FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT AT
45 WATER GATE, QUADRING

FINAL REPORT

ELLINGHAM CONSULTING LTD

ECL0088/ ARC SURVEY AND DESIGN CONSULTANTS LTD

DATE AUGUST 2019

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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 ARC Survey and Design Consultants Ltd in respect of a development that consists of one dwelling at 45 Water Gate, Quadring.

A planning application for the proposed development is to be submitted by ARC Survey and Design Consultants Ltd.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located at 45 Water Gate, Quadring, Spalding, PE11 4PY. The National Grid Reference of the site is 52265/33326.

The location of the site is shown in Figure 1.

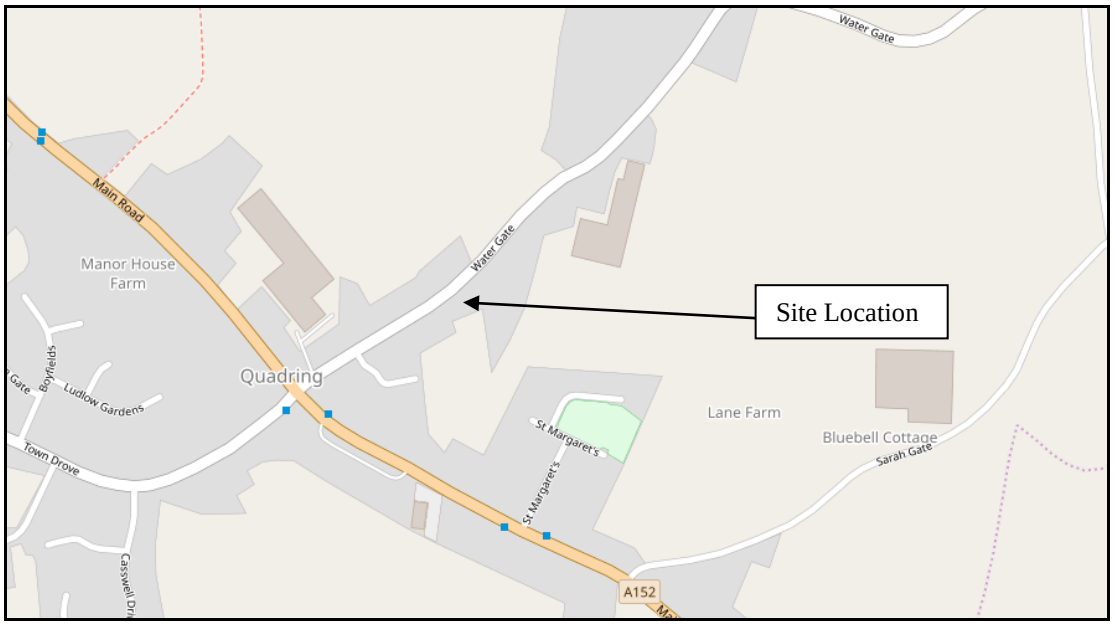


Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site is on the southern side of Water Gate and is a residential plot. There is a bungalow on the site surrounded by a garden. A riparian drain forms the eastern boundary of the site. The area of development is approximately 0.04 hectares.

A topographic survey of the site has been undertaken and is provided in Attachment 2. Ground levels around the existing bungalow are typically +2.7m OD. Levels within the rear garden of the existing property increase to +2.8m OD and +2.9m OD. The level of Water Gate adjacent to the site is +3.3m OD.

The site is in the Welland and Deepings Internal Drainage Board (IDB) District. The site and the surrounding land are within the Risegate Eau catchment and drain in an easterly direction to Risegate Eau Pumping Station that discharges to the River Welland.

The online British Geological Survey maps indicate that the site is likely to be underlain by Oxford 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 one new dwelling. The proposed dwelling will have 2 storeys. The existing bungalow on the plot will be demolished.

2.4 Local Development Documents

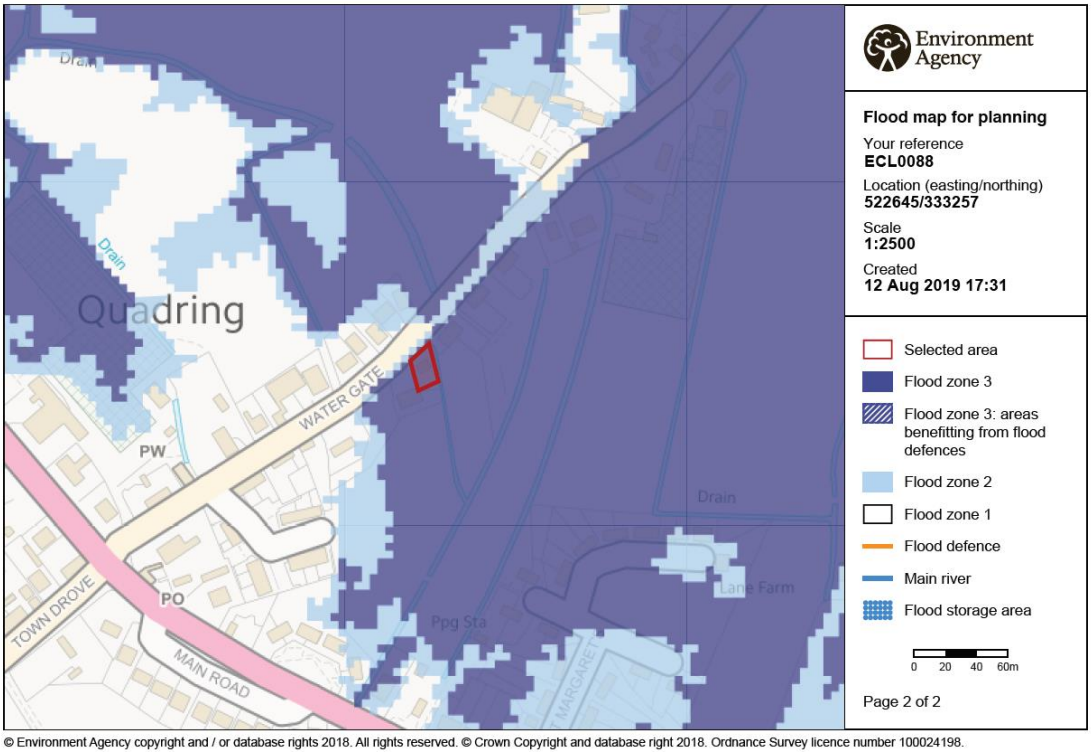
The South East Lincolnshire Local Plan 2011 – 2036, adopted in March 2019, is the Local Plan for the district. Policy 4: Approach to Flood Risk states the requirements for flood risk reduction.

The South East Lincolnshire Level 1 and Level 2 Strategic Flood Risk Assessment (SFRA) was prepared in June 2017.

The Joint Lincolnshire Flood Risk and Drainage Management Strategy has been prepared by Lincolnshire County Council as the Lead Local Flood Authority. The purpose of the Strategy is to increase the safety of people across Lincolnshire by reducing the number of people at risk of flooding, increasing the resilience of local communities and reducing the impact of flooding

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.



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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 (annual probability between 1% and 3.3%);
- the site has a low risk of surface water flooding (annual probability between 0.1% and 1%); and
- the site is not within an area at risk of reservoir flooding.

Within the South East Lincolnshire SFRA:

- the Residual Flood Hazard Map for the present day 1% fluvial event and 0.5% tidal event shows that the site is outside of the 'low hazard' area;
- the Residual Flood Hazard Map for the 2116 1% fluvial event and 0.5% tidal event shows that the site is outside of the 'low hazard' area;
- the Residual Peak Depth Map for the present day 1% fluvial event and 0.5% tidal event shows that the site is not within an area of flooding; and
- the Residual Peak Depth Map for the 2116 1% fluvial event and 0.5% tidal event shows that the site is not within an area of 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 and Exception Test

The Sequential Test and Exception Test are required to be applied by the Local Planning Authority.

Large parts of the South Holland district close to the River Welland lie within Flood Zone 3. As such opportunities to undertake the development at an alternative site within Flood Zone 1 are very limited. At this location it is not possible to position the development on higher ground within the proposed site.

The SFRA states that it is necessary to use the refined flood risk information (hazard and depth maps) to assist with the application of the sequential test. The refined flood risk information contained within the SFRA demonstrates the site is not at risk during the 1% fluvial event and 0.5% tidal event. The site therefore has a low probability of flooding and is considered to pass the sequential test.

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 Local Plan has a target of a net increase of at least 11,681 dwellings in South Holland over the 25-year local plan period. The Plan considers this new housing is required to ensure the sustainability of the Local Plan area. The proposed development will contribute to this target.

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 approximately 6km north east of the tidal River Welland downstream of Spalding. The River Glen, a tributary of the River Welland, is a similar distance to the south east of the site. The defences on the River Welland and the River Glen 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 every 5 years.

There is an extensive local drainage network managed by Welland and Deepings IDB. There is an IDB maintained watercourse, the Watergate Dyke, 80m to the east of the site. The site and the surrounding land drains to the Risegate Eau which is 3km south of the site at its closest. The catchment drains in an easterly direction to Risegate Eau Pumping Station which discharges to the tidal River Welland.

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 Boards assets are commensurate with the standard of protection that is sought.

Approximately 6km west of the site is the South Forty Foot Drain. This is the primary channel for drainage of the Black Sluice Level and is the responsibility of the Black Sluice IDB. The drain discharges to the River Witham in Boston.

Current maintenance standards of the Welland and Deepings IDB, Black Sluice IDB and the Environment Agency are generally good.

4.2 Sources of Flooding

The potential sources of flooding identified during this assessment are:

- local blockages to the Welland and Deepings IDB main drain system;
- an event in the local drainage network greater that exceeds that standard of protection;
- failure of Risegate Eau Pumping Station;
- overtopping and / or breaching of the River Glen defences; and
- overtopping and / or breaching of the River Welland tidal defences.

4.3 Probability of Flooding

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

The standard of drainage provided by Welland and Deepings IDB and Black Sluice IDB is assessed at 2% annual probability (1 in 50 chance each year), 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 Welland and Deepings IDB and Black Sluice IDB main drains incorporating a freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).

The River Welland tidal defences provide protection during the 0.5% annual probability (1 in 200 chance each year) tidal event. The River Glen has defences that provide protection during the 1% annual probability (1 in 100 chance each year) fluvial event.

4.4 Historic Flooding

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

4.5 Climate Change

Climate change is likely to impact the site through increased rainfall intensity and duration affecting the local drainage network and increased tide levels.

The River Welland tidal defences provide protection during the 0.5% annual probability (1 in 200 chance each year) event inclusive of the effects of climate change. The estimated tide level during this event is +7.13m OD and typical defence levels are in excess of +7.5m OD. In summary the existing systems and defences are appropriate for the design life of the development (i.e. 100 years).

4.6 Residual Risks

The South East Lincolnshire SFRA includes maps demonstrating the impact of climate change in 2116. The Residual Peak Depth maps within the SFRA show that when the climate change allowances are applied to the 1% annual probability fluvial (1 in 100 chance each year) and the 0.5% annual probability tidal (1 in 200 chance each year) event the site is not at risk.

The residual risk to the site is during an event that exceeds the standard of protection provided by the defences. In these events the risk to the site is lowered due to the distance of the site from the River Welland and River Glen.

5.0 FLOOD RISK MITIGATION AND RESIDUAL RISKS

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Risegate Eau Pumping Station due to mechanical breakdown or the power supply being disrupted would increase this risk.

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. During the design life of the development the site is not at risk. Over time there will be a gradual increase in risk to the site due to climate change.

There is a residual risk to the site during an exceedance event. The risk from the River Welland and River Glen is reduced due to the distance of the site from these watercourses. If during an extreme event the site was affected, the situation would not be sudden.

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

5.2 Mitigation Measures

Based upon the information available during the preparation of this flood risk assessment, in order to mitigate against the remote risk of flooding it is recommended that the floor level of the dwelling is 0.3m above ground levels with 0.3m of flood resilient construction above finished floor level.

The developer should ensure that the eventual occupier of the dwelling is 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 occupier of the dwelling should register with the Floodline Direct Warnings Service to receive any future flood warnings.

It is recommended that surface water run-off is discharged to soakaways to BRE365 design requirements and therefore water from the site will not affect any adjoining properties or increase the flood risk elsewhere.

Should there be a failure of Risegate Eau Pumping Station and conditions were such to put properties and land at risk of flooding, the IDB would take emergency action to maintain the drainage level of service by utilising temporary pumping equipment.

6.0 CONCLUSIONS AND RECOMMENDATIONS

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

- The proposed development is in a defended floodplain. It is in the floodplain of the River Welland and protected during the 1% annual probability (1 in 100 chance each year) fluvial event and 0.5% annual probability (1 in 200 chance each year) tidal event. During the design life of the development the site would not be at risk in the event of a breach of the tidal defences.

- The site is located within an Internal Drainage Board 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 Welland and Deepings IDB main drains incorporating a significant freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).

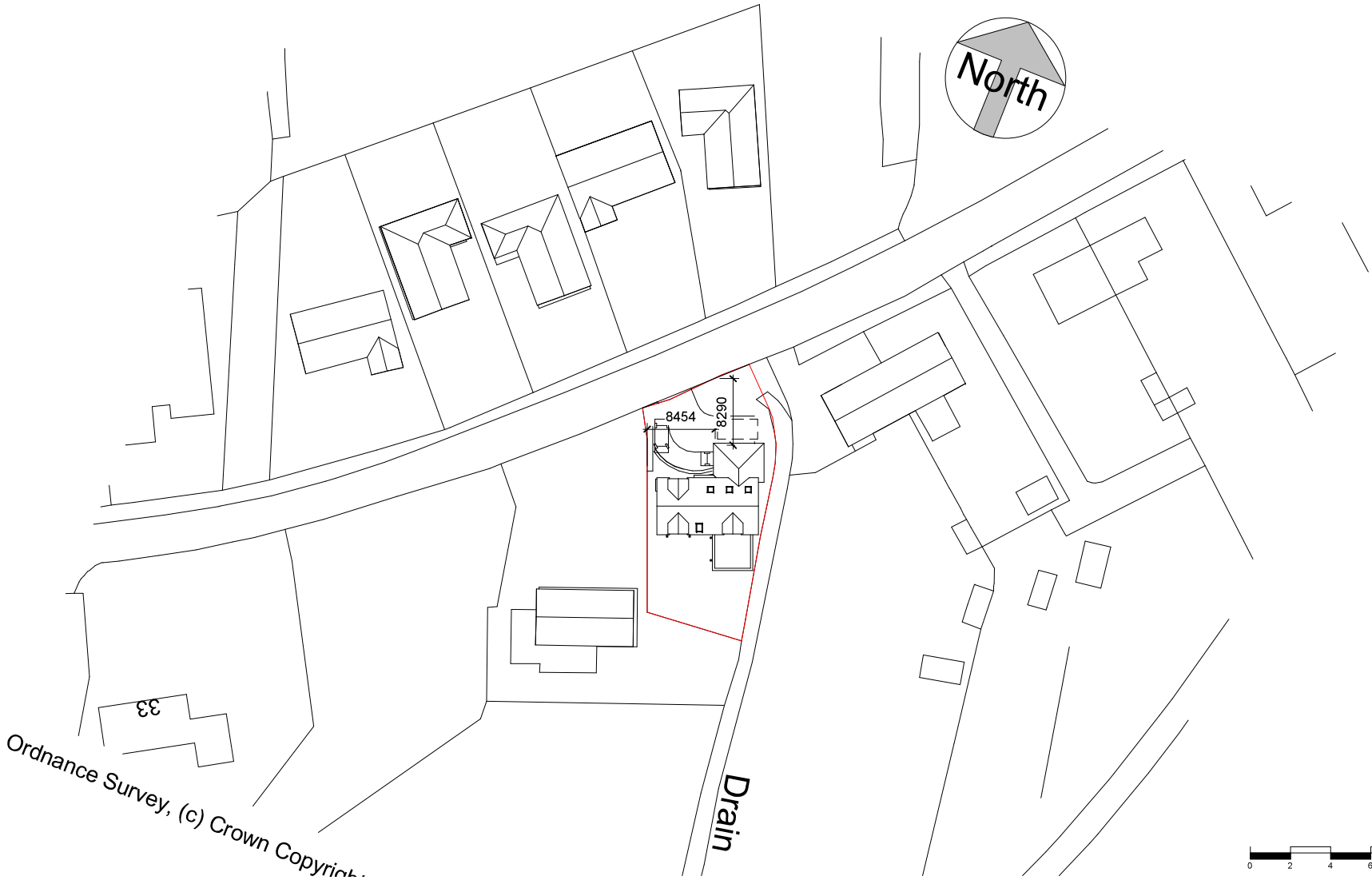
- It is recommended that the floor level is 0.3m above ground level with 0.3m of flood resilient construction above finished floor level to mitigate against the risk of flooding during the lifetime of the development. Surface water run-off from the development should be discharged to soakaways to BRE365 design requirements so that adjoining land and properties are not affected.

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

ATTACHMENT 1

SITE PLAN - PROPOSED

(Dwg P101)



1 Proposed Site Plan

1 : 500

1 to 200
0 2 4 6 8 10

1 to 500
0 5 10 15 20 25

1 to 1250
0 10 20 30 40 50 60

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No.	Description	Date

Enter address here

Project Name

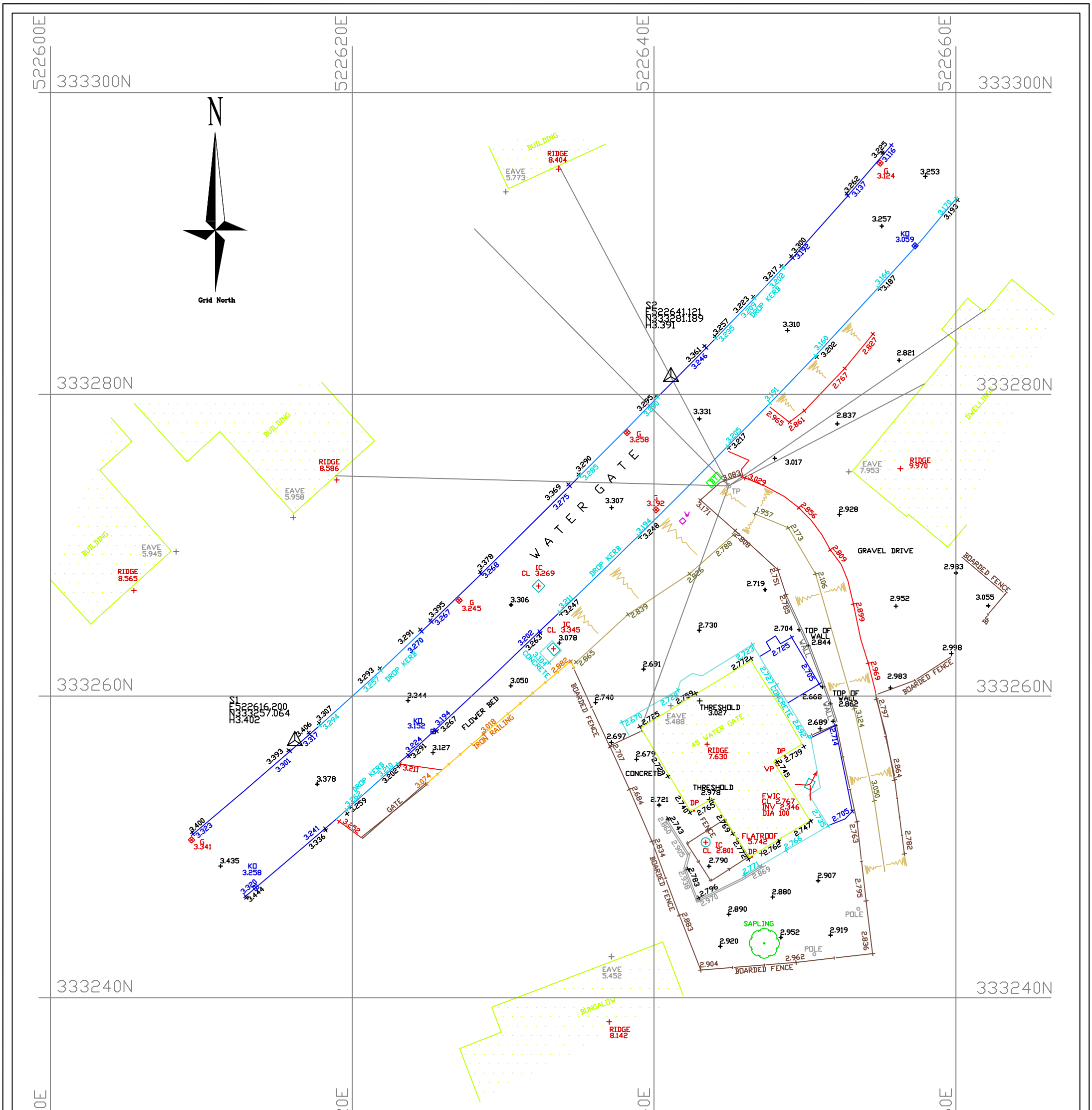
Site Plan Proposed

Project number	Project Number	P101
Date	13.08.19	
Drawn by	RG	
Paper	A3	Scale 1 : 500

13/08/2019 18:14:03

ATTACHMENT 2

TOPOGRAPHIC SURVEY
(DWG 001-WATER GATE)



TOPOGRAPHICAL SURVEY OF LAND AT 45 WATER GATE, QUADRING.

SURVEY RELATED TO OSGB36(15) ORDNANCE SURVEY GRID CO-ORDINATES

THIS SURVEY IS USING A SCALE FACTOR OF 1.0000000 AND IS BASED ON USING STATION 1 WITH REFERENCE TO STATION 2.

Revisions	
A	
B	
C	

Drawing No: 001-WATER GATE | Revision | Sheet

SURVEYOR: HDS | DATE 22/06/2019

CLIENT

MORE SPACE
GARAGE CONVERSIONS

SCALE
1:250

SHEET SIZE
A3

NOTES

1. GRID AND LEVELS RELATED TO ORDNANCE SURVEY GPS NETWORK
2. ALL LEVELS ON KERB LINES ARE CHANNEL LEVELS UNLESS NOTED OTHERWISE.
3. SERVICE ROUTES HAVE BEEN IDENTIFIED BY LIFTING OF INSPECTION COVERS & VISUAL INSPECTION FROM THE SURFACES.
4. FOR SAFETY REASONS, DRAINAGE PIPE SIZES HAVE BEEN DETERMINED FROM THE SURFACE AND SHOULD BE TREATED AS APPROXIMATE ONLY.
5. DRAINAGE PIPE SIZES ARE DIAMETERS AND ARE SHOWN IN MILLIMETERS.
6. TREE HEIGHTS ARE AN ESTIMATION ONLY, UNLESS A LEVEL IS PROVIDED, WHICH IS DENOTED BY A BOX.