

FLOOD RISK ASSESSMENT FOR RESIDENTIAL DEVELOPMENT AT HARRINTON DRIVE, CROWLAND

FINAL REPORT

ECL0408/TMV ARCHITECTS

DATE JANUARY 2020

ELLINGHAM CONSULTING LTD

Email: tim@ellinghamconsulting.co.uk

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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 Mr J Findings in respect of a development that consists of one residential dwelling at Harrington Drive, Crowland.

A planning application for the proposed development is to be submitted by TMV Architects.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located on land next to 10 Harrington Drive, Crowland, PE6 0AT. The National Grid Reference of the site is 52408/30939.

The location of the site is shown in Figure 1.



Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site is an undeveloped plot on the southern side of Harrington Drive, Crowland. The site is currently grassed. There are residential dwellings to the east and west of the site and a paddock to the south. The area of development is approximately 0.03 hectares.

A topographic survey has been undertaken and is provided in Attachment 1. The site is flat with typical ground levels between +1.2m OD and +1.3m OD. The carriageway level of Harrington Drive alongside the site is +1.25m OD.

The site is in the North Level Internal Drainage Board (IDB) district. Surface water at the site would naturally drain through soakaway and hence to the IDB drainage system. There is a riparian drain on the southern side of the paddock that is to the south of the site. The nearest IDB Main Drain is Riddington's Drain which is on the southern side of James Road approximately 160m south of the site.

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 peat.

2.3 Proposed Development

The proposed development consists of one dwelling. The dwelling will be single storey. A Site Plan is provided in Attachment 2.

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 Flood Zones

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.

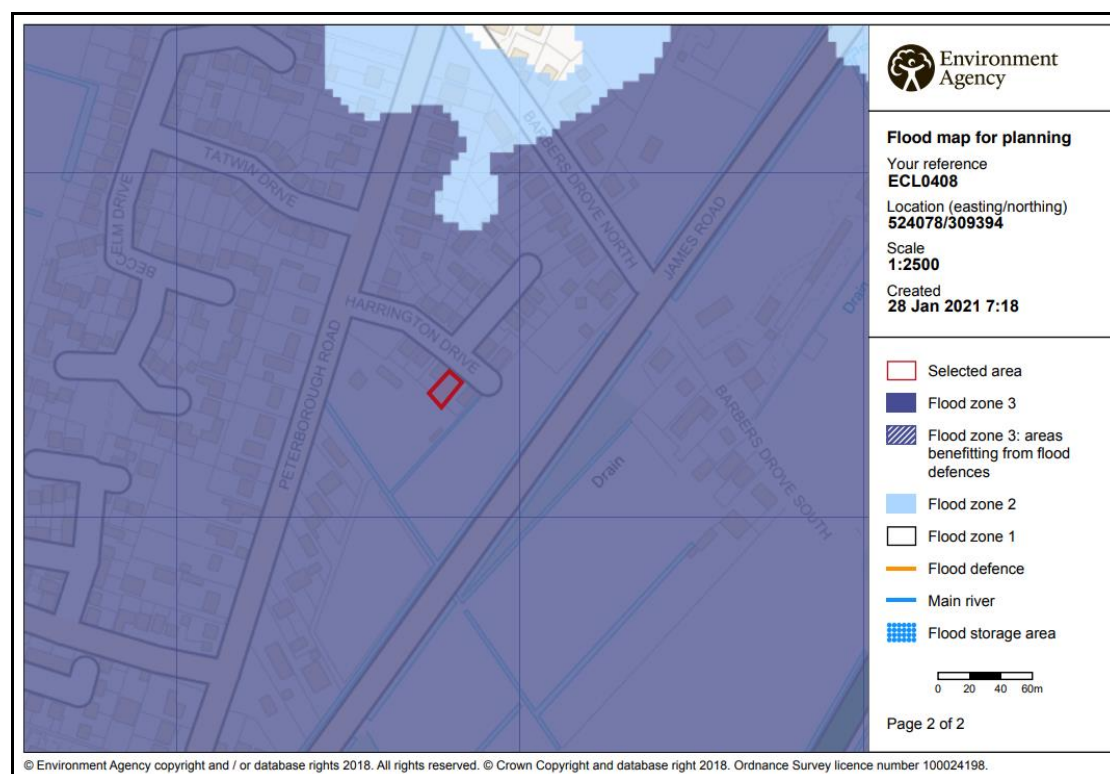


Figure 2 – Environment Agency Flood Map for Planning

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 within an area at risk of reservoir flooding.

Table 1 shows the level of risk at the site within the South East Lincolnshire SFRA.

SFRA Map	Present Day	2116
Residual Flood Hazard Map for the 1% fluvial and 0.5% tidal event	The site is in the 'Danger for Most' area	The site is in the 'Danger for Most' area
Residual Peak Depth Map for the 1% fluvial and 0.5% tidal event	The peak flood depth is between 0.5m and 1.0m.	The peak flood depth is between 0.5m and 1.0m.

Table 1 – Flood Risk within SFRA Maps

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.

Large parts of the South Holland district between the River Welland and River Nene lie within Flood Zone 3. As such the opportunities to undertake the development at an alternative site with a lower flood risk are limited. The River Welland has defences that provide protection during the 0.5% annual probability (1 in 200 chance each year) event including climate change. The site therefore has a low probability of flooding.

The District Council's 5-year Housing Land Supply Assessment identifies four large sites within the settlement of Crowland. The four sites have been reviewed to determine whether they provide an alternative location for development at a lower flood risk. Based upon the information within the SFRA the alternative sites have a similar level of flood risk because they are in Flood Zone 3 and at each development part of the site is at risk of a breach with potential depths between 0.5m and 1.0m. As such it is reasonable to conclude that there are no available sites within Crowland that offer a lower level of flood risk and therefore the development 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 1.6km south east of the River Welland. Crowland Washes provides floodplain storage for the River Welland. The village of Crowland is protected from the River Welland by the Corporation Bank approximately 900m west of the site.

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 North Level Internal Drainage Board. There is an IDB Main Drain, Riddington's Drain, approximately 160m south which discharges to the New South Eau and then into the North Level main Drain. The North Level Main Drain outfalls to the River Nene via Tydd Pumping Station.

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.

Current maintenance standards of the North Level Internal Drainage Board and the Environment Agency are generally good.

4.2 Sources of Flooding

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

- local blockages to the North Level IDB drainage system;
- an event in the drainage network that exceeds the standard of protection;
- failure of Tydd Pumping Station; and
- overtopping and breaching of the Crowland Wash Corporation Bank.

4.3 Probability of Flooding

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

The standard of drainage provided by North Level 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 North Level IDB high priority watercourses incorporating a freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).

The Corporation Bank provides protection against the 1% annual probability (1 in 100 chance each year) event. The defence falls within the Reservoirs Act 1975 legislation. As such it is inspected annually by a Supervising Engineer who will assess its structural integrity to provide protection to people and property.

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 flood levels. The Corporation Bank provides protection against the 1% annual probability (1 in 100 chance each year) event including climate change.

4.6 Residual Risk

There is a residual risk of flooding at the site should a breach occur. The South East Lincolnshire SFRA includes maps demonstrating the impact of a breach in 2116. The proposed development is a single storey dwelling and therefore it is necessary to consider the potential depth of flooding during the 0.1% annual probability (1 in 1000 chance each year) event. An extract from this map is shown in Figure 3 below.



Figure 3 – SFRA 2116 Residual Peak Depth Map

The map shows that the site is at risk with depths between 1m and 2m. To the west of the site the dwellings and Harrington Drive carriageway have flood depths of between 0.5m and 1.0m. Using LiDAR, the topographic survey and the residual peak depth map a flood level of +2.4m OD can be estimated.

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Tydd Pumping Station could lead to an increased 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.

The SFRA considers the residual risk associated with a breach in the defences. The residual flood level during the 2115 0.1% annual probability (1 in 1000 chance each year) event is +2.4m OD.

The proposed arrangement increases the impermeable area and therefore there will be an increased volume of surface water that has the potential to increase flood risk.

5.2 Mitigation Measures

Based upon the information available during the preparation of this flood risk assessment, to mitigate against the remote risk of flooding it is recommended that:

- the finished floor level of the dwelling is at a minimum level of +2.4m OD; and
- there will be 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.

Should there be a failure of Tydd Pumping Station and conditions were such to put properties and land at risk of flooding, the Internal Drainage Board 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 development will not affect any adjoining properties or increase the flood risk elsewhere.

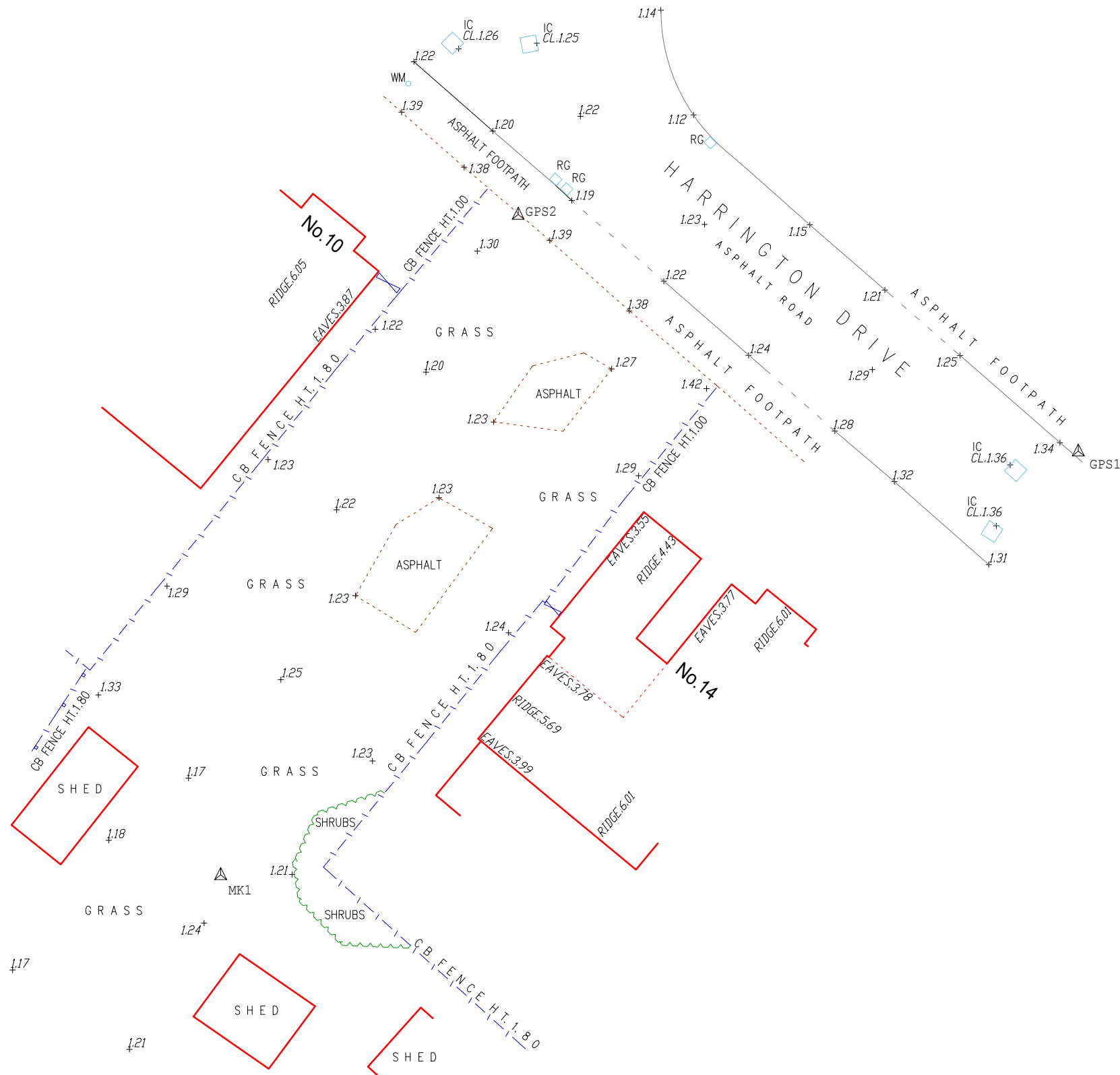
6.0 CONCLUSIONS AND RECOMMENDATIONS

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

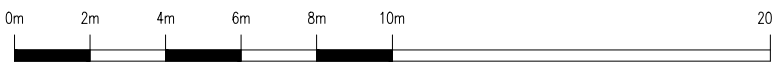
- The proposed development consists of one single storey dwelling on Harrington Drive, Crowland.
- The site is in Flood Zone 3. The Corporation Bank provides protection against the 1% annual probability (1 in 100 chance each year) event including climate change in the River Welland. During the life of the development, a maximum flood level of +2.40m OD could occur at the site should there be a breach of the Corporation Bank.
- 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 North Level IDB high priority watercourses 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 minimum floor level of the dwelling is +2.4m OD 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 SAT23021)



STATION	EASTING	NORTHING	LEVEL
GPS1	4215.985	1464.669	1.387
GPS2	4193.997	1473.959	1.378
MK1	4182.317	1448.045	1.247



SCALE 1:200

LEGEND

	Survey Station
	Level (cross indicates position)
	Kerb
	Drop Kerb
	Change of Surface
	Banking
	Hedge / Bush Canopy
	Gate
	Wall
	Fence
	Overhead Electricity Line
	Overhead Telephone Line
	T5/0.20 Approx. Spread [m]/Approx. Trunk Dia. [m]

Notes:
Arbitrary grid used. Survey tied to Ordnance Survey Vertical Datum. SASurveys are not trained arboricultural consultants. All spreads are estimated. In some cases it may be prudent to have tree species confirmed by a trained specialist.

Scaled distances taken from this survey should be treated as of low certainty, designers and contractors must take (verify) their own site measurements.

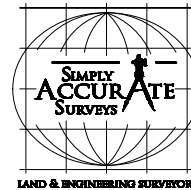
ABBREVIATIONS (Where applicable)

AB_ Air Brick	MH_ Manhole
BG_ Box Gully	MKR_ Marker
BLR_ Retractable Bollard	OB_ Open Boarded Fence
BL_ Bollard	P_ Post
BP_ Boundary Post	PCL_ Post & Chain Link Fence
BS_ Bus Stop	PF_ Panel Fence
BW_ Post & Barbed Wire Fence	PR_ Post & Rail Fence
CB_ Close Boarded Fence	PW_ Post & Wire Fence
CI_ Corrugated Iron Fence	PWM_ Post & Wire Mesh Fence
CP_ Chestnut Paling Fence	RW_ Retaining Wall
CW_ Concrete Wall	SF_ Security Fence
CD_ Cable Duct	STW_ Stone Wall
CL_ Cover Level	PM_ Parking Meter
CM_ Cable Marker	RE_ Rodding Eye
CPS_ Concrete Paving Slabs	RG_ Road Gully
DP_ Down Pipe	RS_ Road Sign
ECB_ Electricity Control Box	RWP_ Rain Water Pipe
ECB_ Electricity Cable Pit	SC_ Stop Cock
EJB_ Electricity Cable Junction Box	SV_ Sluice Valve
EP_ Electricity Pole	T_ Tree
ERP_ Earthing Point	TCB_ Telephone Call Box
FB_ Flower Bed	THL_ Threshold Level
FH_ Fire Hydrant	TIC_ Telephone Inspection Cover
FP_ Footpath	TJB_ Telephone Junction Box
G_ Gully	TL_ Traffic Light
GP_ Gate Post	TP_ Telephone Pole
GV_ Gas Valve	TTP_ Tactile Paving
H_ Hydrant	UTL_ Unable to Lift
HAG_ Height Above Ground	VP_ Vent Pipe
IC_ Inspection Cover	WL_ Water Level
IL_ Invert Level	WM_ Water Meter

Client: **Jordan Finding**
Land next to No.10 Harrington Drive
Crowland
PE6 0AT

Simply Accurate Surveys

35 Winston Crescent, Biggleswade
Bedfordshire, SG18 0ET
Tel. 07907353858
Email general@sasurveys.co.uk
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Drawing
Topographical survey
Land next to No.10 Harrington Drive, Crowland, PE6 0AT

Drawing No.	Date:
SAT23021	12/01/2021

Drawing Scale: 1:100 @ A3

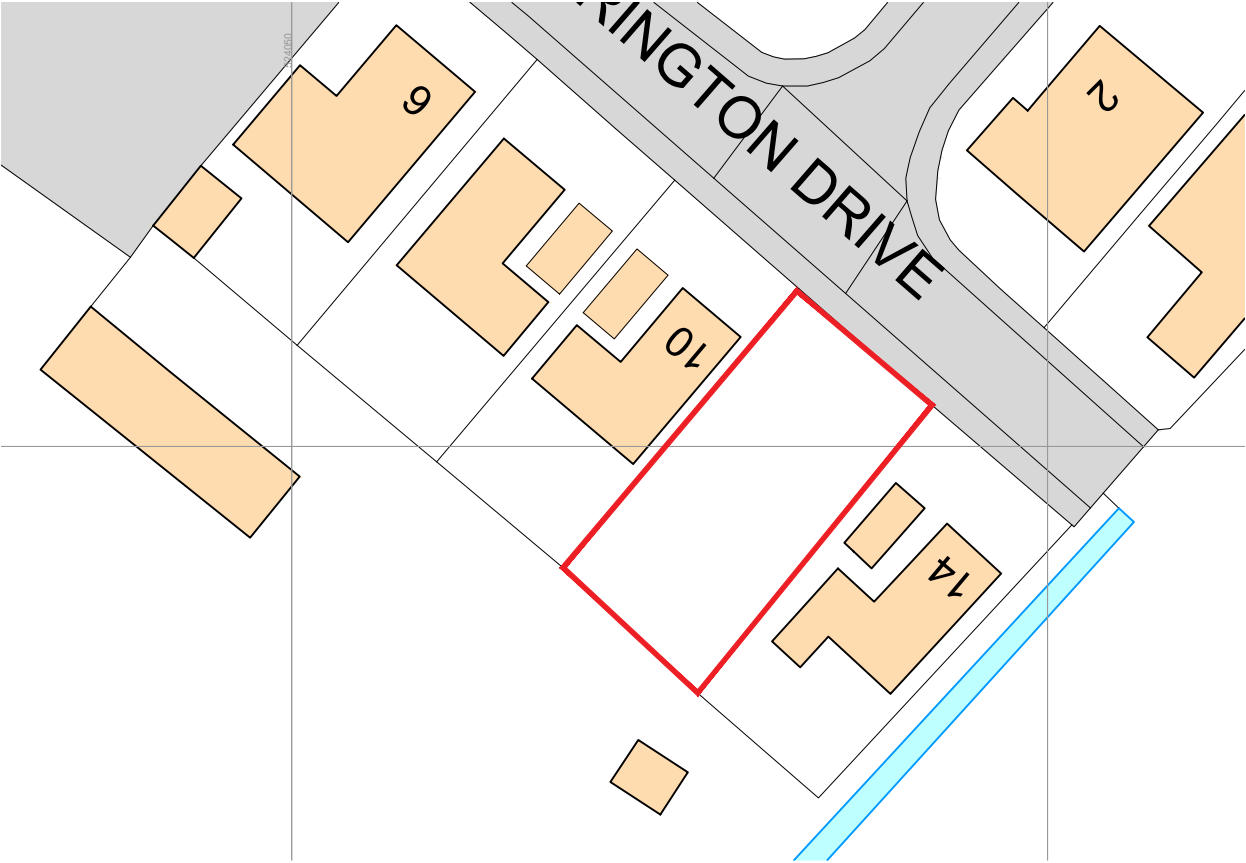
ATTACHMENT 2

EXISTING AND PROPOSED SITE LOCATION AND BLOCK PLAN (DWG 761/01)

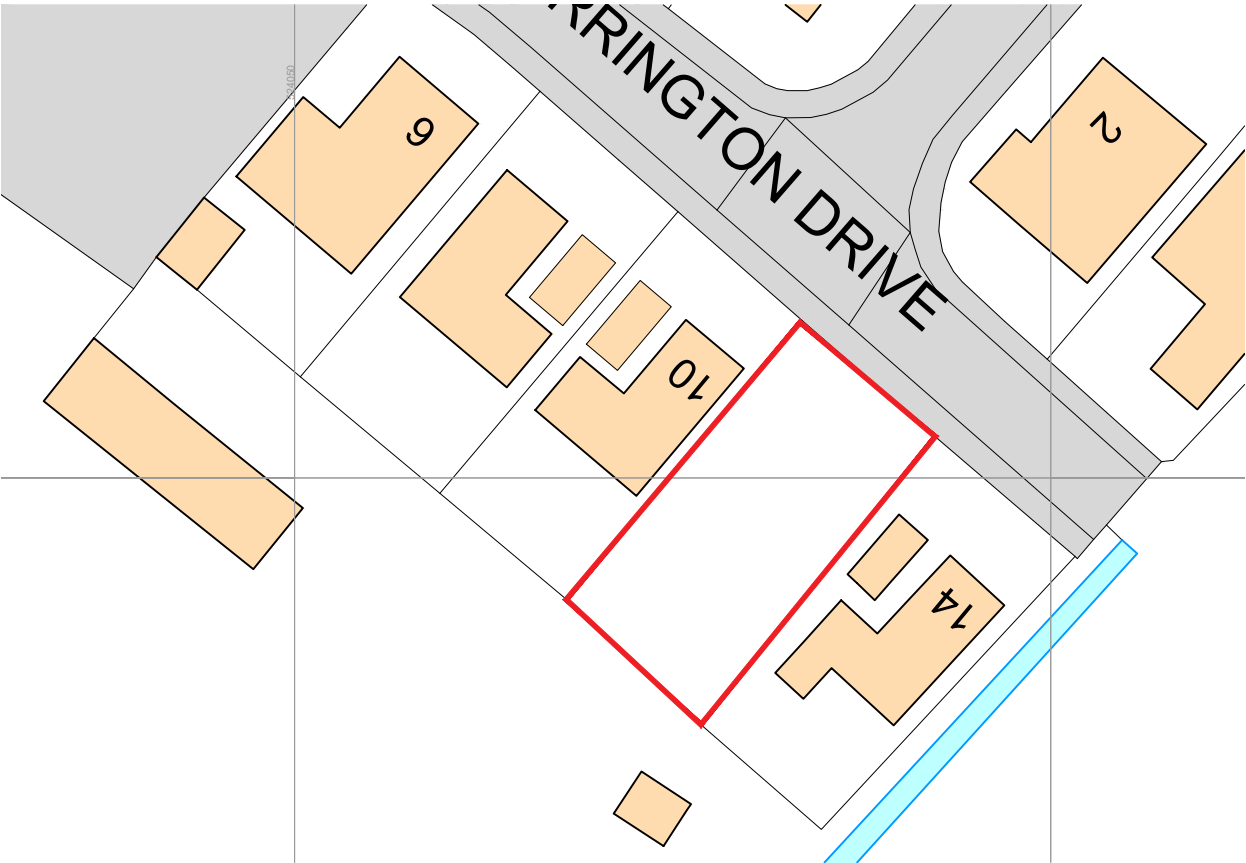
Contractors must work only to figured dimensions which are to be checked on site, any discrepancies are to be reported to the architect before proceeding.

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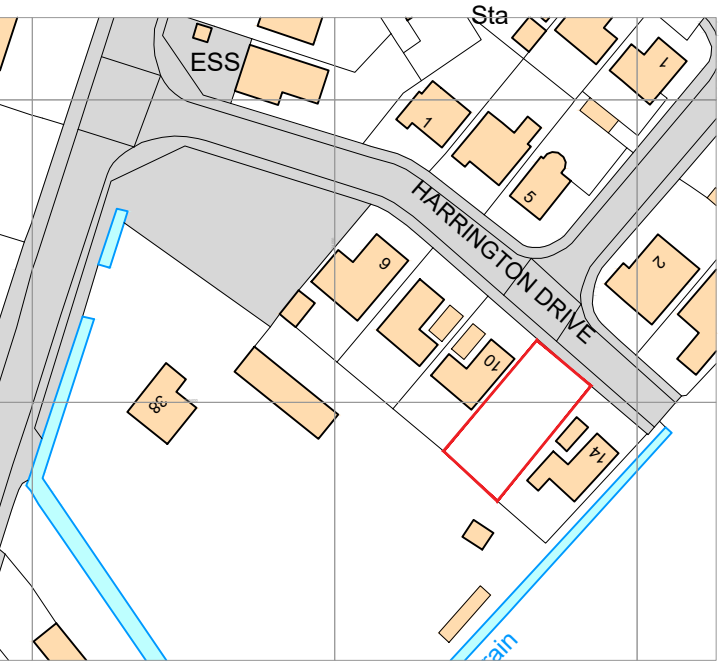
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EXISTING BLOCK PLAN
SCALE 1:500



PROPOSED BLOCK PLAN
SCALE 1:500



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LOCATION PLAN
SCALE 1:1250

- 04.01.20 FIRST ISSUE		TJM	
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		01	
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EXISTING AND PROPOSED SITE LOCATION AND BLOCK PLAN		Varies @A3	
Drawn By:		Date:	
TJM		JAN 2021	
Checked By:		Date:	
MDV		JAN 2021	

TMVARCHITECTS

The Repeater Station, London Road,
Norman Cross, Peterborough, PE7 3TB