FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT AT
MARCH RIVERSIDE, UPWELL

FINAL REPORT

ECL0286-2a/ANGLIA BUILDING CONSULTANTS

DATE JULY 2022

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CONTENTS

1.0 INTRODUCTION

This Flood Risk Assessment has been prepared in accordance with National Planning Policy Framework (NPPF) and supporting planning practice guidance (PPG) on Flood Risk and Coastal Change.

In areas at risk of flooding or for sites of 1 hectare or more, developers are required to undertake a site-specific Flood Risk Assessment to accompany an application for planning permission. This Flood Risk Assessment has been produced on behalf of Mr P West in respect of a development that consists of the conversion of agricultural buildings to form 3 new dwellings at March Riverside, Upwell.

A planning application for the proposed development is to be submitted by Anglia Building Consultants. Planning approval for an annex to the main dwelling at the site was granted under application F/YR20/0863/F. The proposed development includes modification of the scheme approved under that application.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is situated at Laddus Farm, March Riverside, Upwell, PE14 9AT. The National Grid Reference of the site is 54719/30087.

The location of the site is shown in Figure 1.

Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site is on the northern side of March Riverside approximately 2.5km west of Upwell. The site consists of a series of outbuildings to the south of an existing dwelling and an access to March Riverside. The area of the proposed development is approximately 0.12 hectares.

A topographic survey of the site has been undertaken and is provided in Attachment 1. Ground levels around the outbuildings are between +2.2m OD and +3.0m OD. The highest levels are alongside March Riverside carriageway which is at +3.0m OD. The agricultural land surrounding the site is at a level less than +2.0m OD.

The site is in the Needham and Laddus Internal Drainage Board's (IDB) district. Surface water at the site naturally drains through soakaway and hence to the IDB drain system. On the southern side of March Riverside is the River Nene (Old Course). The River Nene (Old Course) is maintained by the Middle Level Commissioners.

The online British Geological Survey maps indicate that the site is likely to be underlain by the Ampthill Clay Formation mudstone. The bedrock is shown to be overlain with superficial deposits of clay and silt.

2.3 Proposed Development

The proposed development consists of the conversion of outbuildings to form three single storey residential dwellings. A Site Plan is provided in Attachment 1 and the barns to be converted are identified. The eastern barn, alongside March Riverside, will form 2 dwellings and the western barn will form one dwelling.

2.4 Local Development Documents

The Fenland Local Development Plan is the adopted Local Plan for the district. Policy LP14 for Responding to Climate Change and Managing the Risk of Flooding in Fenland states the requirements for flood risk reduction.

The Fenland Level 1 Strategic Flood Risk Assessment (SFRA) was prepared in 2011.

The Cambridgeshire Flood and Water Supplementary Planning Document has been prepared by Cambridgeshire County Council (as the Lead Local Flood Authority) in conjunction with the other Cambridgeshire local planning authorities and other relevant stakeholders to support the implementation of flood risk and water related policies.

2.5 Available Flood Risk Information

The site is located within Flood Zone 3, an area with a high probability of flooding, of the Environment Agency Flood Maps for Planning as shown in Figure 2.

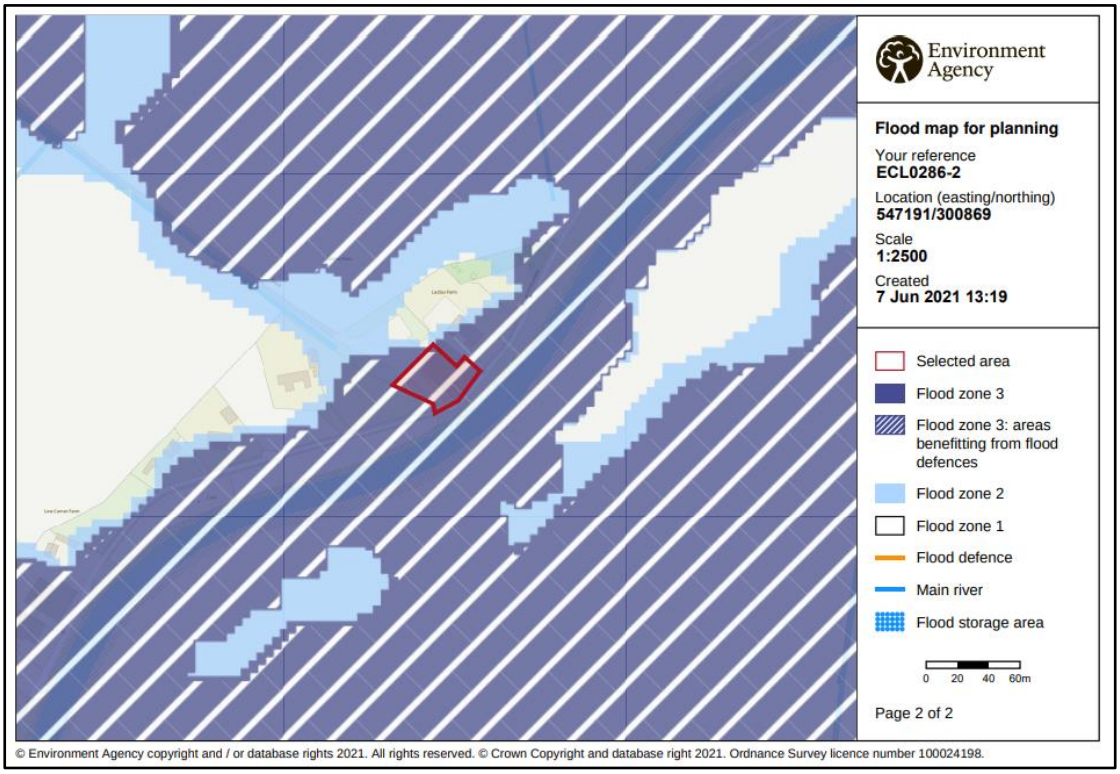


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- the site has a medium risk of flooding from rivers or the sea (annual probability between 1% and 3.3%);
- the site has a very low risk of surface water flooding (annual probability less than 0.1%); and
- the site is not within an area at risk of reservoir flooding.

The site is within Fenland District however it is close to the boundary with King's Lynn and West Norfolk. The King's Lynn and West Norfolk Borough Council Level 1 SFRA includes flood risk maps for areas adjacent to its boundary. The maps show that:

- the site is in Flood Zone 3a;
- the site is not at risk during a 1% annual probability (1 in 100 chance each year) fluvial event including allowance for climate change;
- the site is not at risk during a 0.5% annual probability (1 in 200 chance each year) tidal event including allowance for climate change;
- the site is not at risk of surface water flooding including allowance for climate change;
- the site is not susceptible to groundwater flooding;
- the site is not within an area at risk from a breach; and
- the site is not within an area at risk from reservoir flooding.

3.0 FLOOD RISK VULNERABILITY

3.1 The Sequential and Exception Test

The NPPF requires the application of a Sequential Test to ensure that new development is in areas with the lowest probability of flooding.

The Exception Test is a method to demonstrate and help ensure that flood risk to people and property will be managed, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.

3.2 Vulnerability Classification

Table 2 of the PPG Flood Risk and Coastal Change categorises different types of uses and development according to their vulnerability to flood risk. The proposed development is covered by the description of buildings used for dwellings and is classified as 'More Vulnerable'.

Table 3 of the PPG Flood Risk and Coastal Change sets out Flood Risk Vulnerability and flood zone 'compatibility'. The site is in Flood Zone 3 and the development is 'More Vulnerable' therefore it is necessary to complete the Exception Test.

PPG Flood Risk and Coastal Change defines that the lifetime of the development in terms of flood risk and coastal change is 100 years.

3.3 Application of the Sequential Test and Exception Test

It is for the Local Planning Authority, taking advice from the Environment Agency as appropriate, to consider the Sequential Test.

Paragraph 033 of planning practice guidance (PPG) on Flood Risk and Coastal Change states that 'The Sequential Test does not need to be applied for applications for Change of Use (except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site)'.

Paragraph 048 of the PPG states that 'A Change of Use may involve an increase in flood risk if the vulnerability classification of the development is changed. In such cases, the applicant will need to show in their flood risk assessment that future users of the development will not be placed in danger from flood hazards throughout its lifetime.' The mitigation measures proposed in Section 5.2 of this flood risk assessment are such that risks to future users are mitigated.

The Exception Test requires consideration of the wider sustainability benefits of a development and that the development would be safe and residual risks managed.

The Fenland Local Plan defines the housing distribution for new dwellings across the District. Within the district there is a target of 11,000 new dwellings over the period from 2011 to 2031. The proposed development utilises existing buildings and will contribute to the target of new dwellings.

Section 5 of this Flood Risk Assessment describes the flood mitigation measures and the management of the residual risks, demonstrating that this development will be safe and not increase flood risk elsewhere. The development is considered to pass the Exception Test.

4.0 SITE SPECIFIC FLOOD RISK

4.1 Local Flood Assets

The site is 8.8km from the Ouse Washes. The Ouse Washes is a washland providing flood storage to manage flood risk. The Middle Level drainage area is protected from the Ouse Washes by the Middle Level Barrier Bank. The site is 6.5km south east of the River Nene tidal defences. The Middle Level Barrier Bank and River Nene Tidal defences are the responsibility of the Environment Agency.

There is a long-term strategy for the maintenance of the Environment Agency defences which is reviewed and updated periodically.

There is an extensive local drainage network managed by the Needham and Laddus IDB. The nearest board drain is 500m north east of the site. The site, and surrounding land, drains by gravity to the River Nene (Old Course).

During the operation and maintenance of its pumping stations, associated structures, and channel systems, the IDB seeks to maintain a general standard capable of providing flood protection to its district. A routine maintenance programme is in place to ensure that the Board's assets are commensurate with the standard of protection that is sought.

The site is immediately north of the River Nene (Old Course). Via the Popham's Eau and the Middle Level Main Drain, the River Nene (Old Course) flows to St Germans Pumping Station to discharge to the tidal River Great Ouse. The River Nene (Old Course), Popham's Eau, the Middle Level Main Drain and St Germans Pumping Station are the responsibility of the Middle Level Commissioners.

Current maintenance standards of the Needham and Laddus IDB's, the Middle Level Commissioners and the Environment Agency's defences are generally good.

4.2 Sources of Flooding

The following potential sources of flooding have been identified during this assessment:

- blockages to the IDB main drain system;
- an event in the local drainage network that exceeds the standard of protection;
- failure of St Germans Pumping Station;
- overtopping and/or breaching of River Nene (Old Course); and
- overtopping and/or breaching of the Middle Level Barrier Bank or the River Nene tidal defences.

Based upon the Environment Agency Long Term Flood Risk maps and the SFRA the site is not at risk of surface water flooding. As such surface water flooding has not been considered further in this assessment.

4.3 Probability of Flooding

The probability of flooding associated with blockages in the IDB's drainage system is low due to the maintenance standards already achieved and managed by the IDB.

The standard of drainage provided by Needham and Laddus IDB is assessed at 2% annual probability (1 in 50 chance each year). This is compatible with the Department of the Environment, Food and Rural Affairs (DEFRA) target level of service for rural drainage and flood defence works. The risk associated with flooding due to events greater than 2% annual probability (1 in 50 chance each year) is lowered due to the Board drains incorporating freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).

St Germans Pumping Station offers protection against the 1% annual probability (1 in 100 chance each year) fluvial event with an allowance for climate change. St Germans Pumping Station was replaced in 2011 so that a standard of protection against the 1% annual probability (1 in 100 chance each year) event could be maintained.

Overtopping or breaching of River Nene (Old Course) is considered to be a low risk. The Middle Level maintained watercourses provide protection during the 1 in 100-year fluvial event. The Middle Level maintained watercourses also incorporate a minimum 0.9m freeboard above the maximum design water level.

The Middle Level Barrier Bank and River Nene tidal defences provide protection during the 1% annual probability (1in 100 chance each year) fluvial event and 0.5% annual probability (1 in 200 chance each year) tidal event. The SFRA maps show that the site is not at risk of inundation from the Ouse Washes in the event of a breach.

4.4 Historic Flooding

During the preparation of this assessment, no evidence was discovered of the site being flooded.

4.5 Climate Change and Residual Risk

Climate change is likely to impact the site through increased rainfall intensity and duration affecting the local drainage network and increased flood levels in the River Great Ouse and River Nene.

The SFRA maps show that the site is not at risk during the 1% annual probability (1in 100 chance each year) fluvial event with climate change or the 0.5% annual probability (1 in 200 chance each year) tidal event with climate change.

In summary the existing systems and defences are appropriate for the design life of the development (i.e. 100 years).

The primary residual risk to the site is during an exceedance event.

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of St Germans Pumping Station would increase the level of risk at the site.

The probability of the site flooding from any Environment Agency system is less than 1% annual probability (1 in 100 chance each year) because of the standards of the existing flood defences. Over time there will be a gradual increase in risk to the site due to climate change. During the design life of the development it is not anticipated that the site would flood.

Any increase in impermeable area associated with the development will be minimal so there is no potential that flood risk will be increased elsewhere due to surface water.

5.2 Mitigation Measures

The site has a low 'actual risk' of flooding. It is recommended that the floor levels of the dwellings are on average 0.3m above ground level with 0.3m of flood resilient construction above finished floor level. It is noted that the ground alongside the development slopes, the floor levels should be not less than 0.15m above ground level at any location.

The developer should ensure that the occupiers of the dwellings are sufficiently aware of the risk of flooding, and the standard of the existing defences. The Environment Agency provides a Flood Warning Service which includes Flood Warning Codes and uses direct warning methods where the risks and impacts of flooding are high.

In addition to direct and indirect flood warnings, the Environment Agency operates a 24 hour a day Floodline Service providing advice and information on flooding. The occupiers of the dwellings should register with the Floodline Direct Warnings Service to receive any future flood warnings.

During an extreme event it is anticipated that sufficient time would be available to take precautionary actions to limit the potential impact of flooding.

Failure of St Germans Pumping Station may occur due to long term mechanical breakdown or power supply being disrupted. However, in these circumstances, if conditions were such to put properties and land at risk of flooding, the Middle Level Commissioners would take emergency action to maintain the drainage level of service by utilising temporary pumping equipment.

It is recommended that surface water run-off is managed so that stormwater from the site will not affect any adjoining properties or increase the flood risk elsewhere.

6.0 CONCLUSIONS

As a result of this assessment, the following conclusions have been reached.

- The proposed development consists of the change of use of outbuildings to form three residential dwellings.

- The proposed development is in Flood Zone 3. It benefits from defences on the Ouse Washes that provide protection during the 1% annual probability (1 in 100 chance each year) fluvial event and the 0.5% annual probability (1 in 200 chance each year) tidal event including climate change.

- The site is located within an IDB catchment with a minimum standard of drainage of 2% annual probability (1 in 50 chance each year) which accords with DEFRA guidelines for rural development. The risk of flooding is lowered further due to the Board drains incorporating a significant freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).

- It is recommended that the floor levels of the dwellings are on average 0.3m above ground level with 0.3m of flood resilient construction above finished floor level.

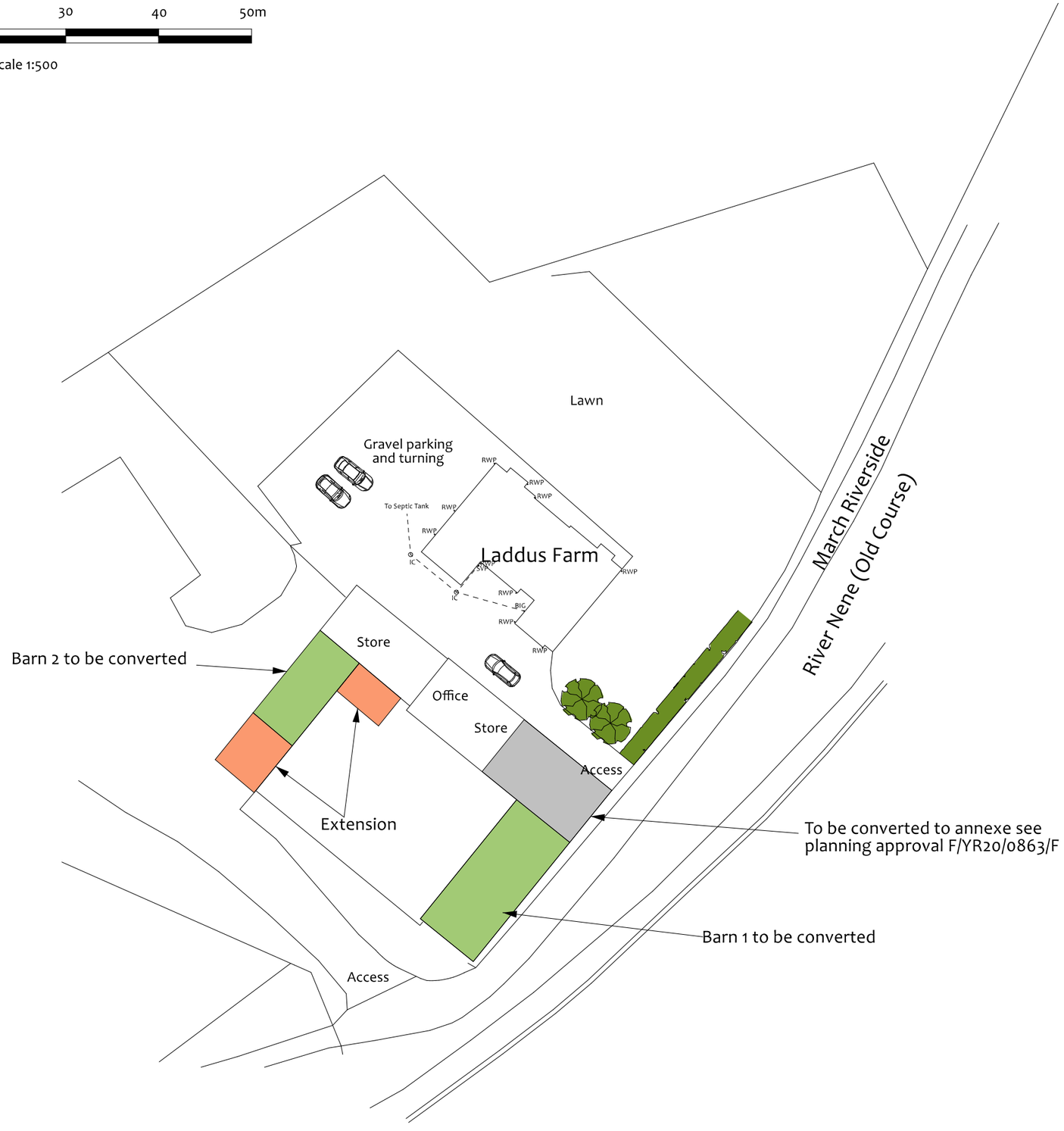
- The development passes the Sequential Test and Exception Test and is therefore suitable for the proposed location.

ATTACHMENT 1

TOPOGRAPHIC SURVEY
(Dwg 16170392-WEST-LAD-3D-TOPO)

0 10m 20 30 40 50m

Scale 1:500



RICS Regulated by RICS

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No	Date	Revision

Issue: For Clients Approval

Site: Laddus Farm, March River Side, Upwell, Cambridgeshire, PE14 9AT

Project: Alterations, extensions and conversion of barns to form dwellings

Drawing Title: Proposed Site Plan

Client: Mr P West

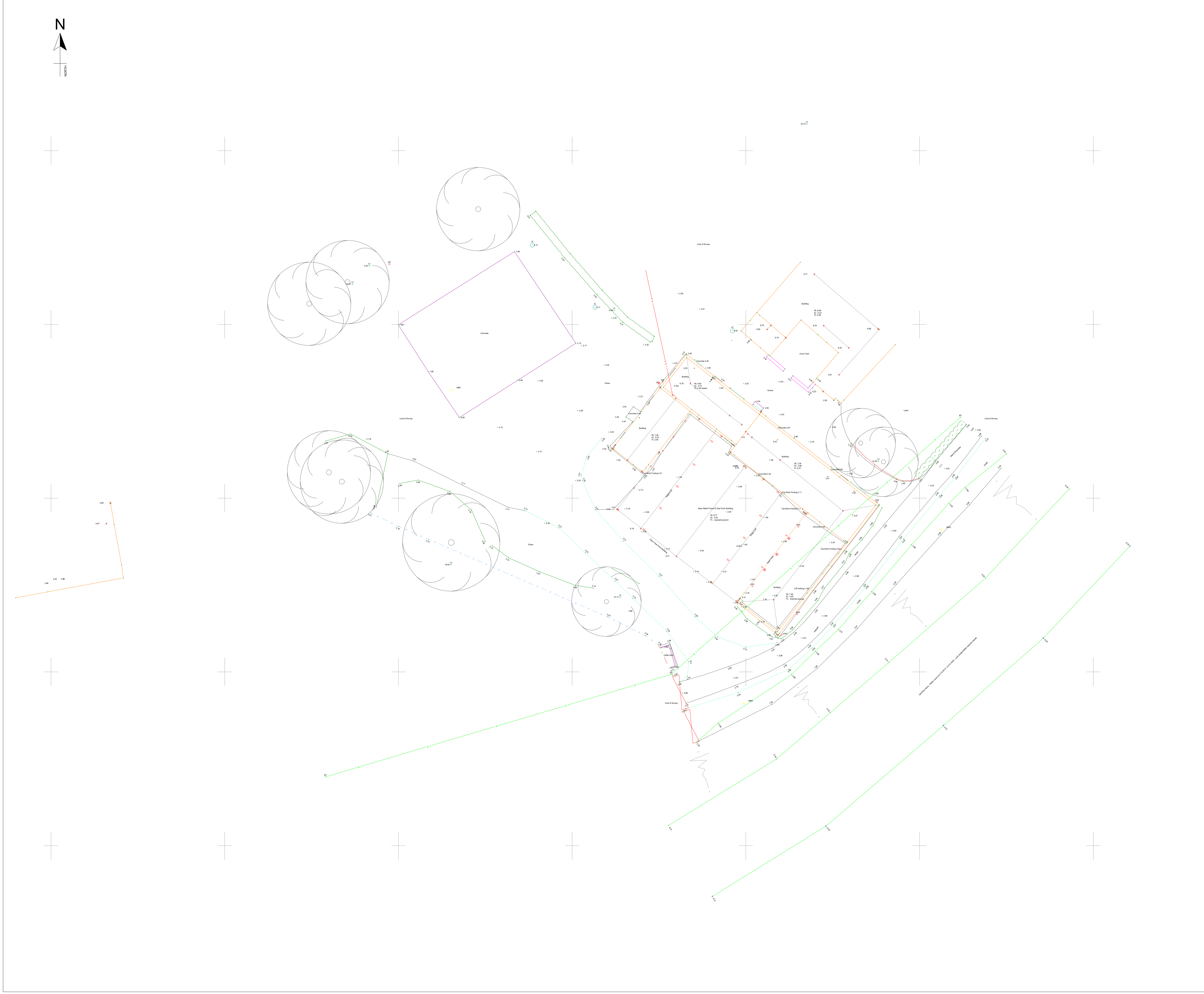
Date July 2022

Scale 1:500 at A3

Drawing Number 21-2123-34

ATTACHMENT 2

PROPOSED SITE PLAN
(DWG 21-2123-34)



Notes :Legends

TOPOGRAPHICAL SURVEYS
ABBREVIATIONS

AV	Air Valve	MH	Manhole
BO	Bollard	MH/F	Manhole Foul
BO/R	Raising Bollard	MH/S	Manhole Surface
BAF	Concrete Baffle	MH/C	Manhole Combined
BS	Bus Stop	MP	Marker Post
BCH	Bench	RN	Road Name
B/W	Barb Wire Fence	NAL	Nal Socket
BX	Utilities Box	OHL-E	Overhead Lines Electric
BT	Communications Box	OHL-C	Overhead Lines Communications
C/P	Closed Panel Fence	PI	Petrol Interceptor
C/L	Chain Link Fence	P/R	Post & Rail Fencing
CL	Cover Level	P/W	Post & Wire Fencing
COL	Column	P-F	Palisade Fence
CN/P	Chestnut Paling Fence	RE	Rodding Eye
CCTV	Close Circuit Camera	RP	Reflective Post
CTV	Cable Television Box	RS	Road Sign
CB	Control Box	RL	Ridge Level
CONC	Concrete	SP	Sign Post
DC	Drainage Channel	SV	Service Valve (Water)
DR	Door	ST	Stay
DP	Down Pipe	SS	Sub Station
D/C	Dropped Crossing	SD	Slot Drain
ECB	Electrical Control Box	TP	Trial Pit
E-S	Electrical Sub Station Shed	TAP	External Water Tap
EP	Electric Pole	TT	Height of Tree
ERF	Estate Rail Fencing	TL	Traffic Light
ER	Earthing Rod	ToW	Top of Wall
EJB	Electric Junction Box (210v)	TP	Telegraph Pole
E-JB	Electric Junction Box (Mains)	U/C	Unknown Cover
ET/P	Electric Transformer on Pole	U/K	Unknown Tree
F/B	Flower Bed	UTL	Unable to Lift
FH	Fire Hydrant	VP	Vent Pipe
FP	Feeder Pillar	W/COB	Cobble Wall
FL	Floor Level	W/BR	Brick Wall
GY	Gully Grate	WC	Toilet Block
GAS	Gas Valve	WFP	Water Filtration Pipe
HW/S	Headwall Sandbag	WL	Water Level
HW/C	Headwall Concrete	WM	Water Meter
IC	Inspection Chamber	WO	Wash Out
IL	Invert Level	WI	Window
I/R	Iron Railings		
KO	Kerb Outlet		
LP	Lamp Post		
LP-WIFI	Post External Light & Wifi		

b t Overhead Telecom Cable
o h l Overhead Electric Cable

Topographical Surveys

The description and heights of trees should be used as a guide only

All below ground survey details have been identified from above ground therefore all details relating to these will be approximate only

Some features or location may not have been surveyed due to obstructions or not reasonably visible at the time of the survey

General

This drawing shows the existing topography of Laddus Farm and surrounding areas on the15th May 2021

Station	Easting	Northing	Level
MM1	547157.685	300890.561	2.037
MM2	547199.687	300845.512	2.925
MM3	547228.176	300870.462	2.709

SURVEY GRID AND LEVEL DATUM

Ordnance Survey (OS) national grid coordinates have been established for survey control point MM1 using GNSS and related to OSTN15(GB).The survey grid is orientated to Grid North with a scale factor of 1.000
All levels relate to the Ordnance Survey (OS) level datum using GNSS OSGM15 (GB) established at MM1

Revision	Details	Date
A	Topographical Survey	15.05.21

Disclaimer:

This plan should only be used for its original purpose. MFM accepts no responsibility for this plan if supplied to any party other than the original client.

All dimensions and or level information shown should be checked on site prior to design and construction.

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

All dimensions in metres

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Client:

Mr West
Laddus Farm
March River Side
Upwell

Project Title:

Proposed Conversion of Barn to Dwelling

Drawing Title:

Topographical Survey of Existing Barns and Surrounding Areas
3d

Scale:	Sheet Size:	Drawn:	Date:
1:250	A1	M.M	17.05.21

Drawing Number:	Revision:
16170392-WEST-LAD-3D-TOPO	A