



Flood Risk Assessment

Outline Planning Application for
Conversion of Existing Hotel
Building into Residential
Accommodation at Lord Hill Hotel
Abbey Foregate, Shrewsbury,
Shropshire. SY2 6AZ

Planning Reference: 19/04202/OUT

Statement prepared for
SY Homes Ltd

Report prepared by
Woodsyde Developments Ltd

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Executive Summary

Woodsyde Developments Ltd has been commissioned by SY Homes Ltd to undertake a flood risk assessment (FRA) for a proposed development in the county town of Shrewsbury. The proposed development will be accessed from the existing accesses to Abbey Foregate, which currently serves The Lord Hill Hotel.

The proposals consist of an outline planning application for the re-development of the existing listed hotel into residential accommodation and includes correction of new residential accommodation to the rear following demolition of existing modern extensions, at Abbey Foregate, Shrewsbury.

The site is 0.51 hectares in size and whilst the site is relatively small and would not generally attract the requirement for Flood Risk Assessment, according to the Environment Agency Flood Maps part of the application falls within Flood Zone 2/3.

As part of the site appraisal process it has been necessary to demonstrate that the proposed development can be achieved with an acceptable risk of flooding and without increasing flood risk to the development or to third parties. This report describes the methods used and the results of this study. The report takes into account the recommendations of National Planning Policy Framework (NPPF)

This report will demonstrate that there will be no flood risk to the site or any other properties as a result of this development. Appropriate attenuation will be provided within the development, with the discharge reduced to Greenfield run-off rates.

1.0 Introduction

1.1 Project Brief.

Woodsyde Developments Limited have been commissioned to carry out an assessment to satisfy the Shropshire Council and Environment Agency's (EA) requirements for a Flood Risk Assessment (FRA) for an outline planning application for residential development on land at The Lord Hill Hotel, Abbey Foregate, Shrewsbury, Shropshire on behalf of SY Homes Ltd.

The FRA is prepared in full accordance with the National Planning Policy Framework (NPPF). The FRA is required to identify the 1% (1 in 100 year) and 1%+ allowance for climate change flood extents and levels for the site and ensure that all aspects of development are clear of the 1%+ allowance for climate change floodplain.

The Environment Agency Flood Maps indicate that the site to be partially located in Flood Zone 2/3. However, the redevelopment of the site will ensure that the new build will be sited outside of any flood zone, nonetheless levels will not alter on the site boundary and as such, a small area of communal garden may still potentially be at risk at flooding from rivers and seas. The site levels fall from Abbey Foregate to the rear of the property and from a north easterly direction to a south westerly direction. There is an approximate 9.0m fall across the site. The proposed development will be protected from any pluvial, fluvial or groundwater flooding risk by raising and by setting the finished floor level typically 300mm above the surrounding ground. It is proposed to capture any potential or possible fluvial and pluvial overland flows that source and direct them to the proposed drainage system.

1.2 Assessment Procedure

This report has been prepared in accordance with the requirements of NPPF.

An assessment of the flood risk to the proposed development has been considered on the basis of the best information available at the date of this report. The assessment herein is deemed appropriate to the requirements of the Environment Agency, the scale and nature of the development, and the available data. The key elements of this assessment are as follows:

- Desk study scoping exercise;
- Site visit;
- Consultation with relevant authorities;
- Review of site topography and development proposals;
- Identification of data corresponding to appropriate design flood events;
- Consideration of climate change;
- Consideration of flood risks to and from the development;
- Calculation of the impact of the development on surface water run-off, and;
- Recommended attenuation measures.

1.3 National Planning Policy Framework

- NPPF was published by Communities and Local Government, March 2012 and supersedes the Planning Policy Guidance Note 25. However, the

- principles on which the assessment is based under PPS25 are still valid.
- NPPF has been developed to provide additional guidance to local planning authorities to ensure the effective implementation of the planning policy set out in the NPPF on development in areas at risk of flooding.
- The guidance retains the key elements of Planning Policy Statement 25.
- The EA is a statutory consultee for all planning applications and will give comment and recommendations to the planning authority for any proposed developments affecting a watercourse.
- NPPF states that a Strategic Flood Risk Assessment (SFRA) should be carried out by the local planning authority to inform the preparation of Local Development Documents (LDDs), having regard to catchment wide flooding issues which affect the area. The SFRA will provide the information needed to apply the sequential approach.

1.4 Requirements of NPPF

For an FRA proportionate to the risk and appropriate to the scale, nature and location of the development the following will need to be considered;

- the risk of flooding arising from the development in addition to the risk of flooding to the development; take the impacts of climate change into account;
- the potential adverse and beneficial effects of flood risk management infrastructure including raised defences, flow channels, flood storage areas and other artificial features together with the consequences of their failure;
- the vulnerability of those that could occupy and use the development, taking account of the Sequential and Exception Tests and the vulnerability classification, including arrangements for safe access;
- quantify the different types of flooding (whether from natural and human sources and including joint and cumulative effects) and identify flood risk reduction measures, so that assessments are fit for the purpose of the decisions being made;
- the effects of a range of flooding events including extreme events on people, property, the natural and historic environment and river and coastal processes; include the assessment of the remaining (known as 'residual') risk after risk reduction measures have been taken into account and demonstrate that this is acceptable for the particular development or land use;
- how the ability of water to soak into the ground may change with development, along with how the proposed layout of the development may affect drainage systems;
- and be supported by appropriate data and information, including historical information on previous events.

1.5 Report Limitations

It is noted that the findings presented in this report are based on a desk study of information supplied and provided by third parties. We have assumed that all information is representative of past and present conditions, but we offer no guarantee as to its validity. The report does not include consideration of any potential hazards arising from any activities at the site other than in connection with the operation of the shops on the lower floor and residential units on the upper floors. Any other hazards associated with other activities at the site have not been assessed and these must be subject to a separate and specific risk assessment by the parties responsible for those activities.

2.0 Site Details

2.1 Site Overview

The site is located on the southern side of Abbey Foregate, Shrewsbury, Shropshire (NGR 350422, 312159). Access to the site will be from the existing accesses to and from Abbey Foregate.

Figure 2.1 below shows the location of the application site.



OS NGR	SJ 350422, 312159
Local Planning Authority	Shropshire Council
Environment Agency Office	Shropshire Region
Water Utility Company	Severn Trent Water

2.2 Site Description

The application site lies adjacent to Abbey Foregate which provides one of the main roads into the town centre. Presently the site is an operational hotel. The development area of the site is roughly rectangular in shape and is approximately 0.51 hectares in size. The site is situated at an approximate level of 58.9m AOD, with a high of approximately 61.15m adjacent to the northern boundary and Abbey Foregate, with a low of approximately 52.08m along the southern boundary. It is noted that the Rea Brook Valley Circular Walk network passes immediately below the southern boundary, with the Rea Brook watercourse situated approximately 100m to the south. The site has a fall from north to south of approximately 9m but is relatively flat from west to east.

2.3 Surrounding Area

To site has residential development to the north, beyond Abbey Foregate, the adjacent site to the east is currently being constructed to residential development. A5112 Bage Way abuts the western boundary at a lower level with a mix of residential development and commercial development to the west towards the town centre. Open fields and grasslands are to the south leading up to the Rea Brook which is approximately 100 metres from the southern boundary of the proposed application site and sits at a level approximately 7.5m – 8m lower.

2.4 Development Proposals

The proposed development will be the conversion of the existing hotel to a mix of apartments and will also include some individual houses within the fabric of the old building and extensions thereof.

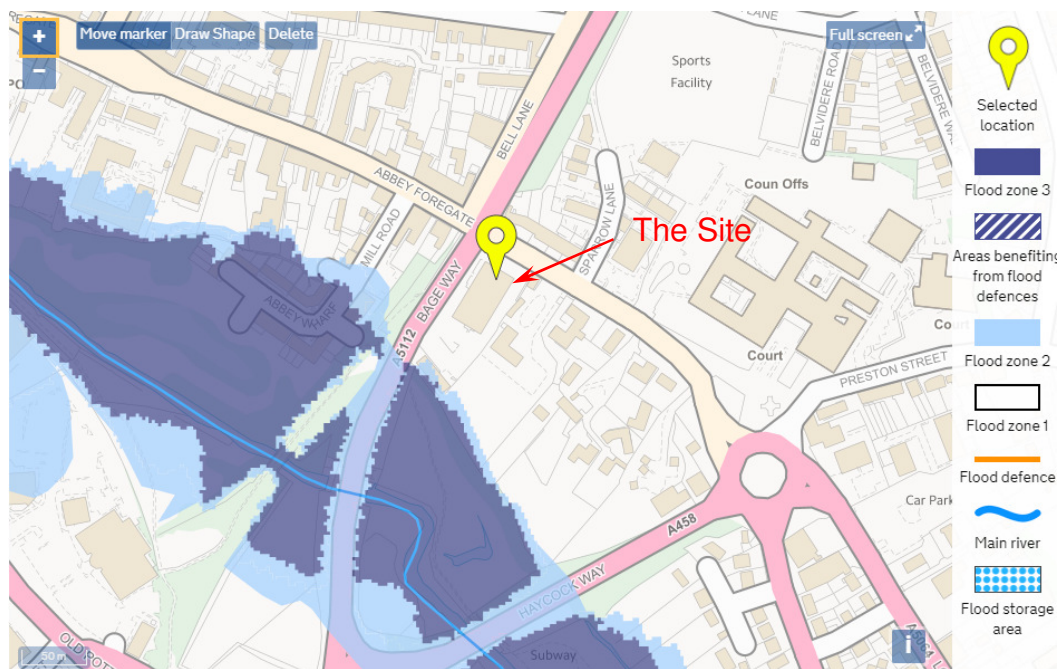
The development proposals will result not result in an increase in surface water with the design of the surface water drainage system limited to existing Greenfield run-off rates.

3.0 Scoping Report

3.1 Indicative Floodplain Map

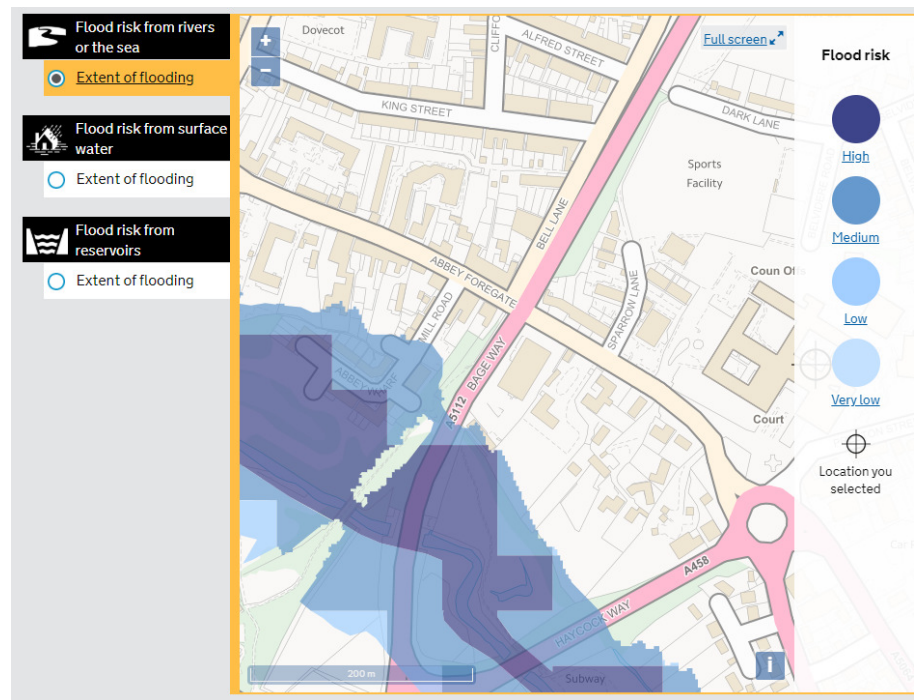
The Environment Agency is responsible for the provision of information pertaining to flood risk from tidal and main watercourses throughout England and Wales. The Environment Agency provides online information service through its Flood Map data. This data is not intended to provide detailed flood information for individual properties but does provide a useful resource at scoping stage. An extract from the Flood Map is given in Figure 3.1 below.

Figure 3.1: Extract from EA Flood Map – Planning (downloaded on 17/12/19)



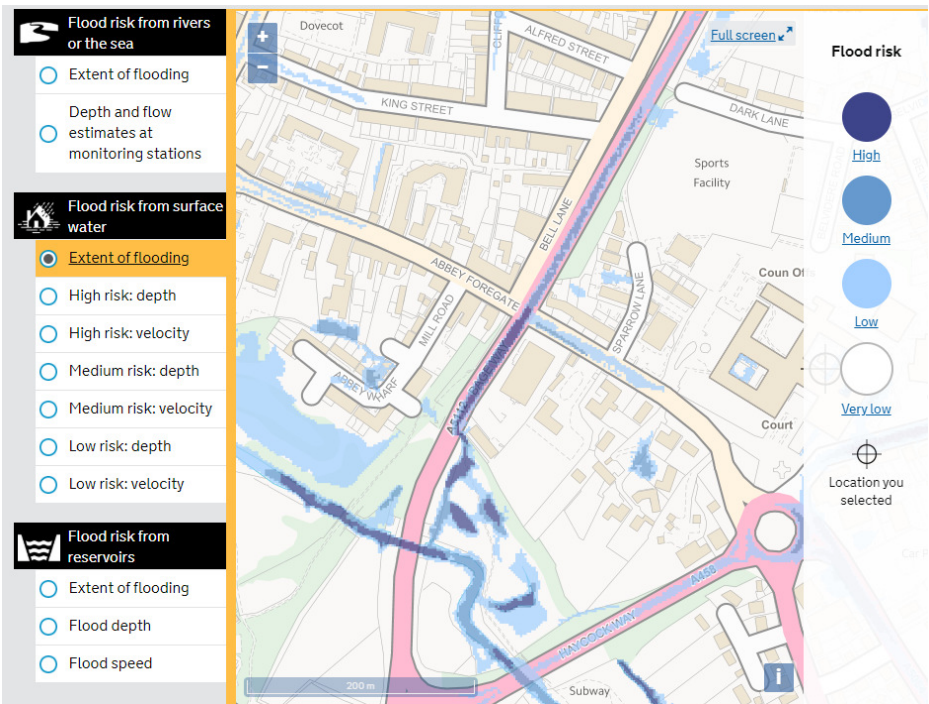
Flood Zone 3 areas have the highest risk of flooding and as such it is recommended that development is restricted in these areas to essential development only.

Figure 3.2: Extract from EA Flood Map – Flood Risk from Rivers and Seas (downloaded on 17.12.19)



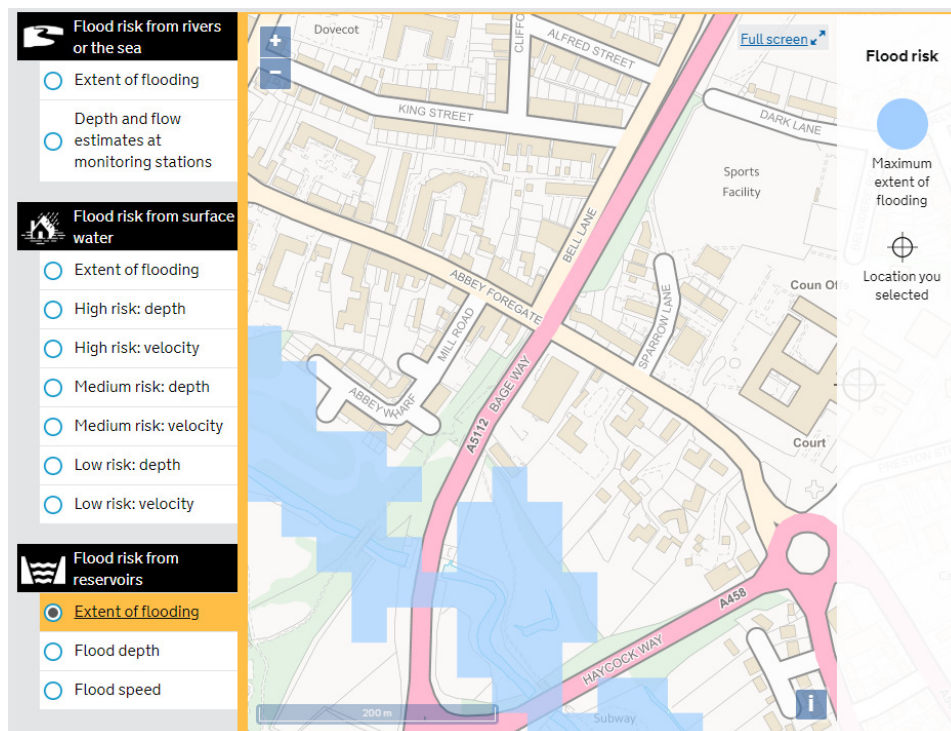
From the plan indicated above it can be seen that the site falls into an area of medium to high risk of flooding. Moreover, the plan shows that the majority of the site the subject of the development is not at risk of flooding from this source.

Figure 3.2: Extract from EA Flood Map – Flood Risk from Surface Water (downloaded on 17.12.19)



From the above plan it can be seen that no portion of the site is liable to flooding from surface water run-off.

Figure 3.3: Extract from EA Flood Map – Flood Risk from Reservoirs (downloaded on 17.12.19)



From the above map it can be seen that only a very small corner of the site may be affected by the potential risk of flooding from Reservoirs.

3.2 Historical Flooding

We understand that the Environment Agency (EA) do not have any records of flooding in the area and the Councils strategic flood risk assessment does not indicate any reported flooding at the site. Discussion with the landowner have confirmed that there have been no reported incidents of flooding at the application site.

However I am aware that residential development has in the recent past taken place towards the town centre, which typically sits at similar levels and it is noted that the Flood Risk Assessment prepared in association with similar sites indicate that the 1 in 100 year flood event plus climate change allowances has a flood level of 52.579m AOD. Properties on those sites have a minimum finished floor level of approximately 53.060m and have been considered to be out of the flood plain. Based on this information it would appear that from the topographical survey that a very small proportion of the site may be at risk of flooding, however, the levels of the site rise steeply by around 1.0m from the boundary by means of a slope in the ground makeup which would ultimately mean any building would be typically set at a finished

floor level of 53.50m and well above the minimum levels on similar such sites.

3.3 Strategic Flood Risk Assessment

The Shropshire Council Local Plan advises that development should be well located and preferably on previously developed land. Here it is expected that preference should be given to locating development in Flood Zone 1. However, consideration must be given to the risk of alternative sources of flooding (e.g. surface water, sewage, and/or groundwater). Sustainable urban drainage techniques must be employed to ensure no worsening of existing flooding problems elsewhere within the area. The area of the development is considered to be in Zone 1. The Shropshire Council SFRA indicates that typically the potential flooding to the Rea Brook upstream of its connection with the River Severn is typically 3m above existing ground levels. If this is applied to the Rea Brook at its closest point to the site would have a flood level of approximately 51.5m AOD.

3.4 NPPF– The Sequential Test

The sequential test should demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate to the type of development or land use proposed.

NPPF suggests that where an SFRA is not available, the sequential test will be based on the EA Flood Zones. The EA maps confirm that only a very small part of the site is within Flood Zone 2/3 'medium/high probability' and majority is within within Flood Zone 1 'low probability'. Therefore, based purely on the EA flood zone classification of the development, Table 3 in NPPF (see Table 3.0 below), indicates that development is appropriate, but a Flood Risk Assessment test is required due to a very small part of the site being indicated as Flood Zone 3. It is considered that the maps whilst providing an indication of potential flooding is not site specific and not based on the topography of the specific site. Nonetheless, given the topography and level of the site it is likely only a very small slither of land along the southern boundary may be at risk of flooding from rivers and seas.

Table 3.0: NPPF: Flood Risk Vulnerability and Flood Zone ‘Compatibility’

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	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

Key:

✓ Development is appropriate. X Development should not be permitted

3.5 Mechanisms of Flooding

To understand the risk of flooding to a site, it is imperative that potential sources of flooding be clearly defined. The likelihood and severity of flooding depends on the characteristics of the flood sources and the degree to which the site is currently, or can potentially, be protected against flooding from these sources. Table 3.2 reviews the potential risk of flooding at the proposed site from different sources.

Table 3.2 Potential Risk of Flooding to the Proposed Development

Source of Flooding	Potential			Comments
	High	Med	Low	
Fluvial (Rivers)		X	X	The site is located predominantly within Flood Zone 1 (Low Probability), however a small slither to the south falls within Flood Zone 2/3 (Medium/High Probability).
Tidal/Coastal			X	The site is located far inland and there is no risk of tidal flooding
Pluvial (drainage system)			X	Possibility of Pluvial flooding in an intense rainfall event due to insufficient sewer capacity
Surface Run-off			X	Increased areas of impermeable material
Ponding		X		Proposed drainage must prevent Ponding
Groundwater			X	No apparent Groundwater flood risk. No basements proposed at this site.

4.0 Flood Risk Assessment

4.1 Introduction

Following the scoping exercise, the primary flood risks are identified to be from Fluvial, Pluvial, Surface Run-off, and Ponding. These sources of flooding have been investigated in greater detail, to ascertain whether the risks are acceptable to the nature of the proposed development. Opportunities to mitigate these risks are discussed in Section 5 of this report.

4.2 Fluvial (Rivers)

The area for the development is considered to be wholly located within Flood Zone 1 (low probability), which means that the likelihood of flooding from fluvial or tidal sources in Flood Zone 1 is less than a 1 in 1000 year probability of flooding or <0.1% and potentially greater than 1 in 100 year probability of flooding. The Environment Agency Maps show that part of the site may be subject to Flood Zone 2/3. However according to the Council's SFRA reports and assessment of the flood risks in the town and along the Rea Brook, the predictions for a 1 in 100-year event plus climate change will be a rise in the water by approximately 3m to the south of the site. The river sits typically at an approximate level of 48m, therefore the highest flood level will be approximately 51m. The flood maps indicate that part of the site sits in Flood Zone 2/3, yet the lowest level on the site boundary is approximately 52.08m and has a ground level of approximately 53.5m where the development will be constructed. From the Flood Risk Assessment completed for the site of the former building supplies off Mill Road, Abbey Foregate indicated that for the 1 in 100 year plus climate change level was predicted to be 52.759m, which is over 3m lower than the site.

4.3 Pluvial (Drainage Systems)

There is no reported evidence of pluvial flooding at the application site. The proposed drainage system for the site will utilise Sustainable Drainage Systems (SUDS) where possible. This will include the provision of an attenuation system within the application site, which will collect any potential pluvial flooding and surface water run-off from the slightly higher ground to the north. Currently the existing site discharges via an uncontrolled system from what would appear an outfall to the Rea Brook through the lands to the south. French drains will be introduced where necessary to collect any potential exceedance flows or additional surface water run-off.

These systems will also provide a measure of drainage attenuation and improve existing conditions where some surface water collects in pockets and lower levels.

It is noted that the existing developments to all sides have suitable means of surface water drainage, such that there will be little likelihood of surface water run-off from the adjacent lands.

Further details of the Drainage Strategy for the site are presented in Section 6 of this report.

4.4 Surface Run-off

Currently the surface water discharges in part drains direct to ground in the planted and lawned areas.

Surface water drainage for the proposed development will provide adequate attenuation located within the driveway and gardens. This system will be designed to accommodate the worst event 1 in 100-year storm + 35% for climate change, at a rate based on betterment of the existing arrangements and based on the existing impermeable area of the site.

Further details of the Drainage Strategy for this site are presented in Section 6 of this report. Appropriate cut-off drains will be provided to boundaries where appropriate to capture any flows from adjacent land.

4.5 Ponding

Ponding may occur if drainage is not adequately designed after periods of heavy rainfall. The new development will have to implement an adequate drainage system as discussed in Section 5 and 6 of this report.

4.6 Groundwater

There is no apparent flooding threat posed from the ground water level at this site. There are potential for basements within the existing building on the higher portion of the site only, however it is understood that there will be no basements to be constructed in the development and therefore no seepage into these structures will occur. Suitable cut-off drainage and French drainage will be incorporated to ensure there are no issues from this source.

4.7 Residual Risk

It is considered that there will be no residual risk as a result of the proposed development.

5.0 Recommended Flood Mitigation

5.1 Introduction

This section discusses mitigation options that should be considered in order to reduce the severity of the flood risk and to minimise the potential hazards associated with any residual flood risk.

5.2 Design Levels

The proposed built form of the development lies outside the fluvial floodplain. However as a matter of course; it is recommended that all floor levels are at least 300mm above existing ground levels.

5.3 Site Topography and Flood Routing

Where achievable there should be a differential level of at least 300mm between the threshold and surrounding ground levels. Where possible, levels should also fall away from buildings, and areas where water could dam up against structures should be avoided, even if drainage is provided. The site has a fall from north to south. The high point of the site is situated along the northern boundary at an approximate level of 61.15m, which then falls in a southerly direction to a level of approximately 52.08m at a point where the site abuts the site boundary.

It is noted that the Flood Map identifies a slither of the site to be in Flood Zone 2/3, however given the topography of the site and the requisite flood levels we consider that this would be restricted to only a half metre strip within the southern boundary and that the existing building set at a level of 53.5m approximately is well above any flood level from the Rea Brook. It should be noted that the Rea Brook is located approximately 100m to the south, but due to the above reasoning and finding, which will have no influence on the site.

5.4 Sustainable Drainage Systems

It is now commonly a planning requirement to consider utilising sustainable drainage systems (SUDS), if it is appropriate to the specific site conditions. These systems are diverse, but generally aim to provide drainage systems that may facilitate flood and/or pollution control, related to run-off. Such systems are generally 'soft engineering' and as a result can be financially, as well as environmentally, attractive engineering solutions.

From knowledge of the area and from previous work on development in the vicinity, the ground can be changeable, where porosity is available in one area and not in another. It is evident that all surface water does not drain to ground from the adjacent developments immediately adjacent to the site, where attenuation tanks/pipes have been used. In this regard soakaways will be used where possible and if there is no porosity, an attenuation piped system will be provided with a discharge to the existing outfall/adopted sewer system. The use of water butts and rainwater harvesting will be used where appropriate.

5.5 Flood Resistance & Resilience

A basic level of flood resistance and resilience can be achieved by following good building practice and complying with the requirements of the Building regulations 2000 published by the Office of the Deputy Prime Minister (ODPM). It is considered

that the finished floor levels should be raised to 300mm above the existing ground levels.

6.0 Drainage Strategy

6.1 Introduction

In order to demonstrate that all forms of flooding have been considered as required by NPPF a drainage strategy is being developed. The aim of including this strategy as part of the flood risk assessment is so that it can easily be seen that the proposed development will not adversely affect the surface water regime in the area and that overall the current situation will be improved. An indicative site layout can be found in Appendix A.

6.2 Existing Surface Water Drainage

The existing building currently has a positive piped drainage system which we believe discharges unrestricted to the Rea Brook through the south of the site. It is considered that some porosity is likely from assessment of adjacent sites, where indeed soakaways have been used, at least in part. Surface water from the proposed development will therefore discharge via soakaways, porosity permitting or to an attenuation system and outfall via a vortex flow control unit at an appropriate rate calculated and based on the existing impermeable areas and existing surface water drainage.

6.3 Existing Foul Water Drainage

At present we understand that the foul water drainage to the site drains to the public sewers within Abbey Foregate, therefore where possible existing outfalls will be reused.

It is understood that the existing foul water system is maintained by Severn Trent Water Ltd.

6.4 Proposed Surface Water Drainage

It is proposed to utilise soakaways where possible for the site drainage, however if insufficient porosity is available then an attenuation system will be provided within the site to drain all surface water from the buildings and access. Permeable surfacing will be provided to the access roads and footpaths where appropriate and will drain to subsurface drains before being directed to the attenuation system. SuDS techniques will be utilised within the development with the possible use of water butts and rainwater harvesting where appropriate.

It is considered that the area for the proposed redevelopment including the access falls within the Flood Zone 1. However, a portion to the rear of the site has been identified on the Environment Agency Flood Maps falls within Flood Zones 2/3. On that site the finished floor levels are at 53.50 approximately and are not within the Flood Zones. The application site is at a typical central area level of 58.9, although there is a 9m fall from front to back. We understand that in the event of potential floods from fluvial sources were to occur, these would be to a maximum height of approximately 52.759m. This would mean that the dwellings would sit minimum 750mm above the flood level predicted. Currently no levels have been shown as the application is outline only and a layout has not been fixed. Nonetheless, there will be a suitable differential between the predicted flood level and any finished floor level.

The proposed surface water will be collected at source and will be suitably attenuated for the 1 in 100-year event plus 35% climate change or drained to suitably

sized soakaways, porosity permitting. The drainage will provide betterment to existing arrangements which we believe currently is free draining and no attenuation or restrictions. The drainage will include flow control vortex if a piped system is eventually proposed. The introduction of french drains across the site and to boundaries will assist to attenuate and capture any potential surface water run-off from the grounds.

6.5 Proposed Foul Water Drainage

It is proposed that the new development will connect into the existing foul sewer network in the adjacent development, subject to confirmation from Severn Trent Water Ltd.

All sewers will be designed in accordance with Sewers for Adoption 7th Edition.

6.6 Maintenance/Adoption.

It is proposed that the new development will connect into the existing foul water sewers via a new connection. Surface water will discharge to an attenuation system and discharge to the existing surface water outfall to the Rea Brook or indeed to soakaways, porosity permitting. All sewers will be designed in accordance with Sewers for Adoption 7th Edition.

6.7 Sustainable Drainage Techniques

It is now commonly a planning requirement to consider utilising sustainable drainage systems (SUDS), if it is appropriate to the specific site conditions. These systems are diverse, but generally aim to provide drainage systems that may facilitate flood and/or pollution control, related to run-off. Such systems are generally 'soft engineering' and as a result can be financially, as well as environmentally, attractive engineering solutions.

Where possible the use of water butts and some rainwater harvesting may be used, otherwise all surface water will drain to a new attenuation system.

7.0 Conclusions & Recommendations

The proposed development on land adjacent to the Lord Hill Hotel, Abbey Foregate, Shrewsbury, Shropshire has been assessed with regards to flood risk. The area for the proposed development falls within Flood Zone 1 and subject to satisfactory surface water drainage to the site proposals there will be no flood risk to the site or any other properties. Appropriate attenuation will be provided within the development, with a discharge to reduced run-off rates. Soakaways of course will be utilised if sufficient porosity is available and can be accommodated within the communal gardens. According to the EA Flood Maps a very small portion of the site along the southern boundary may fall within Flood Zones 2 and 3. However the FRA of the adjacent site would suggest that the Flood Levels do not exceed a level of 52.759m, which would mean that approximately only half a metre width along the southern boundary may be at potential flood risk. This level would suggest that the existing buildings currently sit outside the flood zone and as such the proposed buildings will sit outside the flood zone and will ultimately have a finished floor level of 53.5m minimum, with much of the site at a significantly higher level given the 9m fall across the site.

It is considered that the proposed dwellings will not be at risk of any flooding and following development and the installation of the site drainage there will be no residual risks to any other property.

7.1 Review of NPPF Objectives

The proposed development will not be affected by current or future flooding from any source. Appropriate additional cut-off and land drains will be provided to receive any potential overland flooding.

The site falls from north to south, with levels of approximately 61.15m to the northern boundary and a lowest level of 52.08m to the southern boundary.

The development will not increase flood risk elsewhere, with the restriction of surface water run-off at minimum Greenfield rates and/or betterment to the existing run-off from the existing built form.

The measures proposed to deal with the effects and risks are appropriate, for example using attenuation systems, permeable paving and cut-off/land drainage where possible.

It is considered that the exception test has been met as the area of the proposed buildings falls within Flood Zone 1.

The site will benefit from an attenuation system for the surface water drainage with controlled discharge to the existing systems.

Other origins of flooding have also been assessed and it has been found that there will be no increase in risk of flooding from land, groundwater or sewers as a result of this development.

There are no anticipated negative social, economic or environmental impacts which would result from the development of the site provided mitigation measures outlined in Section 6.4 are adhered to.

Review of Drainage Strategy

The proposed development will ensure that the 1 in 100 year + 35% climate change flows will be attenuated on site.

The surface water drainage will drain to an attenuation system within the site, or soakaways porosity permitting.

Permeable paving, rainwater butts, rainwater harvesting, cut-off drains and land drainage will be provided where necessary to ensure Sustainable Drainage Techniques.

Additional storage capacity will be provided within the proposed sustainable drainage system.

New foul water sewers will be constructed in line with Sewers for Adoption 6th Edition and an application for a Section 106 Agreement will be made where applicable.

Sustainable Drainage Systems will be utilised as where ground conditions allow, and this will be incorporated at the detailed design stage.