

TOPPING ENGINEERS

CONSULTING CIVIL & STRUCTURAL ENGINEERS

FLOOD RISK ASSESSMENT

LOCATION:
Residential Development
Clayton Lane
Thurnscoe
Nr Barnsley

CLIENT:
Mr S Frith

DOCUMENT REF:
22183-FRA-001

REVISION/DATE:
P1-April 2022

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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 of Mr Simon Frith in respect of a planning application for the proposed residential development on a brownfield site at Thurnscoe.

Table - Site Summary

Site Name	Residential Development
Location	Land off Clayton Lane, Thurnscoe S63 0BG
NGR (approx.)	444663, 406540
Development Type	Residential
NPPF Vulnerability	More vulnerable
EA Flood Zone	Flood Zone 1
Local Planning Authority	Barnsley Borough Council

1.1 Sources of Data

The report is based on the following information:

(i) Site and building layout plans prepared by Studio Map
(ii) Topographical survey information.
(iii) Environment Agency Flood Maps.
(iv) Yorkshire Water sewer records.

1.2 Existing Site

The site is Brownfield measuring 1.749Ha. (see location plan appendix B)
Currently there is a large industrial building on the site together with a number of smaller buildings. The associated access roads, hardstandings and parking areas are formed from tarmac and concrete. (see aerial photograph appendix A).
The existing impermeable area totals 11130m2, (see separate drawing 22183-DR-C-0102)
The site is surrounded by agricultural land.
An adopted road (Clayton Lane) forms the eastern boundary.

The site generally falls in south easterly direction with levels ranging from 63.0m AOD down to 54.9m AOD.
The site is currently used for cutting and storage of stone. Water is used on the site for cooling in the cutting process. This water is re-cycled being pumped into a purpose made concrete settlement tank on the western elevation and a series of open basins to the east of the building. Although there are a series of manholes on the site along the access road and hardstanding it is not clear where these outfall to. There are a limited number of gullys on the hardstanding areas, any surface water run off appears to find its way towards a shallow depression in the field/paddock to the south.
In severe storms any run off is likely to find its way onto Clayton lane and into the highway gullys to the south of the site.

Site investigations show the underlying strata to be fill material over mudstone, with perched water present at shallow depths. Settlement basins have been formed within the natural ground along the eastern end of the site. These basins are not lined and are full of water indicating very low infiltration rates.

Yorkshire Waters sewer records show there is a 300mm diam surface water sewer in Clayton Lane 175m to the south. (See appendix C)

1.3 Proposed Development

The proposed development is 24 residential properties, with associated access roads and driveways.
The proposed catchment area totals 4865m2, which is a 56% reduction on existing impermeable area.

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.

1.5 Flood Zone

When preparing this report reference has been made to the Environment Agency flood maps.

The site is shown to be within Flood Zone 1.

Low probability, assessed as having a less than 1 in 1000 annual probability of river flooding in any year (less than 0.1%)

See Appendix D fluvial flood map.

Table 2 of the Planning Practice Guidance classifies land use.

Residential use is considered to be more vulnerable to the potential impacts of flooding.

Table 3 of the Planning Practice Guidance identifies this type of development is considered appropriate within flood zone 1.

Flood Risk Vulnerability Classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less 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**	**x**

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 this section.

Table 0.1 - Pre-Mitigation Sources of Flood Risk

Flood Source	Potential Risk				Description
	High	Medium	Low	None	
Fluvial			X		The site is located in Flood Zone 1.
Tidal				X	The site is far removed from any tidal influence.
Canals				X	None in vicinity.
Groundwater			X		Ground conditions are not conducive to fluctuating groundwater levels.
Reservoirs and waterbodies				X	The site is shown to fall outside of the area at risk of reservoir failure.
Surface Water flooding			X		Flood maps indicate the site is not at risk of surface water flooding.
Sewer flooding			X		No recorded sewer flooding.
Effect of developments on wider catchment			X		Surface water runoff will be dealt with in a sustainable manner,

2.1 River and Sea Flooding

A review of the Environment Agency flood maps shows the site is entirely located within flood zone 1 (low risk) see Appendix D. This is land assessed as having a less than 1 in 1000 annual probability of river or sea flooding (<0.1%).

2.2 Canal Flooding

The nearest canal is the Dearne and Dove canal approx. 7km to the south of the site. The site is not at risk of flooding from this source.

2.3 Groundwater Flooding

Site investigations indicate the underlying strata to be fill material over mudstone..

Groundwater flooding is not considered to be a significant issue in the area however the presence of perched water within the fill material over the clay strata will need to be a consideration during the construction stage.

2.4 Reservoir Flooding

The Environment Agency reservoir flood map shows the site lies outside the predicted extent of reservoir flooding see Appendix F.

2.5 Surface Water Flooding

The Environment Agency maps show there is no risk of surface water flooding affecting the site.

Floor levels of the proposed dwellings will be set typically 150mm above surrounding ground levels. In the event of any surface water run off entering the site from the surrounding agricultural land, the flows would be directed around the properties and allowed to exit into the fields to the south.

Currently there are large areas of hardstanding on the site with limited drainage infrastructure. Any run off from these areas currently drain to the land to the south of the site. The risk of this run off will be alleviated by the proposed development.

2.6 Sewer Flooding

The nearest public sewers are a 300mm surface water sewer and a 150mm combined sewer approx.175m to the south of the site. (see appendix C). The ground levels at the head of the sewer network are approx.7.5m below the site levels.

Should the sewers surcharge or become blocked the site will not be put at risk.

2.7 Effect of Development on Wider Catchment

The site is currently brownfield, the existing impermeable catchment area is 11120$m^{2.}$

The proposed re-development will reduce the impermeable area down to 4865m2.

The flows from the site will be attenuated to ensure there is no increase in flows leaving the site and no detrimental impact on the downstream infrastructure or land.

3.0 Drainage Proposals

3.1 Surface Water Drainage

The drainage strategy for the site is shown on drawings 22183-DR-C-0101 and 22183-DR-C-0102 which should be referred to separately. Reduced copies of both these drawings can be found in Appendix G and H

3.2 Foul Drainage

The foul drainage generated by the development will be domestic in nature. The site currently drains to the combined sewer in Clayton Lane. The drain runs through the fields to the south of the site. This existing drain will be surveyed to establish its condition and suitability for adoption. If it`s not suitable a new offsite foul sewer connection will be made along the same route as the surface water sewer, as shown on the drawings.

4.0 Recommendations

- The site is not at risk of fluvial or pluvial flooding.
- The surface water flows from the site should be attenuated to ensure there is no increase in flows leaving the site. The drainage strategy drawings will need to be agreed with the planning department and Yorkshire Water.

5.0 Conclusions

Providing these recommendations are carried out we consider the proposed development satisfies the requirements of the National Planning Policy Framework and the Planning Practice Guidance in relation for flood risk, and is appropriate for the site.

PREPARED BY



Paul Beeley
On Behalf of Topping Engineers

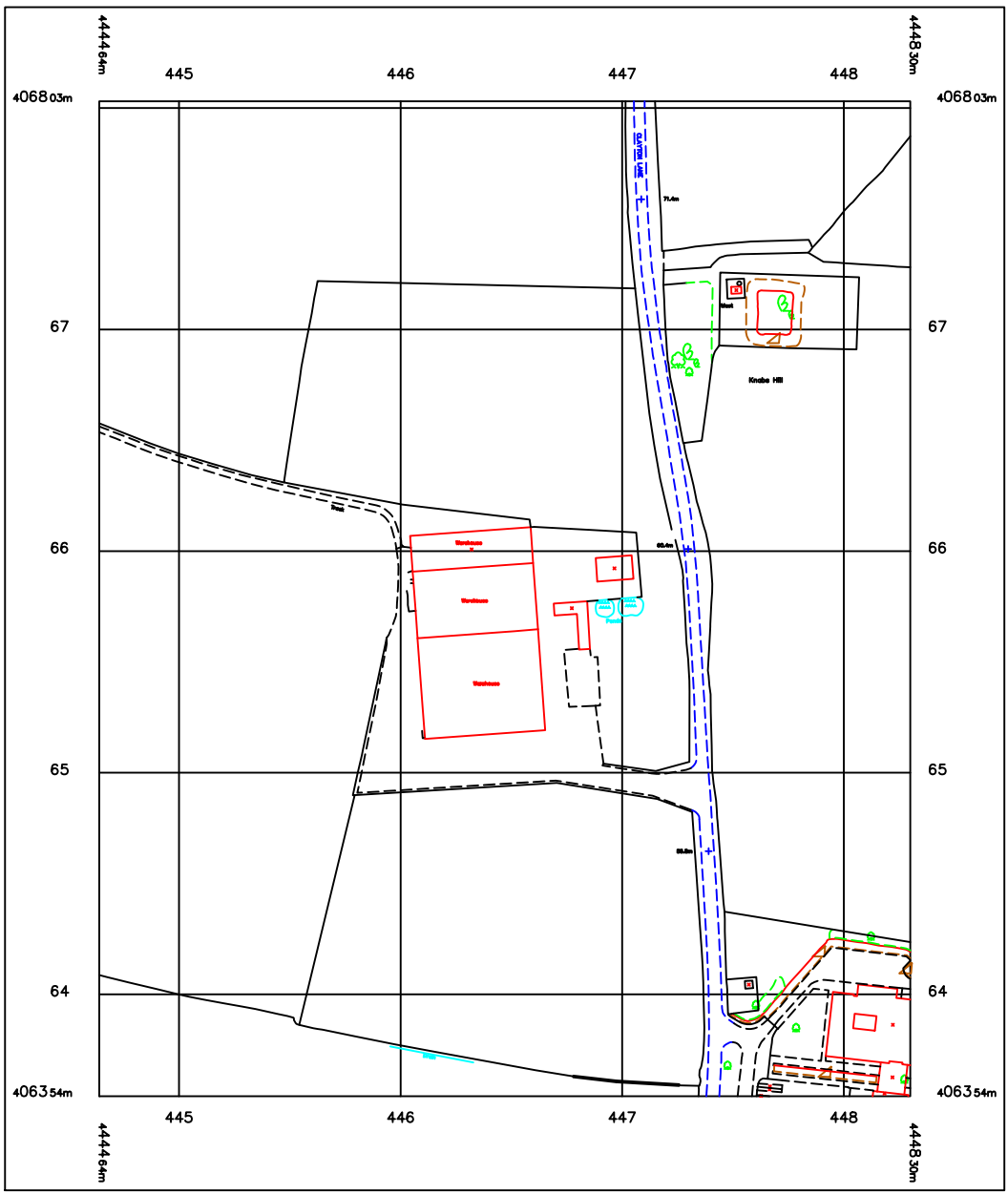
Appendix A



Aerial Photo of the Site

Appendix B

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OS Sitemap ™



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Appendix C



444594 : 405874

Map Name : SE4405SW

Yorkshire Water,
PO Box 500,
Hasiltax Road,
Bradford BD6 2LZ
Contact Name :
Thomas Garside
Contact Tel :

Title

Notes

Partial Key
Foul Sewer = F
Combined Sewer = C
Surface Water Sewer = SW
Trade Sewer = TD
Partially Separate = PS

This plan is furnished as a general guide only and no warranty as to its correctness is given or implied. This plan must not be relied upon in the event of excavations or other works made in the vicinity of public sewers. No house or property connections are shown.

Date Req : 24/03/2022, 11:50:16

Date Gen : 24/03/2022, 11:50:30

Source : Sewer Network Enquiry

UPN: Undefined

Originator: Thomas Garside, SafeMove,

Appendix D

Flood map for planning

Your reference	Location (easting/northing)	Created
Clayton Lane	**444639/406603**	**1 Apr 2022 15:34**

Your selected location is in flood zone 1, an area with a low probability of flooding.

This means:

- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

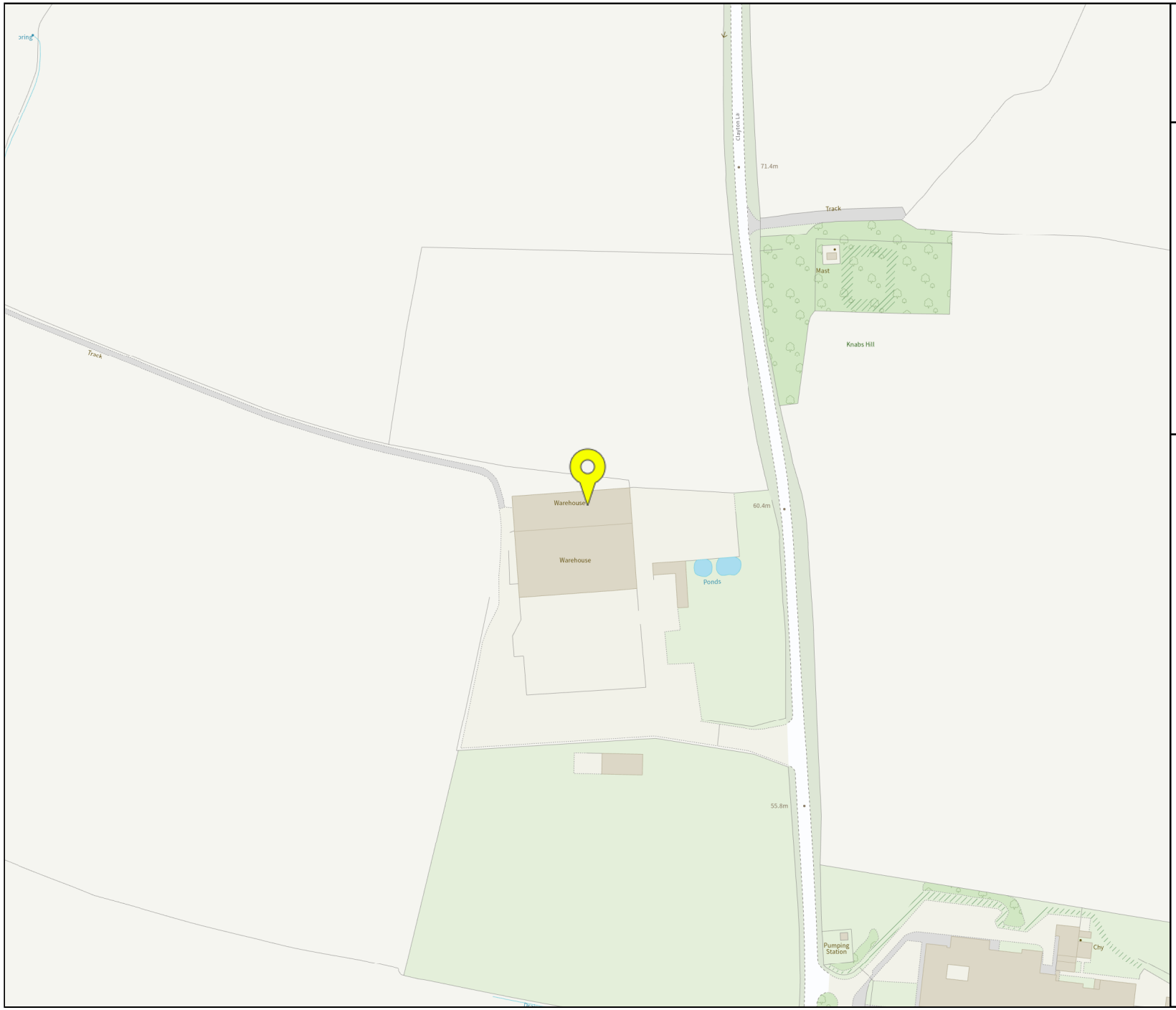
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2021 OS 100024198. https://flood-map-for-planning.service.gov.uk/os-terms



Environment Agency

Flood map for planning

Your reference
Clayton Lane

Location (easting/northing)
444639/406603

Scale
1:2500

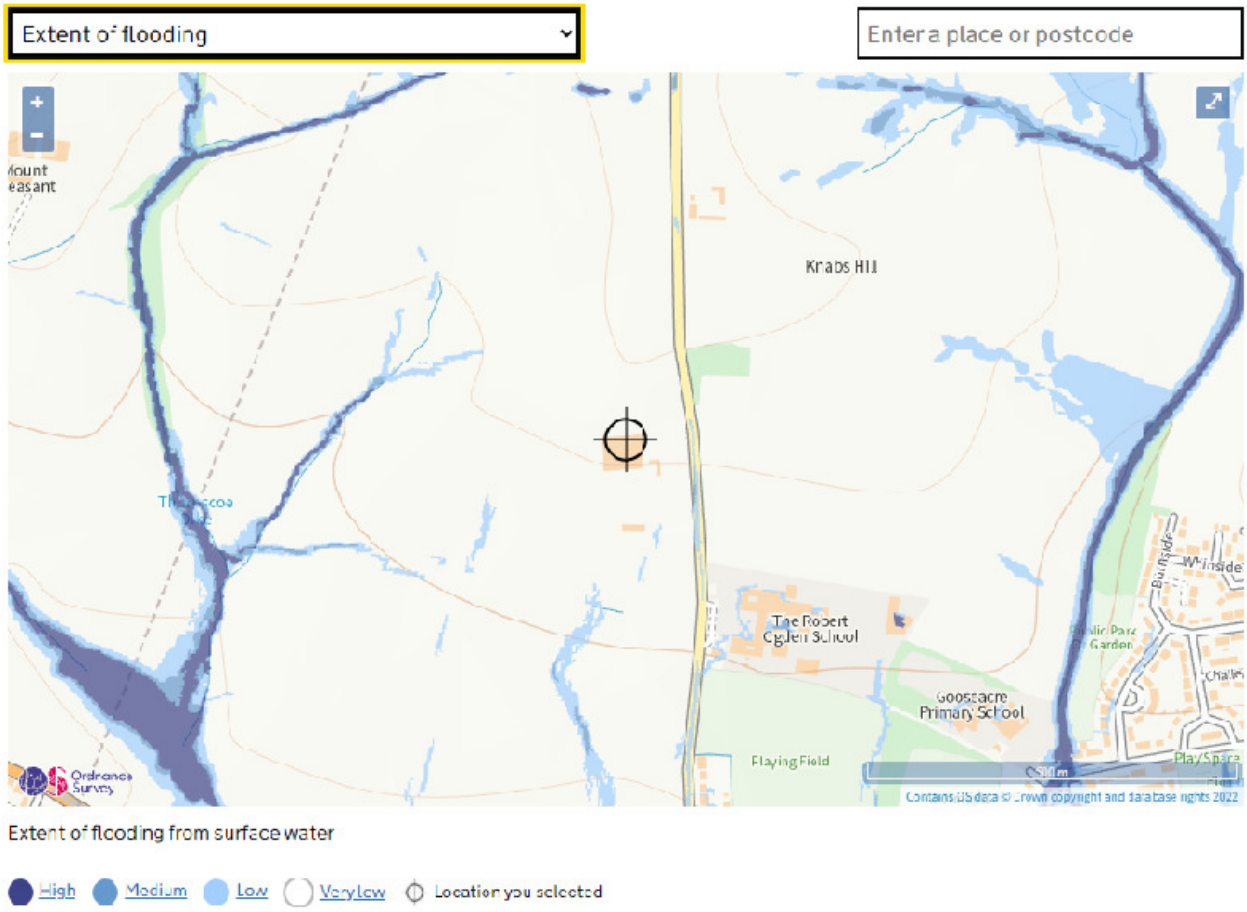
Created
1 Apr 2022 15:34

- Selected point
- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Flood storage area

0 20 40 60m

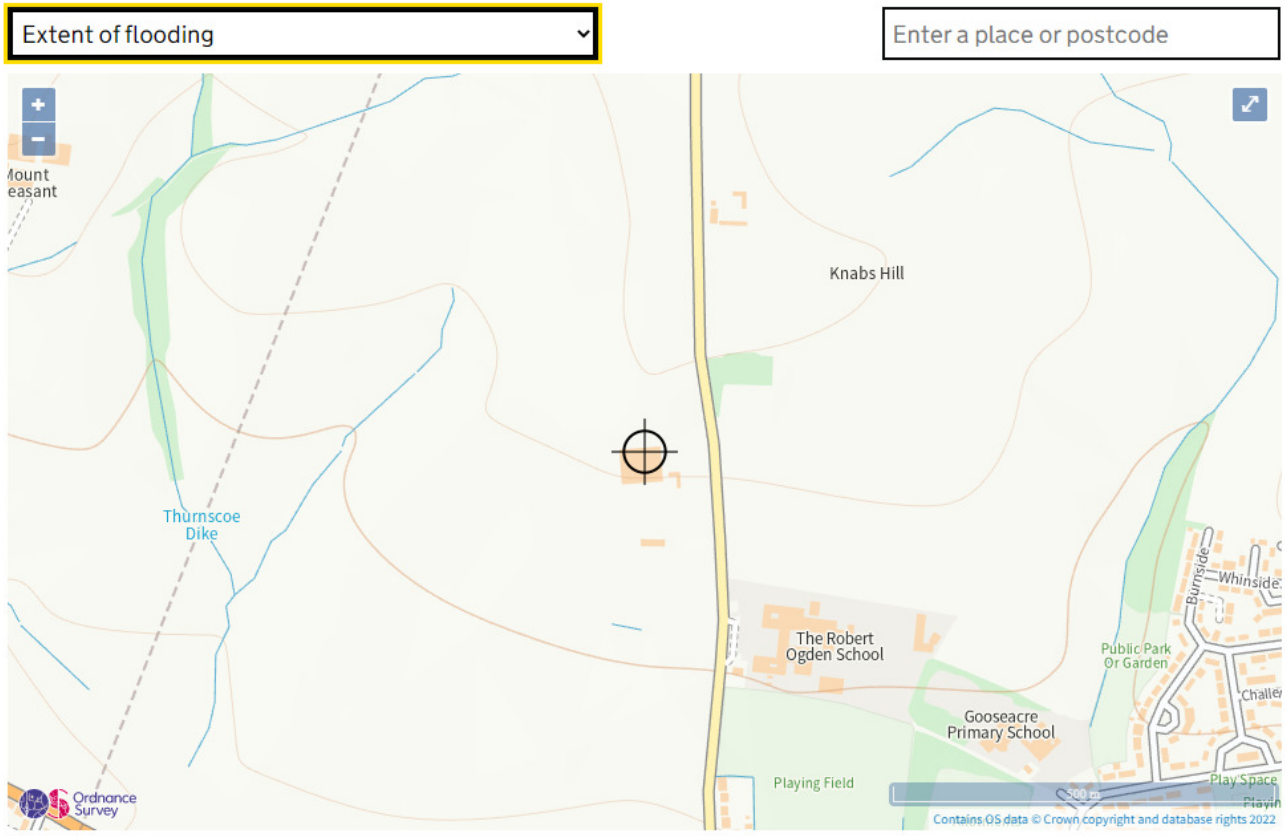
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Appendix E



Surface Water Flood Map

Appendix F



Maximum extent of flooding from reservoirs:

Reservoir Flood Map

Appendix G

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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.



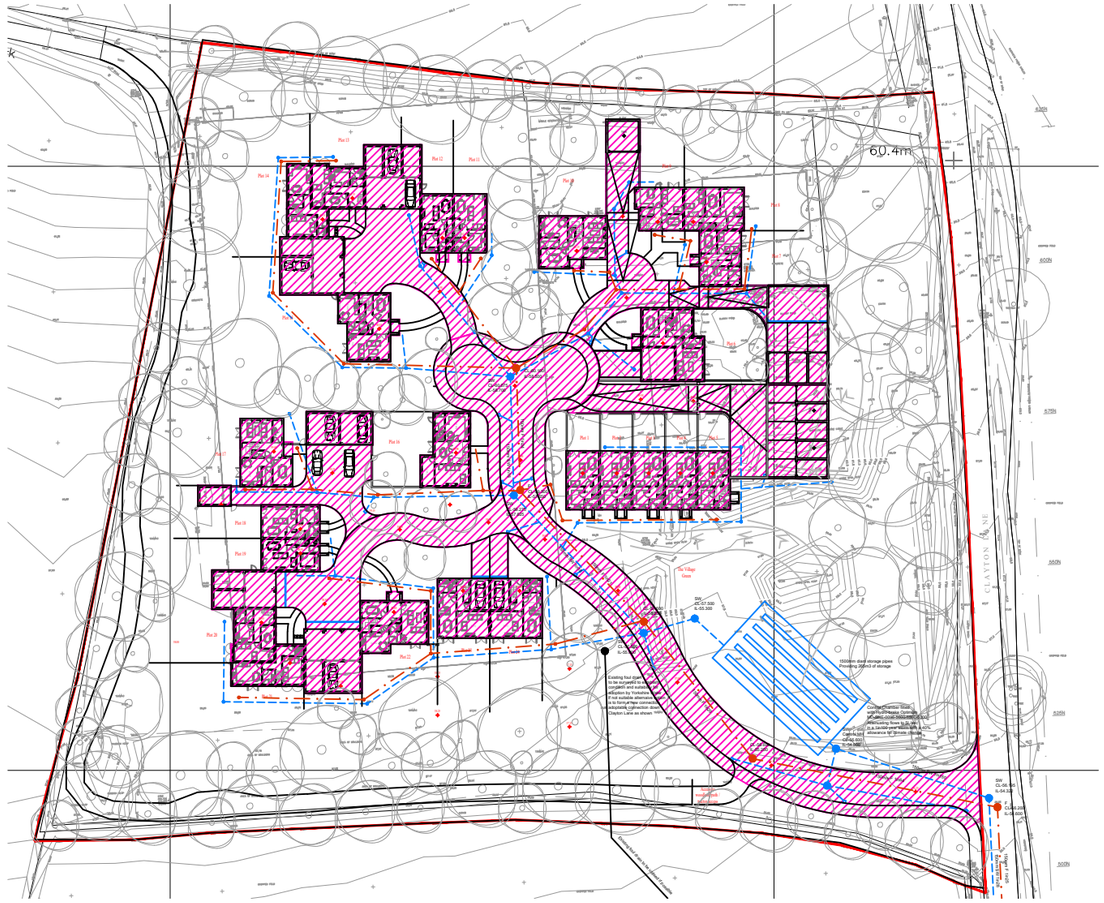
Existing Site Plan Catchment Area (1:500)

Existing Roof Catchment Area = 5465m2
Surface water run off in a 1in1 year storm = 76L/sec

Existing Hardstanding Catchment Area = 5655m2
Surface water run off in a 1in1 year storm = 79L/sec

Total surface water run off in a 1in1 year storm = 155L/sec

Aerial Photograph



Proposed Site Plan Catchment Area (1:500)

Proposed Catchment Area = 4865m2

Drainage Strategy

Surface Water
The site is located within flood zone 1 with a low risk of flooding from rivers or the sea, and pluvial (surface water flooding) is not considered to be a significant risk.

The development site measures 1.749 Ha and therefore a site specific flood risk assessment has been carried out. (See separate report).

Currently there is a large industrial building on the site together with a number of smaller buildings. Associated access roads, hardstandings and parking areas are formed from tarmac and concrete.
The existing impermeable area totals 11120m2 (see existing catchment area plan and aerial photo).

The site is currently used for cutting and storage of stone. Large volumes of water are used for cooling when cutting the stone, this is recyled with water being pumped into a purpose made concrete settlement tank on western elevation and a series of open basins to the east of the main building. We understand rainwater run off from the roofs is used to supply this water.
Although there are a series of MH`s on the site, along the access road it is not clear where these outfall to. There are limited gullys visible on the hardstanding areas. The run off appears to find its way towards a shallow depression in the field/paddock to the south.

In severe storms this run off is likely to find its way onto Clayton Lane and into the highway gullys to the south.

Site investigations have been carried out on the site which reveal the underlying strata to be fill material over mudstone.
Gas/water monitoring boreholes were installed, with the water level ranging from 0.36m to 2.30m. This is believed to be perched water due to the impermeable nature of the ground.

The investigation concludes that the use of infiltration devices is unlikely to be feasible.

Yorkshire Water sewer records show there is a 300mm diam surface water sewer and a 150mm combined sewer located in Clayton Lane 175m to the south of the site.

NPPF guidelines require that surface water arising from a developed site should as far as practicable be managed in a sustainable manner to mimic the surface water flows arising from the site prior to development.

The national planning policy guidance sets out the hierarchy of drainage to promote the use of sustainable drainage systems. The aim of the hierarchy is to drain surface water run-off as high up the drainage hierarchy as reasonably practical.

1. Into the ground (Infiltration).
2. A surface water body.
3. To a surface water sewer.
4. To a combined sewer.

The site investigations show the ground is not suitable for infiltration. Any piped discharge to nearby watercourses would require access across third party land. The most suitable point of surface water discharge is therefore the 300mm surface water sewer to the south of the site, with the connection taken down Clayton Lane.

Unless it can be proven there is an existing connection from the site into this sewer then the proposed flows should be attenuated as close as possible to greenfield run off rates.

The Qbar greenfield run off rate is 3.668L/sec/Ha. The overall development site measures 1.749Ha, therefore if the existing site was greenfield the run off rate would be 6.415L/sec.

The proposed catchment area totals 4865m2 which is a 56% reduction on the existing catchment area.

We propose the flows from the site are attenuated to 5L/sec and underground storage be provided to cater for the 1in100 year storm with a 40% allowance for climate change.

See micro-drainage calculations.

This can be acheived using a 98mm diam hydrobrake and 265m3 of storage in a network of 1500mm diam pipes. The pipes can be located below the public open space and offered to Yorkshire water for adoption under a section 104 agreement.

This will ensure the site is drained in a controlled manner, alleviating the risk of any downstream flooding.

Foul Drainage

The site currently drains via garvity to public sewer in Clayton Lane, this drain is to be surveyed to establish its suitability for adoption. If it proves to be unsuitable a new connection will need to be formed down Clayton Lane as shown.

No.	Revision	Date	Drwn
P1	Existing foul drainage added	4-4-22	

Status: Approval

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Client: Mr S Frith

Project: Residential Development
Clayton Lane, Thurnscoe

Drawing title: Drainage Strategy

Drawn	Chkd	Date	Scale
PB		March 2022	1:500

Contract No.	Drg No.	Revision
22183-DR	C-0102	P1

Appendix H

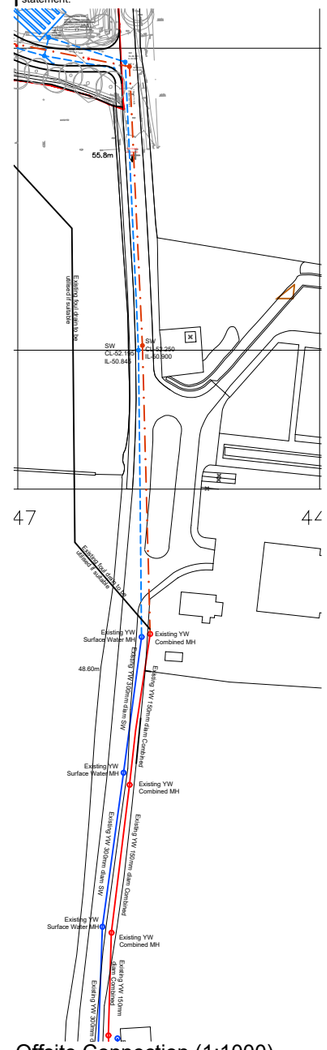
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Drainage Layout Plan (1:500)



Offsite Connection (1:1000)

No.	Revision	Date	Drwn
P1	Existing foul drainage indicated	4-4-22	

Status: Approval

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Client: Mr S Frith

Project: Residential Development
Clayton Lane, Thurnscoe

Drawing title: Drainage Layout Plan

Drawn	Chkd	Date	Scale
PB		March 2022	1:250
Contract No.		Drg No.	Revision
22183-DR		C-0101	P1