

FLOOD RISK ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT AT 26 GREEN LANE, SPALDING, Lincs.

FINAL REPORT

GEOFF BEEL CONSULTANCY

AUGUST 2018

GCB/MERCHANT

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G R Merchant Ltd drg. no. 3388-18-01
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1.0 INTRODUCTION

- 1.1 A full planning application is to be submitted by G R Merchant Ltd on behalf of Mr P Buffham for proposed residential development at the rear of 26 Green Lane, Spalding, Lincs.

- 1.2 Planning approval requires a Flood Risk Assessment to accompany the application to meet the requirements and general principles contained in the Planning Practice Guidance to the National Planning Policy Framework (NPPF) and for approval by the Environment Agency.

The site is shown within Flood Zone 3 of the Environment Agency's Flood Map for Planning. The latest Flood Zone Maps have been created as a tool to raise awareness of flood risk with the public and partner organisations, such as Local Authorities, Emergency Services and Drainage Authorities. The Maps do not take into account any flood defences.

The site is also shown within a defended Flood Zone 1 of the South East Lincs. Strategic Flood Risk Assessment Map (2017) and located in the Welland and Deepings Internal Drainage Board district.

- 1.3 Geoff Beel Consultancy was appointed on 13th August 2018 to undertake a Flood Risk Assessment.

2.0 LOCATION

- 2.1 The development site is land to the rear of 26 Green Lane, Spalding. The National Grid Reference of the central point of the site is TF 24232242.
- 2.2 The position and extent of the site are shown on Fig 1 – Location & Site Layout Plan at the end of the document.
- 2.3 The site, located within the Welland and Deepings Internal Drainage Board district is shown within Flood Zone 3 as detailed on the Environment Agency Flood Map for Planning and in a defended Flood Zone 1 of the Council's Strategic Flood Risk Assessment Map (2017).

3.0 THE SITE AND SEQUENTIAL TEST

- 3.1 The site is currently an existing property with large garden.
- 3.2 The area of development is approximately 0.05 hectare.
- 3.3 The proposed site layout consists of a two-storey dwelling off individual access from Green Lane.
- 3.4 The Sequential Test and Exception Test will require to be applied by the Local Planning Authority but the development may be permitted as the site is protected against the 1 in 100 year fluvial event by a combination of defences, pumping stations and sluice gates meeting the requirements of NPPF as located in Flood Zone 1 of the Councils' Strategic Flood Risk Assessment Residual Hazard Map (2017).

4.0 EXISTING FLOOD ALLEVIATION MEASURES

- 4.1 The site is within a defended floodplain, as defined in Appendix 1 of the Environment Agency's 'Policy and Practice for the Protection of Floodplains' and is considered to be passive until such time as a flood greater than that for which the defences were designed occurs. The likelihood of flooding due to overtopping or failure of a flood defence embankment is considered to be small.
- 4.2 The site is located within the Welland and Deepings Internal Drainage Board protected by the River Welland defences to the 1 in 100 year return period flood event. The nearest 'main drain' open watercourse, the Town Drain (Spalding) is some 300 metres south of the site. Existing land level is generally at 3.20m aOD whilst Green Lane carriageway level is at 3.13m aOD.
- 4.3 The existing standard of drainage for the Welland and Deepings Internal Drainage Board is 1 in 50 years return period, compatible with the Department of the Environment, Food and Rural Affairs target level of service for rural drainage and flood defence works. Freeboard of 1.00 metre is provided to the lowest land levels.
- 4.4 The site and surrounding development drains by Anglian Water Services Ltd sewerage to the Board's Town Drain (Spalding) and hence to Pode Hole Pumping Station. The Pode Hole Pumping Station discharges into the Vernatts Drain which ultimately flows into the tidal River Welland.
- 4.5 The Vernatts Drain is an embanked high level carrier conveying the surface water run-off from some 16165 hectares of land into the tidal River Welland at Surfleet Seas End.

The Welland and Deepings IDB have recently completed a three year programme to raise and strengthen the Vernatts Drain embankments to accommodate with 450mm freeboard, the design flood level of 3.96m aOD, estimated to be a 1 in 100 year return period event.

- 4.6 Current maintenance standards within the Welland and Deepings Internal Drainage Board are generally very good.

During the operation and maintenance of its pumping stations, associated structures and channel systems, particularly those that could affect property, the Board seeks to maintain a general standard capable of providing flood protection to its district. A routine maintenance programme is in place to ensure that the Board's assets are commensurate with the standard of protection that is sought. However, bank slips, blocked culverts etc may occur from time to time and these matters are usually dealt with promptly.

- 4.7 The fluvial River Welland is located approximately 600 metres to the east of the site with a standard of protection of 1 in 100 years return period. The Crowland and Cowbit Washes are situated upstream of the town on the opposite bank of the River Welland offering integrated protection to Spalding and the surrounding district.

- 4.8 Fluvial flood levels of the River Welland on the site frontage upstream of Spalding Town Bridge are as follows:

	Present	Present + Climate Change
1%	4.43m	4.68m
0.1%	4.45m	4.68m

- 4.9 Maintenance standards of the Environment Agency's main rivers and defences are well maintained and regularly inspected for their asset condition.

5.0 POTENTIAL SOURCES OF FLOODING

- 5.1 Five potential sources of flooding have been identified as a result of this assessment:

- a) local blockages to AWS Ltd sewerage
- b) local blockages to existing IDB main drain system.
- c) storm return period of 1 in 50 years being exceeded
- d) failure of Pode Hole Pumping Station
- e) overtopping and breaching of the fluvial River Welland defences

- 5.2 The probability of flooding from source a) is low due to the standards of sewerage already achieved by Anglian Water Services Ltd. Telemetry systems monitor the performance of the sewerage for any blockage.

- 5.3 The probability of flooding from source a) is low due to the maintenance standards already achieved and managed by the IDB.

The probability of flooding from b) is also low due to the Welland and Deepings IDB main drain design standard incorporating a minimum 900mm freeboard to the lowest land level which provides adequate storage in events greater than 1 in 50 years.

- 5.4 Failure of Pode Hole Pumping Station may occur due to long term mechanical breakdown or power supply being disrupted. However, in these circumstances, if conditions were such to put properties and land at risk of flooding, the Internal Drainage Board would take emergency action to maintain the drainage level of service by utilising temporary pumping equipment. The probability of such an occurrence is also considered to be low.

Previous historic rainfall events of 1968 and 1978, estimated to be greater than 1 in 100 year events, caused no flooding to any residential properties at the time and the Boards policy is to provide a standard of drainage which satisfies NPPF requirements of a 1 in 100 year return period for fluvial protection inclusive of the effects of climate change and development. The Boards policy regarding the connection of future developments to the arterial system enables a flexible approach to be adopted and meet the criteria for "sustainable urban drainage".

The probability of the site flooding from this potential source is also considered to be low.

- 5.5 The possible overtopping and breaching of the fluvial River Welland flood defences which may affect the site under extreme conditions is also considered to be very low. The standard of defence of 1 in 100 years would have to be exceeded to create such conditions. However, the defences to the site river frontage consist of steel sheet piling and hard defences with no risk of a breach occurring.
- 5.6 It is therefore recommended that proposed floor levels of the development should be 300mm above existing road level of Green Lane at 3.43m aOD to safeguard against the remote possibility of overtopping of the River Welland defences. Flood resilient measures will also be incorporated into the design and construction of the dwelling up to 300mm above finished floor level.

6.0 EXTENT OF KNOWN FLOODING

- 6.1 During the preparation of this assessment, no evidence was discovered of the site being flooded or of any adjoining properties.

7.0 PROBABILITIES AND TRENDS OF FLOODING

- 7.1 The probability of this development flooding from localised drainage systems is very low. It is also intended to construct floor levels 300mm above Green Lane carriageway level at 3.43m aOD with flood resilient measures incorporated up to 300mm above finished floor level.
- 7.2 The probability of the site flooding with water from any AWS Ltd sewerage system Welland and Deepings river system is less than 1% because of the standards of the existing flood defence systems, storage within existing drainage channels and the location of the site. Similarly the same standard is provided by the Environment Agency's main river and defences.
- 7.3 If under very extreme events, levels of floodwater from any Environment Agency or Welland and Deepings river or arterial systems rose to such an extent that the site was affected, the situation would not be sudden. It is very probable that sufficient time would be available to take precautionary actions to limit the extent and potential impact of flooding.
- 7.4 The water levels in the drainage channels will tend to rise as a result of the impacts of climate change. However the existing systems and defences together with the raising of floor levels above existing Green Lane carriageway level will be appropriate for the design life of the development (i.e. 100 years).
- 7.5 Proposed floor levels are above the 1 in 1000 year return period flood event plus climate change offering safe refuge for the occupants. Safe access and egress to and from the site would be available in a south westerly direction towards Deeping St. Nicholas where land is in Flood Zone 1.

8.0 IMPACTS OF FLOODING

No significant impacts of flooding are anticipated.

- 8.2 Floor levels of the development will be raised 300mm above existing Green Lane carriageway level at 3.43m aOD offering additional protection against impacts arising from any extreme short duration, localised events. Surface water drainage will be discharged to soakaways designed to BRE365 requirements and Building Regulations approval.

- 8.3 The general location of the site within the catchment is such that if flooding occurred from any of the Environment Agency or Welland and Deepings river systems, then probably 2 to 3 days warning time would be available.

- 8.4 The developer should ensure that the eventual occupiers of the dwelling are sufficiently aware of the risk of flooding, and the standard of the existing defences. The Environment Agency provides a Flood Warning Service which includes Flood Warning Codes and uses direct warning methods where the risks and impacts of flooding are high. Indirect warnings are provided to all flood risk areas, even those at low risk of flooding. The main method is media broadcasts via local radio and also by television.

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 contact: tel: 0345 988 1188.

- 8.5 No displacement of water from the site will affect any adjoining properties and agricultural land.

9.0 RESIDUAL RISK – EXTREME EVENTS

- 9.1 The residual risk from extreme events is very low on this site, because of its location, within a pumped sub-catchment of the Welland and Deepings IDB area and its location 600 metres from the River Welland fluvial defences consisting of vertical steel sheet piling and concrete capping beam and hard defences.

- 9.2 The site is within Flood Zone 1 according to NPPF classification the site with a very low risk of flooding due to the current standards of drainage and flood defence and land levels. The site is not located within a Functional Flood Plain of any 'main river' or 'main drain'. The Environment Agency Flood Map for Planning has been produced irrespective of existing flood defences and standards of protection.

- 9.3 South Holland District Council and Boston Borough Council in conjunction with the Environment Agency and the local IDB's within the Council area have carried out a Strategic Flood Risk Assessment of the whole area by appointed Consulting Engineers.

The South East Lincs. Strategic Flood Risk Assessment has produced more definitive Flood Risk Maps similar to those published by the Environment Agency and at the same time has analysed flood return periods of all tidal and fluvial defences for year 2115 to account for the effects of climate change.

Breach scenarios of embankments failing and/or being overtopped have also been carried out to establish Flood Risk Zones.

10.0 CONCLUSIONS AND RECOMMENDATIONS

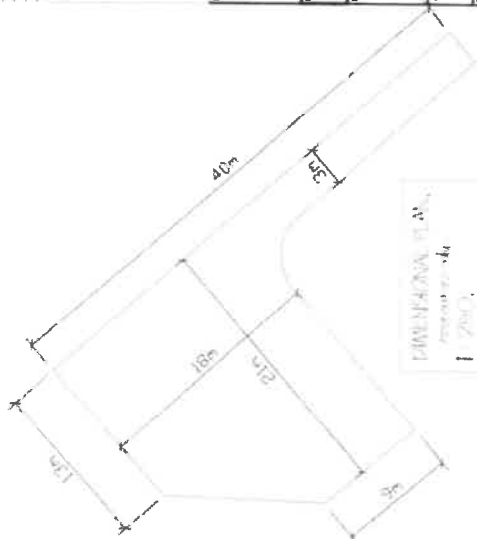
10.1 As a result of the assessment, the following conclusions have been reached:-

- The proposed development is not in a Functional Floodplain. It is located in the Passive Floodplain protected by River Welland and Welland & Deepings IDB defences to a 1 in 100 year return period.
- The site is in Flood Zone 1 of the South East Lincs. Strategic Flood Risk Assessment Flood Maps with the actual risk of the site flooding from any Environment Agency river system being very low.
- Although the site is located within an Internal Drainage District with a minimum standard of drainage of 1 in 50 years, this accords with Defra guidelines for rural development. Freeboard to design water level of 900mm to lowest land level is available for events greater than 1 in 50 years providing further storage within the drainage channels.
- Floor levels will be raised 300mm above existing Green Lane carriageway level at 3.43m aOD and flood resilient techniques incorporated into the design and construction of the proposed dwelling up to 300mm above finished floor level.
- On site surface water drainage will be discharged to soakaways to BRE365 design requirements and Building Regulations approval.



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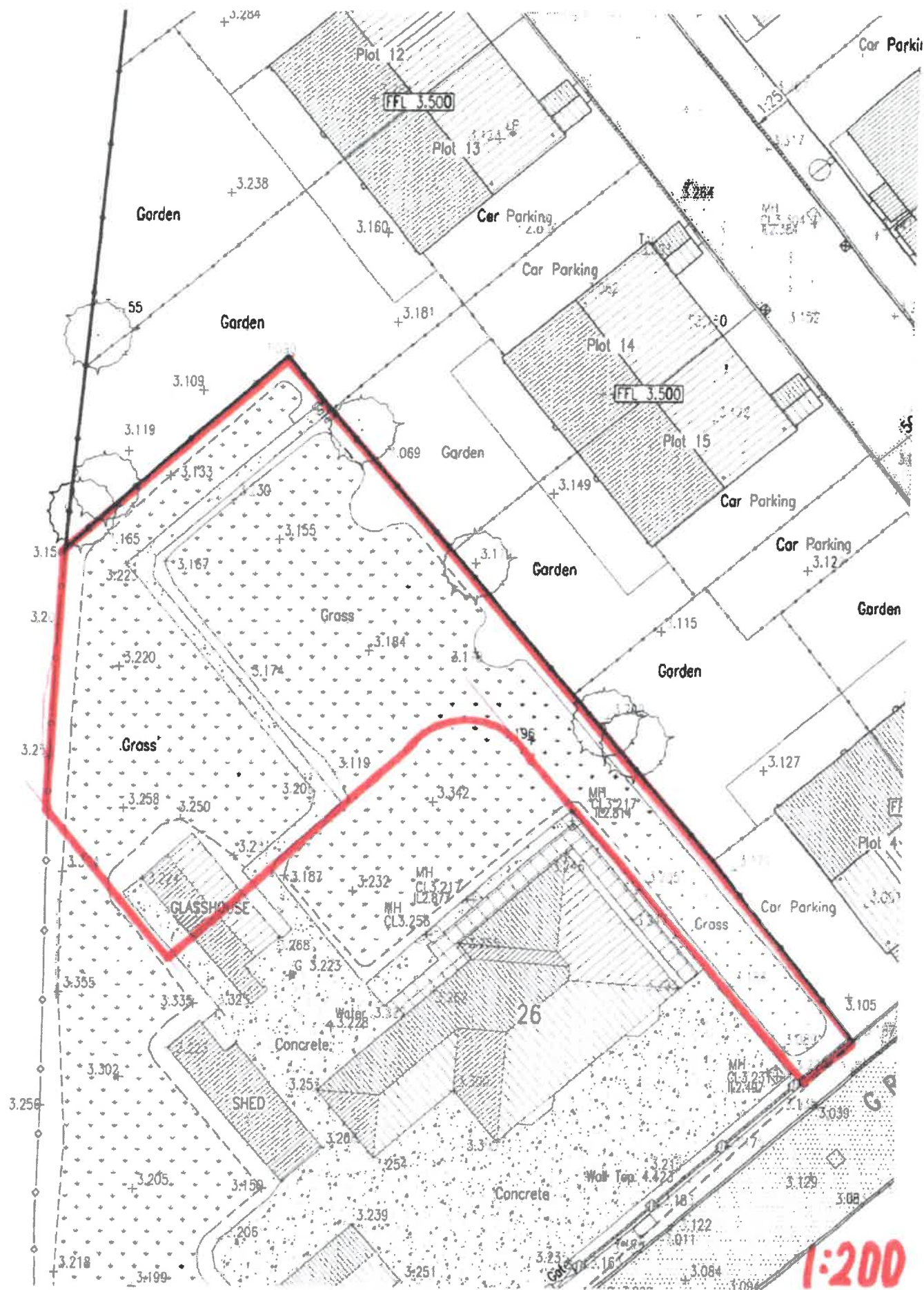
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1:200



Flood map for planning

Your reference

PE11 2YD

Location (easting/northing)

524227/322420

Scale

1:2500

Created

15 Aug 2018 2:18



Selected point



Flood zone 3



Flood zone 3: areas
benefitting from flood
defences



Flood zone 2



Flood zone 1



Flood defence



Main river

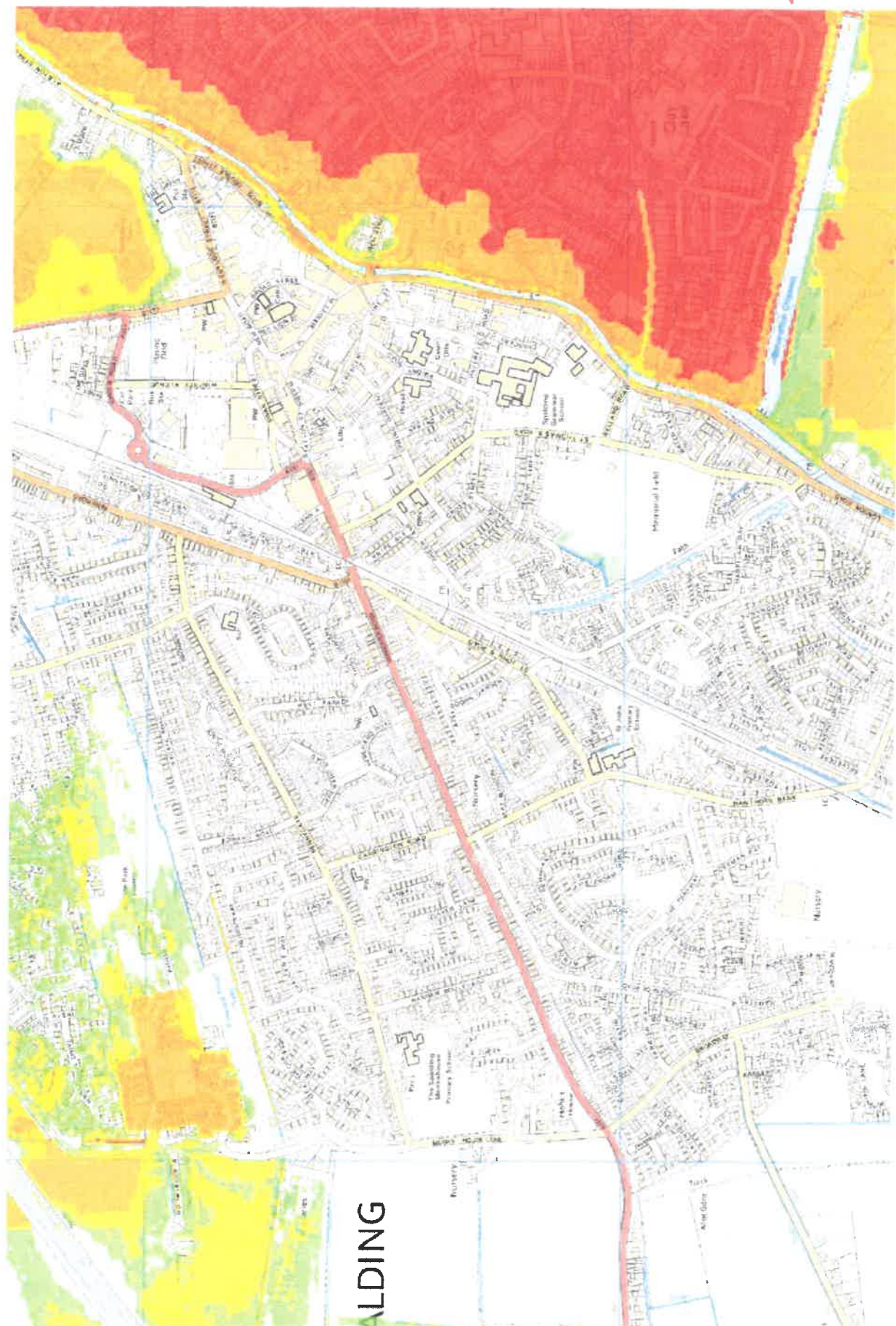


Flood storage area

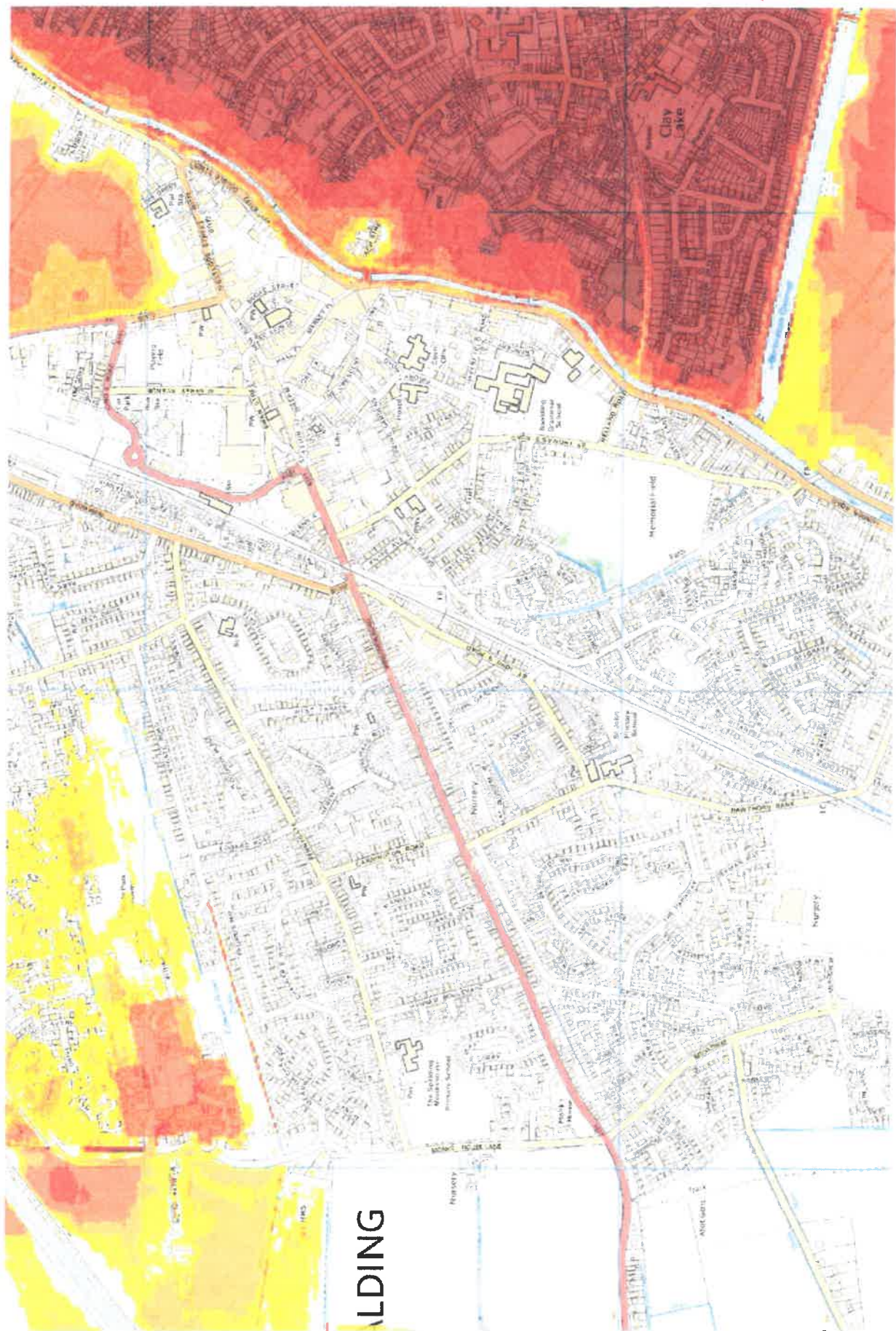


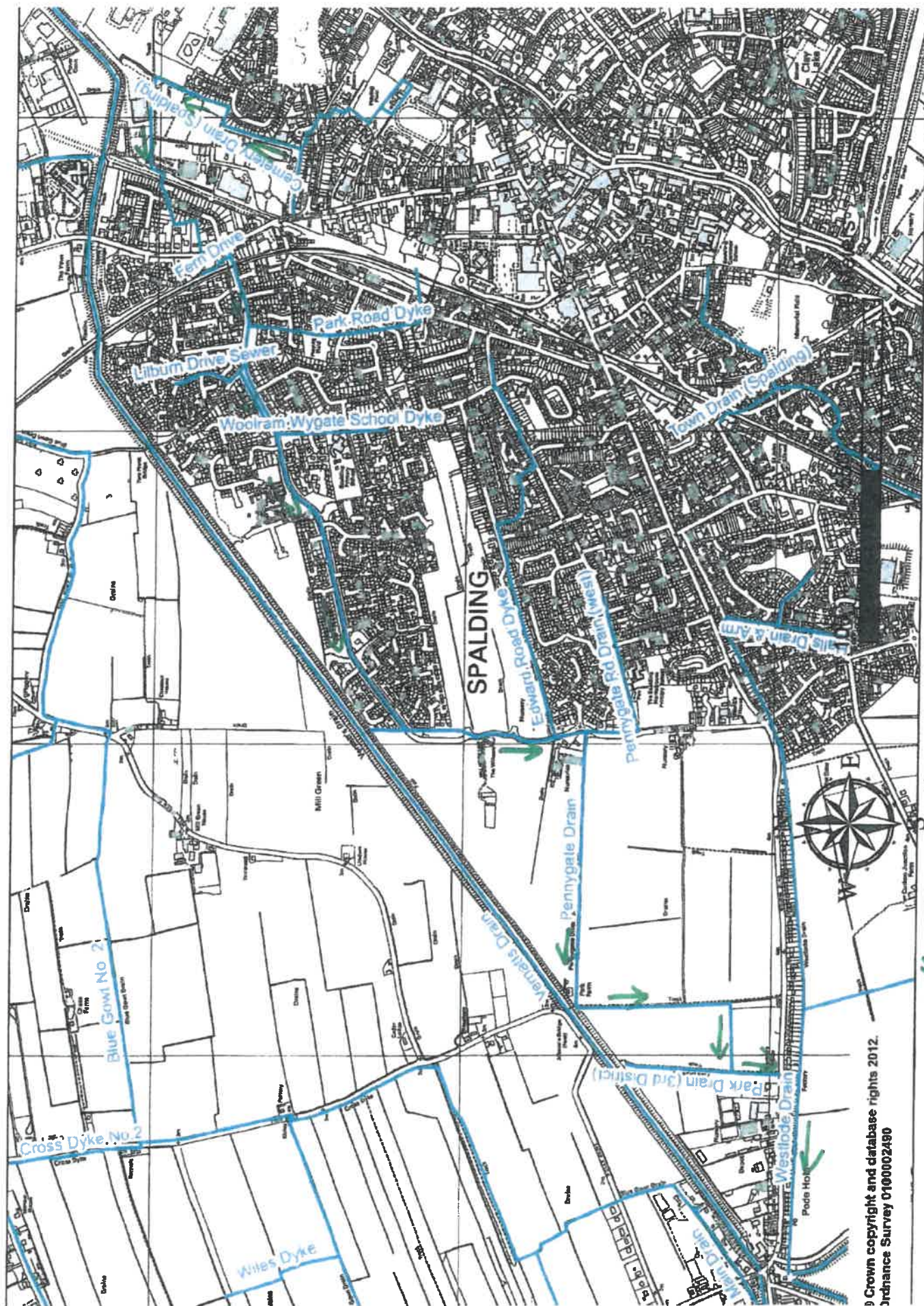
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Residual Hazard Map 2115



Residual Depth Map 2115





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