FLOOD RISK ASSESSMENT

Conversion of disused chapel and adjacent Islamic building to residential (93 units in total):

- Sleeping accommodation on ground floor
- Self-contained ground floor dwellings
- Suitable Evacuation to Flood Zone 1
- Evacuation / Refuge addressed for a range of flood events

at

Upper Brook Street, Chapel,
Manchester, M13 9AJ

22nd March 2014

GLNK Ltd

Table of Contents

If this report has been released electronically, the appendices referred to herein can be found in the annexed zip folder/s as .pdf or .dwg files. If this report has been released in hard copy the appendices will be bound into the back of this report. Plans may be annexed separately as A1 or A0 copies where a bound-in A3 copy is not appropriate.

1.0 Scope 4

2.0 Executive Summary 4

3.0 Introduction 5

4.0 Purpose of the Report 5

5.0 Report Information Sources 5

6.0 Overview of British Legislation 5

6.1 National Planning Policy 5

7.0 Site Status and Environmental Setting 6

7.1 Site Location and Status 6

7.2 Current Site Description 6

7.3 Existing Flood Risk 6

7.4 EA Data, Approved Modelling and Hazard 7

8.0 Assessment of Proposed Development 9

8.1 Proposed Development 9

8.2 Flood Resilience 10

8.3 Sustainable Drainage Systems (SUDS) 12

8.4 Refuge and Evacuation 13

8.5 Flood Response Management 13

Flood Watch 14

Flood Warning 14

Severe Flood Warning 15

8.6 Annual Monitoring 15

8.7 Surface Water Runoff – Flood Risk from the Development 15

8.8 Flood Storage 16

8.9 Climate Change 16

8.10 Flood Risk Vulnerability 16

8.11 Exception Test 16

9.0 Conclusion 17
9.1 Recommendations for Further Work 17
10.0 Appendices 17

1.0 Scope

This report contains the details of a Flood Risk Assessment carried out by GLNK Consulting Limited ("GLNK Ltd") for conversion to residential of the disused Upper Brook Street Chapel and site, Manchester, M13 9AJ, henceforth referred to as "the site" in this report.

This report has been prepared for Church Converts (Manchester) LLP and must not be relied upon by any other party without the explicit written permission of GLNK Ltd.

All parties to this report do not intend any of the terms of the Contracts (Right of Third Parties Act 1999) to apply to this report.

Please note this report does not purport to provide definitive legal advice nor can it be used to demonstrate that the site will never flood in the future.

The Executive Summary contains an overview of key findings and conclusions. However, no reliance should be placed on the Executive Summary until the whole of the report has been read. Other sections of the report may contain information which puts into context the findings noted within the Executive Summary.

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2.0 Executive Summary

This FRA has been carried out in accordance with the 27th March 2012 National Planning Policy Framework (NPPF). It is to be used to assist the Local Planning Authority (LPA) and Environment Agency (EA) when considering the flooding issues of the proposed development as part of a planning application.

This is categorized as a "More Vulnerable" landuse in accordance with the NPPF classifications; the site is located in FZ3 hence the NPPF Exception test does need to be passed.

Evacuation to Flood Zone 1 for all future occupants is appropriate and feasible; a site and development specific Flood Response Management Plan is included in this report.

Dry emergency access to upper levels (above the extreme 1 in 1000 year accommodating for climate change) for all upper level occupants for the lifetime of the development is achievable. First floor levels will be a minimum of c. 2.7m above the existing ground level. Given building to be converted, the residual flood setting and scale of development, flood compensation is not considered necessary. A preliminary drainage strategy and SUDS appraisal are included. Below ground archaeological constraints likely to restrict SUDS.

Given the residual risk flood setting, the level, extent and depth of flooding on the site can be managed in terms of resilient measures, evacuation to areas in Flood Zone 1 and emergency refuge.

Based on the likely flooding risk, it is considered that the proposed development can be constructed and operated safely in flood risk terms, without increasing flood risk elsewhere and is therefore appropriate development in accordance with the NPPF.

3.0 Introduction

The site boundary is provided in the location plan in Appendix A.

The FRA combined a desktop study, review of available information, consultations and an assessment of all sources of flooding posed to and from the site and proposed development, in accordance with National Planning Policy Framework (NPPF). Appropriate flood mitigation measures were then considered, either as already incorporated within the scheme or recommended for inclusion at detailed design stage. The suitability of the proposed development was also reviewed in the context of the NPPF and the technical guidance accompanying the NPPF.

4.0 Purpose of the Report

This FRA has been carried out in accordance with National Planning Policy Framework (NPPF). It is to be used to assist the Local Planning Authority (LPA) and Environment Agency (EA) when considering the flooding issues of the proposed development as part of a planning application.

The report provides the following information:

- An assessment of the flood risk posed to the site based on flood information and mapping provide by the EA and Strategic Flood Risk Assessment (SFRA);
- An assessment of the proposed development in terms of surface water run-off; and
- Proposals for measures to mitigate the flood risks posed to and from the development where appropriate.

5.0 Report Information Sources

The information source used to undertake this FRA has been collected from the following sources:

- British Geological Survey Website (accessed September 2013);
- EA Website (accessed September 2013);
- Manchester City Council Level 1 Strategic Flood Risk Assessment (2008);
- Manchester City Council Level 2 Strategic Flood Risk Assessment (2011);
- Internet mapping and searches.

6.0 Overview of British Legislation

6.1 National Planning Policy

The National Planning Policy Framework (NPPF) and accompanying Technical Guidance was published on the 27th March 2012. This supercedes all Planning Policy Statements (PPS's) and remaining Planning Policy Guidance (PPG's). Flood risk is retained as a key development consideration and is incorporated within Section 10: "Meeting the challenge of climate change, flooding and coastal change":

> "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."

The Sequential and Exception Tests (as per PPS25) are retained as part of the NPPF. The accompanying NPPF Technical Guidance also includes Tables 2 and 3 (similar to Tables D2 & D3 of PPS25) to assist with flood risk vulnerability classifications and development suitability. This report provides the flood risk assessment element of both tests where appropriate. It is the decision of the planning authority as to whether the tests can be fully passed.

6.2 Local Policy

Local Authorities consider flood risk through relevant environmental and climate change policies which enforce the requirements of the NPPF.

The Strategic Flood Risk Assessment (SFRA) is a key source of flood risk specific information for the area. The SFRA provides a more detailed review of flood risks and recommendations for ensuring developments can be constructed and operated safely in accordance with the NPPF. Greater detail of the SFRA is provided in the report.

7.0 Site Status and Environmental Setting

7.1 Site Location and Status

The site is a plot of land c. 0.2ha with an existing chapel with associated hardstanding access and soft landscaping (permeable) adjacent. The site is c. 650m south of Manchester Piccadilly Station, south of the Mancunian Way. The site location plan can be seen in Appendix A.

7.2 Current Site Description

The following description is based on information made available from internet mapping, architects drawings and aerial photography.

The site is currently 80% permeable comprising the chapel and associated hardstanding. The site is bounded by Upper Brook Street to the west, and commercial buildings / plots to the south, north and east. The site's surrounding is predominantly commercial.

7.3 Existing Flood Risk

Fluvial

There are no surface water features present on the site.

From an inspection of ordnance survey plans the nearest water feature to the site is the River Medlock which is located 300m to the north of the site.

According to the EA flood map, the site is partially within Flood Zone 2 & 3. There are no defences along this immediate stretch of watercourse.

The site is within the EA Flood Warning area.

The EA's mapping supercedes the SFRA mapping. Figure 1 is the EA up to date website mapping:

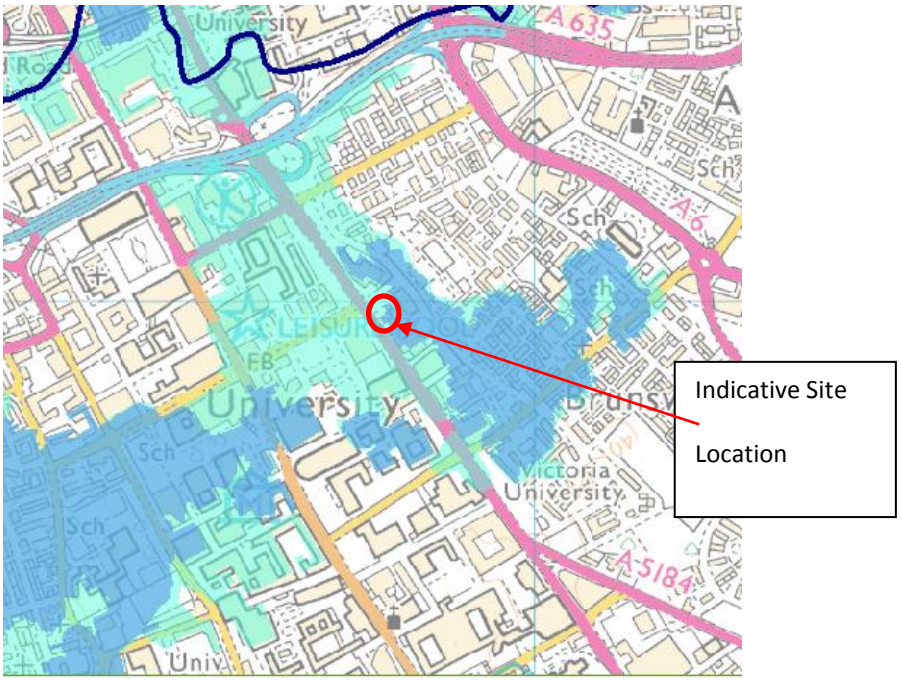


Figure 1: EA website flood map (September 2013)

Strategic and Preliminary Flood Risk Assessment

The mapping for the SFRA's and the PFRA is out of date or not of a suitable resolution such that it is not site specific. The SFRA does not have up to date site specific mapping, but is referred to where appropriate in the relevant sections of this report.

The SFRA does not indicate any other significant sources of flooding posed to the site.

7.4 EA Data, Approved Modelling and Hazard

The site is still at potential residual risk from surcharging / overtopping events in the Medlock.

The Brunswick PFI flood modelling has been approved by the EA. This provides detailed depth modelling which covers the site and surrounding areas:

As per email sent to the EA dated 6th march 2014:

flooding across the site hence the different depths):

1. The finished floor level within the Chapel?

Will remain the same as existing for the ground floor - but no water can enter the building - see attached.

2. Modelled level data for (with reference)

a. 1 in 100 year + climate change
38.732mAOD
b. 1 in 1000 year

3. Flood depths within the chapel building?
   a. For 1 in 100 year + climate change
   No depth of flooding as no waters can enter the building existing or proposed
   b. And 1 in 1000 year
   No depth of flooding as no waters can enter the building existing or proposed
4. Flood depths surrounding the site?
   a. For 1 in 100 year + climate change
   Up to 0.342 BUT only in south of site, main access will be in zero depth of flooding to unrestricted FZ1 to the west.
   b. And 1 in 1000 year
   Similar to above and up to 0.5mAOD, but main access is in zero depth of flooding

Given the catchment response and therefore likely potentially short duration of flooding, the assessment concentrates on the hazard rating, design response, refuge and flood warning management including suitability of evacuation.

Groundwater

There are no specific records of groundwater flooding for the site noted in the SFRA. There is no ground investigation data available for the site to confirm the geology and groundwater levels on the site.

SFRA Map GW 2.1 indicates the area of south central Manchester is within an area of potential rising groundwater levels.

There are no records from the existing site users of the site being flooded as result of groundwater.

The proposed development does not include any works which could increase the risk of flooding to or from the development from groundwater sources.

Artificial Sources of Flooding

There are no artificial waterbodies / lost rivers in the immediate area with likely flood flowpaths that could reach the site.

The site is not within an EA Reservoir flood risk area.

The proposed development does not include any works which could increase the risk of flooding to or from the development from artificial sources.

Other Sources of Flooding (Infrastructure)

United Utilities is responsible for storm water and foul water sewer systems in the area of the site.

No records of surface water or sewer flooding were noted in the data reviewed.

The condition, depth and exact location of sewers in surrounding roads is not known at this stage.

Given the size of the scheme, the proposed development does not include any works which could likely significantly increase the risk of flooding to or from the development from infrastructure sources.

It is assumed the existing connections will be retained where feasible and if new connections are required these will require consent United Utilities.

Flood History

From available information the site has not been inundated by historic flood events.

Key Flooding Sources

A summary of the key flooding sources relative to the site that have been identified from available sources is provided in Table 1. Those sources discounted in the above sections have been excluded:

Table 1: Summary of Flooding Sources and Pathway / Risk

Flooding Source	Potential			Comments on Pathway Likelihood
	High	Medium	Low	
Fluvial			x	Site is Located in Flood Zone 2 & 3. Suitable flood evacuation timing and route for all future occupants. Residual risk from Medlock. Internal access for majority of occupants to upper floors above the extreme flood event level for the lifetime of the development; in conjunction with a flood evacuation plan the site could be operated safely, given the potential velocity of flow is low and site is not within a rapid inundation zone / breach flood

8.0 Assessment of Proposed Development

8.1 Proposed Development

The proposed development can be seen in Appendix B.

The proposed development is:

“Repairs and alterations to the former Welsh Baptist Chapel and attached Islamic Academy building, in association with: conversion to self-contained residential units together with erection of detached single storey building to form additional residential units (93 units in total), vehicular access from Upper Brook Street and associated works”

- Convert existing chapel to residential
- Internal works on existing chapel to split into multiple levels; self-contained ground flats
- Evacuation to Flood Zone 1 within 150m (see following sections)

- First floor levels will be a minimum of c. 2.7m above the existing ground level.

There will not be an unacceptable increase in impermeable areas on the site, given the existing buildings and hardstanding on the site; the incorporation of permeable landscaping for non-building areas offers the opportunity to maximize the opportunity for permeable areas (see section on SUDS).

FLOOD PROOFING

Refer to Appendix B3 and B4.

These are standard designs which respond to the EA's concern of the potential flood waters in the unlikely event of an extreme event reaching the site.

The Buildings would have zero depth of flooding with appropriate access for evacuation to the north for all in zero depth.

Preliminary Drainage Strategy

Below ground archaeological constraints are likely to restrict the ability to incorporate extensive below ground SUDS techniques and/or below ground tank storage.
Restriction SUDS such as swales could be incorporated (see section on SUDS), subject to appropriate archaeological risk management.
The drainage strategy is based on the following guidelines, to be incorporated as appropriate to the scheme and as existing:

- Separate foul and surface
- As required, capacity based on the 1 in 100 year storm including for climate change
- SUDS to be incorporated (see following section)

The following flood resilient measures are to be incorporated as appropriate:

8.2 Flood Resilience

The proposed development will utilize the flood resilient techniques recommended in the NPPF Technical Guidance where appropriate and also the recommendations that have previously been issued by various councils:

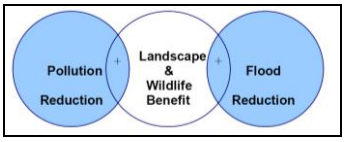
These include:

- Plasterboards will be installed in horizontal sheets rather than conventional vertical installation methods to minimise the amount of plasterboard that could be damaged in a flood event
- Wall sockets will be raised to as high as is feasible and practicable in order to minimise damage if flood waters inundate the property
- The ground floor will be concrete in order to minimise damage and reduce the turnaround time for returning the property to full operation after a flood event
- Any wood fixings on ground floor will be robust and/or protected by suitable coatings in order to minimise damage during a flood event
- Airbricks will be raised to as high as is feasible and practicable
- The Damp Proof Membrane will be installed above the main floor slab and tied in to the walls where appropriate, to reduce the turnaround time for returning the property to full operation after a flood event.
- The ground floor waterproofing will be extended to an appropriate level above existing ground levels.

8.3 Sustainable Drainage Systems (SUDS)

Concept SUDS Strategy

The following diagram indicates the philosophy behind the proposed SUDS strategy, and is taken from the EA's SUDS guidance:



(Source: Environment Agency, 2009)

Table 2 indicates the SUDS Hierarchy Appraisal for the site and proposed development:

Table 2: Site Specific SUDS Appraisal

SUDS Hierarchy	SUDS Technique	Potential Benefits			Site Specific	
		Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit	?	Scheme Specific SUDS Suitability Appraisal and Comment
Most Sustainable	Living Roofs	•	•	•	X	Not likely feasible given nature of individual house to be constructed. (eg: Blue, Green and Brown roofs)
	Ponds / Basins	•	•	•	*	Could be incorporated into site subject to confirmation of the physical and chemical properties of the ground. But not likely suitable given flood setting or below ground archaeological constraints
	Swales	•	•	•	*	Could be incorporated into site subject to confirmation of the physical and chemical properties of the ground. But not likely suitable given flood setting or below ground archaeological constraints
	Infiltration Techniques	•	•		*	Ground Investigation data is required to confirm the chemical suitability of the site and also porosity eg: strategically located soakaway tests to BRE 365 and detailed design. Confirm as part of detailed design. But not likely suitable given flood setting or below ground archaeological constraints
	Permeable Surfaces and Filter Drains	•	•		✓	Permeable finishes to parking / access areas. Additional permeable surface areas could be incorporated. Subject to confirmation of the physical and chemical properties of the ground; i.e. existing saturation of the ground But not likely suitable given flood setting or below ground archaeological constraints
Least Sustainable	Tanked Systems	•			*	If required as part of the drainage strategy, this would be used as back up to ensure 1 in 100 year +cc storage can be achieved on site if necessary. But not likely suitable given flood setting or below ground archaeological constraints

Key:
Potentially suitable at the site: * Incorporated in the scheme: ✓ Not suitable / possible at the site: X

8.4 Refuge and Evacuation

A precautionary approach has been taken.

Based on the likely flood risk (EA data) and associated warning time that is feasible (residual risk of fluvial flooding with EA warning scheme in operation) it is considered likely that there would be sufficient time to evacuate / seek refuge as appropriate.

In the event of a fluvial flood reaching the site, evacuation should be the preferred response for the full range of flood events.

Range of Flood Events

The site is within a fluvial flood extent. It is therefore considered that:

a) Evacuation is always the preferred response and is feasible at this site with early flood warning available
b) Refuge for all future upper level occupants is the correct emergency strategy for all flood warning types
c) Provision of the suitable refuge area means upper level occupants will have acceptable facilities; the duration of an extreme flood event is not likely to be long but again evacuation is always preferred and feasible

Early Flood Warning - Evacuation

Upon EA Flood Warning, the preferred evacuation route should be:

- Immediately north on Upper Brook Street for 150m – within Flood Zone 2 (in zero depth of flooding based on detailed modelling)
- East on Grosvenor Street for 50m – into unrestricted Flood Zone 1

Evacuation is always the preferred approach.

Community Safety Planning and Local Authority to advise and confirm.

There is no need for any occupants to have to walk through floodwaters if a flood event does inundate the site:

a) Evacuation time will be sufficient given the flood setting
b) Refuge is the correct strategy for all flood warning types in an emergency
c) Provision of the upper levels for all upper level occupants with acceptable facilities for the duration of the flood

8.5 Flood Response Management

Flood Safety Pack

Occupants should ensure a flood safety evacuation pack is kept in a safe and easily accessible place. This should include as a minimum:

- First aid kit
- Torch

- Warm clothing or blanket
- List of appropriate contact numbers
- Bottled water
- Waterproofs / Wellington boots
- Non-perishable food

The following procedural levels apply to this site and should be read and understood by all occupants:

Flood Watch



The EA will issue a Flood Watch status when flooding is possible. This will be issued by the EA through their website and Flood Warning Direct based upon the weather and river conditions.

Flood watch means – 'Flooding of low lying land and roads is expected. Be aware, be prepared, watch out.

When a flood watch warning is issued residents should:

- Be aware of water levels and whether the river is rising or falling
- Reconsider travel plans
- Listen to and watch for weather and flood warnings on local radio and television stations
- Contact Floodline on 0848 988 1188
- Check that a flood kit has been prepared

At this stage residents should ensure that their neighbours are aware of the Flood Watch alert in case residents are not subscribed to Floodline Warning Direct and do not receive the alert.

Flood Warning



Flood Warning means – 'Flooding of homes and businesses is expected. Act now.

The flood warning alert will be issued when water levels are rising and further rain is expected – it is advised to safeguard the property and prepare to evacuate.

At this stage residents should:

- Contact the local emergency authorities to find out whether evacuation is considered necessary and where they are providing for evacuees
- Consider what is needed if evacuation to short term accommodation is necessary: children's essentials (for example, milk, baby food, sterilised bottles and spoons, nappies and wipes) medication and clothing (if there is heavy rainfall you may get wet whilst evacuating).
- Consider moving suitable and sentimental belongings upstairs or in a high place downstairs
- Consider what provision can be made for family pets

- Check with neighbours that they are aware of the situation and have prepared accordingly
- Locate keys for locking windows and tools for switching off gas and electricity supplies. It will be necessary to switch off utilities and secure unoccupied properties during evacuation.
- Put sandbags or flood boards in place

Residents must locate, water, electricity and gas supplies and switch off before evacuating. If residents are unsure of how to do this they must contact their supplier. Neighbours may be able to provide assistance as the houses within the development are generally similar and other residents may have similar problems or solutions.

Residents should call the EA Floodline on 0845 988 11 88 periodically and listen to and watch for weather and flood warnings on local radio and television stations.

If water levels begin to fall without reaching the properties, residents should continue to monitor the situation. Residents should stay alert and be ready to evacuate until the EA issues "All Clear" status.

Severe Flood Warning



Severe flood warning means that severe flooding is expected. There is extreme danger to life and property and people are advised to act immediately i.e. Evacuate.

The Environment Agency aim to provide at least 2 hours warning between the Flood Warning alert being issued and the commencement of flooding. The EA recommend that residents should evacuate when a Flood Warning or Severe Flood Warning status is issued.

If flood levels continue to rise, residents are advised to evacuate before safe access is lost. At this level driving through flood water may become hazardous and residents must evacuate beforehand.

Residents should monitor the flood progression and evacuate, on foot as soon as possible. The safe access route (see section 3.1 above) in times of flood will be clearly marked and signposted and residents should use this route for means of evacuation rather than attempting an alternative route. Residents should be aware that parts of the evacuation route may be up to 300mm depth of flooding.

Before evacuating, residents must ensure that all windows are securely closed and locked, this will provide protection against thefts and water pressure caused by flood waters. On leaving the property residents must ensure that doors, including internal doors, are securely locked and closed.

8.6 Annual Monitoring

Occupants should contact the EA on an annual basis to confirm the flood status of the property.

If the flood status has changed, the evacuation and refuge plan should be reviewed and updated by suitable flood risk consultants as appropriate.

8.7 Surface Water Runoff – Flood Risk from the Development

In accordance with the NPPF, this FRA also considers the risks posed from the development to surrounding areas.

There will be not be a significant increase in impermeable areas and furthermore this can be minimized with the incorporation of permeable surfaces for proposed non-building areas. There will not likely be an increase in peak discharge rates and volumes, including for future potential impacts from climate change.

The proposals will incorporate new low-water demand devices such that any increase in peak flow and volume of flow is likely to be negligible.

Given the small scale of the proposed development it is considered likely that the development will have a negligible effect on surrounding infrastructure. There will not be any significant increase in overland flow from the site.

8.8 Flood Storage

It is considered that there would not be a significant reduction in flood storage and therefore no flood compensation is required, given:

a) the current building footprints within the floodplain
b) the small increased size of the scheme (App B)

8.9 Climate Change

The impact of climate change in accordance with the NPPF is likely to be an increase in the rainfall intensity in the future, which will increase peak storm flows to sewer. The proposed development will incorporate low flush and reduced water demand showers and toilets, such that the combined flows to sewer are likely to have a negligible impact. It is considered therefore that flows in the future are not likely to have a significant impact, even with an allowance for climate change.

There is unlikely to be an unacceptable impact on the receiving sewers.

The EA data incorporate likely increases in flood levels including an accommodation for climate change.

8.10 Flood Risk Vulnerability

According to the NPPF retained Flood Risk Vulnerability Classification as per the former Table D2 in PPS25, the proposed residential land use would be classified as “More Vulnerable.”

The NPPF also retained Flood Risk Vulnerability and Flood Zone “Compatibility” Classification as per the former Table D3 of PPS25; this states that a “More Vulnerable” development in Flood Zone 3 requires the Exception Test (retained by NPPF) to be passed.

8.11 Exception Test

Table 2 provides the likely response to the 2 key criteria of the Exception Test, which should be confirmed by the planning department. This FRA provides the second element required of NPPF to satisfy the Exception Test.

Table 2: Exception Test Summary

Exception Test Criteria	Proposed Development
It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA where one has been prepared.	Planners to confirm. Replacement dwelling proposed.
A FRA must demonstrate that the development will be safe, without increasing flood risk elsewhere, and, where possible will reduce flood risk overall.	Pass. Suitable evacuation timing and route. Site in FZ2 & 3. In emergency, dry access to upper levels (above the extreme flood event) for upper site occupants for the lifetime of the development is achievable. As long as the flood resilient measures are incorporated and the future occupants sign up to the EA Flood Warning Scheme and understand the flood response required, it is considered likely that the proposed development can be operated safely in flood risk terms and is therefore appropriate development in accordance with the NPPF.

Based on the data reviewed to date, the flood risk assessment recommends the property could be constructed and operated safely in flood risk terms.

9.0 Conclusion

The site is considered to be generally at a low risk from all sources of flooding except for potential fluvial residual flooding in extreme events.

The proposed development is categorised as “More Vulnerable” in accordance with the NPPF; it is therefore an appropriate type of development within Flood Zone 3 if the NPPF Exception Test can be passed.

The proposed scheme can incorporate suitable flood resilient measures. Evacuation is feasible and the low hazard given the flood setting.

Based on the likely flooding risk, it is considered that the proposed development can be constructed and operated safely in flood risk terms, without increasing flood risk elsewhere and is therefore appropriate development in accordance with the NPPF.

9.1 Recommendations for Further Work

1. Produce a House Flood Evacuation Plan if deemed necessary
2. If more up to date flood levels are available, the residual risk should be re-evaluated
3. Sign up property to EA Flood Warning scheme
4. Community Safety Planning and Local Authority to advise and confirm

10.0 Appendices

A. Site Location
B. Proposed Development Plans

Appendix A

Appendix B