

P e l l F r i s c h m a n n

Ferry Moor Lane, Grimethorpe

Flood Risk Assessment

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1 Introduction

LANDOR Planning Consultants Ltd has commissioned Pell Frischmann Ltd to undertake a Flood Risk Assessment in respect of and to support the agricultural restoration and landscape enhancement works of Ferry Moor Lane, Grimethorpe.

This report has been prepared to accompany a planning application to be submitted by LANDOR Planning Consultants Ltd.

1.1 Scope of Works

The following scope of works has been undertaken to provide a Flood Risk Assessment to meet the requirements set out in the National Planning Policy Framework (NPPF), the associated Planning Practice Guidance (PPG) and local policy:

- ¾ Collate and undertake a desk-based review of publicly available flood risk information, such as Environment Agency mapping, local data, policy and guidance;
- ¾ Undertake a desktop review of other data that has been made available, such as topographic surveys, existing drainage plans and proposed layout plans;
- ¾ Provide outline advice on flood mitigation measures including sustainable drainage systems (SuDS) opportunities for the proposed development; and
- ¾ Provide an FRA based on the above information.

1.2 Sources of Information

A review of the relevant information from a range of sources has been undertaken and includes the following:

- ¾ Ferry Moor Detailed Design Plans – May 2023
- ¾ Existing Site Survey – May 2023
- ¾ EA Flood Zone Map
- ¾ EA Surface Water Flood Map
- ¾ EA Reservoir Flood Map
- ¾ EA's Ground Water Source Protection Zone (GWSPZ) Map
- ¾ Statutory Main River Map
- ¾ MAGIC MAP
- ¾ British Geology Survey (BGS) maps
- ¾ gov.uk

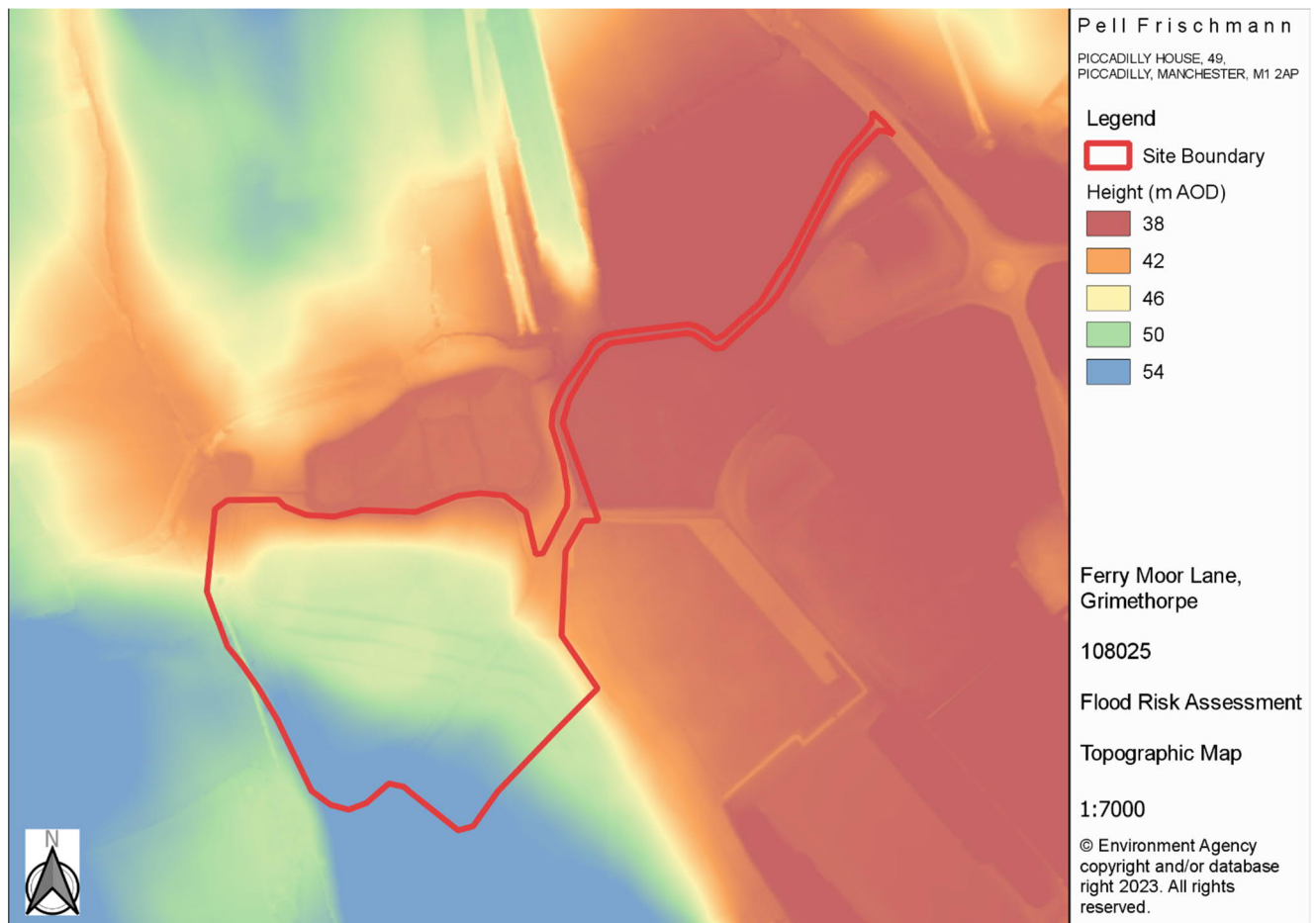


Figure 2 Site Topography

2.3 Existing Drainage

2.3.1 Watercourses

The nearest main river is the Dearne which is located approximately 1.5 km south of the site.

There are a few areas of standing water on the northern edge and in a central part of the site that generally dry up in summer period.

An ordinary watercourse crosses the proposed access track.

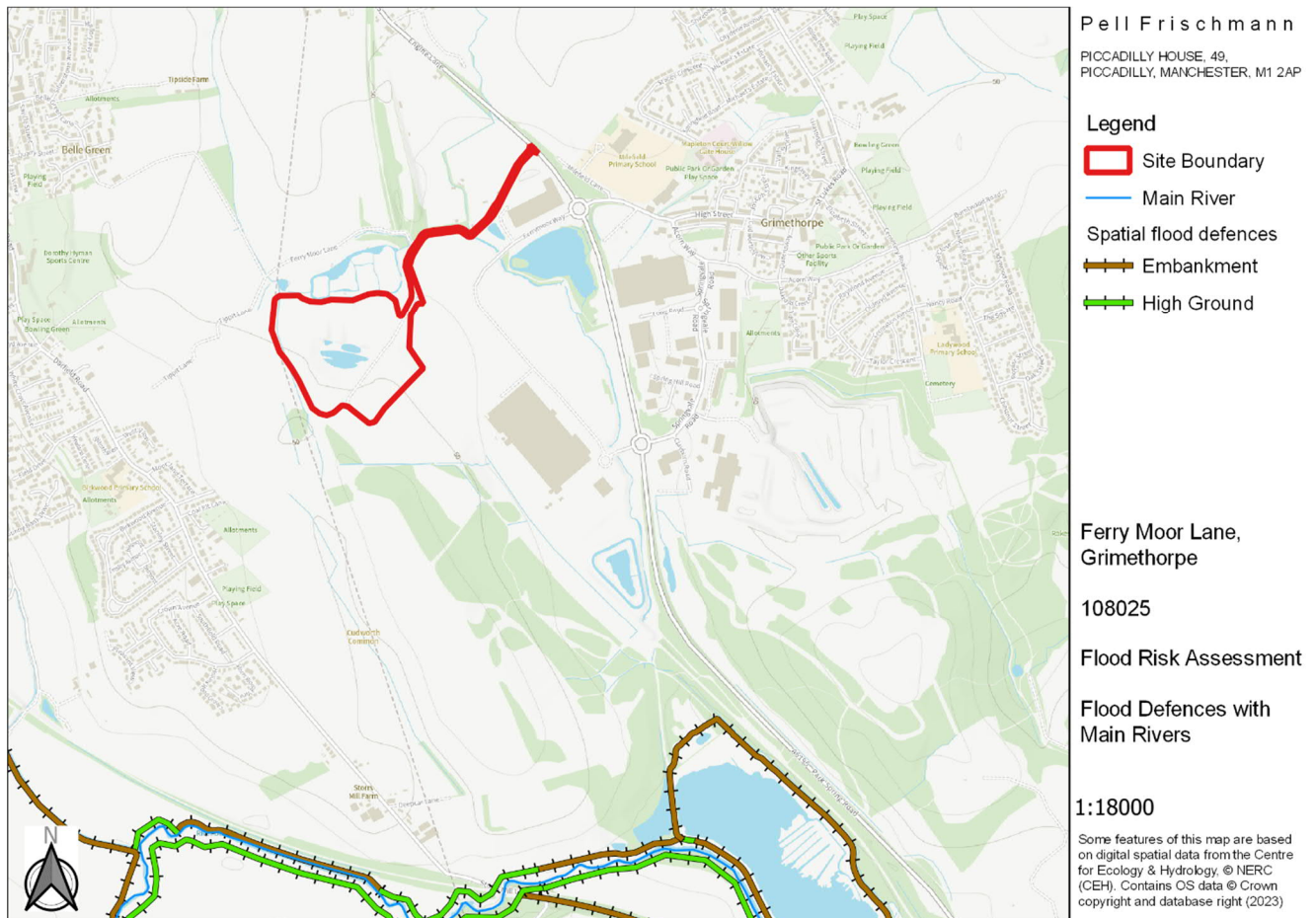


Figure 3 Site Watercourses and Flood Defence Map

2.3.2 Land Drainage

We are not aware of any land drainage being present.

2.3.3 Sewers

Due to the nature of the site, it is unlikely that sewers are present.

2.4 Geology

A review of the British Geology Survey (BGS) maps shows that the majority of the site is underlain by the Pennine Middle Coal Measures Formation - Mudstone, siltstone and sandstone.

Historic borehole records indicate clay, mudstone and siltstone layers.

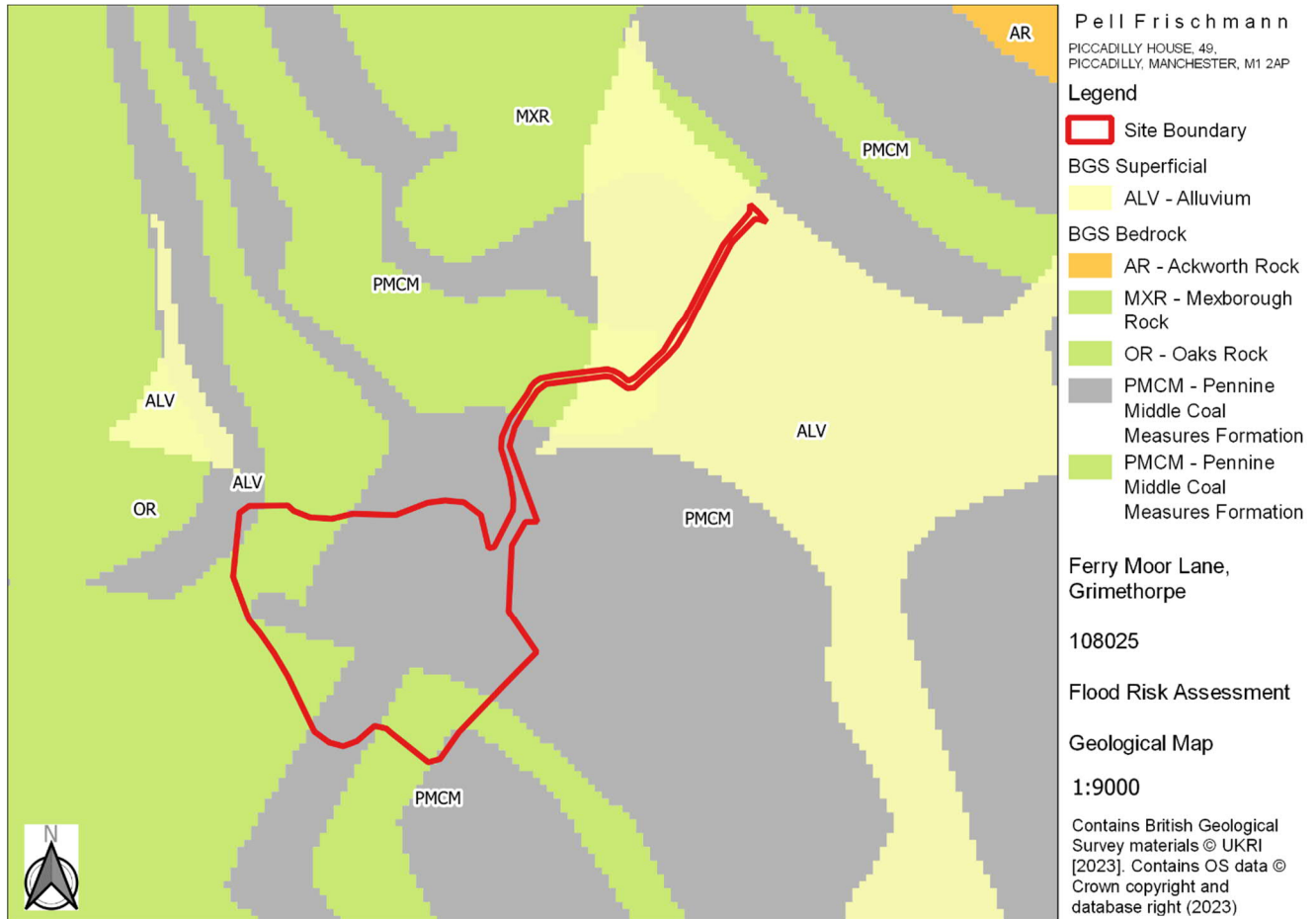


Figure 4 Site British Geology Survey Map

2.5 Proposed Development

The purpose of the proposed development is to return the site to productive use by improving the soil profile so that it is suitable for agriculture and outdoor recreational uses in a restored landscape to include new tree plantations and enhanced biodiversity. The restoration of the site will be achieved through the importation of 430,300m³ of soils and inert materials under an Environment Agency (EA) Permit as a waste recovery operation.

The proposal centres on the provision and improvement of the subsoil and topsoil to allow strong plant establishment for agronomic reasons, and to create a healthy significant native tree and shrub planting scheme for public amenity enjoyment and bio-diversity gain. In addition, the proposed grading work seeks to enhance the site landscape credentials through varied topography and the creation of focused viewing / resting zones within a new path network.

A plan of the proposed development is included in **Appendix B**.

3 Existing Flood Risk

3.1 Fluvial Flood Risk (Rivers and Sea)

The Environment Agency's flood risk data indicates the majority of the development area is within Flood Zone 1, land having a less than 0.1% annual probability of river or sea flooding. A short section of the access road is in Flood Zone 3, having a 1% or greater chance of flooding from rivers in a year or a 0.5% or greater chance of flooding from the sea in a year.

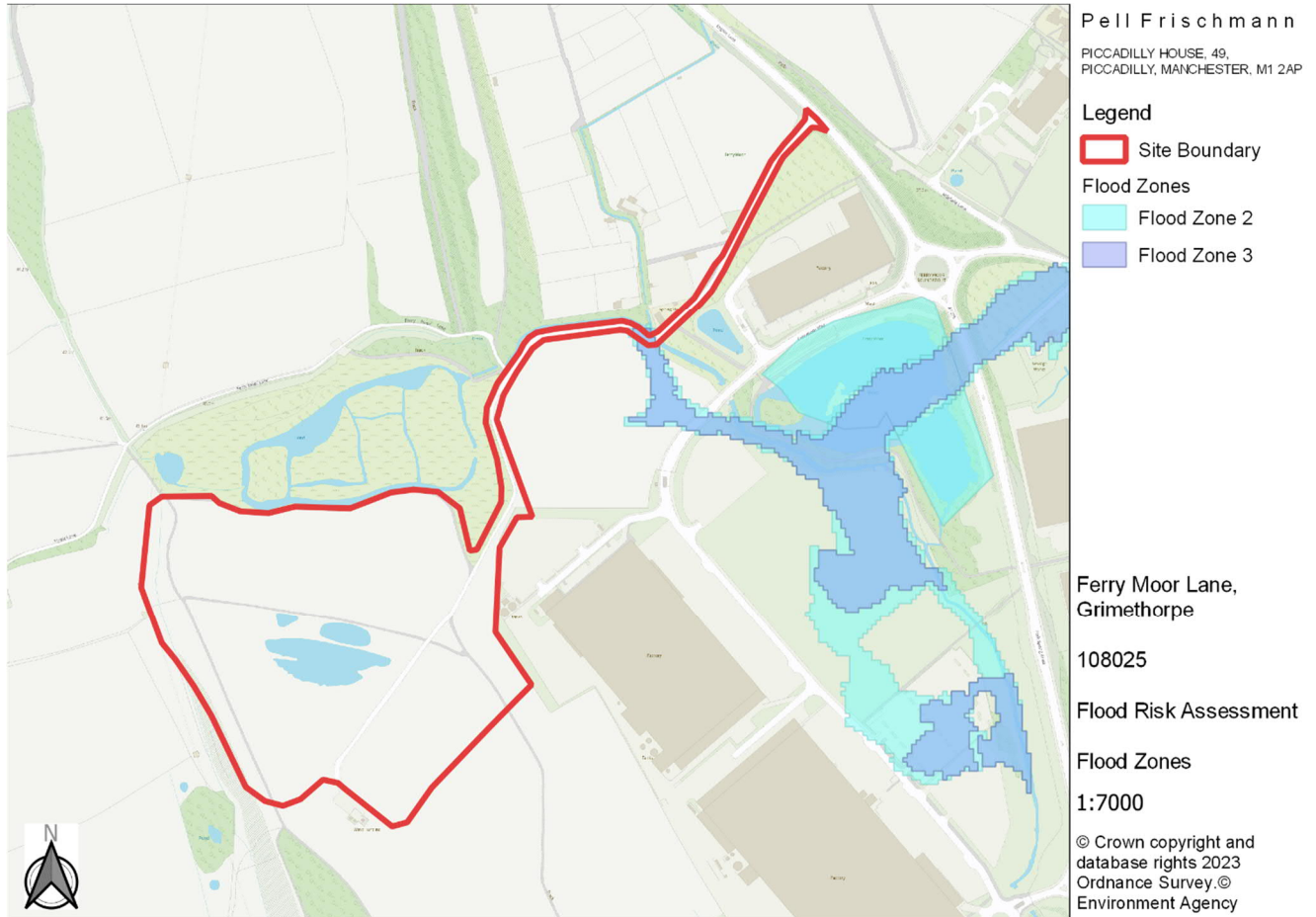


Figure 5 EA Flood Zone Map

3.2 Flood Risk from Surface Water

Surface water flooding occurs where high rainfall events exceed the drainage capacity in an area (i.e. sewer system and/or watercourse), leading to flooding.

An extract of the Environment Agency's Risk of Surface Water Flooding map is shown below in Figure 6.

The map shows that the majority of the site is at low risk of surface water flooding (a probability of flooding less than 1 in 1000 in any given year). The maps show that when subjected to both medium (between probability of 1 in 100 and 1 in 30 in any given year) and high probability (greater than 1 in 30 in any given year) the application site experiences moderate surface water flooding.

All areas where the surface water flooding occurs currently will be raised.



Figure 6 EA Flood Risk from Surface Water

3.3 Groundwater Flooding

A review of the EA's Ground Water Source Protection Zone (GWSPZ) map for the development site location indicates that the application site is not located in a groundwater source protection zone.

The application site is situated above a Secondary A aquifer.

MAGIC Map indicates that vulnerability of the groundwater under the site is High.

The groundwater levels beneath The Site are currently unknown. According to the long-term flood risk enquiry service at gov.uk, groundwater flooding is unlikely in this area. The historic borehole information didn't indicate any water strikes in rather large depths either.

3.4 Sewer Flooding

We are not aware of any flooding incidents that would affect the Site.

3.5 Artificial Sources

The Environment Agency's '*Maximum extent of flooding from reservoir*' dataset indicates that the Site is not at risk of flooding from reservoirs.

3.6 Summary

The table below provides a summary of the five sources of flood risk for the Site. Overall, the Site can be considered to have a low flood risk.

Table 1 Existing Flood Risk Summary

Flood Sources	Flood Risk		
	Low	Medium	High
Fluvial	✓		
Pluvial		✓	
Groundwater	✓		
Sewers	✓		
Artificial	✓		

4 Planning Policy and Guidance

4.1 National Planning Policy Framework

¾ The NPPF provides the planning framework on which this FRA has been based. The NPPF states that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk. Where development is necessary, the development should be made safe and not increase flood risk elsewhere.

4.2 Local Policy

Since the site falls with Flood Zone 1 there were no additional requirements for the area of the development site.

4.3 Flood Risk Vulnerability Classification

Table 2 of the NPPF PPG is shown in Table 2 below. This outlines what classification of development is acceptable within each flood zone, what requires further testing and what is not deemed acceptable.

Table 2 Flood Risk Vulnerability Classification

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	✗	Exception Test required	✓	✓
Zone 3b	Exception Test required	✗	✗	✗	✓

Buildings are classified depending on their uses and are placed in vulnerability classes depending on flood risk sensitivity. The amenity open space is classified as ‘*Water Compatible*’. ‘*Water compatible*’ assets are appropriate developments in Flood Zones 1, 2 or 3.

4.3.1 Sequential Test

The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. Development should not be permitted if there are reasonably available sites appropriate for development in areas at a lower risk of flooding.

It is necessary to undertake a Sequential Test for a planning application if both of the following apply:

- ¾ The proposed development is in Flood Zone 2 or 3; and
- ¾ A Sequential Test hasn’t already been completed for a development of the type you plan to carry out on your proposed site.

However, a small part of the access track is in Flood Zone 3, it classifies as a “minor development”, therefore a Sequential Test is not required.

4.3.2 Exception Test

The proposed development is ‘*Water Compatible*’. Based on Table 2 (see Section 4.2) an Exception Test is not required for the site.

5 Managing Flood Risk

5.1 Flood Mitigation

5.1.1 Master Planning

In line with the NPPF Sequential Approach the proposed ground raising and reprofiling works have been located in Flood Zone 1, the lowest flood risk area possible.

5.1.2 Ground Level Raising and Compensatory Storage

The proposal includes ground raising and reprofiling and as the site is located in Flood Zone 1 it, therefore, does not require compensatory flood storage. The potential flood risk increases in the surrounding areas, as a consequence of the ground raising will only affect green spaces, the existing Wind Turbine and its access track. The related flood risk mitigation measures will be discussed in Section 5.2.

5.2 Drainage and Surface Water Management Strategy

It is understood that the Site is currently open, green space and is currently permeable. The full extent of the drainage network on the Site is currently not known, but it is assumed that there are no positive drainage features. The plan of the existing site is included in **Appendix A**.

Since the proposals doesn't include new impermeable areas, the overall runoff volume won't be affected. Thus, the runoff won't need to be controlled. Actually, the proposed development is expected to reduce the current runoff rate due to the placement of thick layers of permeable soils on top of the existing less permeable soils. The Masterplan is included in **Appendix B**.

Due to the topography of the site and the proposed development levels the flood risk increase will be negligible at the Wind Turbine site and the access track.

6 Conclusion and Recommendations

This report has identified the following conclusions:

- ¾ The Site is situated within Flood Zones 1 except a short section of the proposed access road which is in Flood Zone 3;
- ¾ The Site is at low to high risk of surface water flooding;
- ¾ The site is at low risk from groundwater flooding and flooding from artificial sources;
- ¾ The Site does not benefit from any formal local flood defences;
- ¾ The development is classed as 'Water Compatible' development under the NPPF guidance. Therefore an Exceptional Test is not required;
- ¾ The access track classifies as minor development there for it is exempt from Sequential Test regardless of being in Flood Zone 3.
- ¾ The nature of the proposed works means that the proposed development will not increase the impermeable area and therefore there is no increase in runoff;

This FRA provided an overview of flood risk on the site and it can be concluded that overall there is a low risk of flooding.

7 Uncertainties and Limitations

This report has been prepared by Pell Frischmann with reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client in accordance with the agreed scope of services.

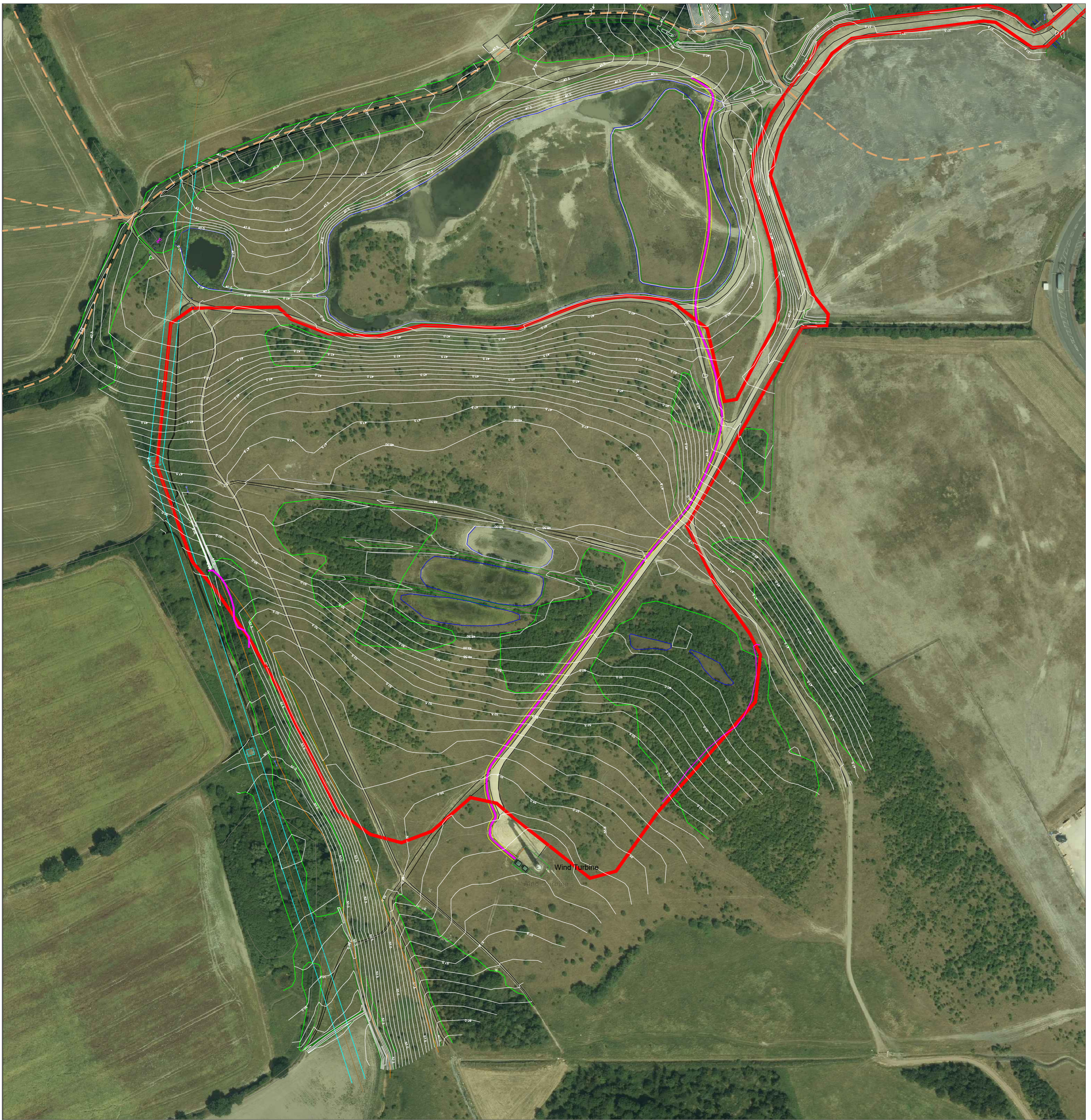
This report has been prepared solely for the use of the Client. The report may not be relied upon by other parties without written consent from Pell Frischmann. Pell Frischmann disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

The report details the findings of work carried out by Pell Frischmann during a study period in August 2023. The report has been prepared on the basis of available information obtained during that study period. Information provided by the referenced third parties has been used in good faith and is taken at face value; however, Pell Frischmann cannot guarantee its accuracy or completeness.

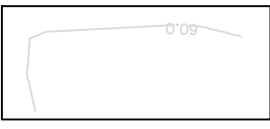

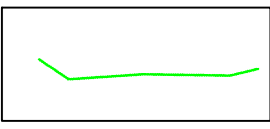

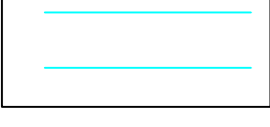
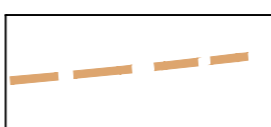

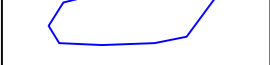
Although every reasonable effort has been made to gather all relevant information within the context of the agreed scope of work, all potential flood risk constraints or liabilities associated with the Site may not have been revealed. Should additional Information become available (including new legislation and changed practices), after the date of the report submission, Pell Frischmann reserves the right to reconsider the recommendations and alter the report accordingly.

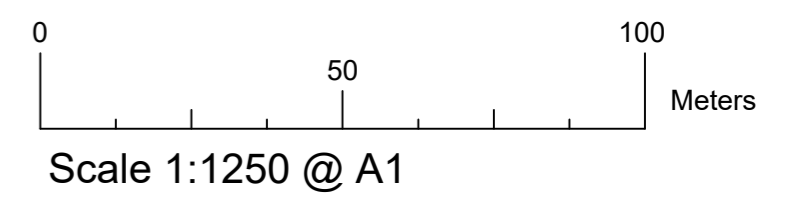
Appendix A - Existing Site

Agricultural Restoration & Landscape Enhancement Scheme



Key:

- | | | | |
|------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------|
|  | Existing Contours (1m Metre Intervals) |  | Underground Powerline plus Wayleave |
|  | Existing Scrub Vegetation |  | Application Boundary (See Also Plan 901.05) |
|  | Overhead Powerlines |  | Existing Public Rights Of Way |
|  | Existing Tracks | | |
|  | Existing Wet / Dry Areas | | |



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Revision.: A - 14/09/23 - adjustment to red line

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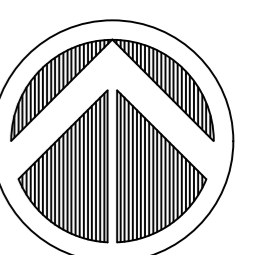
Drawing No: 901.02 Rev A

Project Name: Grimethorpe

Date: 14th September 2023

Drawing Name: Existing Site Survey

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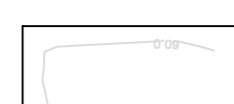
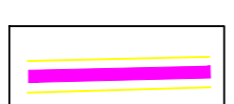
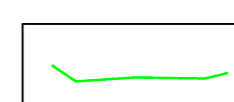
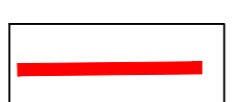
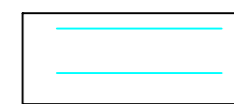

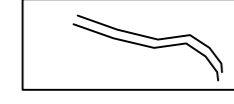







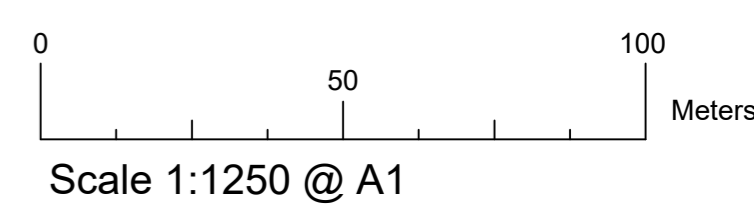
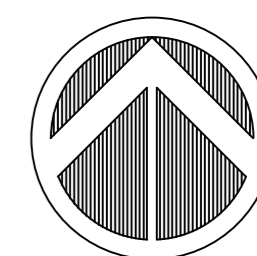
Appendix B - Proposed Masterplan

Agricultural Restoration & Landscape Enhancement Scheme



Key:

- | | | | |
|-------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------|
|  | Existing Contours (1m Metre Intervals) |  | Underground Powerline plus Wayleave |
|  | Existing Scrub Vegetation |  | Application Boundary (See Also Plan 901.05) |
|  | Overhead Powerlines |  | Proposed Contours (1m Intervals) |
|  | Existing Tracks |  | Proposed Amenity Grass |
|  | Existing Wet / Dry Areas |  | Proposed Permissive Public Access Paths |
|  | Existing Public Rights Of Way |  | Proposed Planting |



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Revision No.: A-Changes to Key
Revision No.: B-Changes to red line

Scale: 1: 1250 @ A1

Drawing No: 901.07 Rev B

Project Name: Grimethorpe

Date: 14th September 2023

Drawing Name: Masterplan

Checked By BW

