

**Workers Housing,
Land SE of The Whins, Stillington**

Flood Risk Assessment and Drainage Strategy

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Revision	Date	Comments	Prepared by	Checked by
-	01.11.23	Initial issue	PL	PL

Executive Summary

Site Location	The proposed development is located approximately 2km west of Stillington, Stockton-on-Tees. The site is accessed off a small rural road named Bleach House Bank.
Site Proposals	The proposed development is for a new 2 story 4 bedroomed single detached dwelling with associated car parking and a small access road/drive.
Ground Conditions	At the time of writing there was no ground investigation report prepared. Researching the British Geological Society borehole records the site is expected to be underlain with very stiff clay.
Nearest Watercourse	Elstob Beck 63m to the southwest.
Nearest Surface Water Sewer.	None.
Nearest Combined Sewer	None.
Nearest Foul Water Sewer	None.
Flood Zone	Flood Zone 1 with Flood Zone 2 approximately 57m due southwest of the site.
Surface Water Flooding	None.
Ground Water	Flood risk from groundwater flooding can be deemed as low.
SUDS	Permeable paving, tanked.

1. Introduction

Coast Consulting Engineers (CCE) have been commissioned by G.McKenzie to assess the flood risk associated with a proposed development located approximately 2km west of Stillington, Stockton-on-Tees. This Flood Risk Assessment (FRA) is reviewed in accordance with the National Planning Policy Framework (NPPF) for Development and Flood Risk. In conjunction with assessing the site for flood risk a proposed drainage strategy has been prepared.

This site-specific FRA has been undertaken to determine the risk of flooding to the proposed development from all sources in accordance with the NPPF and to assess the flood risk to others as a result of the development. The assessment will recommend how the risk can be managed in line with planning policy requirements.

One of the key aims of the NPPF is to ensure that flood risk is considered at all stages of the planning process to avoid inappropriate development in areas at risk of flooding and to direct development away from areas at highest risk. Where new development is necessary in such areas, the policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall.

1.1 National Planning Policy Framework (NPPF)

The NPPF (February 2019) requires that:

- A site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account the vulnerability of its users, without increasing flood risk elsewhere, and where possible, will reduce flood risk overall.
- A site-specific flood risk assessment is required for proposals greater than 1 ha in size in a Flood Zone 1; all proposals for new development in Flood Zones 2 and 3, or in an area within Flood Zone 1 which has critical drainage problems (as identified in the Strategic Flood Risk Assessment).

The following definitions for flood zones are derived from NPPF:

FLOOD ZONE 1:

This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).

FLOOD ZONE 2:

This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% – 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% – 0.1%) in any year.

FLOOD ZONE 3:

This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

In addition to the risk of flooding from rivers or sea, consideration must also be given to surface water flooding, flooding due to ground water and flooding from artificial sources such as sewer failure or overtopping of reservoirs.

2. Site location, Topographical Features and Proposals

2.1 Site Location

The proposed development is located approximately 2km west of Stillington, Stockton-on-Tees. The site is accessed off a small rural road named Bleach House Bank.

The National Grid Reference for the site is NZ 353 233 and the nearest postcode is TS21 1NL.

Please refer to the site location plan below.

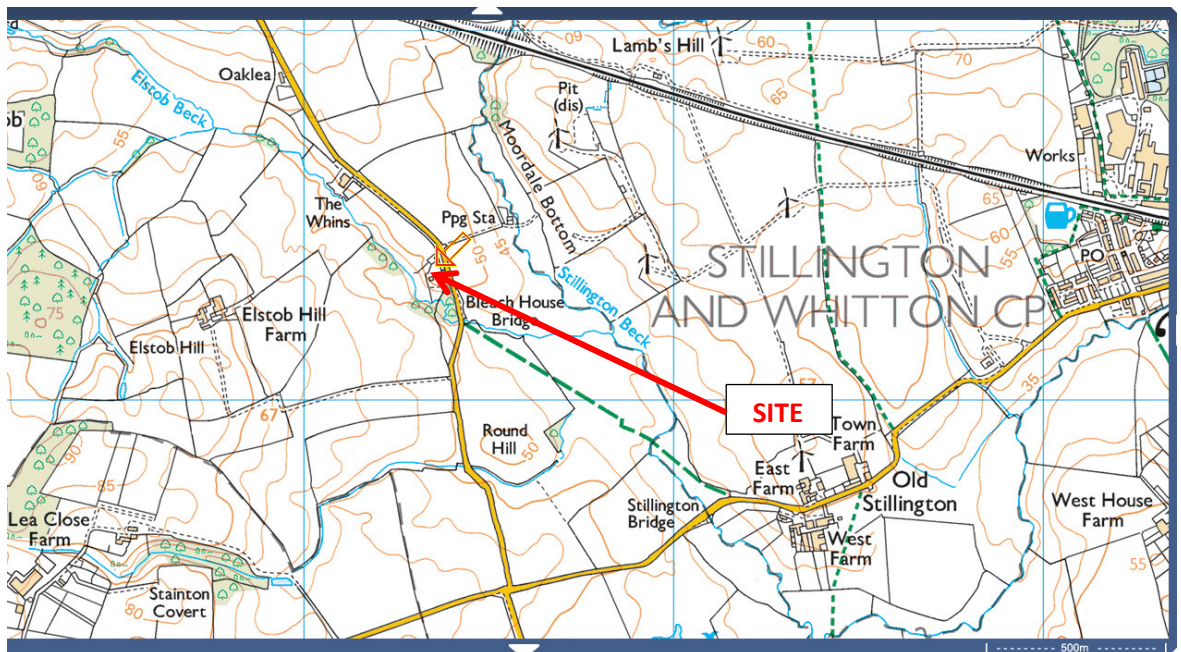


Figure 2.1 – Site Location Plan

2.2 Existing Site Description

The site has an area of 0.07 Ha which comprises of open storage units.

The site is bound by:

- Eastern Boundary – Bleach House Bank access road.
- Northern Boundary – Open farmland.
- Western Boundary – Open farmland and the Elstob Beck.
- Southern Boundary – Open farmland.

The site has a high point at the northeastern corner of 52.242m and a low point at the north western corner of 51.686m therefore the site is generally flat. Towards the west and beyond the site boundary the site falls steeply down to the Elstob Beck, of which the water level adjacent to the site is 43.423m, at the time the topographical survey was carried out (October 2023). The main access is at a level of approximately 52.70m. A topographical survey by Site Scan is shown in Appendix A.

2.3 Existing NWL Sewers

Existing sewer records have been obtained from Northumbrian Water Ltd (NWL). The sewer records show there are no sewers in the vicinity of the site.

A copy of the sewer records can be found in Appendix B.

2.4 Existing Ground Conditions

At the time of writing there was no ground investigation report prepared. Researching the British Geological Society borehole records the site is expected to be underlain with very stiff clay.

A copy of the BGS record can be found in Appendix C.

2.5 Development Proposals

The proposed development is for a new 2 story 4 bedroomed single detached dwelling with associated car parking and a small access road/drive. For the latest architectural site layout please refer to Appendix D.

3. Potential Sources of Flooding and Proposed Mitigation

As required by the National Planning Policy Framework (NPPF) and Technical Guidance to the NPPF, each potential source of flooding needs to be considered; rivers and sea, land, groundwater, sewers and artificial sources (such as reservoirs and canals). Consideration also needs to be given to the flood risk vulnerability classification for this type of development.

3.1 Flood Zone Classification

Environment Agency flood maps have been acquired to assist with this assessment. The flood maps indicate that the development boundary is located entirely within an area classified as a Flood Zone 1. Land located within a flood zone 1 is defined as having less than a 1 in 1,000 annual probability of flooding from rivers or the sea (low risk). Refer to the extract below which identifies the Flood Zones within and in proximity to the development site. There is a Flood Zone 2 and 3 in the vicinity of the site and this can be seen on the cross section on the Proposed Drainage Layout in Appendix E. The position of the Flood Zone 2 and 3 was based on an overlay from the EA Flood Maps. The distance between the outer extent of the Flood Zone 2 is approximately 57m from the proposed property with a level difference of 7.65m between the Flood Zone 2 outer extent and the proposed finished floor level.

As such, it is not considered to be at risk of flooding from rivers or sea.

Flood map showing the flood zone your site is in

The map shows the flood risk to your site and the surrounding area.

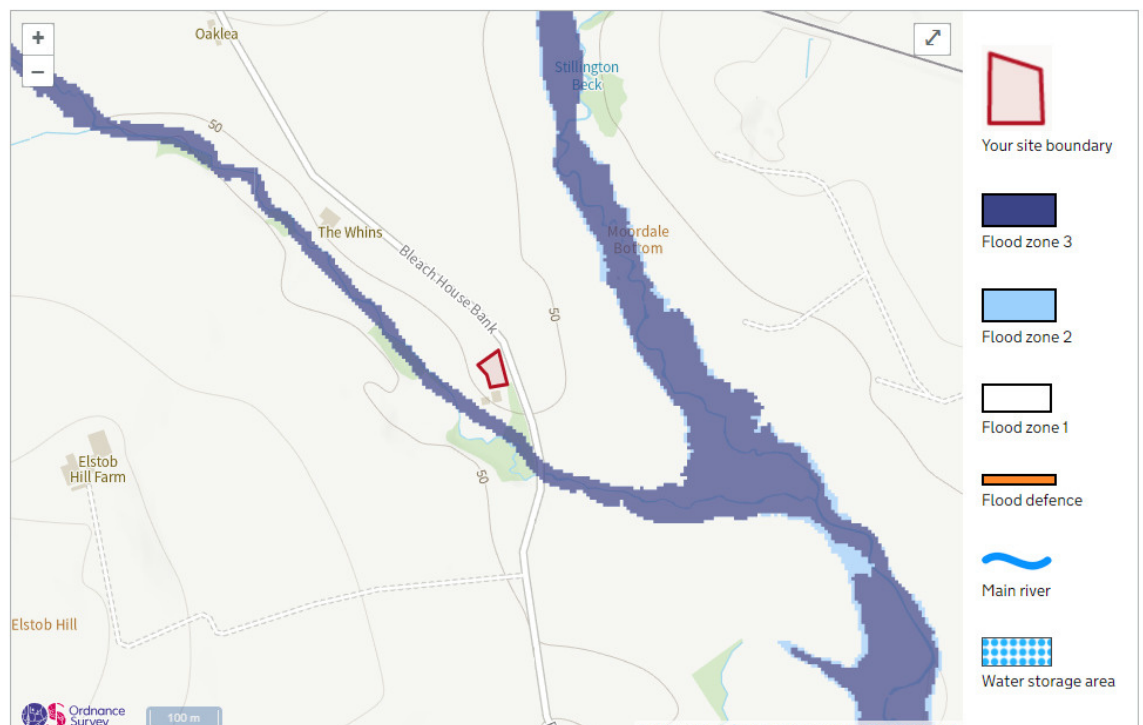


Figure 3.1 – Flood Zone Classification

3.2 Flood Risk Vulnerability Classification

Table 2 of the Planning Practice Guide (2022) states the following with respect to flood risk vulnerability classification. The text highlighted in bold below is the classification for this site, with the less vulnerable descriptions extracted also shown below.

Less vulnerable

- Police, ambulance and fire stations which are not required to be operational during flooding.
- **Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the ‘more vulnerable’ class; and assembly and leisure.**
- Land and buildings used for agriculture and forestry.
- Waste treatment (except landfill* and hazardous waste facilities).
- Minerals working and processing (except for sand and gravel working).
- Water treatment works which do not need to remain operational during times of flood.
- Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.
- Car parks.

Table 3 of the Technical Guidance to the National Planning Policy Framework states the following with respect to appropriate land uses:

Table 3: flood risk vulnerability and flood zone ‘compaibility’

Flood Risk Vulnerability Classification (See Table 2)	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 functional floodplain	Exception Test required	x	x	x	✓

Key: ✓ Development is appropriate.
X Development should not be permitted.

An exception test will not be required in this instance as development is located outside of a flood zone 2 or flood zone 3.

3.3 Surface Water Flood Risk

EA flood maps shown below in Figure 3.2 show there is no existing surface water flooding on the site. Flood risk from surface water flooding can therefore be deemed as **low**.

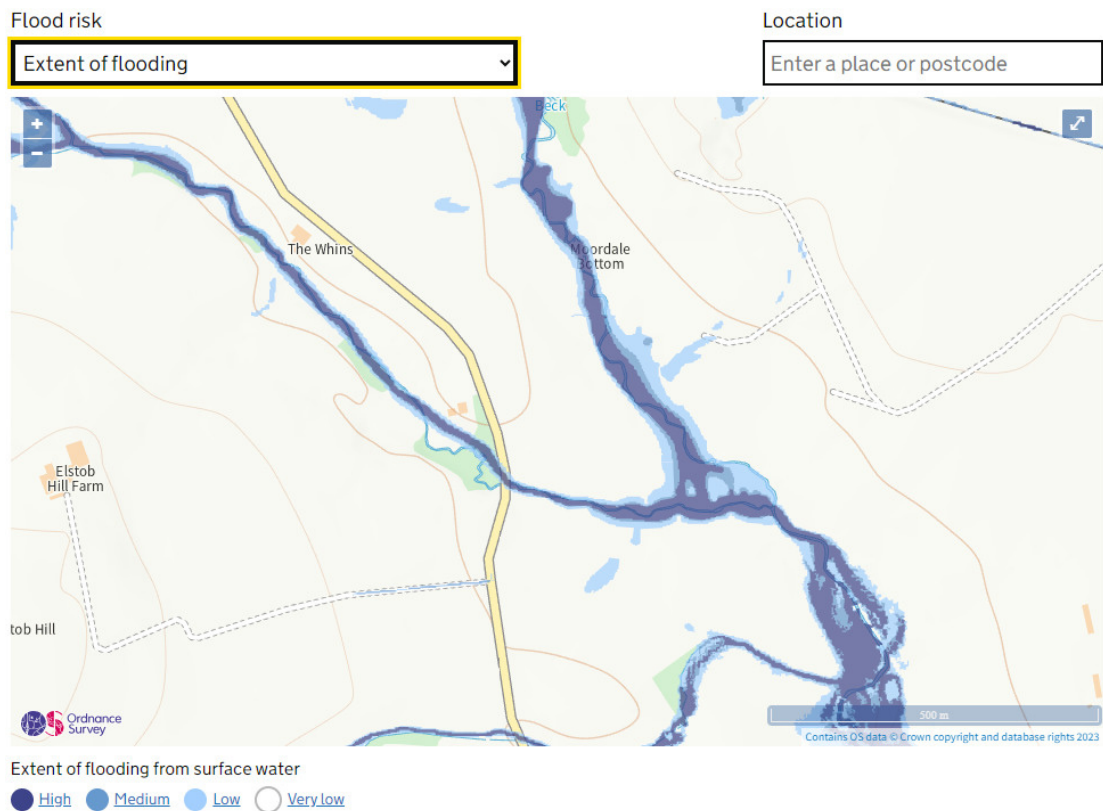


Figure 3.2 – Extent of surface water flooding

3.4 Groundwater Flood Risk

Flooding due to groundwater occurs when the levels of water below the ground rise and emanate above finished ground level. This occurs more frequently when the site is underlain by a permeable strata. BGS records found in Appendix C and discussed in Section 2.4 Existing Ground Conditions show in the vicinity of the site the existing strata is stiff clay which is an impermeable layer. This layer preventing by blocking any potential risk of groundwater rise.

Flood risk from groundwater flooding can therefore be deemed as **low**.

3.5 Sewer Flood Risk

Existing sewer records have been obtained from Northumbrian Water Ltd (Appendix B). The records show that there are no existing sewers in the vicinity of the site.

The risk of sewer flooding therefore can be deemed as **low**.

3.6 Reservoir Flood Risk

Artificial sources of flood risk such as man-made ponds or reservoirs can cause a potential risk of flooding. Figure 3.4 below shows the site lies well outside the risk from reservoir flooding.

The risk of flooding due to this source can be deemed as **low**.



Figure 3.4 – Extent of reservoir flooding

3.7 Conclusion of Flood Risk

The proposed development is entirely within a Flood Zone 1 in line with the guidance contained within the NPPF for flooding. The site has been assessed for flood risk with respect to surface water, groundwater, existing sewers and reservoirs and all of these risks have been categorised as being low risk. As such the proposed development is deemed appropriate with respect to flood risk in accordance with the guidance contained within the NPPF for flooding.

4. Drainage Strategy - Surface and Foul Water Disposal

The proposed development is for a new 2 story 4 bed roomed single detached dwelling with associated car parking and a small access road/drive. For the latest architectural site layout please refer to Appendix D.

Part H of the Building Regulations 2010 provides a recommended hierarchy for surface water disposal:

1. By infiltration
2. To watercourse
3. To sewer

4.1.1 Infiltration

BGS records found in Appendix C and discussed in Section 2.4 Existing Ground Conditions, show in the vicinity of the site the existing strata is stiff clay, which is an impermeable layer. Infiltration techniques are therefore deemed inappropriate.

4.1.2 Watercourse

The Elstob Beck approximately 63m to the southwest of the property. The topographical survey has located an existing silt trap and outfall to the beck. It is therefore intended to connect to the Elstob Beck indirectly for the surface water via the existing silt trap subject to a condition survey. A copy of these proposals can be seen on the Proposed Drainage Layout found in Appendix E.

4.2 SUDS Techniques

In line with National Planning Policy, SUDS techniques are to be utilised as part of the design of the surface water network. The applicable techniques and the benefits that they bring to the development are outlined below and are shown on the Proposed Drainage Layout shown in Appendix D E.

- Source Control: **Permeable car parking** will reduce the effects of pollution in run-off to the environment and will eliminate surface ponding. The construction will be used as a method of source control to clean/treat any potential pollutants within the stone sub-base. There is a groundwater extraction borehole identified approximately 225m to the east of the development so the permeable paving is to be tanked to prevent any possible pollution linkages towards this extraction point.

4.3 Foul Water

It is proposed to connect the foul flows into the existing foul sewerage treatment tank subject to a condition survey. This can be seen on the Proposed Drainage Layout in Appendix E.

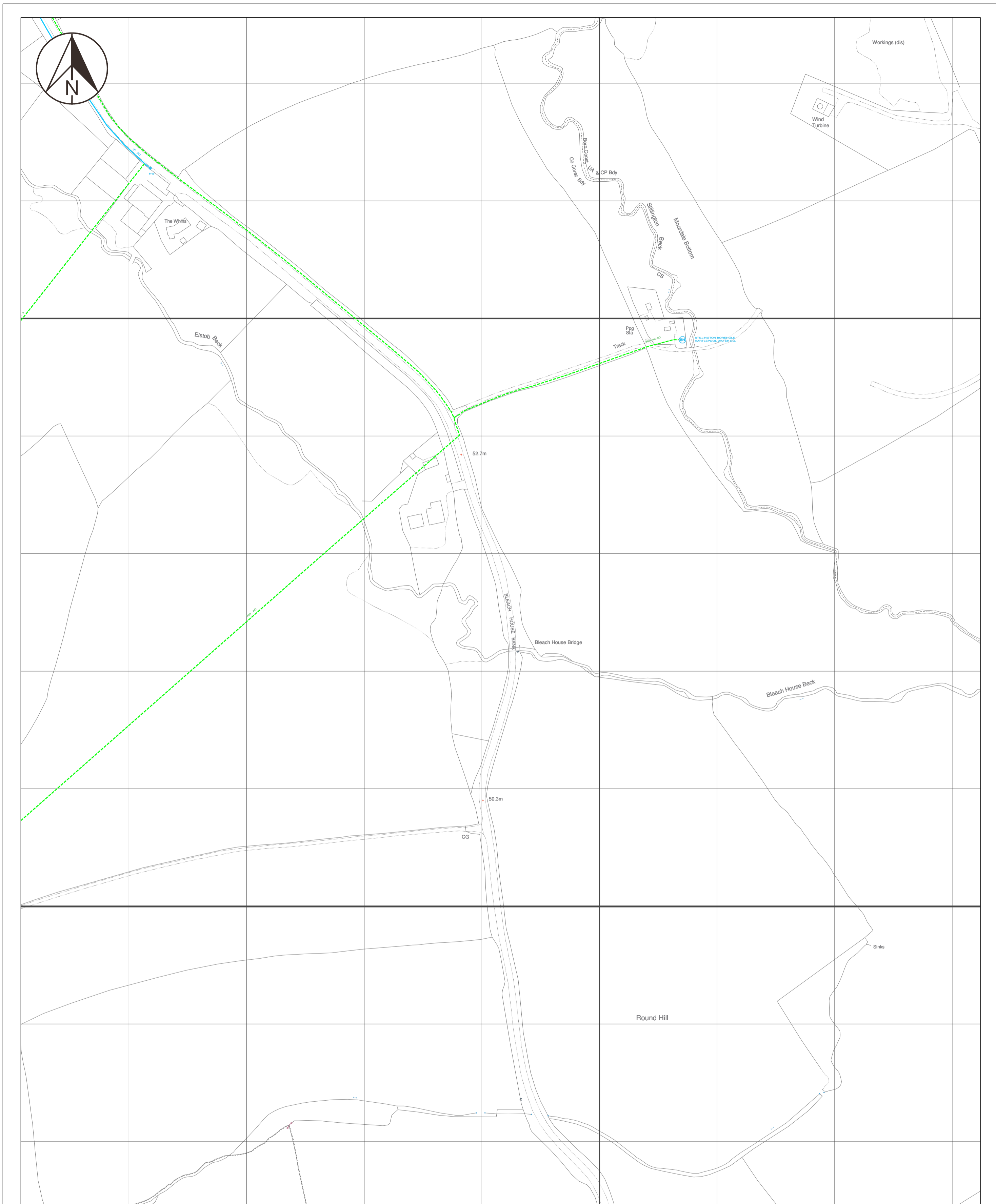
5. References

The following reference documents have been used in the preparation of this report.

- National Planning Policy Framework 2019.
- Planning Practice Guidance 2014.
- Environment Agency online flood maps.
- Design and Construction Guidance for foul and surface water sewers offered for adoption under the Code.
- Building Regulations Document H 2010.
- Improving the Flood Performance of New Buildings – Defra.
- Rainfall runoff management for developments SC030219 – Defra.
- Susdrain.org
- The SuDS Manual CIRIA C753.
- North-East Lead Local Flood Authorities Sustainable Drainage Local Standards – July 2020
- Non-statutory technical standards for sustainable drainage – LASOO
- British Geological Survey online maps.
- Phase 2 Geo-environmental Ground Investigation – June 2017 by DBS Environmental

Appendix A – Topographical Survey

Appendix B – NWL Sewer Records



Waste Water -	NWL Responsibility	Private/Non NWL	Proposed	Water Network -	Network Types	AB Asbestos
Combined		Combined		Combined		
Foul		Foul		Foul		
Surface		Surface		Surface		
Treated Eff		Treated Eff		Raw		
Untreated Eff		Trade Eff		Fire		
Overflow		Watercourse		Supply		
				Private		

User : AMOSL

Date : 30/10/2023 17:37:47

Map Sheet : NZ3523SW

Title :

Centre Point : 435416,523250

Paper / Scale : A2@1:2179



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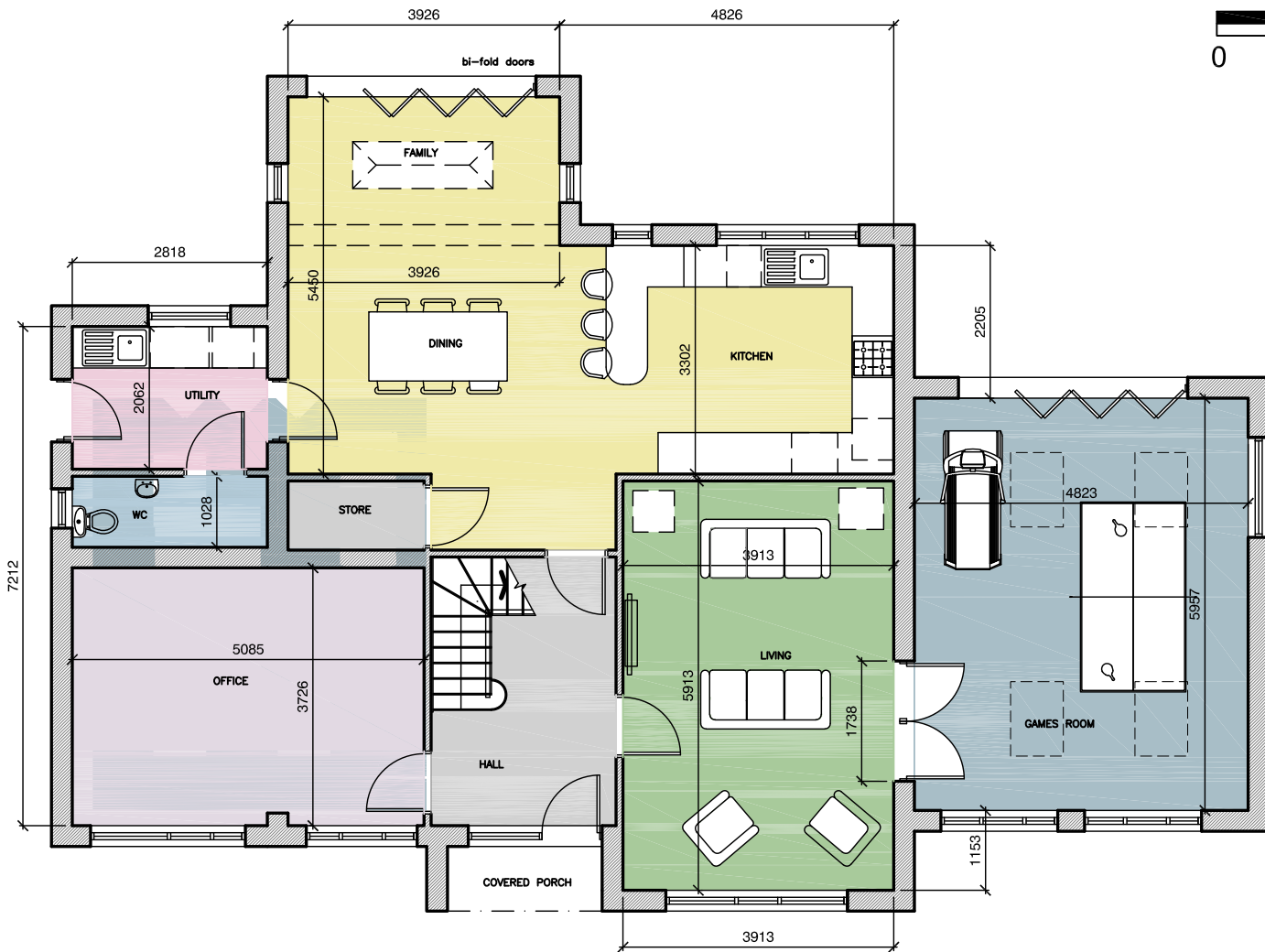


Appendix C – British Geological Society borehole record

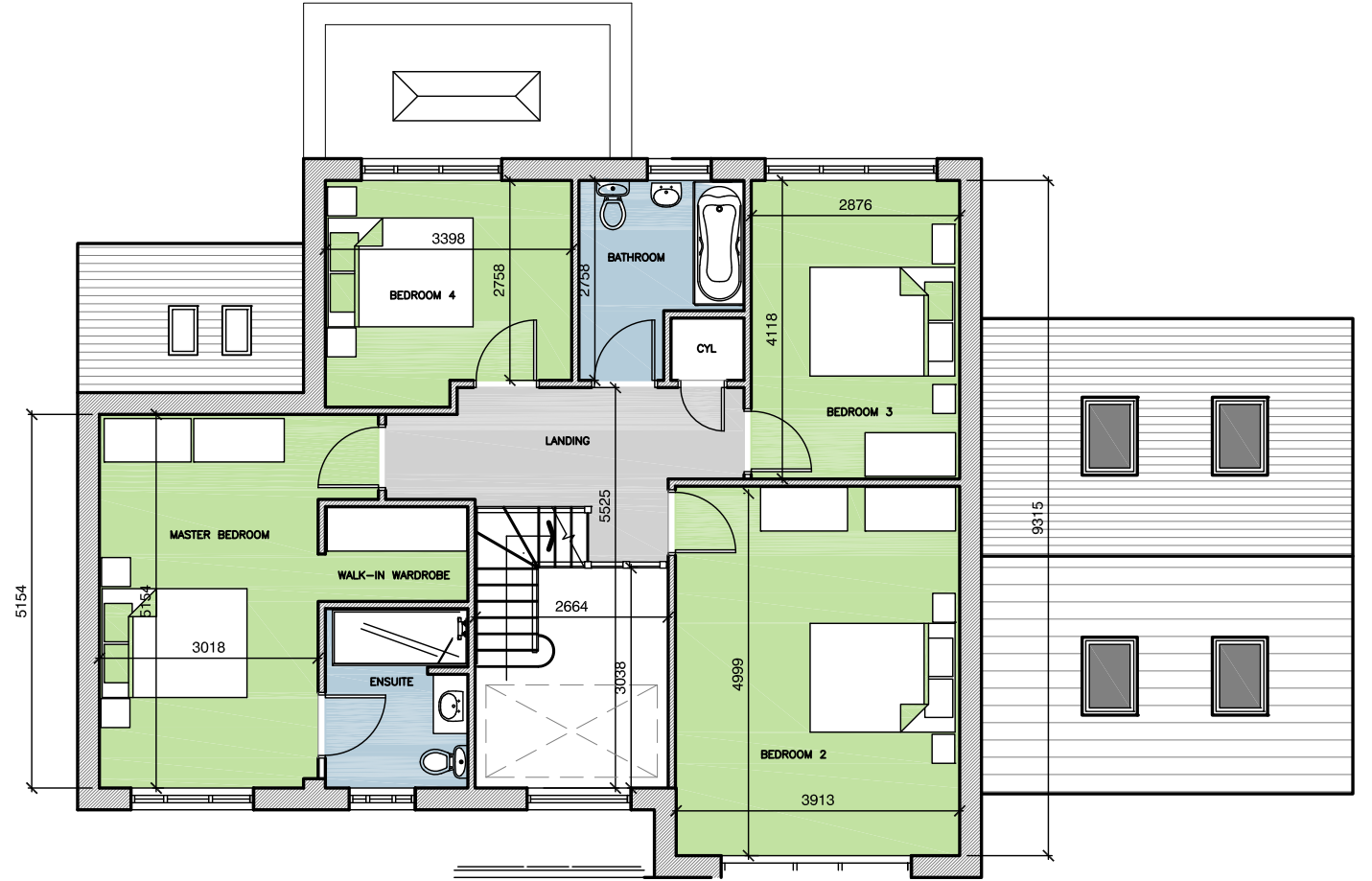
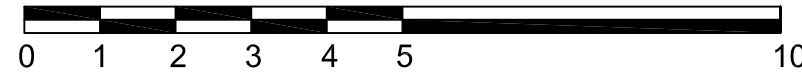


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Casing Diameter (mm) :		Project :	Sheet 1 of 10
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Start :	//		Coordinates
End :	//		E 435480.00
			N 523450.00
Water Strike	Description	Depth (m)	Legend Level (OD)
	Brown clayey TOPSOIL	0.30	49.04
1.00	Stiff to very stiff dark brown silty CLAY with some subangular fine grained gravel, some subrounded coarse grained gravel and some small fragments of coal, abundant in places.		
2.00			
3.00			
4.00			
5.00			
6.00			
7.00			
Continued next sheet			
Remarks :			
BGS Ref: ?, NRA Ref: Stillington STL3, 25-4-343 C3			

Appendix D – Architectural Proposed Site Plan



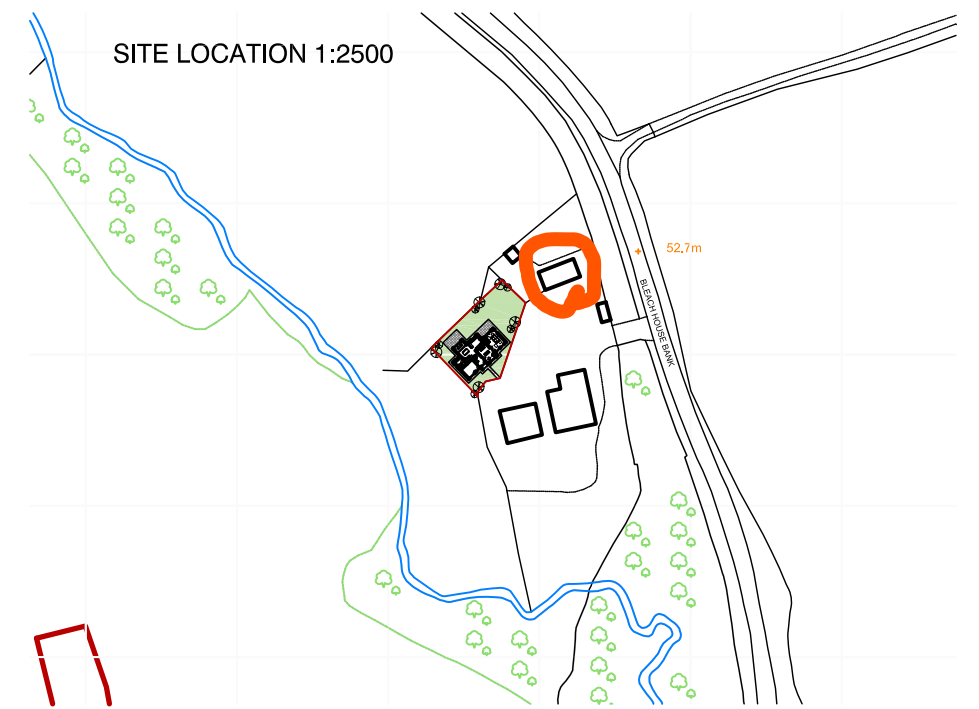
GROUND FLOOR LAYOUT
GROSS INTERNAL AREA - 138SQ.M



FIRST FLOOR LAYOUT
GROSS INTERNAL AREA - 83.69SQ.M (EXCLUDES STAIRWELL)



SITE PLAN 1:500



SITE LOCATION 1:2500

SKETCH FEASIBILITY

UNLESS STATED OTHERWISE, THE DESIGNS SHOWN ARE SUBJECT TO
DETAIL SITE SURVEY AND INVESTIGATIONS AND/OR APPROVAL OF THE
RELEVANT VARIOUS LOCAL AUTHORITY OFFICERS, STATUTORY
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SCALE:	1:100
DATE:	060623
A	PLAN, SITE PLAN POS CHANGED 050723 NJV / NJV

A3

LAND SOUTH EAST THE WHINS- STILLINGTON

LEEDS
LEICESTER
PONTEFRAC



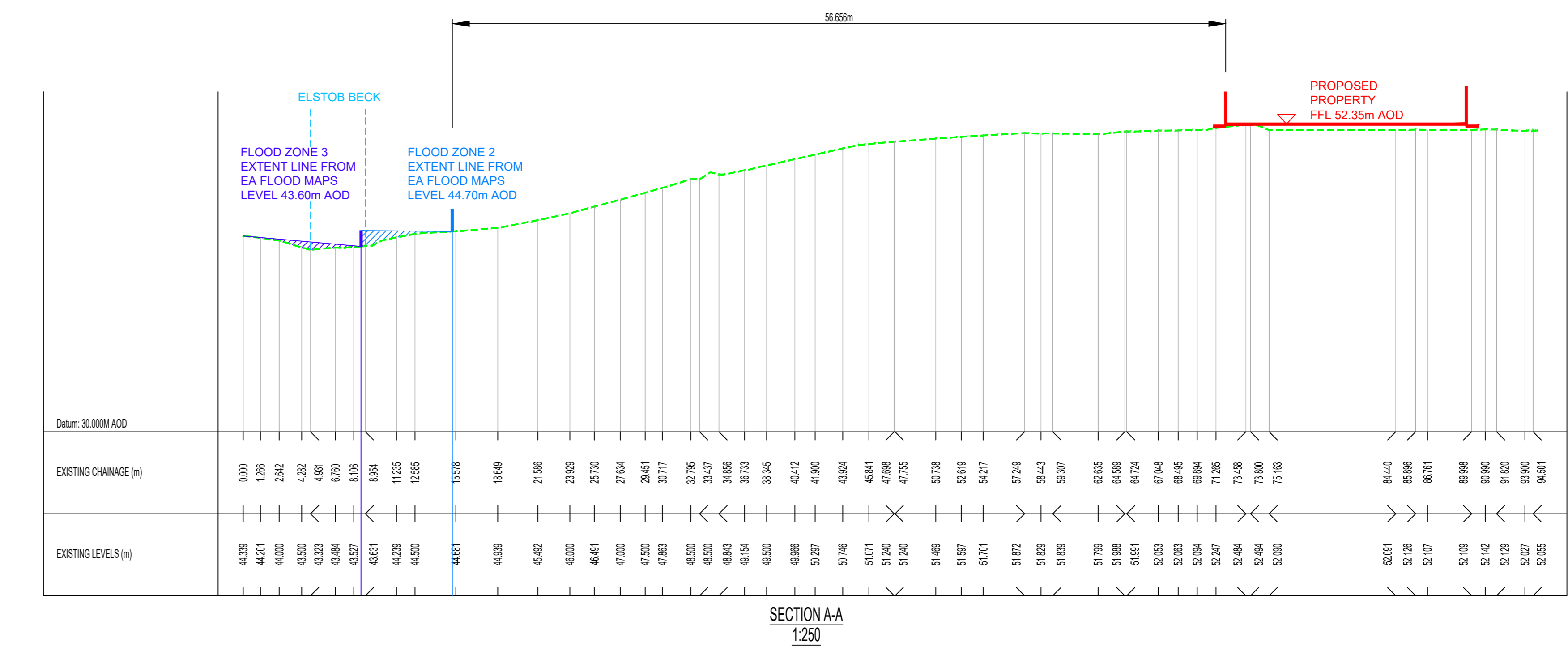
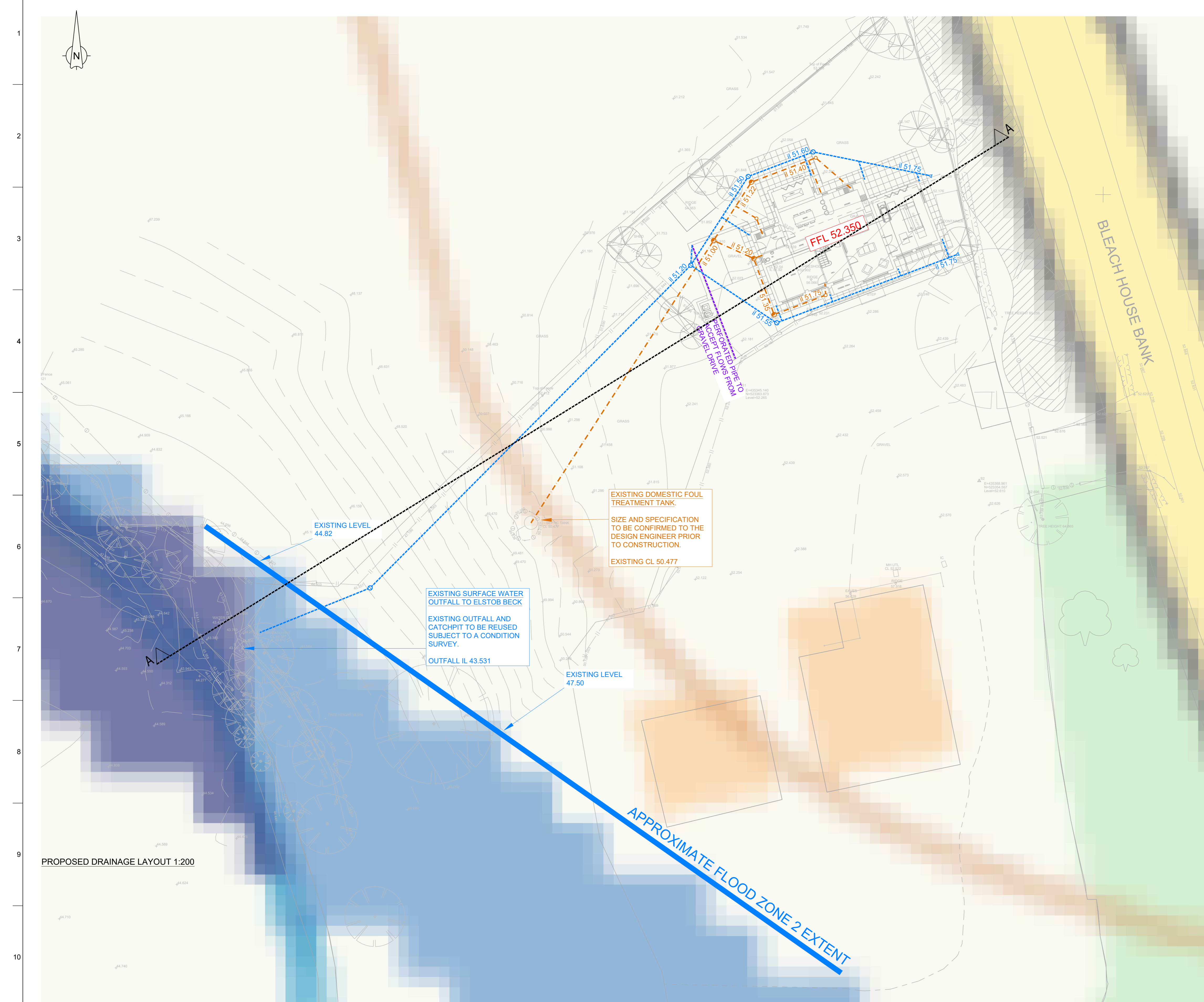
CLIENT ORIGIN PLANNING / G. MCKENZIE
PROJECT TITLE WORKERS HOUSING
LAND S/E OF THE WHINS, STILLINGTON
DRAWING TITLE PROPOSED FLOOR LAYOUTS

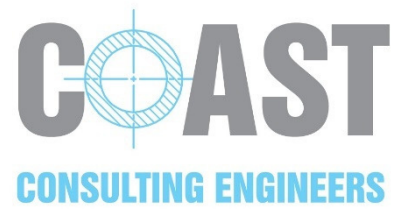
PROJECT NO. VAD.23.12
DRAWING NO. SK100
REVISION A



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Appendix E – Proposed Drainage Layout





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