

<p>Is the land under single ownership?</p>	<p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>
<p>If 'no' who are the other landowners?</p>	<p>Please list other owners: ALL OWNERS PHILIP A. J. KITCHEN NICOLA Z J ROGER LISA M. HALLIDAY PAUL R. KITCHEN</p>
<p>Is the access to the site under separate land ownership/s</p>	<p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, please provide details</p>
<p>In the case that the site, or access to the site is owned by more than one landowner, the Council may contact you to establish which part of the site is under your control. If it is possible to indicate this on the attached map, or you have previously detailed this in documentation to the Council, please confirm this by providing details below.</p> <p>AS INDICATED ON MAP</p>	

Availability

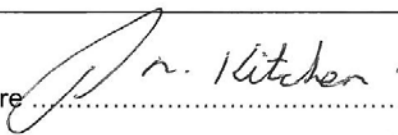
<p>Is the site occupied?</p>	<p><input checked="" type="checkbox"/> Occupied <input type="checkbox"/> Part occupied <input type="checkbox"/> Vacant</p> <p>If occupied, please provide details</p> <p style="text-align: center;">IN AGRICULTURAL USE</p>
<p>When is the site available?</p>	<p><input checked="" type="checkbox"/> Available now <input type="checkbox"/> Not immediately available but could be developed within the plan period (before 2026) <input type="checkbox"/> not within the plan period (2027+)</p>
<p>If the site were allocated for development, when would you intend to develop the site?</p>	<p><input checked="" type="checkbox"/> 2014/15-2018/19 <input type="checkbox"/> 2019/20-2032/24 <input type="checkbox"/> 2024/25-2025/26</p> <p>Please provide any comments you may have on how firm the indicated dates are, and what would cause this to change.</p>

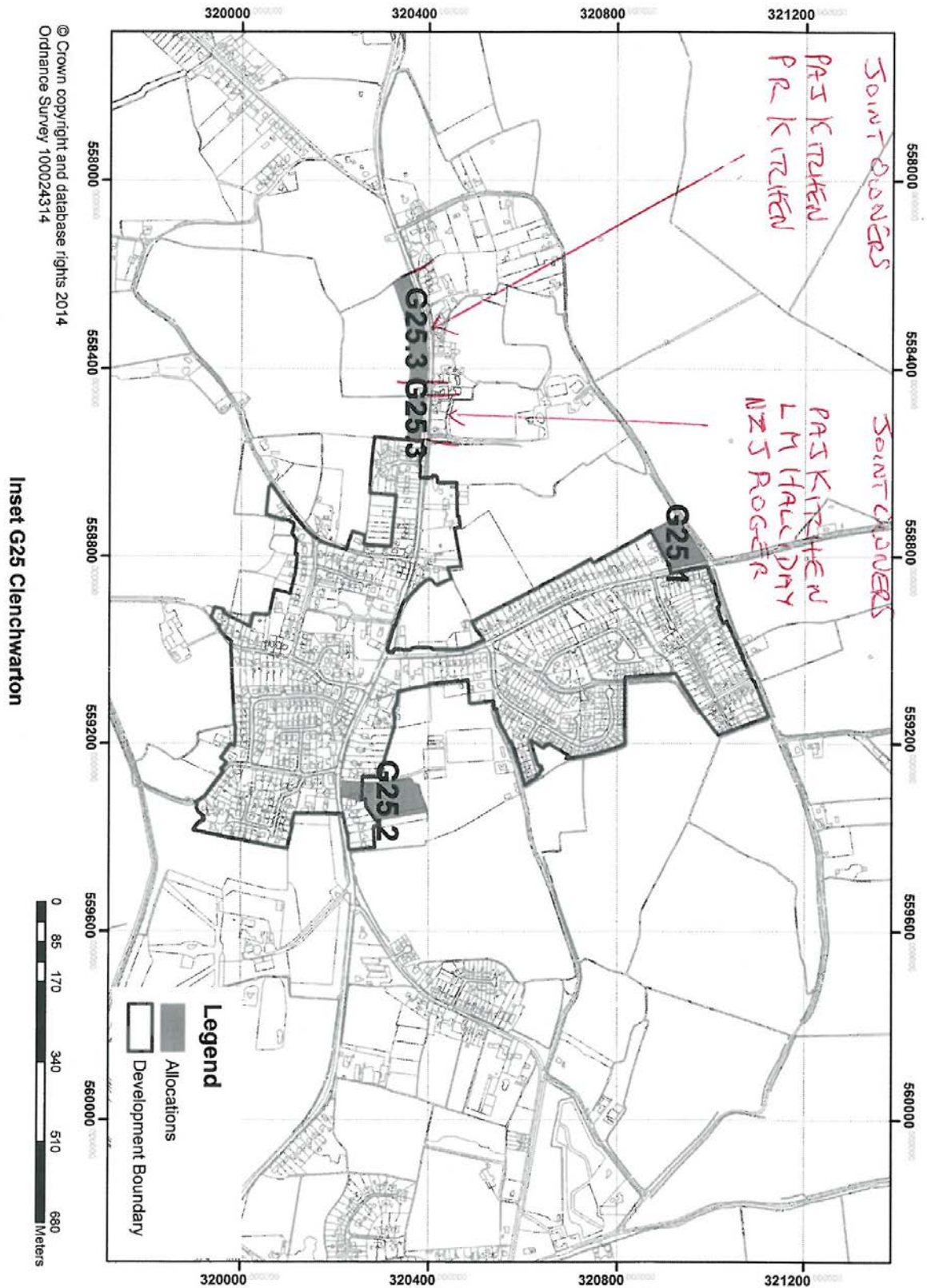
Constraints	
<p>Are there any financial considerations that you are aware of that may influence whether or when the site would be developed?</p>	<p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If yes, please provide details</p> <p style="text-align: center;">AFFORDABLE HOUSING COSTS ? COMMUNITY INFRASTRUCTURE LEVY ? UNKNOWN SECTION 106 AGREEMENTS</p>

<p>Are you aware of any abnormal costs associated with bringing forward this site for development, e.g. contaminated land?</p>	<p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>If yes, please provide details</p>
<p>Are there any other constraints that may prevent or delay development of the site? (see examples)</p>	<p>e.g. access issues, land contamination, ecology issues, land covenants, heritage issues, flood risk, legal issues, infrastructure requirements, hazards, land use, occupation of land, market demand, other?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>If yes, please provide further details or state 'see submission for full details'</p>


Further Information	
If the site was identified by the Council as a preferred option, have you read the draft policy relating to it?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Do you have any comments on the requirements and consideration set out in that draft policy? DELIVERABILITY FORMS ISSUED PRIOR TO CABINET MEETING ON 4/11/2014

Other
Please provide details of any other viability issues in relation to the site that the Borough Council should be aware of that has not been covered in your submission or this form (use separate sheets if necessary)

Signature	
Print name	PAUL RICHARD KITCHEN
Date	11.11.14



Appendix 8: Ian Bix Report supporting Preferred Option Site




PREFERRED OPTIONS FOR DETAILED
POLICIES AND SITES PLAN

REPORT TO SUPPORT DEVELOPMENT
OF PREFERRED OPTION SITE CLENCH1

WILDFIELDS ROAD/HALL ROAD,
CLENCHWARTON

1809 - 02.10.13



Ian. H. Bix Associates Ltd.
ARCHITECTURAL & BUILDING CONSULTANTS

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PREFERRED OPTIONS FOR DETAILED POLICIES AND SITES PLAN

CLENCHWARTON

This report has been prepared to support a preferred options site, namely CLENCH1, land along Wildfields Road and Hall Road.

The site is made up of two parcels of land amounting to 2.88 hectares to the south of Wildfields Road and the east of Hall Road and has been given a suggested residential development allocation for 46 dwellings. The development is subject to the provision of additional information as requested upon Page 264 of the preferred options for detailed policies and sites plan document.

Our Involvement

We act upon behalf of the owner of the smaller parcel of land which sits upon the corner of Wildfields Road and Hall Road, a former nursery and represents an area of 0.66 hectares.

The remaining part of the site, that being the land to west, presently a field in agricultural use is in the ownership of a local farmer who has employed their own agent to provide additional information regards the development. The land area of this larger site represents an area of 2.22 hectares.

Within this report, we will comment upon the options for developing the site in part, relative to our client's smaller parcel of land and as a site as a whole encompassing both parcels of land.

Additional information

Referring to Page 264 we deal with the questions in the same numerical order as follows:-

1. Flood Risk Assessment

Our clients have commissioned a Flood Risk Assessment for the site as a whole from Geoff Beel Consultancy and a copy of that Flood Risk Assessment is appended to support the proposal. We trust the assessment is self-explanatory. Reference should be made to the conclusions and recommendations of the report. Finished floor levels are required to be set with a finished floor level (FFL) of 3.00m AOD. These will vary between 300 to 750mm above natural ground level and are considered to be achievable. The development will require being of two-storey dwellings with no bedrooms at ground floor and safe refuge above flood level available in new developments within flood risk zones. The dwellings are to be constructed incorporating flood resilient construction technology.

2. Improvements to Pedestrian Links from the Site to the Highway Infrastructure

Currently there is no footpath upon the western side of the Hall Road. However, there is a footpath on the eastern side which runs back to the south linking to footpaths in the village.

Therefore, to fully develop CLENCH1 we foresee a new adopted road complying with Norfolk County Council Planning and Transportation requirements. The road will be constructed of a 4.8m wide carriageway with footpaths of 1.5m either side. The footways will be extended into Hall Road on the western side where they will be taken further south and provided with a crossover so as to connect to the existing footpath which runs to the east of Hall Road.

Consultation was made with NCC Highways regards an appropriate access and the advice favours an access from Hall Road. Please refer to appended e-mails for enquiry dated 28/08/13 and reply 04/09/13. An access off the 3m wide Wildfields Road would require major widening to at least 4.8m throughout its length which is considered prohibitive. An access off the 5.5m wide Hall Road being much more favourable and the sensible solution for the development.

3. **Provision of Pedestrian/Cycle Link to Recreation Ground to South of the Site and Submission of a Suitable Plan for the Future Management and Maintenance of Pedestrians/Cycle Link**

We feel the requirement for a pedestrian and cycle link from we assume the larger parcel of the site that sits to the west to be unnecessary, although possibly achievable subject to obtaining the necessary rights of way. Hall Road and its current footpath provide a cycle and pedestrian link to the village and recreation ground. Hall Road and its footpath are maintained by Norfolk County Council Highways and therefore in our opinion there is no need to provide a separate or cycle pedestrian link from the development. A separate route will require agreements with third parties and may be difficult to achieve and the question is this of benefit?

4. **Submission to Details Relating to the Sewer that Crosses the Site together with Mitigation (if required) ie. Easements/Diversion to the Satisfaction of Anglian Water**

We have obtained information relating to the sewers which serve both our clients smaller parcel of land and the adjoining larger parcel to the west. There does not appear to be a sewer that crosses either site, therefore an easement or diversion is not necessary. Please refer to the appended AWA record maps for confirmation.

However, we recognise that to develop the whole site it will be necessary to provide an engineering design to provide both a positive foul and surface water drainage system. There are two possible foul sewer connections, one being in Hall Road at MH No.8901(depth 1.8m) and the other being within the field to the west behind 66, Hall Road MH No 8701(depth 1.67m). The foul sewers are reasonably deep, 150mm diameter pipework and are we trust of sufficient capacity to accept the development. The drainage design will be undertaken by a drainage engineer for approval by Anglian Water. In respect of surface water drainage, this is dealt with later under item 6.

5. **Ecological Study**

Our clients have commissioned a report from Wild Frontier Ltd regards the presence of reptiles and other such species together with comments regards flora and fauna. A copy of this report is attached which we trust is self explanatory. Referring to the conclusions of the report it states that provided the list of mitigation measures are put in place, then there is no significant impact from the proposed development. Additional surveys are recommended at the appropriate time.

6. **Sustainable Drainage Measures**

It is apparent the land especially the field to the west lays heavy and is surrounded by an open drainage system. Therefore the provision of sustainable drainage measures is limited and consultation was made with the Internal Drainage Board regards a sensible solution to provide adequate drainage from the site and their advice has been appreciated.

Their advice is to take the water from the site in a north-easterly direction which will then feed onto an IDB drain that sits to the east.

All of the open drains around the larger parcel of land (field) are clear and well maintained. The only drains which are not well maintained are the drains which run west to east alongside Wildfield Road, and the open drain along Hall Road. Both are overgrown with small spindly trees which have taken over the drains. It is proposed that these spindles are removed; the trees lopped back and the open drains dug out and re-graded to fall to the corner of the two roads.

At this point the IDB advice is to provide a culvert diagonally across the road to take the water away from the site and onto a riparian drain opposite which in turn connects to the IDB drain. Refer to e-mail from IDB to Geoff Beel dated 10/09/13, received by ourselves 13/09/13.

The upgrade will be designed by a drainage engineer to the IDB approval to ensure that the system is brought up to standards. It is also anticipated that the IDB will take over the maintenance of the riparian drains ensuring an IDB maintained drain throughout.

The adopted roads will be taken to a positive surface water drainage system which will discharge into the IDB drain, thus satisfying the highway requirement for a positive system.

In respect of sustainable drainage measures, then any private driveways serving individual plots are constructed to allow them to drain naturally and return groundwater to the natural ground without the need for taking it away from individual sites. Also individual plots will be served by soakaway drainage.

7. **Affordable Housing**

Affordable housing will be provided in line with the requirements of the local authority and in accordance with their core strategy requirements, will amount to 20% of the number of dwellings. The housing officer will advise regards the dwellings to be provided identifying the number of bedrooms required for each to satisfy the needs of the village.

8. **Development Options**

Options 1 and 2 – Development of the Smaller Parcel of Land

This parcel of land was put forward for inclusion as a potential development site by our clients as a separate piece of land. In respect of developing this smaller parcel of land, then in our opinion it makes sense to extend the village guideline so as to complete the development along Hall Road to both sides up to the corner of Wildfields Road.

The site itself is well surrounded by mature hedges and trees and is capable of being developed for 8 to 11 plots with the latter figure being increased to 13 upon the basis of allowing two plots upon land that may be currently landlocked.

So as to provide an indication of the site's potential, we have provided two drawings to illustrate how they can be developed.

Drawing No 1809-01 which is appended shows a proposed development of 8 dwellings off a private drive, thus avoiding the need for an adopted road. This provides a layout of well sized plots, 20% of which will be affordable. The key points for this site are as follows:-

- The site is surrounded by mature trees and hedges.
- All plots will have benefit of this enclosed landscaped site.
- Surface water drainage for the private drive will be based upon a sustainable drainage solution allowing water to drain back to the natural ground.
- Surface water from the dwellings will be taken to soakaways.
- Foul water drainage will be taken to the sewer in Hall Road.
- 20% affordable housing.
- Finished floor levels of dwellings to be set at 3.00m AOD.
- The development will require being of two-storey dwellings with no bedrooms at ground floor.
- The dwellings are to be constructed incorporating flood resilient construction technology.

Drawing No 1809-02 which is appended shows a proposed development of 11 dwellings off an NCC adopted road and also includes a private drive to serve two more plots upon a potentially landlocked site making 13 plots in total, 20% of which will be affordable. The key points for this site are as follows:-

- The site is surrounded by mature trees and hedges.
- All plots will have benefit of this enclosed landscaped site.

- Surface water drainage for the adopted road will be taken to an attenuated system allowing water to drain back into the existing open drains at an agricultural rate. This will avoid the need for providing improved open drains and a culvert across the road.
- Surface water from the dwellings will be taken to soakaways.
- Foul water drainage will be taken to the sewer in Hall Road.
- 20% affordable housing.
- Finished floor levels of dwellings to be set at 3.00m AOD.
- The development will require being of two-storey dwellings with no bedrooms at ground floor.
- The dwellings are to be constructed incorporating flood resilient construction technology.

Option 3 – Development of the Two Parcels of Land as a Whole Site (CLENCH1)

Drawing No 1809-03 which is appended shows a proposed development for the whole of the CLENCH1 site incorporating both parcels of land.

This confirms 46 dwellings can be accommodated upon the proposed site of which 20% will be affordable housing. The drawing includes an area for public open space, landscaping and maintenance strips for the open drains that exist on some sides of the site.

The larger parcel of land has on two sides open drains and therefore we have provided a 9m wide maintenance strip to serve these drains. These dimensions may be reduced if considered excessive subject to discussions with IDB. Currently the site is an open field with a woodland to its north-west corner adjacent Wildfields Road. So as to provide a landscaped edge to the development, we propose a 6m wide tree belt to be planted around its edge. This will provide a landscaped boundary and windbreak to enclose the development. The maintenance strip alongside the open drains can be used for pedestrian and dog walking.

The sizes of plots are similar to the existing plots in Hall Road.

- Access to the site is from Hall Road through the smaller parcel of land.
- The road will be an adopted road with a 4.8m wide carriageway and footpaths of 1.5m.
- Drainage from the adopted road will be taken to the existing open drain system and that system improved via cleaning out drains currently in poor order together with the provision of a culvert to link up with an open drain to the north-east of the corner between Hall Road and Wildfields Road.
- It is hoped the IDB will adopt these improved open drains as part of their system.
- Foul water drainage will be taken in part to the existing foul water manhole in Hall Road and in part to the existing foul water manhole to the east of No 66 Hall Road.
- 20% affordable housing.
- Finished floor levels of dwellings to be set at 3.00m AOD.
- The development will require being of two-storey dwellings with no bedrooms at ground floor.
- The dwellings are to be constructed incorporating flood resilient construction technology.

Appendices

Drawings 1809-01, 02 and 03

Geoff Beel Consultancy Flood Risk Assessment (includes AWA record maps)

NCC Highway Consultation – e-mail enquiry dated 28/08/13 and reply 04/09/13.

Report from Wild Frontier Ltd

E-mail from IDB to Geoff Beel dated 10/09/13, received by IHB on 13/09/13.



Indicative Proposed Site Plan Scale 1:1000 1809-01

*Proposed Development,
Clench1 Site, Hall Road, Clenchwarton*





Indicative Proposed Site Plan Scale 1:1000 1809-02

*Proposed Development,
Clench1 Site, Hall Road, Clenchwarton*





Indicative Proposed Site Plan Scale 1:1000 1809-03

*Proposed Development,
Clench1 Site, Hall Road, Clenchwarton*



**FLOOD RISK ASSESSMENT
FOR PROPOSED RESIDENTIAL DEVELOPMENT
AT JUNCTION OF
HALL ROAD WITH WILDFIELDS ROAD,
CLENCHWARTON,
KINGS LYNN, NORFOLK**

FINAL REPORT

GEOFF BEEL CONSULTANCY

SEPTEMBER 2013

GCB/BIX

DISCLAIMER

This document has been prepared solely as a Flood Risk Assessment in support of a planning application for proposed Residential Development at junction of Hall Road with Wildfields Road, Clenchwarton, Kings Lynn, Norfolk. "Geoff Beel Consultancy" accepts no responsibility or liability whatsoever for any use made of this document other than by the client "Mr & Mrs Smith and Others" for the purposes it was originally commissioned and prepared. All comments and opinions made are based upon information available to "Geoff Beel Consultancy" during the necessary investigative process, and the conclusions and recommendations could therefore, differ in the event of material subsequently being found erroneous, incomplete or misleading. "Geoff Beel Consultancy" therefore, accepts no liability should this prove to be the case.

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- 6.0 EXTENT OF KNOWN FLOODING
- 7.0 PROBABILITIES AND TRENDS OF FLOODING
- 8.0 IMPACTS OF FLOODING
- 9.0 RESIDUAL RISKS – EXTREME EVENTS
- 10.0 CONCLUSIONS AND RECOMMENDATIONS

Fig 1 - Location Plan – Kings Lynn & West Norfolk Borough Council Preferred Options Policy Plan

Fig 2 - Kings Lynn & West Norfolk Borough Council Strategic Flood Risk Assessment Flood Zone Map No 4 (2008)

Fig 3 - Kings Lynn & West Norfolk Borough Council Strategic Flood Risk Assessment Hazard Area Map No 4 (2008)

Fig 4 - Environment Agency Tidal Hazard Mapping – 1 in 200 year event, Depth & Velocity in 2115 – CCN/2011/29156

Fig 5 - Anglian Water Wastewater Asset Plans

Fig 6 - Kings Lynn Internal Drainage Board District Plan

1.0 INTRODUCTION

- 1.1 Land amounting to 2.88 hectares to the south of Wildfields Road and west of Hall Road, Clenchwarton is allocated for residential development of 46 dwellings in Kings Lynn & West Norfolk Borough Council Preferred Options Policy Plan subject to a Flood Risk Assessment being submitted.

The Flood Risk Assessment is to be submitted by Ian H Bix & Associates on behalf of Mr & Mrs Smith and Others for proposed residential development at land alongside Wildfields Road and Hall Road, Clenchwarton, Kings Lynn.

- 1.2 Planning approval would require a Flood Risk Assessment to be submitted to the Environment Agency to meet the requirements and general principles contained in Paragraph 9 of the Technical Guidance to the National Planning Policy Framework (NPPF).

The site is located within the Environment Agency's Flood Zone 3 of the Great Ouse River and is situated approximately 2.00kms from the River.

The latest Agency Flood 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 within the Kings Lynn Internal Drainage Board's area and is also located in Tidal Flood Zone Category 3 of the Kings Lynn & West Norfolk Borough Council's Strategic Flood Risk Assessment Maps (2009) but outside any present day Hazard Zone.

2.0 LOCATION

- 2.1 The development site is located south of the junction between Westfields Road and west of Hall Road, Clenchwarton. The National Grid Reference of the central point of the site is TF
- 2.2 The position and extent of the site are shown on Fig 1 – Location Plan at the end of the document.
- 2.3 The site, located within the Kings Lynn Internal Drainage Board district is shown within tidal Flood Zone Category 3 as detailed on the Environment Agency Flood Zone Map and the Council's Strategic Flood Risk Assessment Maps (2009) but outside any present day Hazard Zone.

3.0 THE SITE AND SEQUENTIAL TEST

- 3.1 The site is currently a dwelling and buildings with surrounding paddock fronting Hall Road and Grade 2 agricultural land south of Wildfields Road abutting the village residential area of the Kings Lynn & West Norfolk Borough Council Local Plan.
- 3.2 The area of development is 2.88 hectares with proposed vehicular access to Hall Road.
- 3.3 The proposed site layout consists the demolition of the existing buildings on the Hall Road frontage to create the access to 46 dwellings.
- 3.4 The Sequential Test and Exception Test will require to be applied but the development may be permitted as the site is protected against both the 1 in 100 year return period fluvial event and the 1 in 200 year return period tidal event meeting the requirements of NPPF.

The proposal is for the part redevelopment of an existing developed area with flood resilient measures incorporated.

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 embankments is considered to be small.
- 4.2 The site is located within the Kings Lynn Internal Drainage Board district which is protected by the Great Ouse Tidal and Sea Defences against a minimum flood return period of up to 1 in 200 years. The nearest Boards 'main drain' is located north east of the development site alongside Bailey Lane Road with land levels at the site varying between 2.22m and 2.73m aOD. the site is surrounded by well maintained riparian drains.

- 4.3 The Kings Lynn IDB drainage system at present achieves a target standard of protection to residential properties of 1 in 100 years return period with a minimum freeboard of 900mm elsewhere in the district to lowest agricultural land levels.

As a result of the Strategic Drainage Study recently carried out by the Boards Consulting Engineers with hydraulic modelling of the West Lynn outfall catchment to include allowances for future development and climate change, the following conclusions have been reached:-

- . the freeboard criteria of 900mm is not achieved for all studied return periods with overtopping at isolated locations along the lengths of the West Lynn main drains and tributary drains, giving rise to reducing standards of service over the next 50 years.
 - . the Board has resolved to continue its policy regarding the connection of future developments to the arterial system which enables a flexible approach to be adopted and meet the criteria for "sustainable urban drainage". The Board has adopted a target level of service for all urban properties of 1 in 100 years plus freeboard.
 - . the Board has resolved to carry out improvements to the West Lynn Outfall Sluice district by way of seeking developers contribution to provide a level of protection of a future 1 in 100 years return period event with 900mm freeboard.
- 4.4 The site and surrounding land drains by gravity in a generally easterly direction to outfall into the tidal River Great Ouse at West Lynn Outfall Sluice, operated and maintained by the Kings Lynn Internal Drainage Board.
- 4.5 Current maintenance standards within the Kings Lynn Internal Drainage Board and of the Environment Agency tidal defences are generally 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 Boards 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.

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 existing riparian drains
- b) local blockages to existing IDB main drain system
- c) storm return period of 1 in 100 years being exceeded
- d) failure of the West Lynn Outfall Sluice
- e) overtopping and breaching of the Wash Coastal defences known as Coast West

5.2 The probability of flooding from the riparian drain is low as the owner occupier of the site maintains the drain to a high standard. This will continue upon completion of the proposed development to safeguard the standard of protection. Improvements to the riparian drains will be required in conjunction with the Kings Lynn IDB to create a sustainable drainage scheme and enable discharge of any increase of surface water to the IDB system.

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

The probability of flooding from c) is also low due to the Kings Lynn 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 100 years. Flooding of some agricultural land would occur but no properties.

5.3 Failure of the West Lynn Outfall Sluice 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 Kings Lynn IDB 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.

5.4 The site is shown to be within Flood Zone 3 of the River Great Ouse as detailed on the Environment Agency Flood Zone Map. However the maps have been prepared irrespective of existing defences which in this location are the tidal defences to the west embankment of the River Great Ouse improved after the 1978 tidal surge event.

The Council's Flood Zone Maps (2009) do however take account of existing flood defences in alleviating the risk of flooding.

- 5.5 The highest recorded tide level at Kings Lynn was 5.92m aOD in 1978 since which improvements to 6.30m aOD for hard defences and 7.00m aOD for soft defences have been carried out. The Kings Lynn defences were designed to a 1 in 100 year return period plus freeboard of 1.1 metres.

A more recent report prepared by Consulting Engineers for the Environment Agency has confirmed that the defences would withstand a 1 in 200 year return period still water level of 6.14m aOD (estimated). NPPF states that development should be safe from flooding for its lifetime of 100 years; after taking into account sea level rise due to climate change the predicted 1 in 200 year tide level at Kings Lynn would be 7.16m aOD. This would overtop existing hard defences by 0.86 metre and be 0.16 metre above soft defence level.

More recent Tidal Hazard Mapping produced by the Environment Agency identifies the site to be liable to a depth of flooding of between 0.50-1.00m and a velocity of up to 1.00m/sec as a result of a breach occurring to the River Great Ouse tidal defence in 2115.

It is necessary to mitigate against this remote risk and finished floor level of all new 2 storey dwellings will require to be raised above existing land levels with no sleeping accommodation at ground floor.

- 5.6 The Wash coastal defences known as Coast West extend from the Kings Lynn tidal defences downstream to the sea frontage. They consist of earth embankments, raised and strengthened after the 1978 tidal surge event and are at a minimum level of 7.00m aOD. This level would be overtopped by 0.16 metre during the predicted 1 in 200 year tide level. Whilst there may be wave action at the time of high tide the risk of overtopping and breaching is considered to be low.
- 5.7 The development site is located a minimum distance of 2.00 kms from the Coast West tidal defences and consideration should be given for overtopping or breaching of the defences, assuming that no further improvements are carried out during the next 100 years. There are a number of secondary defences between the site and the Coast West tidal defences offering further protection from the Environment Agency tidal hazard mapping however the site could be affected by floodwaters between 0.50-1.00m depth.
- 5.8 The Preferred Options Policy document referred to an Anglian Water sewer crossing the site and details of mitigation would be required. Plans received from Anglian Water show no sewer other than at the extreme southern limits and outside the development site boundary.

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 within the last 100 years.

7.0 PROBABILITIES AND TRENDS OF FLOODING

- 7.1 The probability of this development flooding from localised drainage systems is very low. The nearby main drain provides adequate standard of protection for up to 1 in 50 years return period plus freeboard to lowest land levels.
- 7.2 The probability of the site flooding with water from the tidal River Great Ouse, main river is between 0.5% and 1%. If the trend of climate change anticipated to occur continues over the next 100 years, without any further improvements to the main river tidal defences, there is a risk of overtopping at the 1 in 200 year return period event.
- 7.3 If under very extreme events, levels of floodwater from main 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 also tend to rise as a result of the impacts of climate change. However the existing systems and defences together with the proposed development of the site with floor level at a minimum of 3.00m aOD some 700mm above surrounding land level will be appropriate for the design life of the development (i.e. 100 years). Surface water drainage from the site will be to a sustainable drainage scheme produced in conjunction with the Kings Lynn IDB and for the existing riparian drains to be taken over by the Board for future maintenance. Flood resilient measures will be incorporated into the design and construction of the new dwellings.

8.0 IMPACTS OF FLOODING

- 8.1 No significant impacts of flooding are anticipated due to the existing standards of tidal defence, however a precautionary approach has been adopted to protect against the possibility of overtopping or a tidal breach occurring to the Coast West tidal defences. The development will require to be two-storey dwellings with no bedrooms at ground floor and safe refuge above flood level available in new developments within flood risk zones.
- 8.2 The developer should ensure that the eventual occupiers of the properties 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 including teletext.

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 no: 0845 988 1188. All occupiers of the new dwellings will be required to register with the Floodline Direct Warnings Service to receive any future flood warnings.

9.0 RESIDUAL RISK – EXTREME EVENTS

- 9.1 The residual risk from extreme fluvial events is low on this site, because of the existing standard of drainage provided by the Kings Lynn IDB. The discharge of surface water from the site will be accommodated by a sustainable drainage scheme in conjunction with the Kings Lynn IDB.
- 9.2 Although within tidal Flood Zone Category 3 according to PPS25 classification, the site actually has a 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 Zone Maps have been produced irrespective of existing flood defences and standards of protection whilst the Council's Strategic Flood Risk Assessment Maps do take into account existing defences.
- 9.3 In the very extreme event of the Coast West Tidal Defences being either overtopped or breached, there is a risk of flooding to the site even with land levels varying between 2.22m and 2.73m aOD and secondary embankments between the site and the tidal defences.

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 in a Passive Floodplain protected by River Great Ouse tidal defences to a present 1 in 200 year return period standard.
- . Although the site is in tidal Flood Zone Category 3, the actual risk of the site flooding from tidal main river is very low at less than 0.5%.
- . Although the site is located within Kings Lynn 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.
- . Land levels at the site vary between 2.22m and 2.73m aOD and safeguard against the risk of tidal defences being overtopped or breached. Finished floor levels will be a minimum of 3.00m aOD and no lower than Wildfields Road/Hall Road carriageway levels with flood resilient/resistant measures incorporated into the design and construction of the properties.
- . The IDB has confirmed its policy of carrying out improvements to the West Lynn Outfall Sluice catchments to sustain a level of protection of 1 in 100 years over the asset life of the development.

Preferred Options for a Detailed Policies and Sites Plan

Preferred Options

