

FLOOD RISK ASSESSMENT

**PROPOSED RESIDENTIAL DEVELOPMENT
HIGH STREET/BOSTON ROAD,
GOSBERTON
SPALDING
LINCOLNSHIRE
PE11 4NR**



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Version 1 June 2016

FLOOD RISK ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT, HIGH STREET/BOSTON ROAD, GOSBERTON, LINCOLNSHIRE. PE11 4NR

INTRODUCTION

The Government has placed increasing priority on the need to take full account of the risks associated with flooding at all stages of the planning and development process. This seeks to reduce the future damage to property and the risk to life from incidents of flooding. Their expectations relating to flooding are contained in the National Planning Policy Framework (NPPF) March 2012, which identify how the issue of flooding is dealt with in the drafting of planning policy and the consideration of planning applications by avoiding inappropriate development in areas at risk from flooding.

Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. Local Plans should apply a sequential, risk-based approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account of the impacts of climate change.

The Environment Agency's flood maps show areas that are at risk, from fluvial and tidal flooding. These maps show the limits of the flood plain of the area which could be affected by flood events, over topping or breaching of flood defences. They are based on the approximate extent of floods with a 1% annual probability of exceedance (1 in 100-year flood) for rivers and 0.5% annual probability of exceedance (1 in 200-year flood) for coastal areas under present expectations or the highest known flood. However, they do not take into account of the presence of defences or the likelihood that flood return intervals will be reduced by climate change.

This Flood Risk Assessment has been prepared in support of the planning application and considers the risk of flooding from fluvial and tidal sources. It also considers the risks of localised flooding due to inadequate Foul and Surface Water Sewers, Failure of Reservoirs, Water Main pipe bursts, Sewer Blockages, Pump Failures or High Ground Water Table etc.

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APPLICATION SITE

The site is located at land off High Street/ Boston Road, Gosberton, Spalding Lincolnshire PE11 4NR within the administrative area of South Holland District Council. The National Grid Reference for the middle of the site is TF2441331554 with a site area 2.167Ha or thereabouts. **Plan 1**

The current outline planning application is for the erection of 46 detached and semi-detached dwellings and for the construction of a new adopted access road and footpath. **Plan 2**

The Site would be classed as Major Development applying the National Planning Policy Guidance (NPPG) as the site is to be developed for more than 10 dwellings.

The National Planning Policy Framework Technical Guidance NPPF defines three levels of flood risk depending upon the annual probability of fluvial flooding occurring.

Zone 1 – Low Probability (<0.1%)

Zone 2 – Medium Probability (0.1 – 1.0%)

Zone 3 – High Probability (>1.0%)

The proposed development site is shown to be within Flood Zone 3a 'High Probability' as detailed on the Environment Agency's Flood Zone Maps without defences, and as defined in Table 1 of NPPF. Map1

Table 1: Flood Zones Definition (Ignoring the presence of defences)

Zone 3a - high probability Definition This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year. Appropriate uses The water-compatible and less vulnerable uses of land (table 2) are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone. The more vulnerable uses and essential infrastructure should only be permitted in this zone if the Exception Test is passed. Essential infrastructure permitted in this zone should be designed and constructed to remain operational and safe for users in times of flood. Flood risk assessment requirements All development proposals in this zone should be accompanied by a flood risk assessment. Policy aims In this zone, developers and local authorities should seek opportunities to: • reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage systems; • relocate existing development to land in zones with a lower probability of flooding; and • create space for flooding to occur by restoring functional floodplain and flood flow pathways and by identifying, allocating and safeguarding open space for flood storage.

Applying the Flood Risk Vulnerability Classification in Table 2 of NPPF the proposed residential development is classified as "More Vulnerable", with Table 1 of NPPF stating that such uses are appropriate in this zone subject to the Exception Test.

Table 2: Flood Risk Vulnerability Classification

More vulnerable • Hospitals. • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste⁶. • Sites used for holiday or short-let caravans and camping, <i>subject to a specific warning and evacuation plan</i>.⁷

From the topographical survey the site is irregular in shape is to be accessed from Boston Road with an emergency link cycle / footway connection to High Street. The site is reasonably level averaging 2.75m ODN and the mid-level on Boston Road at the site entrance is 3.25mODN. **Plan 3**

DRAINAGE AUTHORITIES

Environment Agency

The Environment Agency is responsible for reducing the risk of flooding from designated main rivers and from the sea.

The following potential sources of flooding affecting the development site have been identified as:

- From the River Welland(Tidal)
- River Glen (Fluvial)
- South Forty Foot (Fluvial)
- Welland & Deepings Internal Drainage Board system

The Flood Zone Maps identify river catchments over 3 sq. km. These maps are a theoretical estimate of areas that could be inundated should no defence exist. In practice current standards of protection would result in flood envelopes substantially less than shown by these maps. The maps make no allowance for local, site specific features.

The flood zone maps show that the site of the proposed development is considered at risk from flooding. These maps indicate that the area would be flooded without flood defences, which are in place, (with an annual probability of more than 0.5% i.e. return frequency of less than 1 in 200 years for tidal flooding or more than 1.33% return frequency of less than 1 in 100 years for fluvial flooding). (**Map 1**)

The National Flood Risk Assessment Map shows that the site is at a low/ medium risk of flooding. Medium means that each year, this area has a chance of flooding of less than 1 in 30 (3.3%), but Greater or equal to 1 in 100 (1%). This takes into account the effect of any flood defences that may be in this area. Flood defences reduce, but do not completely stop the chance of flooding as they can be overtopped or fail. **Map 2**

The fluvial defences protecting this site consist of earth embankments. They are in good condition and provide protection against a flood event with a 1% chance of occurring in any year (1 in 100). The Environment Agency inspect these defences regularly to ensure that any potential defects are identified early.

The South Forty Foot Drain is located 7.5Km west of the site, the River Glen is 3.7Km to the south of the site and the River Welland 5.0Km east of the Site.

With the main rivers in question having adequate flood defences protecting the site and due to the site's location and distance to the flooding source it is doubtful if flood waters following a breach to the defences would reach the site, if it did it would be low. This is confirmed when examination of the South Holland District Council SFRA Residual Peak Depth and Velocity District - Year 2115 1 % Fluvial / 0.5% Tidal Event Probability maps, show that the site is not affected.

South Holland District Council

In order to inform the process of risk assessment and site selection the District Council commissioned Haskoning UK Ltd Consultants to prepare a Strategic Flood Risk Assessment in December 2002. They have carried out an update of this report and this report was published in January 2010

This Flood Risk Assessment has taken the results of the updated South Holland Strategic Flood Risk Assessment (SHSFRA) into account in its findings.

It was found that the actual risk from primary sources of flooding (taken as being rivers and the sea) was assessed as being the product of:

- Medium probability (assigned because the standards of the primary defences are variable) and
- Low consequence (assigned because of the District's generally rural nature and because any urban flooding is likely to be shallow with minimal impact).

The findings reflect the considerable protection afforded to the area by coastal and tidal & fluvial flood defences and by the extensive well organised system of lowland IDB fluvial drainage.

The computer modelling used in the SFRA to produce the Hazard, depth and velocity maps simulated the spread of flood waters over the land and allowed for the presence of locally raised features such as road embankments etc.

The potential flooding consequences shown on this map relate to flooding from the sea, main rivers and Internal Drainage Board systems taking into account the presence of current flood risk management measures such as flood defences.

The consequences designated as being an Actual Risk arise from direct overtopping of defences, where this would occur, together with assumed breach failure of some defences. Breach failure has been assumed to

occur in places where the freeboard between peak sea or river water level and the defence crest level is less than the minimum desirable for structural security of the defence.

From the Residual Peak Depth District and the Residual Peak Velocity District - Year 2115 1% Fluvial / 0.5% Tidal Event Probability maps from the update of strategic flood risk assessment for South Holland District Council have been used in this assessment. These maps show that the site is not affected from flooding.

Maps 3 & 4.

The Environment Agency requires that developments for residential purposes should be informed by the flood depths arising from the 2115 0.5% breach scenario. For areas where flood depths are 0 – 0.25m deep the finished floor level FFL should be raised a minimum of 300mm above existing ground level.

In order to provide a gravity system for both the foul water and surface water drainage systems It is therefore proposed that the FFL for the properties be raised a minimum of 600mm to 3.35mODN. This is at a similar level to that of Boston Road.

Welland & Deepings Internal Drainage Board

The proposed development site is located within Catchment area of Welland & Deepings Internal Drainage Board. The Board is responsible to operate and maintain the arterial fluvial system.

The existing site drainage falls to the riparian maintained dyke on the northern boundary and this discharges into the Board's drain Moses Cut-52. **Map 5**

FLOODING FROM OTHER SOURCES

Flooding is a natural process and can happen at any time from sources other than watercourses and the sea.

- Flooding from land can occur from intense rainfall, often over short duration of time that is unable to soak into the ground or enter the drainage system. However, with the natural topographic nature of the ground being flat, with no high ground around the site this will not cause any rapid inundation of the site and is likely only lead to local ponding of shallow depth and low velocity following the natural land contours. The properties are also raised 600mm above the average ground level. The updated SFRA concluded that flooding from this source is limited to minor isolated cases and is not of strategic significance as regards to flood risk.
- The area is not known to suffer from any groundwater problems and therefore is taken as having no strategic significance as regards to flood risk.
- Flooding from sewers can occur from over loading from heavy rainfall caused by blockages or having inadequate capacity. However, with the natural topographic nature of the ground being flat, with no high ground around the site this will not cause any rapid inundation of the site and is likely only lead to local ponding of shallow depth and low velocity following the natural land contours. The

properties are also raised 600mm above the average ground level. The updated SFRA concluded that flooding from this source is limited to minor isolated cases and is not of strategic significance as regards to flood risk.

- Non-natural or artificial sources of flooding such as reservoirs, lakes or canals where water is stored above natural ground level could cause flooding if the structure fails or is over topped. There are no known facilities close to the proposed development.

SEQUENTIAL APPROACH

When applying the sequential approach for flood risk in accordance NPPF the site would fall into Zone 3a (High Probability) as the site is shown to be within the tidal flood plain as shown on the Environment Agency's Flood Map without defences in place.

However, the results of the updated SHSFRA shows that the site is located within a low/medium probability flood zone but the area is reliant on protection by flood defences providing a standard of protection of 1 in 100 years return period.

Applying the Flood Risk Vulnerability Classification in Table 2 of NPPF, the proposed residential development is classified as "More Vulnerable", with Table 1 of NPPF stating that such uses are appropriate in this zone (as summarised in Table 3 NPPF).

TABLE 3: Flood risk vulnerability and flood zones 'compatibility'

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	x	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	x	x	x

Sequential Test & Exception Test

The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. The NPPF states that development should not be permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding. It is important to note that the Sequential Test does not specifically mean that sites such as this cannot be developed, rather that sites at less risk should be developed first. There could be a significant number of other, available sites suitable for such development. It would therefore be extremely difficult to ascertain the location of all other available, less vulnerable sites, whether they would be suitable for development and whether they had any reasonable prospect of being brought forward.

In this context, it is necessary to examine housing needs within the District and the Strategic Housing Land Availability Assessment (SHLAA) outlines a shortfall in the supply of deliverable housing land. Given the significant proportion of the District, which is deemed to be at risk of flooding, to rigidly apply the Sequential Test would undermine the ability of the District to meet its strategic housing need by further restricting available, developable land. This approach would therefore undermine the wider strategic objectives of the NPPF in ensuring there are enough deliverable sites to meet wider housing needs.

When checking the South East Lincolnshire Strategic Housing Land Availability Assessment (January 2016). This report examines potential sites for meeting South Lincolnshire housing needs. Examination of the allocation map for Gosberton it is noted that the proposed development site is Identified as site Gos024 and the site is in scale with the 230 dwellings which the emerging Local Plan seeks to be developed in Gosberton. Consequently, the site is considered suitable.

The report identifies the flood risk as being in Flood Zone 3a with no hazard rating and no hazard for depth.

This site is available for development now, is sustainable and would contribute to the housing stock within the District at a time when the number of deliverable sites falls well short of what is required.

Accordingly, the Sequential Test is passed.

As the Sequential Test has been satisfied then development must pass the Exceptions Test to demonstrate that it provides wider community benefit to meet the overall requirements of sustainable development for this windfall site. It is considered that the use of the properties for people living within the village of Gosberton would help to provide wider sustainability benefits to the community through access to accommodation for those people living in the area whom are in need of housing and includes the provision of 46 No homes and help to secure the longer term economic sustainability vitality and viability for the area. It is therefore concluded that the development would meet the requirements of the first part of the Exception Test and would be in accordance with the NPPF.

This FRA in support of the development and indicates that the second part of the Exceptions test is satisfied and that the development would be safe for the lifetime of the development (100 years) and not increase flood risk elsewhere.

It is therefore concluded that both the Sequential and Exception Tests are satisfied.

With the properties being two storeys there is a safe haven for residents to await the flood level to recede or to be rescued. Also the ground floor levels have been raised above the predicted flood level.

CLIMATE CHANGE

Global warming is now recognised that it is likely to affect the frequency and severity of extreme events as both tidal and fluvial flooding. The Climate change allowances in the NPPF Guidance was updated on the 19th February 2016.

The site is located within the Anglian River Basin, for sites within Flood Zone 3a and for “More vulnerable” land uses the Higher Central and Upper End river flow allowances figures in Table 1 should be used.

Table 1 Peak river flow allowances by river basin district (1961 to 1990 baseline)				
River basin District	Allowance category	Total potential change anticipated for '2020s' (2015 to2039)	Total potential change anticipated for '2050s' (2040 to2069)	Total potential change anticipated for '2080s' (2070 to2115)
Anglian	Upper End	25%	35%	65%
	Higher central	15%	20%	35%
	Central	10%	15%	25%

The effect of global warming on peak rainfall allowances is given in Table 2.

Table 2 Peak rainfall intensity allowance in small and urban catchments (1961 to 1990 baseline)			
Applies across all of England	Total potential change anticipated for 2010 to 2039	Total potential change anticipated for 2040 to 2059	Total potential change anticipated for 2060 to 2115
Upper End	10%	20%	40%
Central	5%	10%	20%

The annual sea rise due to climate change is given in NPPF and the recommended contingency allowances are stated in Table 3

Table 3 Peak sea level allowance for each epoch in (mm) per year with cumulative sea level rise for each epoch in brackets (use 1990 baseline)					
Area of England) (Use River Basin maps	1990 to 2025	2026 to 2050	2051 to 2080	2081 to 2115	Cumulative Rise 1990 to 2115 (m)
East, Midlands, London, South East	4 (140mm)	8.5 (212.5mm)	12 (360mm)	15 (525mm)	1.24m

The South Forty Foot Drain is located 7.5Km west of the site, the River Glen is 3.7Km to the south of the site and the River Welland 5.0Km east of the Site. It is therefore considered that with the main rivers in question having adequate flood defences protecting the site and due to the site's location and distance to the flooding source it is doubtful if flood waters following a breach to the defences would reach the site even taking into account the above climate change allowances... This is confirmed when examination of the South Holland District Council SFRA Residual Peak Depth and Velocity District - Year 2115 1 % Fluvial / 0.5% Tidal Event Probability maps, show that the site is not affected.

MANAGEMENT OF SURFACE WATER RUN-OFF

In accordance with the House of Commons Written Statement (HCWS161 – 18th December 2014) there is an expectation for SuDS to be incorporated in all residential developments of 10 houses or more (major

developments) unless demonstrated to be inappropriate.

Furthermore, in accordance with recognised guidance, Part H of the Building Regulations 2010 and National Planning Policy Framework 2012, there is a hierarchy of where surface water should discharge.

This hierarchy should be followed where practicable, and is as follows:

- 1) Infiltration
- 2) Watercourse
- 3) Public sewer

The drainage strategy prepared by Hall Infrastructure Design Ltd, dated 18.06.16 (See separate Document for the site design & Microdrainage calculations), is the preliminary overview and will be subject to the detailed design being undertaken when planning permission and final layout has been determined. It is proposed to utilise source control techniques to reduce the storm water discharge from the proposed development in order to minimise the impact of the development on the surrounding area and to comply with EA guidelines, which require at least one workable solution for managing surface water.

The proposal includes for the construction of a new adopted access road and footpath serving 46 detached and semi-detached dwellings with an overall housing density of 21.8 plots per hectare. The proposed impermeable area has been calculated based on the roof areas of proposed dwellings (0.326 Ha – 15%), the adopted access road and footpaths (0.250 Ha – 12%), domestic curtilage private parking courtyard (0.054 Ha – 3%) and domestic curtilage driveways (0.183 Ha – 9%) totalling 0.810 Ha which represents 39% (including an allowance for development creep) of the total site area as shown on the schematic concept drainage plan drawing no 1611/01. It is proposed that roof areas will discharge to adjacent domestic curtilage driveways and / or domestic curtilage private parking courtyards will in turn will discharge to a network of under-drained roadside swales connected to an on-line storage / balancing pond through to the proposed outfall point.

Existing green field conditions.

Existing green field runoff values, calculated in accordance with the H R Wallingford greenfield runoff estimation for sites in accordance with DEFRA / Environment Agency Report SC030219 rev E and Interim National Procedure Principle 17, confirm that the impermeable area (0.810 Ha) of the site generates a 1 year run off value of 5.00 l/s, 30 year of 5.00 l/s and 100 year of 5.00 l/s. These are all classified as default values representing the minimum flow rate that can be practicably achieved without blockage of flow control structures.

Infiltration

Soil infiltration testing has been undertaken by Lincs Laboratory in April 2016. Their report ref G39367/6/MH/MT concluded that the test holes excavated to a depth of 1.0m did not give results suitable for soakaway structures at that depth due to there being no infiltration and a water table at depth 1.0m – 1.1m below ground level.

Grass areas and soft landscaping areas incorporating the required SuDS balancing features are proposed in the development totalling 1.30 Ha (61%), as scheduled on the schematic concept drainage plan 1611/01. There are no proposals for any of the impermeable areas of the development to discharge by infiltration due to the findings of the soil infiltration testing undertaken by Lincs Lab.

Watercourse

There are no proposals for any other surface water to discharge by infiltration due to the findings of the soil infiltration testing carried out by Lincolnshire Laboratory. A watercourse will therefore be used as the method of disposal of surface water from the adoptable road network together with the domestic curtilage roof areas.

Surface water from the adoptable road (0.250 Ha) (which will comprise one footway to the high side and a single cross-fall carriageway) will shed directly into a 300mm deep adjacent under-drained swale to the low side, providing highway water with an initial treatment stage, with domestic curtilage roof areas (0.326 Ha), individual domestic curtilage permeable paved driveways (0.183 Ha) and the domestic curtilage private parking courtyard (0.054 Ha) being collected along the way, connected in to the perforated under-drain pipework. Typical construction details for the source control outlets from domestic roof water to permeable paved individual driveway and under-drained conveyance swale are shown on the schematic concept drainage plan drawing no 1611/01.

Roof water will be collected in underground pipes, where required, within domestic curtilage with silt traps incorporated prior to connecting to adjacent permeable paved individual driveways wherever practicable by way of proprietary diffusers which in turn are connected to the under-drained swale. Where roof water downpipes are located either over or immediately adjacent to permeable paved individual driveways these will surface discharge to the permeable paving with proprietary rainwater shoes with no underground pipework being required. This provides an "on-plot" source control treatment stage for all domestic curtilage runoff prior to entering the adoptable system. An on-line surface water detention and attenuation balancing pond provides additional storage and a second treatment stage at the flow control location. The pond will be wet (maximum 600mm depth) under normal conditions with a normal water area of 499m², normal water level of 2.000m ODN and 1:3 side slope batters, as shown on the schematic concept drainage plan 1611/01.

A Hydrobrake Optimum flow control device attenuates flows down to the permitted discharge rates for 1-year, 30-year and up to the 1:100-year plus 30% climate change standard to permitted discharge rates. Flows in excess of these figures are stored in the on-line detention and attenuation balancing pond where they are stored for a period of time before draining back down again to normal water level.

The final outfall from the development is proposed at invert level (1.970m ODN) which is 300mm above the invert level of the existing open watercourse as shown on the schematic concept drainage plan 1611/01. The invert level of the development discharge at the balancing pond is proposed at 2.000m ODN.

Sewers

There are no proposals to discharge surface water to any public sewer.

Foul Water Drainage

A pre-planning assessment report ref 00010611 dated 13th January 2016 has been prepared by Anglian Water Services Ltd at the request of J H Walter LLP and this confirms that there is a suitable foul water connection point available. This is to a new manhole to be constructed on the line of an existing 150mm foul sewer in High Street between manholes 2401 and 3401 as shown on the schematic concept drainage plan. This will be accessed by a foul sewer link through the emergency access cycle /footway link.

It is anticipated, given the requirement for site levels to be raised, that a gravity foul water solution will be achievable and the network of foul sewers will be included in a section 104 agreement with Anglian Water Services Ltd to ensure the foul water infrastructure can be monitored and maintained to ensure it will continue to function correctly for the lifetime of the development.

As there is a positive drainage system capable of receiving flows from the development there is no likely impact on neighbouring property.

FLOOD PROTECTION

Any impact of damage to the properties can be foreseen and mitigated against by relatively simple design and construction techniques. There are two forms of flood protection works: -

- **Flood-resistance or proofing works:** - these try to reduce the amount of water actually entering a building.
- **Flood-resilient works:** - these reduce the amount of damage caused by water entering the building.

The proposed property will have the following resilient measures incorporated in the construction in accordance with "Improving the flood performance of new buildings" CLG (2007).

- The ground floor to be constructed with a solid concrete floor with no voids beneath and no low level wall vents. However, if a beam type floor is to be used, provision should be incorporated for draining the under floor void.
- The lowest ground floor level for the properties is to be raised 600mm above existing average ground level with a lowest level being 3.35mODN.
- Avoid the use of absorbent cavity insulation to the ground floor level.
- Treated and sealed timber skirting and architraves.
- Arrange for all service circuits to be routed at first floor level where practical socket outlets, boilers etc. to be a minimum of 0.5m above the raised ground floor level.
- As this site is in an area that is capable of receiving flood warnings from the Environment Agency

Floodline Warning Direct system. It is recommended that the property Owner contact the Environment Agency's Floodline on 0845 988 1188 to register the property to receive advance warning of flooding by telephone, mobile, fax, SMS text, email or pager. The Environment Agency aim to issue a 'severe flood warning' approximately 2 hours before existing defences are overtopped.

CONCLUSION

- o The proposed development site is shown to be within Flood Zone 3a 'High Probability' as detailed on the Environment Agency's Flood Zone Maps without defences.
- o The site does have the protection of fluvial/ tidal flood defences which are well maintained by the Environment Agency for both the present day and also for climate change.
- o Following a breach to the defences, the Peak Residual Depth District - Year 2115 1% Fluvial / 0.5% Tidal Event Probability map included in the South Holland SFRA Update 2010 shows that the site is not subject to any flooding.
- o The proposed residential development is classified as "More Vulnerable", with Table 1 of NPPF Technical Guide stating that such uses are appropriate in this zone, subject to the exception test.
- o The Sequential and Exception Tests are considered to be passed for the proposed development as the site has been identified in the emerging South-East Lincolnshire Local Plan.
- o A drainage strategy for the development has been proposed which is outlined in this report.
- o Any impact of damage to the properties can be foreseen and mitigated against by relatively simple design and construction techniques. They will be constructed using materials which are flood resilient construction as outlined in the report
- o Flooding from other sources is unlikely to affect the site.

NOTE: -

The Drainage Statement prepared by Hall Infrastructure Design Ltd dated 16 June 2016 should be read in conjunction with this Flood Risk Assessment

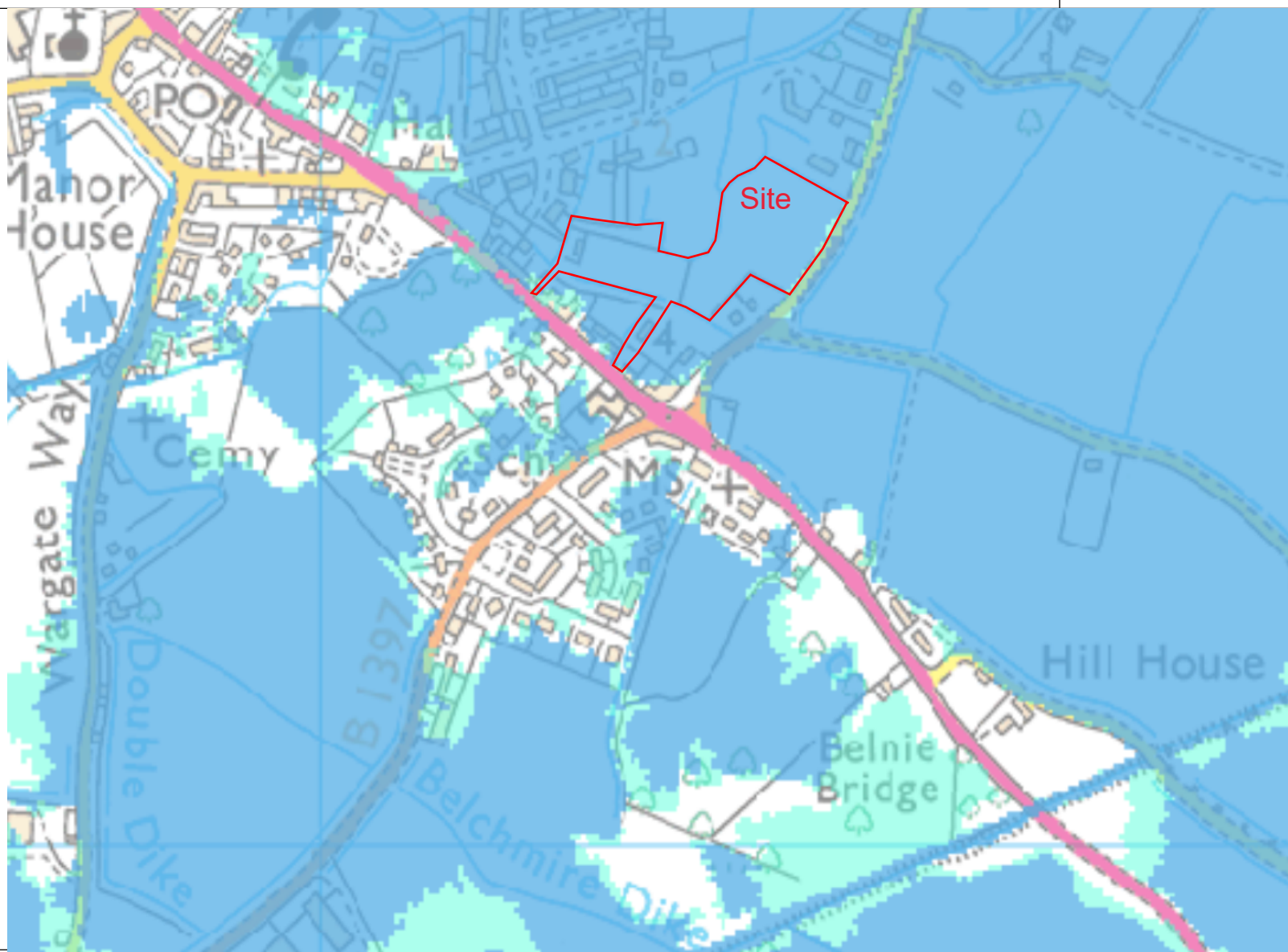
APPENDIX

Map 1	Extract from Environment Agency Flood Zone Map
Map 2	NaFRA Flood Map
Map 3	South Holland SFRA Residual Peak Depth Spalding year 2115 1% Fluvial/0.5% Tidal Event Probability
Map 4	South Holland SFRA Residual Peak Velocity Spalding year 2115 1% Fluvial/0.5% Tidal Event Probability
Map 5	Extract from Welland & Deepings IDB Catchment map
Plan 1	Location Plan
Plan 2	Layout and Drainage Plan
Plan 3	Topographical Survey

Flood Map centred on Gosberton

Legend

- Flood Map - Defences
- Areas Benefiting from Flood Defences
- Flood Map - Flood Storage Areas
- Flood Map - Flood Zone 3
- Flood Map - Flood Zone 2

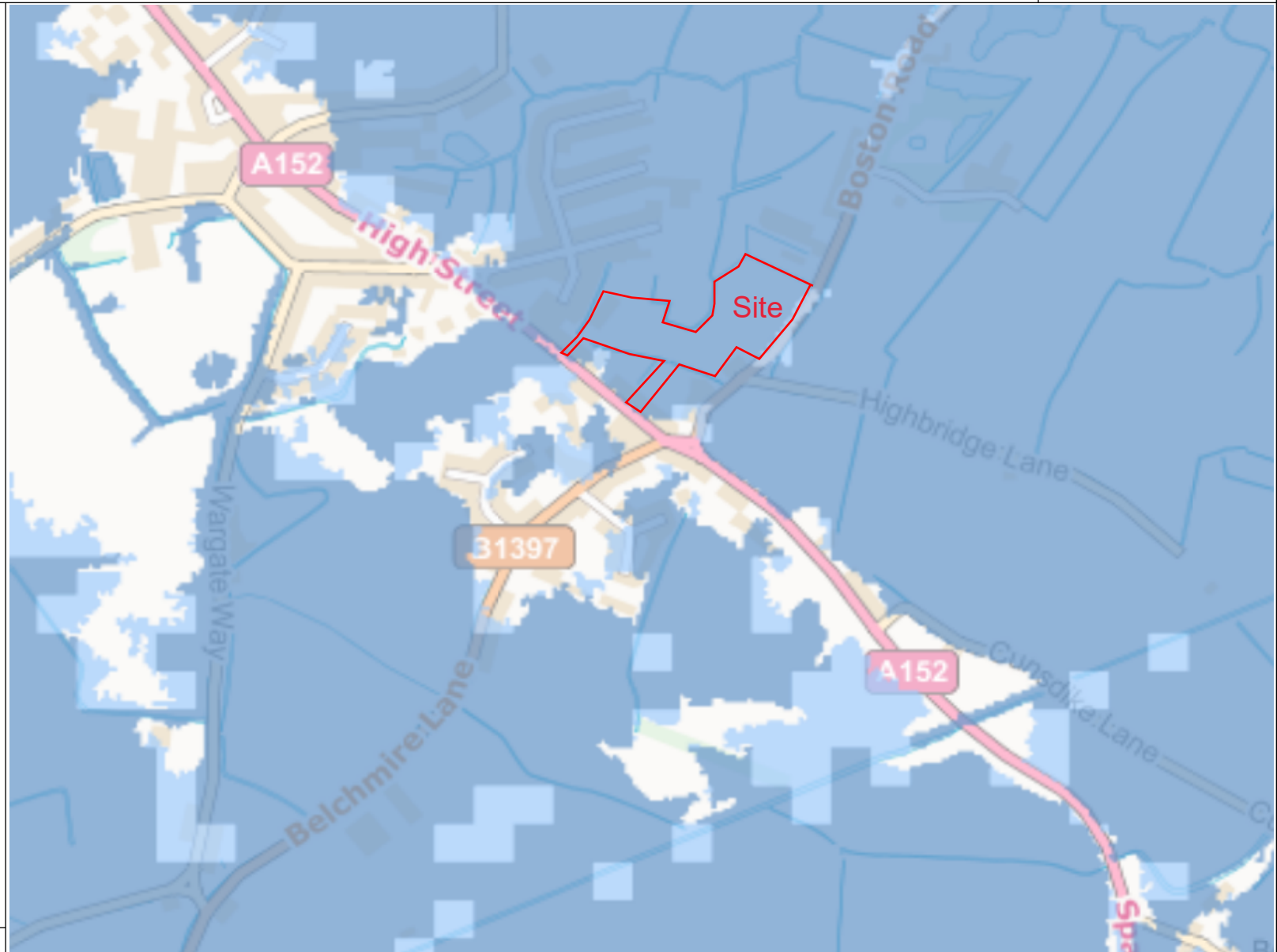
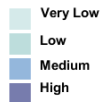


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Nafra FM Boston Road Gosberton

Legend

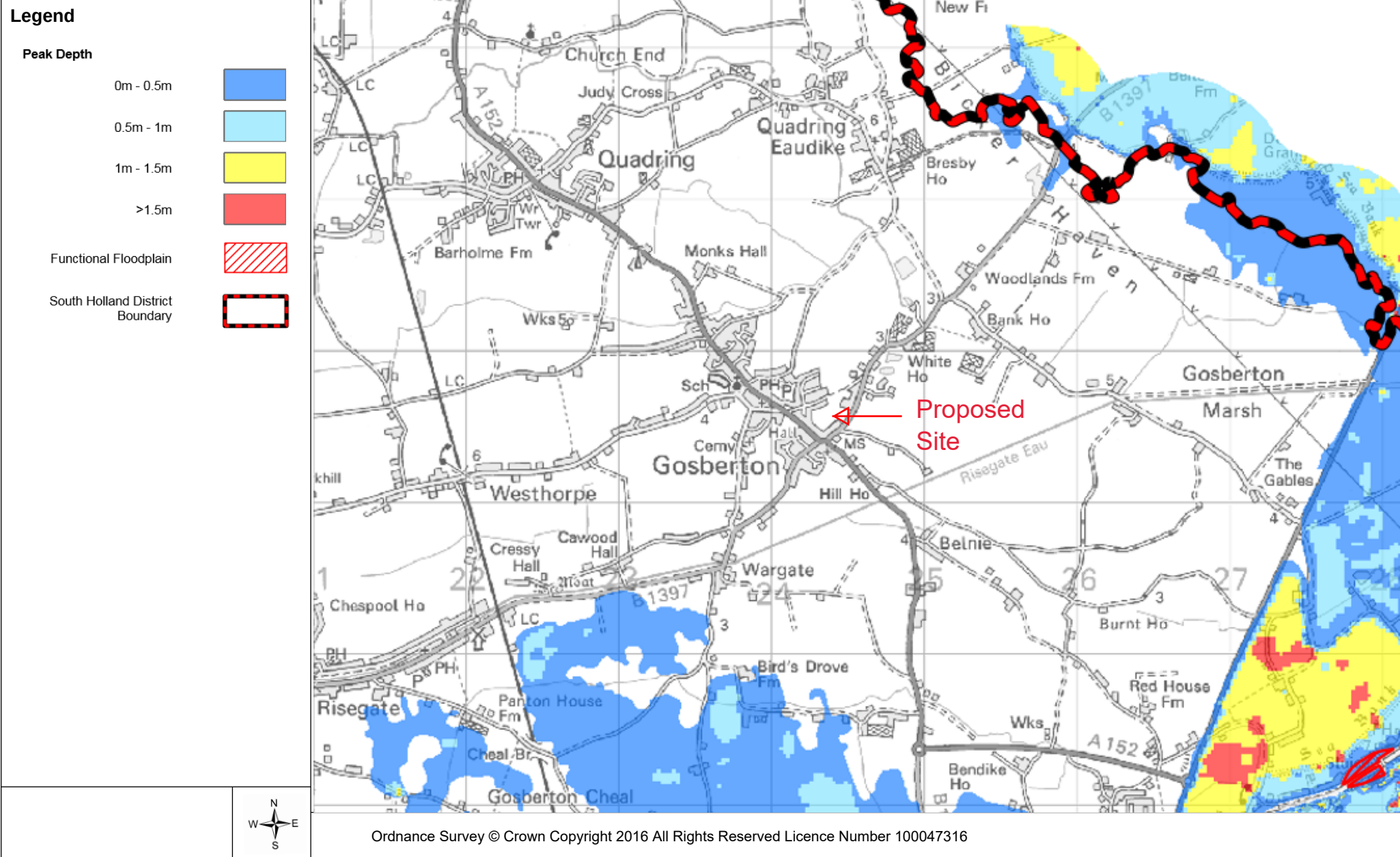
National Flood Risk Assessment (NaFRA)



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Extract From South Holland District Council SFRA

UPDATE OF STRATEGIC
FLOOD RISK ASSESSMENT
Residual Peak Depth
District - Year 2115
1% Fluvial / 0.5% Tidal Event Probability



Extract From South Holland District Council SFRA

UPDATE OF STRATEGIC
FLOOD RISK ASSESSMENT
Residual Peak Velocity
District - Year 2115
1% Fluvial / 0.5% Tidal Event Probability

Legend

Peak Velocity (metres per second)

0 - 0.1



0.1 - 0.25



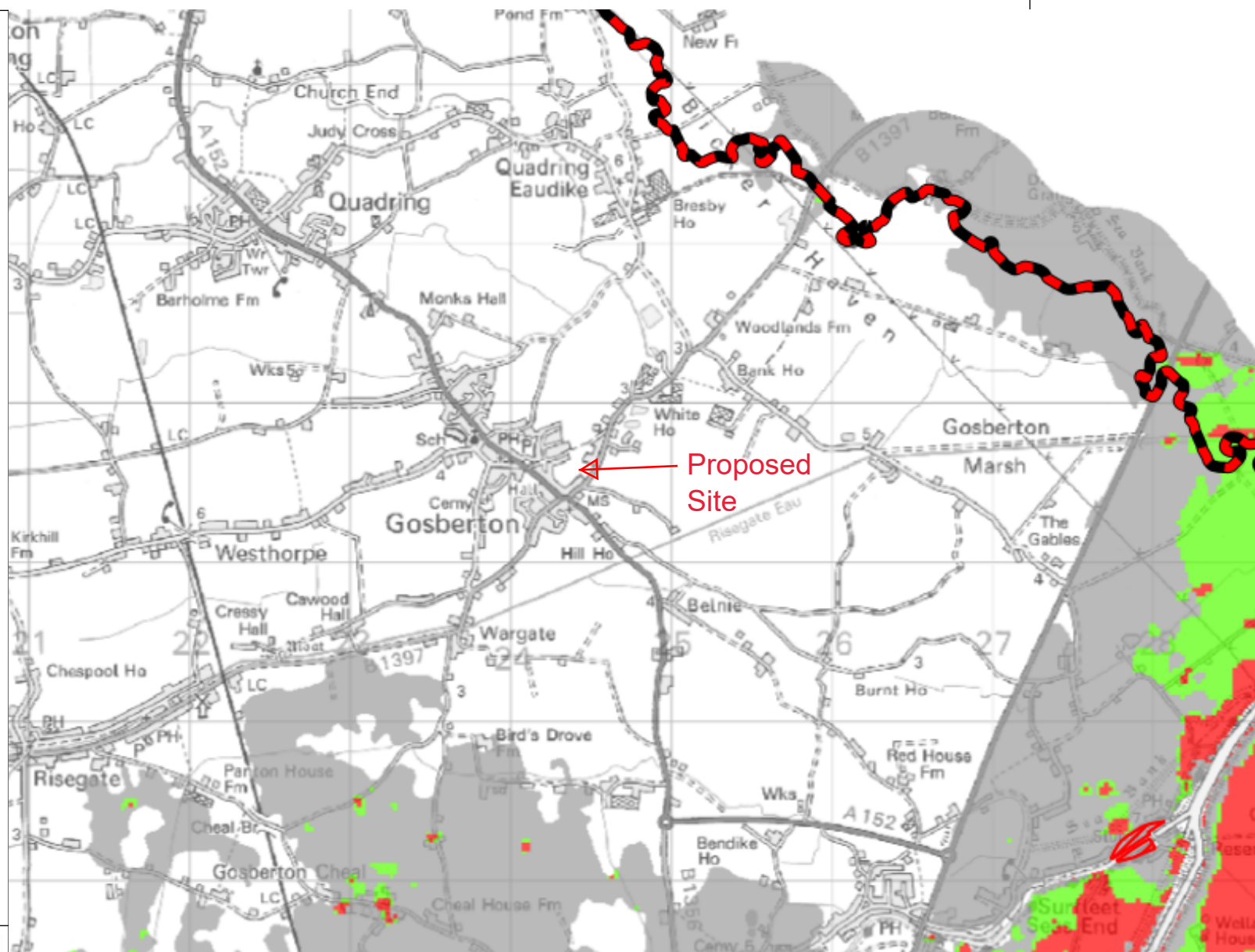
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Functional Floodplain

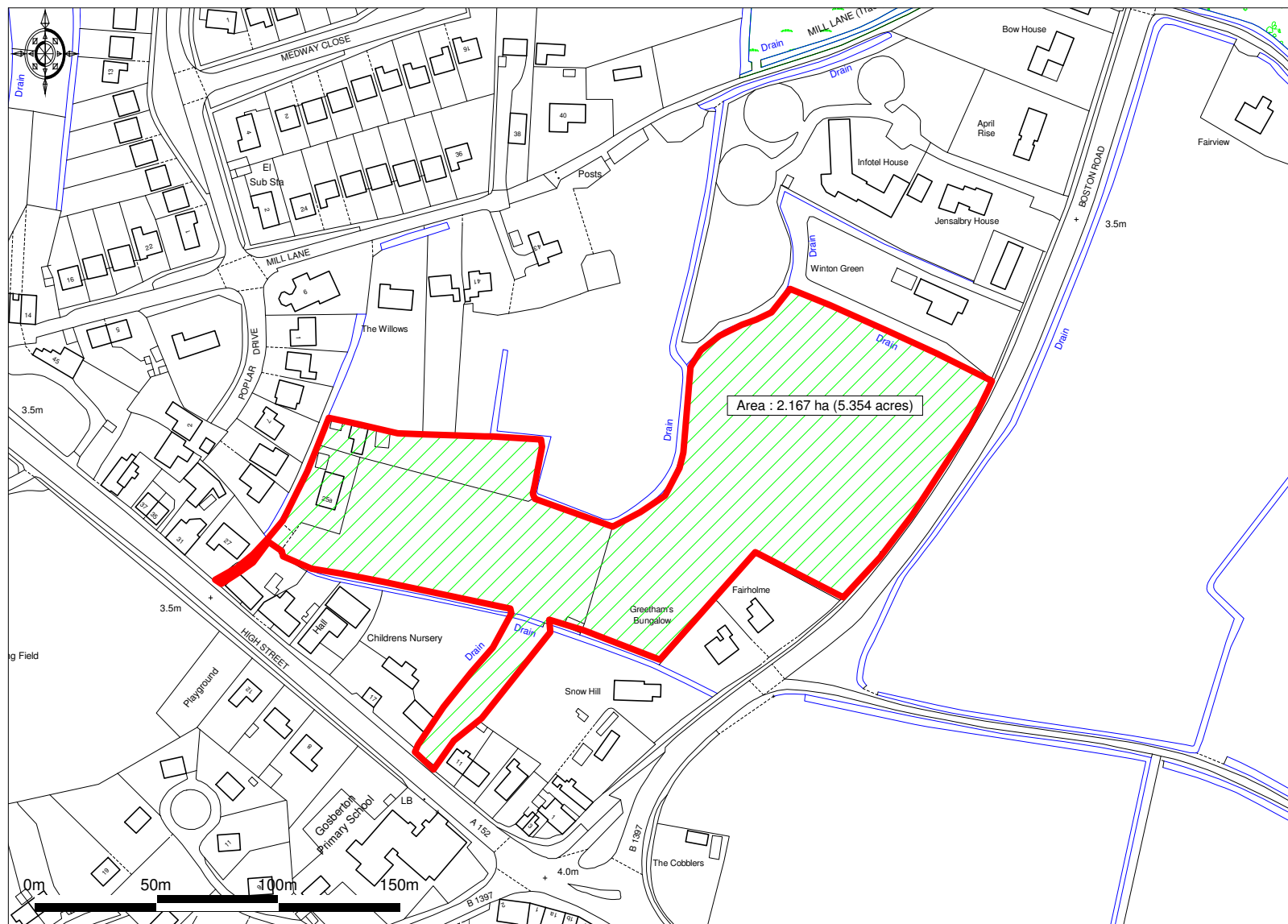


South Holland District
Boundary



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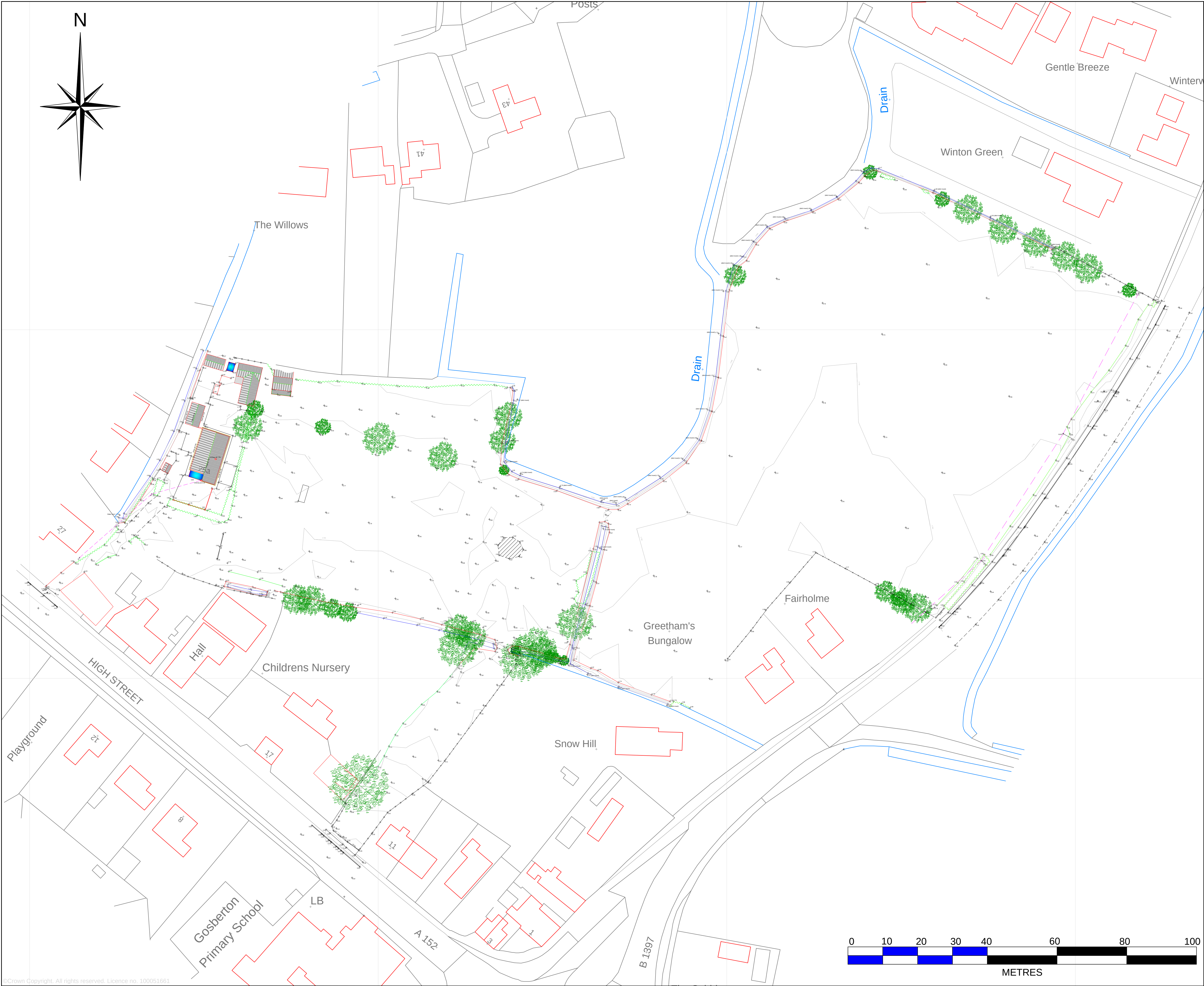
Land East of 25A High Street Gosberton



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Scale 1:2500 @ A4





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Do not scale from this drawing

Legend

- Road/path edge (defined line)
- Road/path edge (undefined line)
- Building line / wall line
- Ridge valley line - level stated
- Eaves line - level stated
- Overhead cables
- Hedge line (ground level)
- Verge line
- Top of bank/batter/slope
- Bottom of bank/batter/slope
- 0.250m contour - level as stated
- Spot level
- Trees

FOR INFORMATION

0	Original survey drawing	NGH	15/02/2016
Rev	Revision	Ini	Date

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Project
Land adjacent to
25a High Street, Gosberton, Lincs

Drawing Title
Topographical Survey
Overview

Scales
1: 500

Sheet Size
A1

Drawn
N.Hewerdine

Checked
NGH

Approved
Date
26/10/15

Drawing Number
NGH-P284-01

Rev
0

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