CONSULTING ENGINEERS LTD

FLOOD RISK AND DRAINAGE ASSESSMENT

LAND NORTHEAST OF HENLEYS NURSERIES, HOLME ROAD, MARKET WEIGHTON

On Behalf of

MR & MRS METCALFE

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QUALITY MANAGEMENT

ISSUE/REVISION	Revision v1.0	Revision v1.1	Revision v1.2	Revision v1.3
Prepared By	W Walker			
Date	19 January 2024			
Signature				
Reviewed By	A Bottomley			
Date	19 January 2024			
Signature				

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APPENDICIES

1.0 INTRODUCTION

1.1 Mr and Mrs Metcalfe are proposing to develop a parcel of land located off Holme Road, Market Weighton, York with new general purpose agricultural buildings. As part of the viability of the site and to supplement a planning application, it was decided that a Flood Risk Assessment Report should be undertaken.

1.2 It is within the general development strategy of the country for development in areas where there is a risk of flooding to be assessed to avoid unnecessary increase in the requirement for flood defence. Under the National Planning Policy Framework (NPPF) and the Planning Practice Guidance (PPG), consultation is required with the Environment Agency, Water Authority, Lead Local Flood Authority and Internal Drainage Board and a Flood Risk Assessment Report should be prepared considering the development proposals and make recommendations for any flood mitigation measures.

1.3 OEC has been appointed to carry out an assessment of the site, implement appropriate consultations and prepare a Flood Risk Assessment Report, in accordance with NPPF, to satisfy the requirements of the Planning Authority.

1.4 The consultations and assessments have been undertaken between December 2023 and January 2024.

1.5 This report is based on the interpretation and assessment of data provided by third parties. Whilst every effort has been taken to ensure this information is accurate and up-to-date, OEC cannot guarantee the accuracy of third-party data and the findings of this report may change if the data is amended or updated after the date of consultation.

2.0 EXISTING SITE

General

2.1 The site is a rectangular shaped piece of land equating to an area of approximately 0.96ha. The site is located 1.85km southwest of Market Weighton and is situated at Ordnance Survey Grid Reference SE 861 406.

2.2 A site location plan is presented in Appendix A.

Current Use

2.3 The site currently forms part of agricultural land, that has previously been used for the storing of hay bales and manure.

Boundaries

2.4 The site is bound by series of open fields in a very rural setting, with a residential property situated to the north. The site is accessed off Market Weighton Road, via a private drive serving the dwelling.

Topography and Vegetation

2.5 The site has no obvious fall in any direction and is relatively flat. On closer inspection of the topographical survey, the site is undulating with falls in several directions. Levels across the site range between 14.56m A.O.D to 13.79m A.O.D.

2.6 Vegetation over the majority of the site is maintained grassland, however, there is a small area of mature vegetation in the form of trees and bushes to the south of the site.

2.7 A topographical survey is presented in Appendix B.

Existing Drainage

2.8 There is no obvious positive drainage system on the site, with surface water running off into the surrounding land, following the natural topography of the site.

2.9 The nearest watercourses to the site are un-named, situated along both the northwestern and southeastern boundaries.

2.10 The River Humber is the nearest river to the site and is located approximately 16km in a southerly direction, from the site boundary at its nearest location. However, Weighton Beck, which is classified as a main river, is located approximately 327m to the southeast.

Geology and Hydrogeology

2.11 The Geological Survey Maps of Great Britain available on the BGS website indicates that the site is underlain by the Mercia Mudstone Group – Mudstone, with Superficial Deposits consisting of the Bielby Sand Member – Sand, Clayey.

2.12 The Environment Agency's website designates the bedrock under the site as a Secondary B Aquifer. These are mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers.

2.13 The Environment Agency website shows that the site does not lie within a Groundwater Source Protection Zone.

3.0 ENVIRONMENT AGENCY CONSULTATION

3.1 The Environment Agency Flood Map, which shows area of land that could flood from rivers or the sea and are shaded blue, are presented in Appendix C. These areas do not take into account defences as water can overtop or can fail in extreme conditions. The EA flood zone classifications are defined as:-

3.2.1 Flood Zone 1 - 'Low Probability' is assessed as having a less than 1 in 1,000 annual probability of river or sea flooding in any year (less than 0.1%).

3.2.2 Flood Zone 2 - 'Medium Probability' is assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding in any year (1% - 0.1%) and between a 1 in 200 and 1 in 1,000 annual probability of flooding from the sea (0.5% - 0.1%).

3.2.3 Flood Zone 3 - 'High Probability' is assessed as having a 1 in 100 or greater annual probability of river flooding in any year (greater than 1%) and a 1 in 200 chance or greater annual probability of flooding from the sea (less than 0.5%).

3.2 The EA flood map for planning shows that the majority of the site is located within Flood Zone 1, however, a small portion is identified as Flood Zone 2 and the site, therefore, has a low to medium risk of fluvial flooding.

3.3 The flood map for surface water, which shows areas where surface water only would be expected to flow or pond in England & Wales, is also presented in Appendix C. All land in England and Wales will be within 'one' of a possible 'four' categories. The four categories shown on the map are:-

3.3.1 High - This area has a chance of flooding greater than 1 in 30 in any given year (annual probability of flooding 3.3%).

3.3.2 Medium - This area has a chance of flooding between 1 in 100 (1%) and 1 in 30 (3.3%) in any given year.

3.3.3 Low - This area has a chance of flooding between 1 in 1000 (0.1%) and 1 in 100 (1%) in any given year.

3.3.4 Very low - This area has a chance of flooding of less than 1 in 1000 (0.1%) in any given year.

3.4 The proposed development is shown to be within a very low risk area for surface water flooding, with no flood routes from third party land affecting the site.

4.0 WATER AUTHORITY CONSULTATION

4.1 Due to the very remote nature of the site it was not necessary to consult with the Water Authority.

5.0 LEAD LOCAL FLOOD AUTHORITY CONSULTATION

5.1 East Riding of Yorkshire Council (ERYC) are the Lead Local Flood Authority (LLFA) for this area. The following response would be anticipated:-

5.2 The ERYC SuDS & Surface Water Drainage Requirements for New Development document, available on the internet, should be reviewed. This confirms the following:-

5.2.1 For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.

5.2.2 Where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.

5.2.3 Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body, the runoff volume must be discharged at a rate that does not adversely affect flood risk.

5.2.4 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event.

5.2.5 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.

5.2.6 The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100 year rainfall event are

managed in exceedance [flood flow] routes that minimise the risks to people and property.

5.2.7 The drainage design should accommodate expected increases in rainfall volume due to climate change over the lifetime of the development. This should be demonstrated by increasing peak rainfall volume in hydraulic calculations by 40% or by increasing on-site storage by an additional 40%.

5.3 Surface water drainage systems are to be provided in accordance with the National Planning Policy Framework guidance and designed to control surface water runoff close to where it falls and mimic natural drainage as closely as possible. Sustainable drainage systems are to be provided as high up the following hierarchy of drainage options as reasonably practicable:

1) into the ground (infiltration)
2) to a surface water body (watercourse or pond)
3) to a surface water sewer, highway drain or another drainage system,
4) to a combined sewer

5.4 Soakaway tests should be undertaken on the site to confirm if this is a suitable method of drainage for the site. A full survey should be undertaken to determine any land drainage systems, that should either be maintained or diverted.

6.0 INTERNAL DRAINAGE BOARD CONSULTATION

6.1 The proposed development site is located within the Ouse and Humber Drainage Board catchment.

6.2 As the site sits within the boards district, the board would remind the applicant that consent (outside of the planning process) would be needed for any connection, discharge or change in the rate of discharge entering either a board maintained or ordinary watercourse, directly or indirectly.

6.3 Should discharge to a watercourse (directly or indirectly) be proposed, Greenfield run-off rates should be calculated as 1.4 l/s/ha and any outfall structure shall be recessed into the watercourse bank.

7.0 MATERIAL CONSIDERATION IN RESPECT OF NPPF AND PPG

Flood Classification

7.1 The Environment Agency Flood Map has identified that the majority of the site falls within land assessed as having less than a 1 in 1,000 annual probability of river or sea flooding in any year (less than 0.1%). In accordance with Table 1 of the PPG, the site falls within Flood Zone 1 "low probability". A small portion of the site to the north is assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding in any year (1% - 0.1%) and between a 1 in 200 and 1 in 1,000 annual probability of flooding from the sea (0.5% - 0.1%). In accordance with Table 1 of the PPG, the site also falls within Flood Zone 2 "medium probability".

7.2 Therefore, all uses of the land are appropriate within this zone, with the exception of highly vulnerable, but an assessment of the effect of surface water run-off will need to be incorporated in any Flood Risk Assessment.

End Use

7.3 The development proposal is for the construction of general purpose agricultural buildings on the site, and a site plan is presented in Appendix D.

7.4 When applying Table 2 of the PPG, the flood risk vulnerability classification shows that the proposed end use will fall into a "less vulnerable" classification.

Sequential & Exception Test

7.5 As set out in the NPPF, the aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding (Zone 1), but adds that where there are no reasonably available sites in Flood Zone 1, LPA's should take into account the flood risk vulnerability of land uses and consider reasonably available sites in Flood Zone 2 and 3, applying the Exception Test, if required.

7.6 The Environment Agency Flood Map shows the majority of the site as being located within Flood Zone 1 and it is not possible to relocate the agricultural buildings.

Therefore, it is concluded that compliance with the Sequential Test has been demonstrated, but the effect of surface water run-off will need to be incorporated in any Flood Risk Assessment.

7.7 As the Sequential Test is not applicable, it is not a requirement for an exception test to be provided.

Flood Sources

7.8 The risk of flooding to the site from all current and future potential sources of flooding has been assessed as follows:-

7.9 Flooding from Rivers (Fluvial)

There are no rivers recorded within the vicinity of the site that would pose a flood risk to the site, therefore, flooding from this source is considered low risk. This is evident from the Environment Agency Flood Maps.

7.10 Flooding from Local Watercourses (Fluvial)

Minor watercourses are recorded running along the boundaries of the site, however, these have very small catchments taking run-off from the adjacent fields, therefore, flooding from this source is considered low risk.

7.11 Weighton Beck (main river) is recorded within close proximity to the site and the Environment Agency flood map shows that in a catastrophic storm event some flooding may occur across the northern part of the site. Considering that the flood map is patchy, suggesting that the actual water depth would be nominal, it is considered that flooding from the source is low risk. Nevertheless, it should still be considered as part of the proposed development.

7.12 Flooding from the Sea (Tidal/Coastal)

The site is not located near enough to the sea to cause a problem of flooding from this source.

7.13 Flooding from Land (Surface Water)

The Environment Agency surface water flood map shows the development to be within a very low risk area for surface water flooding, with no flood routes from third party land affecting the site. Therefore, flooding from this source is considered to be low risk.

7.14 Flooding from Groundwater

The Geological Survey Maps of Great Britain available on the BGS website indicates that the site is underlain by the Mercia Mudstone Group – Mudstone, with Superficial Deposits consisting of the Bielby Sand Member – Sand, Clayey. The presence of the watercourses adjacent to the site and throughout the surrounding area also indicate that the surface ground conditions are impermeable, therefore, flooding from this source is considered to be low risk. Nevertheless, it should still be considered as part of the proposed development.

7.15 Flooding from Sewer

Due to the very remote nature of the site there are no sewers recorded within the vicinity of the site, therefore, flooding from this source is considered to be negligible.

7.16 Flooding from Reservoirs, Canals or Artificial Sources

The Environment Agency produce maps which show the expected inundation area should a reservoir fail and release its capacity. It should be noted, however, that reservoir flooding is extremely unlikely to happen and there has been no loss of life in the UK from reservoir flooding since 1925. The proposed development site is shown to be within the maximum extent of reservoir flooding.

7.17 There are no canals or other artificial sources within the vicinity of the proposed development site that would pose a risk of flooding on site, therefore, the risk from this source is deemed to be negligible.

7.18 Table 1.0 below, summarises the findings of the detailed assessment and explanations of the flood risk issues on the site.

Table 1.0 – Degree of risk from each source of flooding

FLOOD SOURCE	RISK
River (Fluvial)	**Low**
Watercourse (Fluvial)	**Low**
Sea (Tidal/Coastal)	**Negligible**
Land (Surface Water)	**Low**
Groundwater	**Low**
Sewer	**Negligible**
Other – Reservoir	**Low**
Other - Canals	**Negligible**

Climate Change

7.19 The NPPF and PPG has indicated that the Global Sea level will continue to rise, depending on greenhouse gas emissions, and the sensitivity of the climate system and there will be an increase in rainfall across the country.

7.20 United Kingdom climate change guidance was revised in July 2021 for peak river flows and in February 2016 for peak rainfall intensities. With regards to peak river flows, a regionalised approach has now been adopted to climate change impacts, based upon management catchments of the river basin district of the proposed development site and the flood risk vulnerability classification.

7.21 The proposed development site is situated within the Hull and East Riding Management Catchment, which, based on the "central allowance" climate change scenario, could see peak river flows increase by 20% by the 2080s. As the majority of the site is located in Flood Zone 1, an increase of 20% in river flows is deemed unlikely to affect the proposed development site.

7.22 In accordance with the revised climate change data, the published figures show that, for an expected life of greater than 50 years for any new development, the anticipated increase in rainfall could be up to 40%, subject to the location within the country and the drainage system should be designed in accordance with this requirement. The East Riding of Yorkshire Council flood risk requirements for managing on/off-site flood

risk from fluvial flooding is to assess the development using a 40% allowance for climate change for the 1 in 100 year event.

7.23 Due to the topography of the land and surrounding area, overland run-off from adjoining land is unlikely to be an issue. Therefore, any run-off from outside the site will be insignificant and, on this basis, only rainfall falling within the site boundaries will need to be considered in respect of climate change.

Flood Mitigation

7.24 As the majority of the site falls within Flood Zone 1, with a small portion to the north falling within Flood Zone 2, flood mitigation measures are only required in the event of a catastrophic storm. The following precautionary flood mitigation measures are, therefore, recommended:-

7.24.1 The finished floor levels (FFL) to the buildings shall be raised a minimum of 150mm above external levels.

7.24.2 Ground floors shall comprise solid concrete slabs.

7.24.3 Incoming electricity supplies shall be raised above ground floor level and ground floor electric sockets shall be served by loops from upper level.

7.24.4 In the unlikely event of flooding of the site, it would be appropriate to design external levels with falls away from the proposed buildings.

Emergency Egress During Times of Flood

7.25 It is a requirement under the PPG that occupants should be able to egress any building during times of flood, without being trapped by flood conditions.

7.26 As the majority of the site falls within Flood Zone 1, no special mitigation measures are required for emergency egress during times of flood.

8.0 EXISTING AND PROPOSED DRAINAGE

Sustainable Drainage

8.1 In order to comply with the requirements of NPPF, it will be necessary to consider aspects of Sustainable Drainage techniques for the new development. The Geological Survey Maps of Great Britain available on the BGS website indicates that the site is underlain by the Mercia Mudstone Group – Mudstone, with Superficial Deposits consisting of the Bielby Sand Member – Sand, Clayey. Considering the anticipated geology beneath the site and presence of local watercourses suggesting that the ground is impermeable, it is considered that the site is unsuitable for the disposal of surface water using infiltration techniques.

Drainage

8.2 It is a requirement to ensure that surface water run-off from any proposed development has negligible consequence on downstream areas either in sewer capacity or discharge to watercourse.

Existing Surface Water Run-Off

8.3 The site is greenfield and, therefore, in accordance with current Guidelines and Regulations, the IH124 method of calculating greenfield run-off rates would usually apply. However, as the site is located within the Ouse and Humber Drainage Board Catchment, greenfield run-off rates should be calculated as 1.4 l/s/ha.

Proposed Surface Water Drainage

8.4 Greenfield run-off rates on the proposed development would be negligible and any positive drainage system would create a blockage risk due to the very small orifice size required on any flow control device installed. Therefore, in order to provide a more sustainable solution that mimic's the existing surface water regime, it is proposed that the run-off is simply allowed to discharge onto the adjacent land. Run-off will then flow into the surrounding land in the same manner as the pre-development situation, creating no increased flood risk to downstream areas.

9.0 CONCLUSION

9.1 The majority of the site falls within Flood Zone 1 and the Sequential Test is satisfied. However, in order to accommodate the possibilities of flood from a catastrophic storm, the following precautionary flood mitigation measures are recommended:-

9.1.1 The finished floor levels (FFL) to the buildings shall be raised a minimum of 150mm above external levels.

9.1.2 Ground floors shall comprise solid concrete slabs.

9.1.3 Incoming electricity supplies shall be raised above ground floor level and ground floor electric sockets shall be served by loops from upper level.

9.1.4 In the unlikely event of flooding of the site, it would be appropriate to design external levels with falls away from the proposed buildings.

9.2 Sustainable Drainage Systems of infiltration techniques are considered to be unsuitable on this particular site due to the geological parameters of the natural soils.

9.3 A formal positive drainage system would result in a very small orifice size required on any flow control device installed. Therefore, in order to provide a more sustainable solution that mimic's the existing surface water regime, it is proposed that the run-off is simply allowed to discharge onto the adjacent land. Run-off will then flow into the surrounding land in the same manner as the pre-development situation, creating no increased flood risk to downstream areas.

9.4 No special mitigation measures are required for emergency egress during times of flood.

9.5 Subject to compliance with the above, the proposed development can satisfy the requirements of the National Planning Policy Framework and the Planning Practice Guidance in relation to flood risk.

A P P E N D I X A: SITE LOCATION PLAN

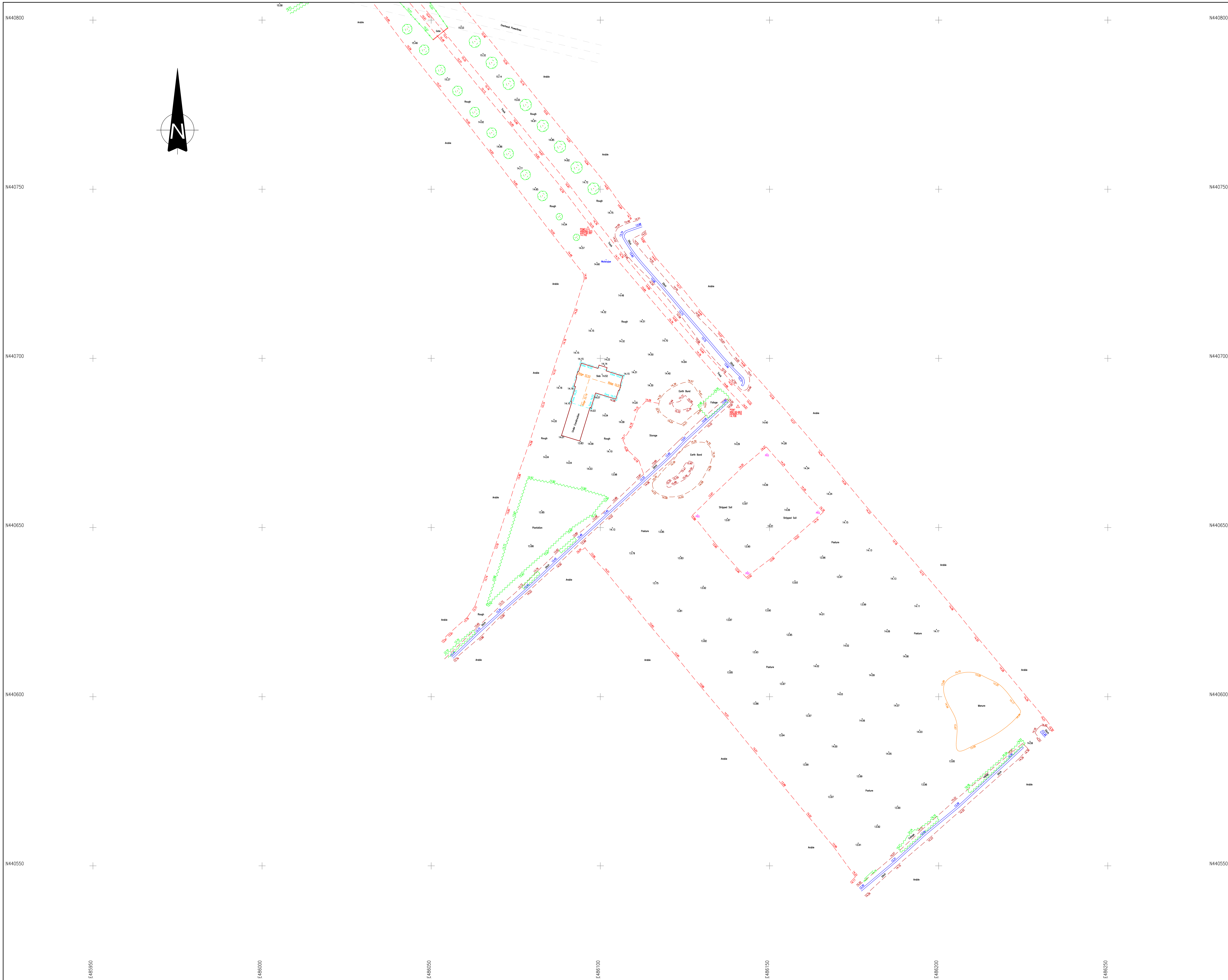
MR & MRS METCALFE

LAND NORTH EAST OF HENLEYS NURSERIES, HOLME ROAD, MARKET WEIGHTON

SITE LOCATION PLAN

GRID REFERENCE: SE 861 406

A P P E N D I X B: TOPOGAPHICAL SURVEY



SYMBOL LEGEND

Borehole	Benchmark
Bollard	Bus Stop
Electric Box	Electricity Pole
Fence Post	Gas Stop Valve
Gate Post	Gas Marker
Gully	Gas Well
Kerb Outlet	Litter Bin
Leachate Chamber	Lamp Post
Manhole Point	MH Triangular
Wooden Peg	Ground Marker
Marker Post	Pylon
Earth Rod	Sample Point
Sign Post	Spot Height
Eave Level	Ridge Level
Stile	Survey Station
Traffic Camera	Telephone Box
Trial Pit	Telegraph Pole
Deciduous Tree	Road Sign
Valve	Vent
Water Meter	Letter Box
MH Circular	Knockout Pot

LINETYPE LEGEND

Bridge
Bottom of Bank
Building
Canopy Edge
Concrete Edge
Ditch
Drop Kerb
Overhead Cable
Fence
Gate
Kerb
Path
Pipe Line
River
Surface Water Drain
Railway Line
Road Centre Line
Tarmac Edge
Top of Bank
Track
Wall
Verge
Flagstone Paving
Stone
Hedgeline
Grass Edge

MANHOLE LEGEND

MHCT	Cable Television
MHEL	Electricity
MHGA	Gas
MHSW	Surface Water
MHFW	Foul Water
MHBT	British Telecom
MHWT	Water
CL	Cover Level

ABBREVIATIONS

LP.	Lamp Post
TP.	Telegraph Pole
EP.	Electricity Pole
SP.	Sign Post
TS.	Tarffic Sign
MH.	Manhole
CL.	Cover Level
MP.	Marker Post
GU.	Gully
TTP.	Tactile Paving
CATV.	Cable Television Point
WM.	Water Meter
WSV.	Water Stop Valve
GSV.	Gas Stop Valve
RE.	Rodding Eye
GU.	Gully
FH.	Fire Hydrant
CATV.	Cable Television Point
WM.	Water Meter
WSV.	Water Stop Valve
GSV.	Gas Stop Valve
IC.	Inspection Cover

SURVEY IS ORIENTED TO ORDNANCE SURVEY NATIONAL GRID. POSITIONS FIXED BY GPS ACTIVE NETWORK TO OS FLAT PLANE, ORIGIN POINT - PGM1. LEVELS TO OSGM15.

THIS SURVEY SHOWS PHYSICAL SITE BOUNDARIES ONLY. CONFIRMATION OF LEGAL OWNERSHIP BOUNDARIES SHOULD BE OBTAINED BY REFERENCE TO THE H.M. LAND REGISTRY TITLE PLAN

THE PLAN SCALE IS FOR GUIDANCE ONLY.
DO NOT SCALE DIRECTLY .
IF IN DOUBT, CONSULT LATITUDE SURVEYS

REV.	DESCRIPTION	DATE

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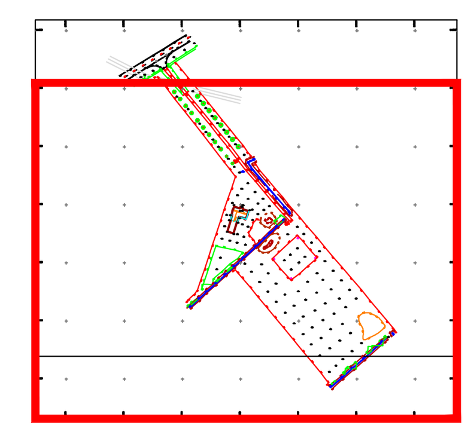
CLIENT



JOB TITLE

MARKET WEIGHTON ROAD,
MARKET WEIGHTON

DRAWING TITLE

TOPOGRAPHICAL SURVEY

DRAWN	SIGNATURE	DATE	STATUS
TD		23/06/2023	FOR COMMENT ☐ FOR APPROVAL ☐
APPROVED	SIGNATURE	DATE	DRAFT ☐ FINAL ☑

SCALE	SHEET	DRAWING NO.	REVISION
1:500	A1	PS1107-004	-

A P P E N D I X C: ENVIRONMENT AGENCY CONSULTATION

Flood map for planning

Your reference	Location (easting/northing)	Created
<Unspecified>	**486146/440612**	**19 Jan 2024 8:37**

Your selected location is in flood zone 2, an area with a medium probability of flooding.

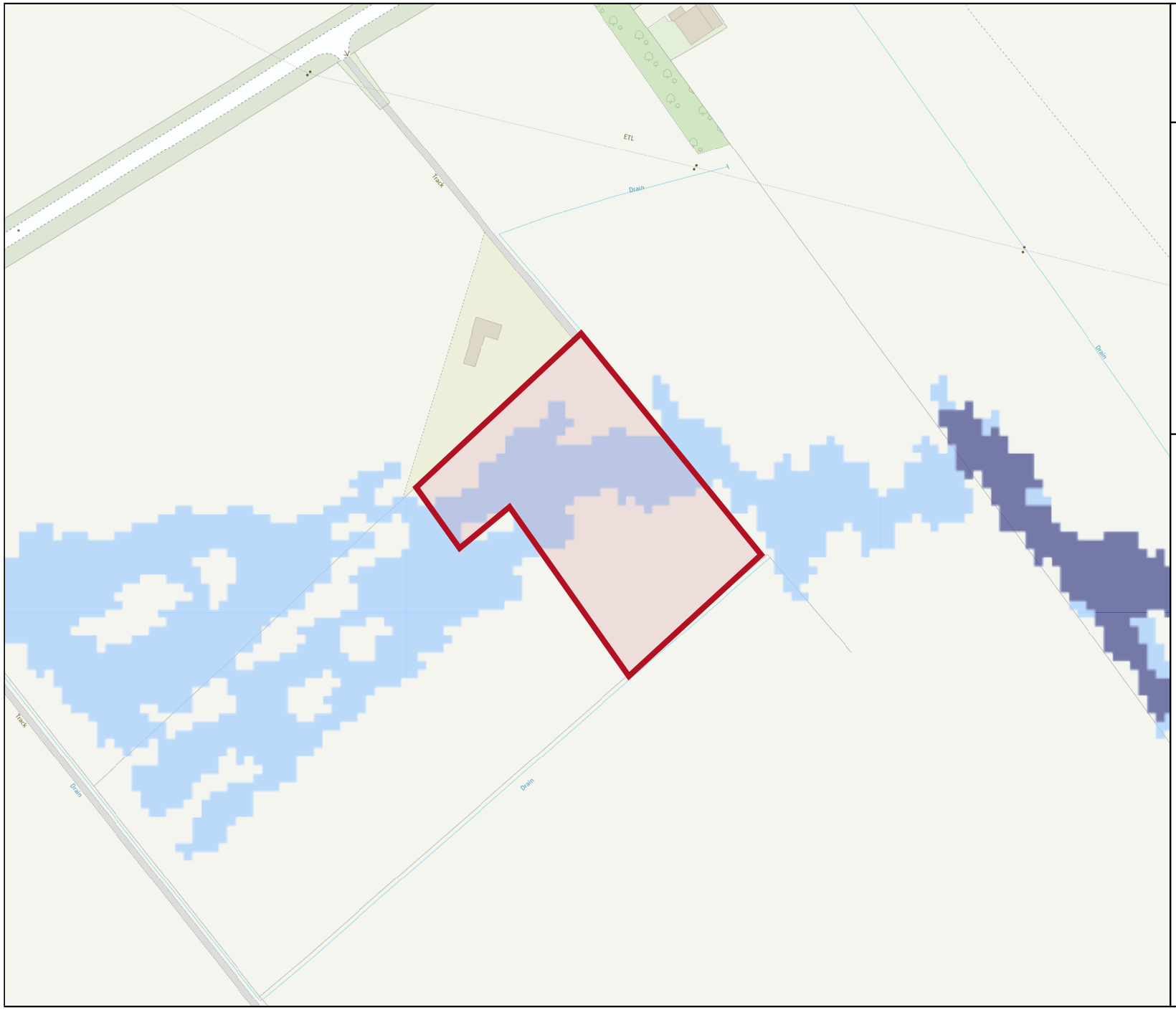
This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see www.gov.uk/guidance/flood-risk-assessment-standing-advice)

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.



Environment Agency

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
486146/440612

Scale
1:2500

Created
19 Jan 2024 8:37

- Selected area
- Flood zone 3
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Water storage area

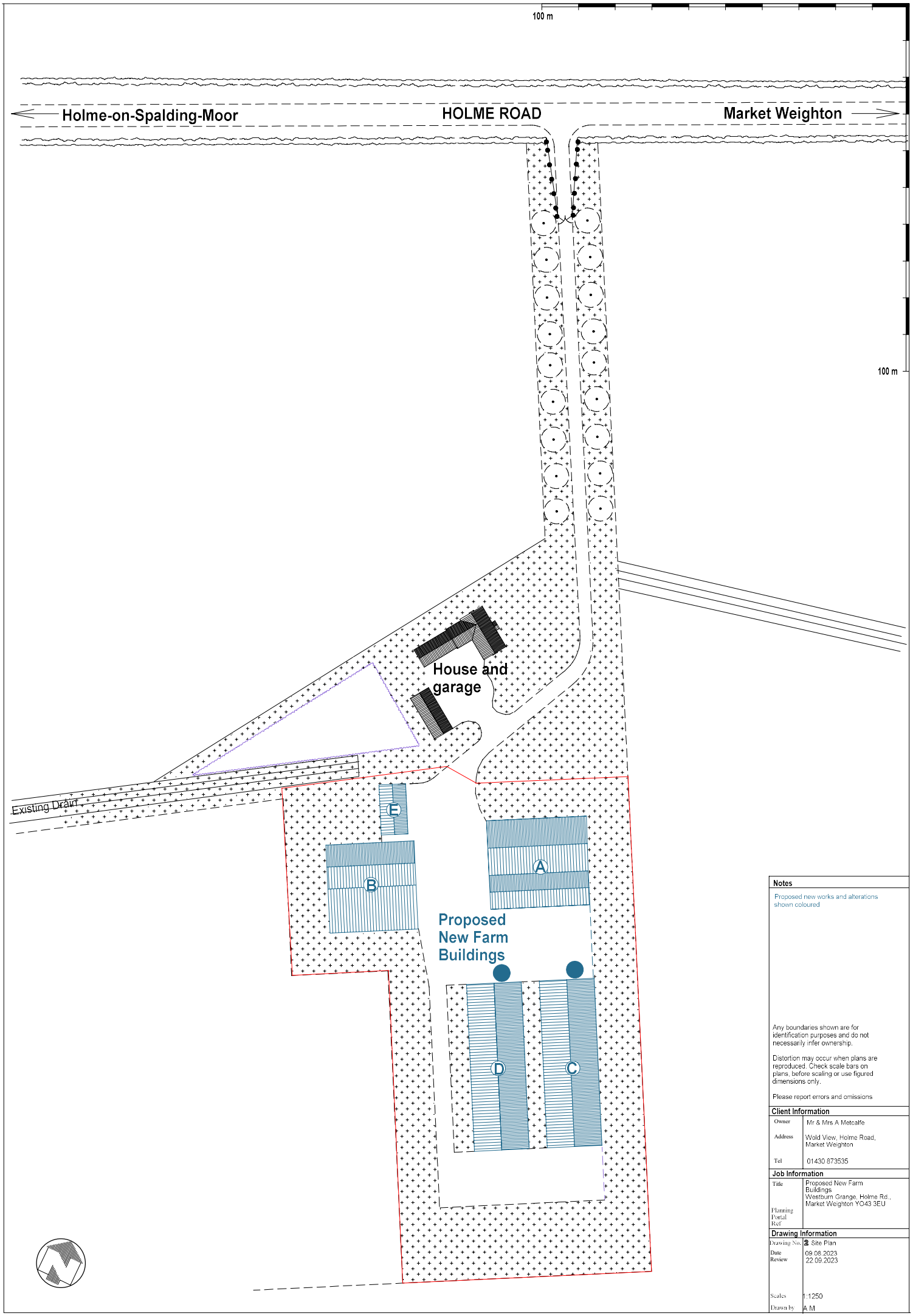
0 20 40 60m

MR & MRS METCALFE

LAND NORT EAST OF HENLEYS NURSERIES, HOLME ROAD, MARKET WEIGHTON

ENVIRONMENT AGENCY SURFACE WATER FLOOD MAP

APPENDIX D: SITE PLAN



Notes

Proposed new works and alterations shown coloured

Any boundaries shown are for identification purposes and do not necessarily infer ownership.

Distortion may occur when plans are reproduced. Check scale bars on plans, before scaling or use figured dimensions only.

Please report errors and omissions

Client Information

Owner	Mr & Mrs A Metcalfe
Address	Wold View, Holme Road, Market Weighton
Tel	01430 873535

Job Information

Title	Proposed New Farm Buildings Westburn Grange, Holme Rd., Market Weighton YO43 3EU
Planning Portal Ref	

Drawing Information

Drawing No.	2 Site Plan
Date	09.08.2023
Review	22.09.2023
Scales	1:1250
Drawn by	A M