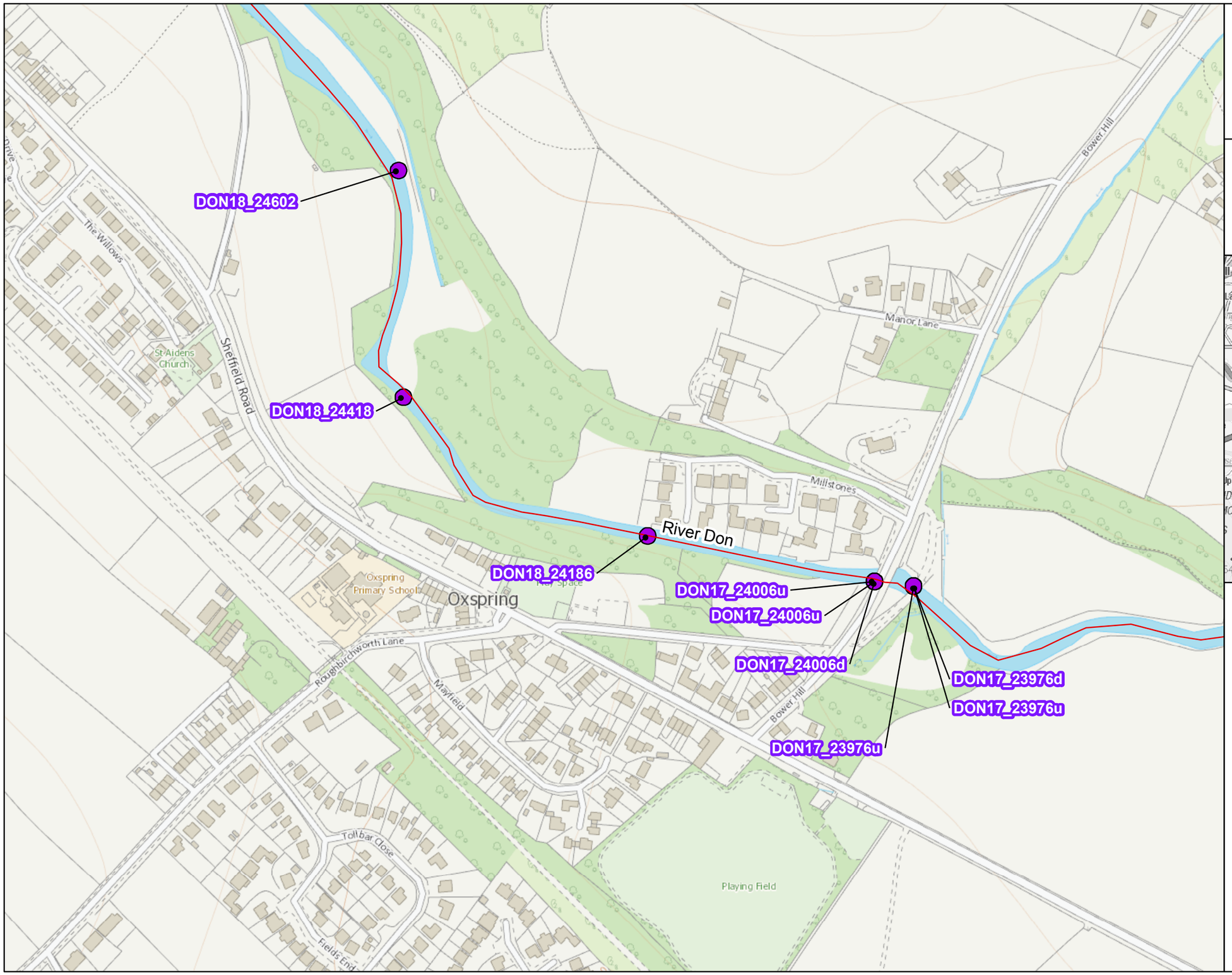
2012 Sheffield River Don Defended Max Levels - RFI/2020/200560 (Level - mAOD)						
Node Point	Annual Exceedance Probability (AEP)					
	4% AEP (1 in 25)	2% AEP (1 in 50)	1.33% AEP (1 in 75)	1% AEP (1 in 100)	0.5% AEP (1 in 200)	0.1% AEP (1 in 1000)
DON18_24602	176.914	177.144	177.174	177.192	177.415	178.029
DON18_24418	176.257	176.557	176.599	176.624	176.906	177.644
DON18_24186	175.305	175.564	175.602	175.624	175.887	176.654
DON17_24006u	174.679	174.903	174.938	174.958	175.194	175.956
DON17_24006u	174.679	174.903	174.938	174.958	175.194	175.956
DON17_24006d	174.679	174.903	174.938	174.958	175.194	175.956
DON17_23976u	174.553	174.769	174.804	174.824	175.057	175.823
DON17_23976u	174.553	174.769	174.804	174.824	175.057	175.823
DON17_23976d	174.466	174.636	174.664	174.68	174.851	175.31

2012 Sheffield River Don Undefended Max flows - RFI/2020/200560 (Flow - m³s)						
	Annual Exceedance Probability (AEP)					
Node Point	4% AEP (1 in 25)	2% AEP (1 in 50)	1.33% AEP (1 in 75)	1% AEP (1 in 100)	0.5% AEP (1 in 200	0.1% AEP (1 in 1000)
DON18_24602	43.479	53.604	54.898	55.754	66.66	105.343
DON18_24418	43.484	53.291	54.636	55.498	66.644	105.317
DON18_24186	43.477	53.147	54.555	55.415	66.627	105.296
DON17_24006u	43.47	53.118	54.533	55.4	66.617	105.295
DON17_24006u	43.47	53.118	54.533	55.4	66.617	105.295
DON17_24006d	43.47	53.118	54.533	55.4	66.617	105.295
DON17_23976u	43.468	53.116	54.525	55.398	66.612	105.297
DON17_23976u	43.468	53.116	54.525	55.398	66.612	105.297
DON17_23976d	43.468	53.116	54.525	55.398	66.612	105.297

2012 Sheffield River Don Undefended Max Levels - RFI/2020/200560 (Level - mAOD)						
Node Point	Annual Exceedance Probability (AEP)					
	4% AEP (1 in 25)	2% AEP (1 in 50)	1.33% AEP (1 in 75)	1% AEP (1 in 100)	0.5% AEP (1 in 200)	0.1% AEP (1 in 1000)
DON18_24602	176.914	177.144	177.174	177.193	177.415	178.03
DON18_24418	176.257	176.557	176.599	176.624	176.906	177.645
DON18_24186	175.305	175.564	175.602	175.625	175.887	176.655
DON17_24006u	174.679	174.903	174.938	174.958	175.195	175.957
DON17_24006u	174.679	174.903	174.938	174.958	175.195	175.957
DON17_24006d	174.679	174.903	174.938	174.958	175.195	175.957
DON17_23976u	174.553	174.769	174.804	174.825	175.057	175.824
DON17_23976u	174.553	174.769	174.804	174.825	175.057	175.824
DON17_23976d	174.466	174.636	174.664	174.681	174.851	175.311

RFI/2020/200560 Node Point Map centred on Millstones Oxspring, Sheffield

Date created: 11/03/2021



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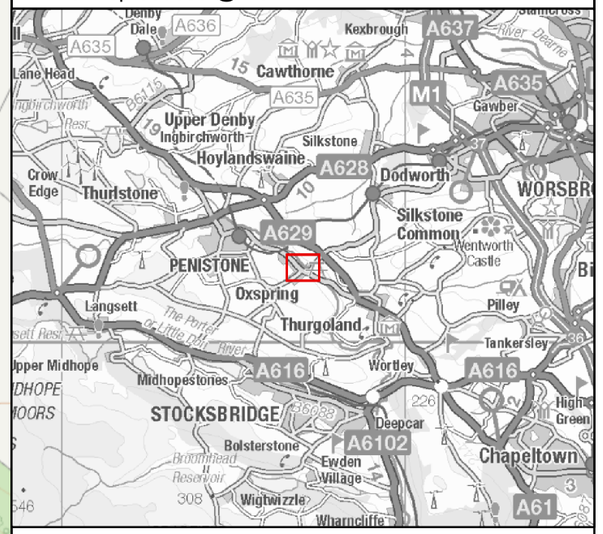

LEGEND

- Main River
- 2012 Sheffield CFR Node Points

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Appendix E

Updated Flood Map 2023

ERR GE21560 Draft Proposed Mapping

Date created: 11/04/2023

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LEGEND

- Draft Base Flood Zone 3
- Draft Base Flood Zone 2

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