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Old Mill Lane, Barnsley Flood Risk Assessment Peel Holdings Limited

June 2012

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Executive Summary

This report provides an assessment, in accordance with NPPF, of the potential increase in flood risk to and caused by a proposed retail foodstore development to the east of Old Mill Lane and to the north of Twibell Street, Barnsley. For those elements that potentially increase flood risk, mitigation measures are suggested.

The Environment Agency Flood Zone Map and Strategic Flood Risk Assessment (2010) locate the site within Flood Zones 1 (low risk), 2 (medium risk) and 3 (high risk).

Comparison of modelled flood levels provided by the Environment Agency to the topographic survey of the site indicates that the extent of Flood Zone 3 is less than that shown on the Environment Agency Flood Zone Map.

It is considered that the probability of the site flooding from fluvial sources is low to high and from surface water is low to medium. Flood risk from all other sources is considered to be low.

Details of the existing and proposed drainage is contained within the Drainage Strategy Report (WSP, 2011).

Finished site levels should be engineered to provide positive drainage and prevent ponding. Gradients of external areas, where possible, should be designed to fall away from buildings, such that any overland flow resulting from extreme events would be channeled away from the entrances. The accumulation of standing water would therefore not occur and thus not pose a risk to the development.

Detailed design of site levels should also mitigate against the risk of any highways, surface water or sewer flooding in the vicinity of the site.

Preliminary calculations have been undertaken based on the 1 in 100 year plus climate change 'worst case' predicted flood level, the masterplan layout and recent topographic survey data. These preliminary calculations show that compensatory flood storage is not required. Detailed 2D hydraulic modelling will be undertaken at the detailed design stage.

The Environment Agency have recommended that the finished floor level should be set 600 mm above the 1 in 100 year plus climate change flood level.

The main food superstore will be developed on 'stilts', providing flood mitigation. In addition, it is recommended that flood resilience measures be incorporated into the design of the buildings. Further information is contained in 'Improving the Flood Performance of New Buildings – Flood Resilient Construction', Department of Communities and Local Government, May 2007 and www.ciria.org.

The site is not located within an Environment Agency flood warning area, however a detailed flood plan / evacuation plan will be developed as part of the detailed design.

Access to the main retail store (for both customers and service vehicles) is proposed via a new road bridge over the River Dearne from a spur to the Wickes roundabout on the new Quality Bus Corridor. This will be designed above the 1 in 100 year plus climate change flood level. In addition, a separate pedestrian access will be available directly from the A61.

The proposed development should not increase flood risk to the site or to other land providing that the suggested mitigation measures are implemented.

1 Introduction

1.1 APPOINTMENT AND BRIEF

1.1.1 Peel Holdings Limited commissioned WSP to provide a Flood Risk Assessment for a proposed retail foodstore development to the east of Old Mill Lane and to the north of Twibell Street, Barnsley.

1.2 OBJECTIVE OF THE STUDY

The objective of this study was to undertake a Flood Risk Assessment in accordance with NPPF.

1.2.1 This study assesses:

- Flood risk to the site and the proposed development; and
- Any impact of flood risk to other land as a result of the development proposals.

1.2.2 Where required, flood risk mitigation measures have been proposed.

1.2.3 This document reports on the flooding issues associated with the proposed development and has been prepared as supplementary documentation to support a planning application.

1.3 STUDY METHODOLOGY

1.3.1 The appraisal process comprised a desk study, data research and consultation with regulatory bodies and third parties.

1.3.2 A site visit was undertaken in August 2011 to assess the general topography of the area and to identify the flood risk features that may affect the site.

1.3.3 A list of documents referred to in relation to the site and their sources is given in Appendix A1.

1.3.4 This report is a holistic risk based assessment of potential flooding from possible sources, including fluvial, tidal, groundwater and surface water runoff. It also identifies and examines the residual flood risk to the proposed development and third party land.

1.3.5 Whilst completing the assessment, consideration has been given to the Development and Flood Risk Practice Guide" (December 2009) and "Flood Risk Assessment Guidance for New Development, Phase 2, R & D Technical Report FD2320/TR2" (2005).

1.3.6 In accordance with paragraph 2.45–2.57 of the Practice Guide, relevant stakeholders were consulted. A list of consultees is given in Appendix A2.

1.4 LIMITATIONS

1.4.1 A search of the Council's planning portal website for other publicly available Flood Risk Assessments for sites in the immediate vicinity was undertaken once at the start of drafting this report. Continual monitoring of the planning portal has not taken place.

1.4.2 This report is based on the interpretation and assessment of data provided by third parties. WSP cannot be held responsible for the accuracy of the third party data and the conclusions and findings of this report may change if the data is amended or updated after the date of consultation.

2 Existing Site

2.1 SITE LOCATION

2.1.1 The site is located in Barnsley, South Yorkshire, approximately 0.7 km northeast of Barnsley Railway Station.

2.1.2 An approximate postcode for the site is S71 1DL and OS grid reference is SE351072.

2.1.3 A site location plan can be found in Appendix B1 of this report.

2.2 SITE DESCRIPTION

2.2.1 Table 2.1 (below) describes the general site characteristics.

2.2.2 A topographic survey of the site is located within Appendix B2 of this report.

Table 2.1: Characteristics of the Site

Area		The site occupies an area of approximately 6 ha.
General Topography		Site levels generally slope down towards the River Dearne. South of the river, levels range from approximately 50 m AOD adjacent to Twibell Street in the south to approximately 44 m AOD along the River Dearne. North of the river existing ground levels are approximately 44 to 45 m AOD.
Existing Surfacing		The site is currently a mixture of buildings, hardstanding and landscaped areas.
Current Use		The site currently comprises an existing retail park containing existing retail warehouses (including Comet, MFI, Howdens and Powerhouse) as well as a depot/cash and carry. A decommissioned gas holder is also present on the site. To the north of the river, the site comprises a cleared depot site and an area of open space.
Boundaries	North	Retail Unit.
	East	Greenfield Areas.
	South	Twibell Street.
	West	Old Mill Lane.

2.2.3 Barnsley Council is currently constructing the new link road (quality bus corridor) connecting Burton Road and Old Mill Lane from which access to the new retail development will be taken.

2.3 EXISTING WATERBODIES

2.3.1 The River Dearne flows in an easterly direction through the site.

2.3.2 In addition, there are two culverted watercourses within the site boundary, one to the south of the river and the other to the north.

2.3.3 The Fleets is located approximately 0.2 km northwest of the site. This is an artificial lake that supplied water to the local mills.

2.4 EXISTING DRAINAGE

2.4.1 Details of existing drainage is contained within the Drainage Strategy Report (WSP, 2011).

2.5 EXISTING FLOOD DEFENCES

2.5.1 The Environment Agency have confirmed that there are no formal flood defences or structures in the immediate area that contributes towards reducing flood risk. However, the Environment Agency Flood Zone Map indicates that there is a flood storage area upstream of the site and also within the site boundary.

2.6 GEOLOGY AND HYDROGEOLOGY

2.6.1 Aquifer designation has been obtained from the Environment Agency Website. The bedrock is classified as a Secondary A Aquifer. These include a wide range of rock layers or drift deposits with an equally wide range of water permeability and storage. Secondary A Aquifers are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases form an important source of base flow to rivers

2.6.2 The Environment Agency have defined Source Protection Zones (SPZs) for 2000 groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk. There are three main zones (inner, outer and total catchment) and a fourth zone of special interest. The site is not located within a Groundwater Source Protection Zone.

2.7 HISTORICAL LAND USES

2.7.1 The earliest historical map reviewed (1852) indicates that the site was not developed. By the late 1800's the Old Mill Gasworks was located on site.

2.7.2 The Barnsley Canal was located to the south of the site which closed in the 1950's.

2.8 HISTORICAL FLOOD RECORDS

2.8.1 Table 2.2 summarises the historical flood records obtained through consultation and liaison with the various bodies contacted as part of this study. Appendix B3 contains all consultee responses.

Table 2.2: Flood Records Summary

Information Source	Flood Records/ Details																						
Environment Agency	The Environment Agency have confirmed that they do not have any historical flood records for the site. Areas upstream and downstream of the site were affected during the June 2007 flood event.																						
Yorkshire Water	Yorkshire Water have confirmed that there are no properties in the vicinity of the site on the DG5 (sewer flooding) Register and that there are no reported incidents of sewer flooding in the area on the Yorkshire Water Operations Database.																						
Barnsley Council	Barnsley Council have confirmed that there are no records of flooding from the culverted watercourses that cross the site.																						
Barnsley Council Strategic Flood Risk Assessment (2010)	The SFRA lists a number of fluvial flood events from the River Dearne: <table><tr><td>2007</td><td>Major Flooding in Dearne Valley</td></tr><tr><td>2000</td><td>Major Flooding in Dearne Valley</td></tr><tr><td>1947</td><td>Major Flooding in Dearne Valley</td></tr><tr><td>1909</td><td>Flooding Dearne valley at Bolton-on-Deerne</td></tr><tr><td>1886</td><td>Major flooding in Dearne Valley</td></tr><tr><td>1883</td><td>Flooding in Barnsley, River Dearne</td></tr><tr><td>1875</td><td>Flooding in Dearne Valley</td></tr><tr><td>1861</td><td>Bursting of Barnsley Canal near Royston</td></tr><tr><td>1846</td><td>Major flooding in Barnsley, River Dearne</td></tr><tr><td>1832</td><td>Major flooding in Barnsley, River Dearne</td></tr><tr><td>1807</td><td>Flooding in Dearne Valley</td></tr></table> The SFRA shows that the site was not affected during the flood events in 1947, 1982, 2000 or 2007, but it is not known whether any of the earlier events affected the site.	2007	Major Flooding in Dearne Valley	2000	Major Flooding in Dearne Valley	1947	Major Flooding in Dearne Valley	1909	Flooding Dearne valley at Bolton-on-Deerne	1886	Major flooding in Dearne Valley	1883	Flooding in Barnsley, River Dearne	1875	Flooding in Dearne Valley	1861	Bursting of Barnsley Canal near Royston	1846	Major flooding in Barnsley, River Dearne	1832	Major flooding in Barnsley, River Dearne	1807	Flooding in Dearne Valley
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1846	Major flooding in Barnsley, River Dearne																						
1832	Major flooding in Barnsley, River Dearne																						
1807	Flooding in Dearne Valley																						

2.8.2 The Chronology of British Hydrological Events website was used to research historical flood events in the area (Ref: www.dundee.ac.uk/geography/cbhe). Four flood records for Barnsley are recorded in the 1800's.

2.9 FLOOD MAPPING

ENVIRONMENT AGENCY MAPPING

Flood Zone Map

2.9.1 The Environment Agency Flood Zone Map locates the site within Flood Zones 1 (low risk), 2 (medium risk) and 3 (high risk) including a flood storage area.

2.9.2 Flood Zone 1 is land designated as having less than a 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).

2.9.3 Flood Zone 2 is land designated as having between 1 in 1000 and 1 in 100 annual probability of river flooding (between 0.1% and a 1%) or between a 1 in 1000 year and 1 in 200 year annual probability of flooding from the sea (between 0.1% and 0.5 %) in any year.

2.9.4 Flood Zone 3 is land designated as having a 1 in 100 or greater annual probability of river flooding (>1%) in any year.

2.9.5 Flood zone designation ignores the presence of any flood defences and only considers flooding from fluvial and tidal sources.

Surface Water Flood Map

2.9.6 The Environment Agency have provided a copy of the Flood Map for Surface Water (2010), which provides a general indication of areas that may be at risk of surface water flooding. It takes broad account of underground drainage and typical storms which are likely to cause flooding. These maps indicate that small areas are susceptible to surface water flooding during a 1 in 200 year storm.

Reservoir Flood Map

2.9.7 The Environment Agency Website indicates that only the river channel that flows through the site is located in a reservoir flood risk area.

2.9.8 The Reservoir Flood Map shows the largest area that might be flooded if a reservoir were to fail and release the water it holds. The map displays a worst case scenario and is only intended as a guide.

NaFra Mapping

2.9.9 The Environment Agency National Flood Risk Assessment Mapping (NaFRA) indicates that the risk of flooding ranges from significant to low.

STRATEGIC FLOOD RISK ASSESSMENT MAPPING

2.9.10 The purpose of the Level 1 Strategic Flood Risk Assessment (2010) was to identify and analyse current and future broad scale flooding issues for proposed development allocation sites/areas in Barnsley Metropolitan Borough Council and provide support for further assessment and sequential testing of proposed development allocations.

2.9.11 The Strategic Flood Risk Assessment (2010) locates the site within Flood Zones 1, 2 and 3. It also includes:

- Fluvial flood extent and depth maps that show the potential scale of flood inundation during overtopping of different standards of flood defence during a range of flood events. These indicate that parts of the site could be inundated up to 1 m depth;
- Climate change maps that show fluvial flood extent and depths from Main Rivers and extent and depths variations, for a undefended floodplain with a 1% (1 in 100 year) fluvial flood flow plus a 20% increase in volume of flood flows. This

allows for the effects of climate change over the next 100 years. These indicate that parts of the site could be inundated up to 1 m depth;

- Areas naturally vulnerable to surface water flooding, which provide an indication of surface water flood extent and variation in depths for particular geographical areas, resulting from a 1% (1 in 100 year) rainfall event; and assuming a 10% (1 in 10 year) rainfall event theoretically being 'lost' due to the sewer capacity. These indicate that only a very small area of the site would potentially be affected by pluvial flooding during a 100 year rainstorm with depths up to 0.5 m.

BRITISH GEOLOGICAL SURVEY FLOOD DATA

2.9.12 The British Geological Survey Geological Indicators of Flooding Map (Appendix B4) indicates that the northern area of the site lies within an area vulnerable to flooding from inland sources.

2.9.13 The British Geological Survey Groundwater Flooding Susceptibility Map indicates that the southern area of the site has a 'high' susceptibility to flooding from groundwater (Appendix B4).

RISK MANAGEMENT SOLUTIONS FLOOD MAPPING DATA

2.9.14 Risk Management Solutions flood mapping data (Appendix B4) indicates that the site is in an area that is potentially susceptible to pluvial flooding for 1 in 75 year, 1 in 100 year and 1 in 1000 year storm event.

2.10 SITE WALKOVER SURVEY

2.10.1 A site walkover was undertaken in August 2011 to assess the site layout and general topography of the land. At the time of the site visit, the weather was dry and there was no evidence of any recent flooding.

2.10.2 The area of the site located to the north of the river could not be accessed due to the construction of the new road.

3 Proposed Development - Description and Location

3.1 Q1A PART 1 - DESCRIPTION – WHAT TYPE OF DEVELOPMENT IS PROPOSED AND WHERE WILL IT BE LOCATED WITHIN THE OVERALL SITE?

3.1.1 The scheme comprises a retail led development primarily consisting of a new-build large format superstore with associated car parking and servicing on the site to the south of the River Dearne. Access to the store (for both customers and service vehicles) is proposed via a new road bridge over the river from a spur to the Wickes roundabout on the new Quality Bus Corridor (Appendix C1).

3.1.2 A petrol filling station linked to the foodstore is proposed to the north of the river. Access to the PFS will be taken from the new link road (Quality Bus Corridor).

3.1.3 A small retail unit (574 sqm) is proposed to the south of the river (and the north of the foodstore). This is intended as a kiosk for leisure/recreation associated with the river corridor.

3.1.4 A third retail unit of 1,961 sqm with associated parking and service access is proposed to the north of the river (and the new link road). This unit comprises a reconfiguration of extant planning permission for a retail warehouse (obtained by National Grid). Service and customer access for this unit is to be taken from the Wickes arm of the new roundabout provided as part of the quality bus corridor (as a minor amendment to the original site layout to align the development more effectively to the Quality Bus Corridor).

3.1.5 Landscaping is proposed along the river in order to improve the river corridor and create a community park. As such the development will bring significant improvements to the river corridor and improving connectivity and amenity access along the Dearne Valley.

3.2 Q1A PART 2 – IS THE PROPOSED DEVELOPMENT NEW, EXTENSION OR CHANGE OF USE?

3.2.1 The proposals are for a new development on a previously developed site.

3.3 Q1B WHAT IS ITS VULNERABILITY CLASSIFICATION?

3.3.1 Table 2 of the Technical Guidance to the National Planning Policy Framework (2012) classes different types of development depending upon their vulnerability. It classes retail developments as 'less' vulnerable' and the PFS as 'highly vulnerable'.

3.3.2 Table 3 of the Technical Guidance to the National Planning Policy Framework (2012) shows that 'less vulnerable' land uses are appropriate development in Flood Zones 1, 2 and 3a. Highly vulnerable uses are appropriate within Flood Zone 1 and within Flood Zone 2 subject to the exceptions test being passed.

3.4 Q1C IS THE PROPOSED DEVELOPMENT CONSISTENT WITH THE LOCAL DEVELOPMENT DOCUMENTS?

Barnsley Unitary Development Plan

3.4.1 The Unitary Development Plan (UDP) is the statutory development plan for the borough along with the Barnsley Education Sites Development Plan Document.

3.4.2 It considers how much development is required in the borough, where it is best located and how it should be designed and contains planning policies on a wide range of matters including, housing, the environment, transport, leisure and economic and community uses. The UDP will eventually be replaced by the Local Development Framework (LDF).

3.4.3 In addition to the UDP, Barnsley Council have published Flood Risk and Development UDP Supplementary Planning Guidance 29 (2003) which provides information for potential development in flood risk areas.

Barnsley Local Development Framework, Core Strategy, Publication (February 2010)

3.4.4 Under the terms of the Planning and Compulsory Purchase Act 2004 each council is required to prepare a Local Development Framework (LDF) to replace its existing UDP.

3.4.5 In the Core Strategy, policies relevant to flood risk include:

CSP 3 Sustainable Drainage Systems (SuDS)

- All development will be expected to use Sustainable drainage systems (SuDS). Only in exceptional circumstances, where it can be demonstrated that all types of SuDS are impractical, will other drainage management systems be permitted;
- Planning applications must include an assessment to show that SuDS will work and be maintained. Measures should be taken to avoid water contamination and safeguard groundwater supply;
- Developers will be required to contribute to the maintenance of SuDS.

CSP 4 Flood Risk

3.4.6 The extent and impact of flooding will be reduced by:

- Not permitting new development where it would be at an unacceptable risk of flooding or would give rise to flooding elsewhere;
- Requiring developers with proposals in Flood Zones 2 and 3 to provide evidence of the sequential test;
- Requiring site-specific Flood Risk Assessments (FRAs) for proposals over 1 hectare in Flood Zone 1 and all development proposals in Flood Zones 2 and 3;
- Requiring proposals over 1000 m² floor space or 0.4 hectares in Flood Zone 1 to demonstrate how the proposal will make a positive contribution to reducing or managing flood risk;
- Requiring all development proposals on Brownfield sites to reduce surface water run-off by at least 30% and development on Greenfield sites to maintain or reduce existing run-off rates;

-
- Requiring development proposals to use Sustainable Urban Drainage Systems (SuDS) in accordance with policy CSP 3;
 - Not culverting or building over watercourses and encouraging the removal of existing culverts wherever practicable;
 - Using flood resilient design in areas of high flood risk.

Barnsley Strategic Flood Risk Assessment (JBA, September 2010)

3.4.7 The purpose of the Level 1 Strategic Flood Risk Assessment (SFRA) was to identify and analyse current and future broad scale flooding issues for proposed development allocation sites/areas in Barnsley Metropolitan Borough Council and provide support for further assessment and sequential testing of proposed development allocations.

3.4.8 The key objectives of the SFRA were to:

- Provide strategic flood risk guidance and advice to planners and developers to help them better understand flood risk and planning related issues, both generally and for specific locations across the study area;
- Investigate and identify the extent and severity of flood risk to the area. This assessment will help councils/Local Planning Authorities (LPAs) to strike an appropriate balance of various sustainable development drivers and factors whilst wherever possible, sequentially steering development away from areas at highest risk;
- Help LPAs to identify specific locations where further and more detailed flood risk data and assessment work is required as part of a Level 2 SFRA, prior to the allocation of specific developments;
- Provide data and guidance in the application of the Sequential and Exception Tests for LPAs to assess specific development sites;
- Supplement current policy guidelines by providing guidance on flood risk assessment requirements and a risk based approach to development considerations. This is to help ensure that areas allocated for development can be developed in a safe and sustainable manner and is aimed at both councils and developers;
- Contribute to the council's Strategic Environmental Assessment (SEA) and LDF. The SEA will be used to inform the council's Sustainability Appraisal (SA), which will aid the selection of suitable land allocations; and
- Be used as a reference document to which all parties involved in planning and flood risk can reliably turn to for initial advice.

Barnsley Water Cycle Study and Surface Water Management Plan

3.4.9 Barnsley Council have confirmed that they do not currently have a Water Cycle Study or Surface Water Management Plan.

3.5 Q1D - PLEASE PROVIDE EVIDENCE THAT THE SEQUENTIAL TEST AND WHERE NECESSARY THE EXCEPTIONS TEST HAS BEEN APPLIED IN THE SELECTION OF THIS SITE FOR THIS TYPE OF DEVELOPMENT

3.5.1 The NPPF requires developers to carry out sequential testing to demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate for the type of development or land use proposed.

3.5.2 The Sequential Test, within NPPF, aims to steer all new developments to areas at the lowest risk of flooding and ensure that the development type proposed is appropriate by reference to the flood risk.

3.5.3 The Sequential Test requires that land for future development must first be sought within Flood Zone 1 (low risk).

3.5.4 A separate Sequential Test report has been written to accompany this planning application.

4 Definition of the Flood Hazard

4.1 Q2A - WHAT SOURCES OF FLOODING COULD AFFECT THE SITE?

SOURCE	LIKELIHOOD
Fluvial	Low to high
Tidal	Negligible
Groundwater	Low
Sewer	Low
Surface Water	Low to medium
Other: Reservoir	Low

4.2 FLUVIAL FLOOD RISK

4.2.1 The proposed development site is located in Flood Zones 1, 2 and 3 on the Environment Agency Flood Zone Map and within the Strategic Flood Risk Assessment (2010). The Flood Zone Map also indicates a flood storage area within the site boundary.

4.2.2 The Environment Agency have supplied modelling results for the River Dearne from two hydraulic modelling studies:

- The River Don Catchment Flood Model (JBA, 2004) provides modelled flood levels through the site;
- The River Dearne Flood Risk Mapping Study (Halcrow, 2010) provides modelled flood levels for the A61 road bridge, upstream of the site.

4.2.3 Results from both modelling studies are summarised below:

2010 Dearne Model (Halcrow) - A61 Road Bridge (Label DEA00001U)	
Return Period	Flood Level (m AOD)
25	43.85
100	44.52
100 + climate change	44.85
1000	46.11

2004 River Don Model (JBA) – Node Point 23278	
Return Period	Flood Level (m AOD)
25	43.21
100	43.53
100 + climate change	Not available
1000	Not available

4.2.4 As the results from the 2010 model are more recent and are higher than those predicted from the 2004 model, the results from the 2010 hydraulic model have been used to consider fluvial flood risk in this FRA as it represents a worst case scenario. Actual flood levels through the site are expected to be lower due to the hydraulic gradient of the river.

The 2010 model results have been plotted onto the topographic survey to determine flood zones and this is in Appendix D1. This shows that the area of Flood Zone 3 (i.e. the site area within the 1 in 100 year flood outline), is less than that indicated on the Environment Agency Flood Zone Map. It also shows that the flood storage indicated to the north of the river, is far less extensive.

4.2.5 The SFRA (2010) includes a series of flood risk maps:

- The fluvial flood extent and depth maps show the potential scale of flood inundation during overtopping of different standards of flood defence during a range of flood events (they do not include the impact of a breach or failure of defences);
- Climate change maps show fluvial flood extent and depths from Main Rivers and extent and depths variations, for an undefended floodplain with a 1% (1 in 100 year) fluvial flood flow plus a 20% increase in volume of flood flows. This allows for the effects of climate change over the next 100 years.

4.2.6 The maps indicate the following:

SFRA Fluvial flood extent and depth maps			
Map	Description	Flood Depth	Flood extent
S2Q100 (Map D)	1% (1:100y) flood event assuming no flood defences exist	Parts of the site could be inundated up to 1 m depth. Areas immediate adjacent to the River Dearne indicate depths of >1.5 m.	North of the river, the majority of the site is flooded. South of the river, flooding is restricted to the northern areas.
S2Q1000 (Map E)	0.1% (1:1000y) flood event assuming no flood defences	Parts of the site could be inundated up to 1 m depth. Areas immediate adjacent to the River Dearne indicate depths of >1.5 m.	North of the river, the majority of the site is flooded. South of the river, flooding is restricted to the northern areas.
S2Q100 + climate change (Map H)	1% (1:100y) flood event assuming no flood defences exist plus a 20% increase in volume of flood flows.	Parts of the site could be inundated up to 1 m depth. Areas immediate adjacent to the River Dearne indicate depths of >1.5 m.	North of the river, the majority of the site is flooded. South of the river, flooding is restricted to the northern areas.

4.2.7 Flood risk from the culverted watercourses is considered to be low as there are no open sections in the immediate vicinity of the site and Barnsley Council are unaware of any flooding issues associated with them. Details of how the culverted watercourses will be accommodated within the scheme are contained within Section 8 of this report.

4.2.8 Based on the available information, it is considered that fluvial flood risk is low to medium for the majority of the site but is high in areas immediately adjacent to the River Dearne.

4.3 TIDAL FLOOD RISK

4.3.1 The proposed development is located away from the coast at an elevation above 44 m AOD.

4.3.2 Based on the available information, it is considered that tidal flood risk is negligible.

4.4 GROUNDWATER FLOODING

4.4.1 The Strategic Flood Risk Assessment (2010) states that “groundwater flooding is caused by the emergence of water originating from underground from either point or diffuse locations. The occurrence of groundwater flooding is usually very local and governed by the local geology. Unlike flooding from rivers and the sea, groundwater flooding does not generally pose a significant risk to life, but is more associated with significant damage to property, with flooding persisting over a number of weeks for some types of groundwater flooding. Groundwater flooding is a significant but localised issue that has attracted an increasing amount of public concern in recent years. Groundwater flooding can also exacerbate fluvial flooding in certain circumstances and arises from:

- Natural exceptional rises in groundwater level;
- Reactivating springs and short lived watercourses (often referred to as ‘clearwater’ flooding);
- Rising groundwater (rebound) following reductions in historic abstraction;
- Mine water recovering to natural levels following cessation of pumping; and
- Local shallow drainage/flooding problems unrelated to deep groundwater responses.”

4.4.2 The SFRA also states that “groundwater flooding has been the focus of one of the key projects under Defra’s Making Space for Water programme and the outputs are available on the Defra website. Staff at the Coal Authority were consulted with respect to the possibility of flooding caused by the re-emergence of minewaters from the formerly very important South Yorkshire mining region following the cessation of minewater pumping. These discussions indicated that the Coal Authority have a comprehensive network of groundwater monitoring boreholes across South Yorkshire and by working in partnership with the Environment Agency and other local coal mining interests are developing a strategic forward plan to manage minewater levels to minimise the risk of re-emerging minewaters causing

both flooding and/or initiating water quality problems in the major Sherwood Sandstone water resource aquifer”.

4.4.3 The Environment Agency have confirmed that they have no information relating to groundwater levels of ground water flooding in the area.

4.4.4 The British Geological Survey Groundwater Flooding Susceptibility Map indicates that the southern area of the site has a ‘high’ susceptibility to flooding from groundwater (Appendix B4). The groundwater flooding susceptibility data shows the degree to which areas are susceptible to groundwater flooding on the basis of geological and hydrogeological conditions. It does not show the likelihood of groundwater flooding occurring, i.e. it is a hazard not risk-based dataset.

4.4.5 Based on the available data, it is considered that the risk of groundwater flooding to the site is low.

4.5 SURCHARGED SEWER FLOODING

4.5.1 Yorkshire Water have confirmed that there are no properties in the vicinity of the site on the DG5 (sewer flooding) Register and that there are no reported incidents of sewer flooding in the area on the Yorkshire Water Operations Database.

4.5.2 As part of the SFRA, Yorkshire Water provided data on internal and external flooding from their databases. It states that “in the Yorkshire Water managed and maintained system, the incidence of external sewer flooding is not widespread or particular frequent. Those areas that appear to be more prone to external sewer flooding are parts of Stairfoot, Lunwood, Elsecar, Goldthorpe, Darton, Higham, Silkstone Common, Smithies and Darfield”. The site is not located within one of these areas.

4.5.3 Based on the available information, the risk from sewer flooding is considered to be low.

4.6 SURFACE WATER FLOODING

4.6.1 The SFRA states that “the topography of the Barnsley Metropolitan Borough Council area, especially in and around a number of the built-up areas make them potentially prone to flooding caused by direct rainfall due to the amount of impermeable surfaces and the lack of sufficient sewer capacity”.

4.6.2 The SFRA contains maps that show areas that are naturally vulnerable to surface water flooding, which provide an indication of surface water flood extent and variation in depths for particular geographical areas, resulting from a 1% (1 in 100 year) rainfall event; and assuming a 10% (1 in 10 year) rainfall event theoretically being ‘lost’ due to the sewer capacity. The modelling technique includes the presence of flood defences and how water may pond behind these defences.

4.6.3 The SFRA indicates that only a very small area of the site would potentially be affected by pluvial flooding during a 100 year rainstorm with depths upto 0.5 m.

4.6.4 The Environment Agency have provided a copy of the Flood Map for Surface Water (2010) which provides a general indication of areas that may be at risk of surface water flooding. It takes broad account of underground drainage and typical storms which are likely to cause flooding. These maps indicate that small areas are susceptible to surface water flooding during a 1 in 200 year storm.

4.6.5 Risk Management Solutions (RMS) flooding data has been obtained which is a modelled dataset that uses land height, predicted rainfall and other factors to predict flooding from rivers and surface water flooding during a 75 (1.3%), 100 (1%) and 1000 (0.1%) year storm. Risk Management Solutions flood mapping data (Appendix B4) indicates that the site is in an area that is potentially susceptible to pluvial flooding for 1 in 75 year, 1 in 100 year and 1 in 1000 year storm event.

4.6.6 Considering all of the available information, the risk of flooding from surface water is considered to be low to medium. However, residual risk still remains for extreme rainfall events.

4.7 FLOODING FROM OTHER SOURCES

4.7.1 Non-natural or artificial sources of flooding can include reservoirs, lakes, canals etc. The potential effects of flood risk management infrastructure and other structures also needs to be considered.

4.7.2 The disused Barnsley Canal is located to the south of the site and is maintained by Barnsley Council. Flood risk from this disused canal is considered to be low.

4.7.3 Following the June 2007 floods and the incident at Ulley reservoir, Sir Michael Pitt was asked by the government to carry out a review of the emergency services' response. He called for reservoir flood maps to be made available to the public and to local emergency planners to allow them to respond quickly to a reservoir flood.

4.7.4 As a result reservoir flood maps have been created for 2007 reservoirs in England and Wales. These maps show the possibility of flooding from large raised reservoirs that hold at least 25,000 cubic meters of water above natural ground level. The maps show the largest area that might flood if a reservoir were to fail in a credible worst case scenario.

4.7.5 The Environment Agency Website indicates that only the river is located in a reservoir flood risk area, however, due to the safety measures and maintenance regimes in place, the risk from reservoir flooding is considered to be low.

4.7.6 Culvert Blockage is considered to be low as there are no open sections in the vicinity of the site.

4.7.7 No further sources have been identified.

4.8 Q2C – WHAT ARE THE EXISTING SURFACE WATER DRAINAGE ARRANGEMENTS FOR THE SITE?

4.8.1 Details are contained within the Drainage Strategy Report (WSP, 2011).

5 Probability

5.1 Q3A – WHICH FLOOD ZONE IS THE SITE WITHIN?

5.1.1 Inspection of the Environment Agency Flood Zone Map indicates that the proposed development site is located in Flood Zones 1 (low risk), 2 (medium risk) and 3 (High risk) including a flood storage area.

5.2 Q3B- IF THERE IS A STRATEGIC FLOOD RISK ASSESSMENT COVERING THIS SITE WHAT DOES IT SHOW?

5.2.1 The Strategic Flood Risk Assessment (2010) locates the site within Flood Zones 1, 2 and 3. It also includes:

- Fluvial flood extent and depth maps that show the potential scale of flood inundation during overtopping of different standards of flood defence during a range of flood events. These indicate that parts of the site could be inundated up to 1 m depth;
- Climate change maps that show fluvial flood extent and depths from Main Rivers and extent and depths variations, for an undefended floodplain with a 1% (1 in 100 year) fluvial flood flow plus a 20% increase in volume of flood flows. This allows for the effects of climate change over the next 100 years. These indicate that parts of the site could be inundated up to 1 m depth;
- Areas naturally vulnerable to surface water flooding, which provide an indication of surface water flood extent and variation in depths for particular geographical areas, resulting from a 1% (1 in 100 year) rainfall event; and assuming a 10% (1 in 10 year) rainfall event theoretically being 'lost' due to the sewer capacity. These indicate that only a very small area of the site would potentially be affected by pluvial flooding during a 100 year rainstorm with depths up to 0.5 m.

5.3 Q3C – WHAT IS THE PROBABILITY OF THE SITE FLOODING TAKING INTO ACCOUNT THE CONTENTS OF THE SFRA AND OF ANY FURTHER SITE SPECIFIC ASSESSMENT?

5.3.1 It is considered that the probability of the site flooding from fluvial sources is low to high and from surface water is low to medium. Flood risk from all other sources is considered to be low.

5.4 EXISTING FLOOD MITIGATION MEASURES

5.4.1 The Environment Agency have confirmed that there are no formal flood defences in the immediate vicinity of the site.

5.5 Q3D – WHAT ARE THE EXISTING RATES AND VOLUMES OF RUN-OFF GENERATED BY THE SITE

5.5.1 Details are contained within the Drainage Strategy Report (WSP, 2011).

6 Climate Change

6.1 DEVELOPMENT LIFESPAN

6.1.1 Based on a typical lifespan for this type of development of 100 years the contingency allowances for climate change set out in Tables B1 and B2 of NPPF applicable to this site up to 2115 are:

- 30% increase in peak rainfall intensity;
- 20% increase in peak river flow.

6.2 Q 4A - HOW IS FLOOD RISK LIKELY TO BE AFFECTED BY CLIMATE CHANGE?

6.2.1 Flood risk is likely to increase with climate change. However, the flood risk management measures described in Section 8 make an allowance for this.

6.2.2 As described in Section 4.2 of the report, the SFRA includes climate change maps which show fluvial flood extent and depths from Main Rivers and extent and depths variations, for a undefended floodplain with a 1% (1 in 100 year) fluvial flood flow plus a 20% increase in volume of flood flows. This allows for the effects of climate change over the next 100 years. Fluvial flood extent and depth is not greatly increased with climate change.

7 Detailed Development Proposals

7.1 Q5A - DEVELOPMENT LAYOUT PROPOSALS AND DRAWINGS

7.1.1 The scheme comprises a retail led development primarily consisting of a new-build large format superstore with associated car parking and servicing on the site to the south of the River Dearne. Access to the store (for both customers and service vehicles) is via a proposed new road bridge over the river from a spur to the Wickes roundabout on the new Quality Bus Corridor.

7.1.2 A petrol filling station linked to the foodstore is proposed to the north of the river. Access to the PFS will be taken from the new link road (Quality Bus Corridor).

7.1.3 A small retail unit (574 sqm) is proposed to the south of the river (and the north of the foodstore). This is intended as a kiosk for leisure/recreation associated with the river corridor.

7.1.4 A third retail unit of 1,961 sqm with associated parking and service access is proposed to the north of the river (and the new link road). This unit comprises a reconfiguration of extant planning permission for a retail warehouse (obtained by National Grid). Service and customer access for this unit is to be taken from the Wickes arm of the new roundabout provided as part of the quality bus corridor (as a minor amendment to the original site layout to align the development more effectively to the Quality Bus Corridor).

7.1.5 Landscaping is proposed along the river in order to improve the river corridor and create a community park. As such the development will bring significant improvements to the river corridor and improving connectivity and amenity access along the Dearne Valley.

7.1.6 The land use and vulnerability for the proposed development is established in Section 3 above.

7.2 Q5B – DEMONSTRATE HOW LAND USES MOST SENSITIVE TO FLOOD DAMAGE HAVE BEEN PLACED IN AREAS WITHIN THE SITE THAT ARE AT LEAST RISK OF FLOODING

7.2.1 The proposed superstore is located to the south of the River Dearne and will be elevated on stilts with car parking beneath.

7.3 FOUL WATER FLOWS FROM THE DEVELOPMENT

7.3.1 Details are contained within the Drainage Strategy Report (WSP, 2011).

8 Flood Risk Management Measures

8.1 Q6A - HOW WILL THE SITE BE PROTECTED FROM FLOODING, INCLUDING THE POTENTIAL IMPACTS OF CLIMATE CHANGE, OVER THE DEVELOPMENT'S LIFETIME?

SURFACE WATER DRAINAGE STRATEGY

8.1.1 The Environment Agency have stated that there should be no increase in surface water runoff from the new development. If the existing site is shown to drain to a watercourse, then surface water runoff should be attenuated to provide a 30% reduction in the final surface water discharge from the site when compared to the existing site outflow prior to redevelopment. However, if the site does not drain to a watercourse or public sewer at present, then flows must be attenuated to a maximum of 5 l/s/ha, equivalent to the greenfield runoff rate.

8.1.2 Details of the proposed surface water drainage strategy is contained within the Drainage Strategy Report (WSP, 2011).

COMPENSATORY FLOOD STORAGE

8.1.3 Initial compensatory flood storage calculations have been undertaken based on the latest masterplan and using the 'worst case' predicted 1 in 100 year plus climate change flood level from the Environment Agency and recent topographic survey information.

8.1.4 With careful consideration of levels, compensatory flood storage can be achieved on site. Detailed hydraulic modelling will be undertaken at the detailed design stage to prove that no additional flood storage is taken up as a result of the proposed development. Refer to Appendix E1 for initial calculations.

SITE LAYOUT

8.1.5 The final masterplan layout should take account of the areas susceptible to surface water flooding.

8.1.6 The proposed masterplan layout should take account of the existing watercourses crossing the site, including the associated easements:

- As the site is next to the River Dearne which is designated as Main River the Water Resources Act 1991 and the Yorkshire Land Drainage Byelaws 1980 apply. Briefly, these state that there shall be no development (including tipping, fencing, etc.) within 8 metres of the top of the bank without the prior written consent of the Environment Agency;
- Barnsley Council have stated that the culverted watercourses crossing the site must be protected during the proposed works. The exact location of the apparatus should be determined on site prior to commencement of any works. A 6 metre easement will be required for any watercourses crossing the site.

8.1.7 To accommodate the development to the south of the river, Barnsley Council have agreed in principle that the culverted watercourse can be diverted subject to satisfactory surveys being undertaken at the detailed design stage.

8.1.8 The culvert to the north of the site is not affected by the proposed development.

SITE LEVELS

8.1.9 Finished site levels should be engineered to provide positive drainage and prevent ponding. Gradients of external areas, where possible, should be designed to fall away from buildings, such that any overland flow resulting from extreme events would be channelled away from the entrances. The accumulation of standing water would therefore not occur and thus not pose a risk to the development.

8.1.10 Detailed design of site levels should also mitigate against the risk of any highways, surface water or sewer flooding in the vicinity of the site.

8.1.11 The levels in the vicinity of the PFS will be raised above the 1 in 100 year plus climate change flood level to allow its development. Compensatory flood storage will be provided as necessary.

FINISHED FLOOR LEVELS

8.1.12 The Environment Agency have recommended that the finished floor level of the proposed units should be set 600 mm above the 1 in 100 year plus climate change flood level.

8.1.13 The food superstore will be developed on 'stilts', providing retail floorspace on the first floor with car parking beneath.

FLOOD RESILIENCE

8.1.14 It is recommended that flood resilience measures be incorporated into the design of the buildings. Further information is contained in 'Improving the Flood Performance of New Buildings – Flood Resilient Construction', Department of Communities and Local Government, May 2007 and www.ciria.org.

ENVIRONMENT AGENCY FLOOD WARNING

8.1.15 The site is not located within an Environment Agency flood warning area.

ACCESS AND EGRESS

8.1.16 Access to the main retail store (for both customers and service vehicles) is via a proposed new road bridge over the River Dearne from a spur in the Wickes roundabout on the new Quality Bus Corridor.

8.1.17 The Environment Agency Flood Zone Map indicates that the proposed access route may pass through Flood Zone 3 / flood storage area and the Environment Agency have stated that:

- If roads are allowed in a floodplain, they would suggest a road at ground level of suitable construction that does not wash away in an event. Ideally, they would not want it raised as that would take up flood storage, however, that would have access and egress issues;

-
- If it was raised, it would need to be above the 1 in 100 year flood level, compensatory storage agreed and a flood risk assessment provided to show that it does not impede flows behind;
 - If a bridge was constructed, the Environment Agency would prefer a clear span bridge rather than any pier in the channel with the deck soffit at 1 in 100 year plus climate change flood level with a minimum 600 mm freeboard, taking into account erosion and scour protection.

8.1.18 It is proposed that the bridge will be constructed above the 1 in 100 year plus climate change flood level to allow safe access and egress from the site. In addition, a separate pedestrian access is proposed direct from the A61. Detailed hydraulic modelling will be undertaken at the detailed design stage to prove that the proposed bridge structure does not increase flood risk or impede flood flows.

FLOOD PLAN

8.1.19 It is recommended that signs are erected around the site and within the buildings detailing the flood emergency planning procedures. In addition, it is recommended that the occupiers of the site develop a flood plan to enable staff to follow set procedures and to give clear instructions to site users should flooding occur.

OTHER INFORMATION

8.1.20 The responsibility for general maintenance and repair of the watercourse and its banks rests with the riparian owner.

9 Offsite Impacts

9.1 Q7A - HOW WILL YOU ENSURE THAT YOUR PROPOSED DEVELOPMENT AND THE MEASURES TO PROTECT YOUR SITE FROM FLOODING WILL NOT INCREASE FLOOD RISK ELSEWHERE?

9.1.1 Surface water discharge will be restricted in line with the Environment Agency's requirements and attenuation storage provided on site for up to the 1 in 100 year storm event plus an allowance for climate change (further details are contained within the Drainage Strategy report (WSP, 2011)).

9.2 Q7B - HOW WILL YOU PREVENT RUN-OFF FROM THE COMPLETED DEVELOPMENT CAUSING IMPACT ELSEWHERE

9.2.1 Details are contained within the Drainage Strategy report (WSP, 2011).

10 Residual Risks

10.1 Q8A - WHAT FLOOD-RELATED RISKS REMAIN AFTER YOU HAVE IMPLEMENTED THE MEASURES TO PROTECT THE SITE FROM FLOODING?

10.1.1 Residual risks will be managed through the design and layout of the proposed development.

10.1.2 Finished site levels should be engineered to provide positive drainage and prevent ponding. Gradients of external areas, where possible, should be designed to fall away from buildings, such that any overland flow resulting from extreme events would be channelled away from the entrances. The accumulation of standing water would therefore not occur and thus not pose a risk.

10.2 Q8B – HOW, AND BY WHOM, WILL THESE RISKS BE MANAGED OVER THE LIFETIME OF THE DEVELOPMENT?

10.2.1 The proposed development will have a separate surface and foul water drainages system installed. It is envisaged that the foul water system would be adopted by Yorkshire Water.

11 Conclusions

11.1.1 This report provides an assessment, in accordance with NPPF, of the potential increase in flood risk to and caused by a proposed retail foodstore development to the east of Old Mill Lane and to the north of Twibell Street, Barnsley. For those elements that potentially increase flood risk, mitigation measures are suggested.

11.1.2 The Environment Agency Flood Zone Map and Strategic Flood Risk Assessment (2010) locate the site within Flood Zones 1 (low risk), 2 (medium risk) and 3 (high risk).

11.1.3 Comparison of modelled flood levels provided by the Environment Agency to the topographic survey of the site indicates that the extent of Flood Zone 3 is less than that shown on the Environment Agency Flood Zone Map.

11.1.4 It is considered that the probability of the site flooding from fluvial sources is low to high and from surface water is low to medium. Flood risk from all other sources is considered to be low.

11.1.5 Details of the existing and proposed drainage is contained within the Drainage Strategy Report (WSP, 2011).

11.1.6 Finished site levels should be engineered to provide positive drainage and prevent ponding. Gradients of external areas, where possible, should be designed to fall away from buildings, such that any overland flow resulting from extreme events would be channeled away from the entrances. The accumulation of standing water would therefore not occur and thus not pose a risk to the development.

11.1.7 Detailed design of site levels should also mitigate against the risk of any highways, surface water or sewer flooding in the vicinity of the site.

11.1.8 Preliminary calculations have been undertaken based on the 1 in 100 year plus climate change 'worst case' predicted flood level, the masterplan layout and recent topographic survey data. These preliminary calculations show that compensatory flood storage is not required. Detailed 2D hydraulic modelling will be undertaken at the detailed design stage.

11.1.9 The Environment Agency have recommended that the finished floor level should be set 600 mm above the 1 in 100 year plus climate change flood level.

11.1.10 The main food superstore will be developed on 'stilts', providing flood mitigation. In addition, it is recommended that flood resilience measures be incorporated into the design of the buildings. Further information is contained in 'Improving the Flood Performance of New Buildings – Flood Resilient Construction', Department of Communities and Local Government, May 2007 and www.ciria.org.

11.1.11 The site is not located within an Environment Agency flood warning area, however a detailed flood plan / evacuation plan will be developed as part of the detailed design.

11.1.12 Access to the main retail store (for both customers and service vehicles) is proposed via a new road bridge over the River Dearne from a spur to the Wickes roundabout on the new Quality Bus Corridor. This will be designed above the 1 in 100 year plus climate change flood level. In addition, a separate pedestrian access will be available directly from the A61.

11.1.13 The proposed development should not increase flood risk to the site or to other land providing that the suggested mitigation measures are implemented.

Appendices, Figures & Tables

Appendix A Introduction

Appendix A1 Documents referred to for Data

Document	Website address
Environment Agency Flood Risk Map	http://www.environment-agency.gov.uk/
Environment Agency Groundwater Vulnerability	http://www.environment-agency.gov.uk/
Chronology of British Hydrological Events	http://www.dundee.ac.uk/ geography/cbhe
Barnsley Unitary Development Plan	http://www.barnsley.gov.uk/planning-local-plans
Barnsley Local Development Framework	http://www.barnsley.gov.uk/pid856
Barnsley Core Strategy	http://www.barnsley.gov.uk/core-strategy-publication
Barnsley Strategic Flood Risk Assessment	http://www.barnsley.gov.uk/0xac16000b_0x00485bbd
Barnsley Flood Risk and Development Guidance	http://www.barnsley.gov.uk/29floodpdf

Appendix A2 List of Consultees

Consultee	Office	Response received at time of drafting report Y/N
Environment Agency	Phoenix House, Leeds	Y
Internal Drainage Board	Dove and Dearne	N
Water Company	Yorkshire Water	Y
Local Authority	Barnsley Council	Y
Local Planning Authority	Barnsley Council	Y
Highways	Barnsley Council	N

Appendix B1 Site Location Plan



Appendix B2 Topographic Survey

Appendix B3 Consultation Responses

Hamilton, Sarah

From: Joy , Matthew <MatthewJoy@barnsley.gov.uk> on behalf of Planningpolicy <Planningpolicy@barnsley.gov.uk>
Sent: 19 July 2011 13:31
To: Hamilton, Sarah
Subject: RE: Flood Risk Enquiry - Old Mill Lane

Sarah

In answer to your query the Council has a Strategic Flood Risk Assessment but, does not have a Surface Water Management Plan or a Water Cycle Study.

The relevant UDP Policies are ES4 and ES5. SPG 29 Flood Risk and Development is also applicable.

However, the LDF Core Strategy has been found sound by the Inspector following examination, and although it will not be adopted until September 2011, its policies carry significant weight and will supersede the UDP policies. I therefore draw your attention to LDF Core Strategy policies CSP 3 and CSP 4.

Regards
Matthew Joy
Planning Policy

From: Hamilton, Sarah [mailto:Sarah.Hamilton@WSPGroup.com]
Sent: 12 July 2011 14:29
To: Planningpolicy
Subject: Flood Risk Enquiry - Old Mill Lane

Dear Barnsley Council,

WSP has been commissioned to undertake a Flood Risk Assessment for a site off Old Mill Lane, Barnsley. Current plans are to redevelop the site as a large foodstore and associated petrol station together with 2 smaller retail units.

Please can you inform me whether you have any of the following:

- Strategic Flood Risk Assessment;
- Surface Water Management Plan;
- Water Cycle Study;
- Any policies that relate to flood risk / drainage within the LDF or UDP;
- Any supplementary guidance in relation to flood risk / drainage;
- Whether any of the above will become available in the near future.

Many thanks and kind regards,

Sarah

Sarah Hamilton
Senior Engineer, Property & Development

Three White Rose Office Park, Millshaw Park Lane, Leeds LS11 0DL.
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Fax: +44(0)113 395 6201
Website: www.wspgroup.co.uk

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Hamilton, Sarah

From: Atkins , Wayne <WayneAtkins@barnsley.gov.uk>
Sent: 16 August 2011 09:57
To: Hamilton, Sarah
Cc: Bell , Derek
Subject: RE: Old Mill Lane, Barnsley
Attachments: Old Mill Lane.pdf

Sarah

The attached PDF shows the approximate location of culverted watercourses crossing your site which must be protected during your works. The exact location of the apparatus should be determined on site prior to commencement of any works. A 6 metre easement will be required for any watercourses crossing the site.

It is believed a colony of Bats roosts within the culvert coming from a northerly direction therefore an ecological survey will be required.

Records of public sewers in the area are held by Yorkshire Water who should be consulted.

There are no records of flooding from the culvereted watercourses shown on the attached plan. Please consult Yorkshire Water regarding flooding from Public sewers and the Environment Agency regarding flooding from the River Dearne.

I assume the site is to discharge to the River Dearne, therefore please consult the Environment Agency regarding discharge rates.

The Council has a generic Corporate Flood Plan for the management of internal services in response to flooding events but has no specific flood plan for this site.

For information regarding emergency arrangements and guidelines available for development sites within potential flood risk areas please speak to the Environment Agency as this area is partly within the Environment Agency designated flood zone for the River Dearne.

Regards

Wayne Atkins

Senior Engineer - Drainage, Policy and Programming
Barnsley Metropolitan Borough Council
Highways and Engineering
Network Management
Westgate Plaza 1
PO Box 603
S70 9FA
Telephone: 01226 772182
Fax: 01226 772196
E-mail: wayneatkins@barnsley.gov.uk

From: Bell , Derek
Sent: 12 August 2011 14:12
To: Atkins , Wayne
Subject: FW: Old Mill Lane, Barnsley

Wayne,

Haven't you dealt with this one already ...??

Cheers ~ Derek

From: Hamilton, Sarah [mailto:Sarah.Hamilton@WSPGroup.com]
Sent: 12 August 2011 13:41
To: Bell, Derek
Subject: Old Mill Lane, Barnsley

Hi Derek,

I have been passed on your contact details by Rob McCarthy.

WSP has been commissioned to undertake a Flood Risk Assessment for a site off Old Mill Lane, Barnsley. Current plans are to redevelop the site as a large foodstore and associated petrol station together with 2 smaller retail units.

Please can you inform me of the following:

- Whether you have any plans of culverted watercourses / drainage in the immediate vicinity of the site;
- Whether you have any historic flooding records in the vicinity of the site (either from watercourses, drainage or highways);
- Whether you have any specific policies in relation to drainage from new developments;
- Whether the Council already has an existing Flood Plan that incorporates emergency procedures for the site if it were to flood?
- What emergency arrangements you would expect to be in place in terms of flooding at this site e.g. flood warning, signage, flood plan for the proposed store;
- Whether you have any guidelines available for development sites within potential flood risk areas.

Any advice would be greatly appreciated.

Kind regards,

Sarah

Sarah Hamilton
Senior Engineer, Property & Development

Three White Rose Office Park, Millshaw Park Lane, Leeds LS11 0DL.
Tel: +44(0)113 395 6243
Fax: +44(0)113 395 6201
Website: www.wspgroup.co.uk

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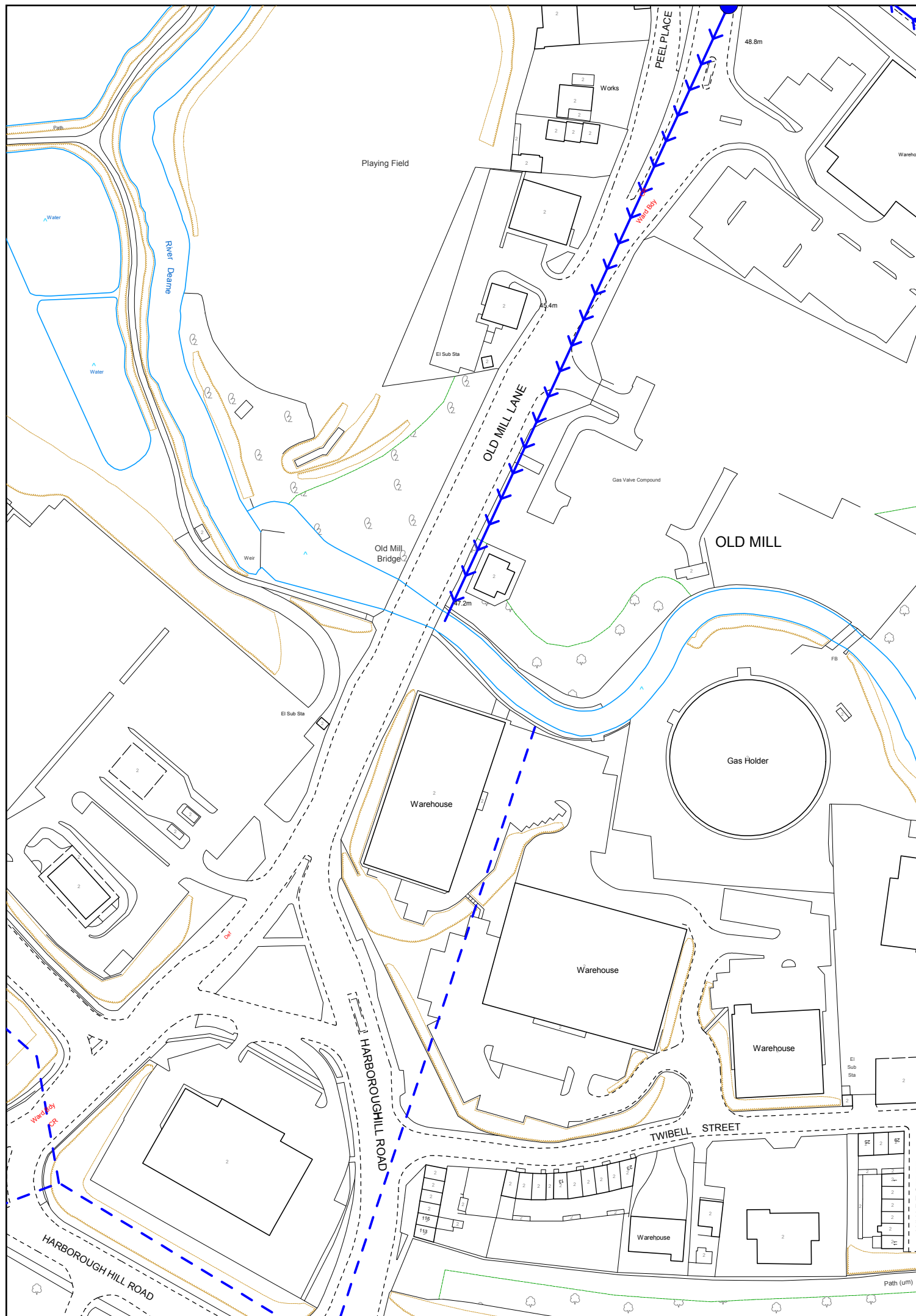
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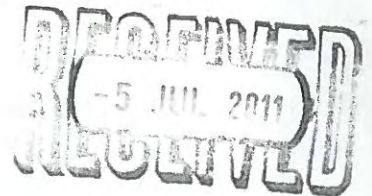




Sarah Hamilton
WSP Group
Three White Rose Office Park
Millshaw Park Lane
Leeds
LS11 0DL

Our ref: RFI/2011/17472
Your ref:

Date: 4 July 2011



Dear Sarah

Provision of Product 4 for Old Mill Lane, Barnsley

Thank you for your request of 10 June 2011 to use Environment Agency data, Product 4, in the development of the above site. The information is attached.

If you have requested this information to help inform a development proposal, then you should note the detail in the attached advisory text on the use of Environment Agency Information for Flood Risk Assessments / Flood Consequence Assessments.

Supporting Information

Flood Zone

- *Please can you confirm what flood zone the site lies within?*
- *Whether or not the flood zones will be updated in the near future.*

Please see the enclosed extract from the Flood Map.

The Flood Map provides information on flooding from rivers and the sea for England and Wales. The Flood Map also has information on flood defences and the areas benefiting from those flood defences.

The Flood Map shows the following:

1. Flood Zone 3 (dark blue area on the enclosed map): natural flood plain area that could be affected by flooding from rivers and/or the sea – not taking into account the presence of any flood defences

- For flooding from rivers the map indicates the extent of a flood with a 1% (1 in 100) chance of happening each year;
- For flooding from the sea the map shows the extent of a flood with a 0.5% (1 in 200) chance of happening each year.

Environment Agency, Phoenix House, Global Avenue, Leeds, LS11 8PG
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Email: enquiries@environment-agency.gov.uk
www.environment-agency.gov.uk



2. Flood Zone 2 (light blue area): natural flood plain area that could be affected by flooding from rivers and/or the sea – not taking into account the presence of any flood defences.

- Indicates the extent of a flood with a 0.1% (1 in 1000) chance of happening each year.

3. Flood defences built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, together with some natural or constructed entities which retain, store or channel water and which may protect against smaller floods.

4. Areas benefiting from flood defences - areas that benefit from the flood defences shown, in the event of a river flood with a 1% (1 in 100) chance of happening each year, or a flood from the sea with a 0.5% (1 in 200) chance of happening each year. If the defences were not there, these areas would flood.

The Rights & Responsibilities of a Riverside Owner

The owner of property adjacent to a watercourse is usually deemed to be the riparian owner and, as such, has both riparian rights and responsibilities with regard to the watercourse within their ownership.

The responsibility for general maintenance and repair of the watercourse and its banks rests with the riparian owner. For more information on Rights and Responsibilities of a riverside owner, you can visit our website at: www.environment-agency.gov.uk and click on 'Flood', 'How can I be prepared?', 'Guidance for riverside property owners' and download the 'Living on the Edge' booklet.

Alternatively type the following address into your web browser:

<http://www.environment-agency.gov.uk/homeandleisure/floods/31626.aspx>

Flood Zones

Under Planning Policy Statement 25 Development and Flood Risk (PPS25) land is divided into three zones with regard to flood risk.

Zone 1, little or no risk, this is land outside the 1 in 1000 year flood plain, land deemed to be safe from flooding in the event of a flood with a 0.1% probability of occurring in any one year.

Zone 2, medium risk; land between the 1 in 1000 and 1 in 100 year fluvial (1 in 200 year tidal) flood plain. Between 0.1% and 1.0% (0.5%) probability of occurring in any one year.

Zone 3, high risk, land within the 1 in 100 year fluvial (1 in 200 year tidal) flood plain, at risk in the event of a flood with a 1.0% (0.5%) probability of occurring in any in year.

These zones do not take account of any flood defences that may exist as these could be overtopped or breached by a more severe flood event than designed for or maintained against.

Site Assessment;

From the supplied plan the site lies within flood zones 1, 2 & 3 on the Environment Agency Flood Map. The attached map confirms this.

Surface Water

There should be no increase in surface water runoff from the new development. PPS25 recognises that the management of flood risk is not simply restricted to flood plains and that a catchment-wide approach should be employed.

If the existing site is shown to drain to a watercourse, then surface water runoff should be attenuated to provide a 30% reduction in the final surface water discharge from the site when compared with the existing site outflow prior to redevelopment. However, if the site does not drain to a watercourse or public sewer at present, then flows must be attenuated to a maximum of 5 l/s/ha, equivalent to the Greenfield runoff rate.

Where surface water runoff drains to a public sewer, further advice on acceptable discharge rates should be sought from the Local water Authority.

Any balancing facility should be designed to accommodate a 1 in 30 year flow from the site below ground and a 1 in 100 year flow retained within the site (including an allowance for climate change), without causing any flooding to buildings.

There are alternatives to conventional storage for the control of surface water run-off that are favoured by the Environment Agency where ground conditions are suitable. Sustainable Urban Drainage techniques (SUDs) tackle surface water run-off problems at source using features such as soakaways, permeable pavements, grassed swales, infiltration trenches, ponds and wetlands to attenuate flood peak flows, produce water quality improvements and environmental enhancements. The Environment Agency seeks to promote the use of SUDs techniques to this site and expects the developer of the site to submit detailed investigations such that the use of SUD's has been fully explored.

More information on SUDs can be found at: <http://www.ciria.org.uk/suds/>

For information on Green Roofs in particular, please visit:
www.thegreenroofcentre.co.uk

Further Questions

We would prefer a clear span bridge rather than any pier in the channel with the deck soffit at 1 in 100 + climate change with a minimum 600mm freeboard. You would need to take into account erosion/scour protection.

If you wish to discuss the site with the engineer dealing with the Barnsley area Lesley Slaney can be contacted on (0113) 213 4779.

Watercourses

- *Details of any watercourses / culverted watercourses in the vicinity and who is responsible for their maintenance;*
- *Minimum set back distances from any watercourse and governing statute / byelaw.*

The watercourse in the vicinity of the site is on the outer perimeter known as the River Dearne. Classified as 'main river' therefore the Water Resources Act 1991, and the Yorkshire Land Drainage Byelaws 1980 will both apply. Briefly, these state that there shall be no development (including tipping, fencing, etc.) within 8 metres of the top of the bank, or the landward toe of a flood defence structure, without the prior written consent of the Agency. If such development is proposed, then an application with full details must be submitted for consent.

The owner of property adjacent to a watercourse is usually deemed to be the riparian owner and, as such, has both riparian rights and responsibilities with regard to the watercourse within their ownership. The responsibility for general maintenance and repair of the watercourse and its banks rests with the riparian owner.

For more information on Rights and Responsibilities of a riverside owner, you can visit our website at: www.environment-agency.gov.uk and follow the links to 'Flood' then 'Living on the Edge'.

I have attached a link to flood risk standing advice which may be of some help to you to look at for advice on what to do when submitting a planning application and for guidance <http://www.environment-agency.gov.uk/research/planning/82587.aspx>.

Hydraulic Modelling

- *Whether or not any hydraulic modelling would be required to accompany a PPS 25 FRA and if so, provide some guidance on the level of modelling required (e.g. 1D or 2D);*
- *Does modelling or any other evidence indicate that flood waters can come out of bank upstream / downstream from the site and flood the site by overland flow?*
- *Whether or not hydraulic modelling will be updated in the near future.*

Modelling

Due to this site being located in close proximity to the join between 2 different mapping studies (the 2010 Dearne study and the 2004 Don study which includes the lower Dearne) we have included both sets of data. Both of these studies area modelled without defences.

Flood Modelling - River Don

The River Don Catchment Flood Model was completed by Jeremy Benn Associates in May 2004. See enclosed the ISIS Hydraulic Model Summary Sheets showing modelled water levels and flows for 5 different annual probabilities and additional results for the 0.5% annual probabilities.

2010 River Dearne Flood Risk Mapping

The River Dearne Flood Risk Mapping Study was completed by Halcrow in May 2010. Please see attached table showing water levels and flows for 8 different annual probabilities as well as a location map of model nodes.

Climate Change

See attached appendix B, from the department for Communities and Local Government's PPS 25 (Planning Policy Statement), for Development and Flood Risk.

Flood Defences / Other Structures

- *Details of any flood defences in the area including standard of protection, condition, type and who is responsible for maintenance;*
- *Details of any proposals for any future flood alleviation scheme that could affect the site and if so, provide details and timescales;*
- *Details of any other man-made structures / sources of flood risk that could affect the site.*

Assets

There are no formal flood defences or structures in this area that contribute towards reducing flood risk.

LIDAR Data

Light Detection and Ranging (LIDAR) is an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground. This technique results in the production of an accurate, cost-effective terrain model suitable for assessing flood risk and other environmental applications.

The Environment Agency owns two LIDAR systems, which are installed in a survey aircraft along with its other operational remote sensing instruments.

The aircraft is positioned and navigated using Global Positioning System (GPS) corrected to known ground reference points. The aircraft typically flies at a height of about 800 metres above ground level and a scanning mirror allows a swath width of about 600 metres to be surveyed during a flight.

To get a license for the data you will need to contact our Science Group, stating the area you are interested in (preferably an OS Grid Reference, or a map with the area outlined). There may be a charge for this data.

Low resolution Data is returned as an ASCII grid, which can easily be converted to a surface model for use in most GIS applications, and is provided in 2km x 2km tiles, at a resolution of 2m.

High resolution Data is also returned as an ASCII grid, in 0.5km x 0.5km tiles, at a resolution between 0.125 and 0.5m.

For current catalogue of coverage see: <http://www.geomatics-group.co.uk/GeoCMS/order.aspx>

To obtain the data and license agreement, please contact:

Environment Agency Geomatics
Phoenix House
Lower Bristol Road
Bath BA2 9ES
Tel: 01225 487658
Fax: 01225 487643

Previous flooding records

- *Any previous flooding records and if so dates, source, depth, extent and any further detail.*

To the best of our knowledge there is no known flood history for this site. However, in close proximity to this location we do have some flood history available (see enclosed map).

Water causing flooding can come from different places, for example from rivers or the sea; surface water (i.e. rainwater flowing over or accumulating on the ground before it is able to enter rivers or the drainage system); overflowing or backing up of sewers or drainage systems which have been overwhelmed or from groundwater rising up from underground aquifers.

Currently the Environment Agency can only supply flood risk data relating to the risk of flooding from rivers or the sea. However you should be aware that in recent years, there has been an increase in flood damage caused by surface water flooding or drainage systems that have been overwhelmed. Local Authorities and/or Water Companies may be able to provide some knowledge on the risk of flooding from sources other than rivers and the sea and we are working with these organisations to improve knowledge and understanding of surface water flooding.

Groundwater

- *Details of any groundwater levels in the vicinity of the site;*
- *Whether or not the site lies within a Groundwater Source Protection Zone;*
- *Details of any groundwater flooding issues in the area.*

We have no information relating to groundwater levels or groundwater flooding for this area.

Details of the location of Source Protection Zones and areas of Groundwater Vulnerability are available on our website under the Groundwater section of our online interactive mapping tool 'What's in your backyard' available at the following address.

<http://www.environment-agency.gov.uk/homeandleisure/37793.aspx>

Information relating to how Groundwater Vulnerability and Source Protection Zones are determined is available at the following online addresses.

Source Protection Zones:

<http://www.environment-agency.gov.uk/homeandleisure/37833.aspx>

Groundwater Vulnerability:

<http://www.environment-agency.gov.uk/homeandleisure/117020.aspx>

Reservoir Flood Risk

- *Whether or not the site is located within an area susceptible to reservoir flooding, and provide a copy of the Reservoir Flood Map to confirm this.*

In respect to Reservoir flood risk, please refer to the "Risk of Flooding from Reservoirs" map on our website at the following location: <http://maps.environment-agency.gov.uk/wiyby/wiybyController?topic=reservoir&layerGroups=default&lang=en&ep=map&scale=3&x=531500&y=181500>

If you require any further assistance, please refer to the contacts available on the website.

Surface Water

- *Whether or not the site is located within an area susceptible to flooding from surface water and provide a copy of the Surface Water Flood Map;*
- *Details of any restrictions associated with the drainage of surface water from the site;*
- *Whether or not the site is located within a critical drainage area.*

Flood Map for Surface Water

Our new surface water flood map and provides a general indication of areas that may be at risk of surface water flooding. It takes broad account of underground drainage and typical storms which are likely to cause flooding, but these are only typical national figures and are not appropriate everywhere. The map indicates two depths of flooding: greater than 0.1m deep, and greater than 0.3m deep.

For more information about how surface water flood risk is managed in your area, please contact your local authority.

Mitigation

- Details of minimum finished floor levels and freeboard;
- Whether or not the site lies within an EA flood warning area;
- Whether or not there is any local guidance on emergency planning in terms of flooding, such as access and egress arrangements;
- Whether or not the EA would expect a flood plan to be developed and detail the level of information required within it;
- Whether or not compensatory flood storage would be required. If so, please can you confirm that the flood volume occupied by existing buildings on site (that are to be demolished) can be used to offset the flood volume occupied by the proposed buildings;
- Detail the level of flood resilient construction required.

Finished Flood Levels

Setting the ground floor level above site ground level will provide a measure of protection against any flooding. Where available we would recommend that flood levels be set 600mm above the 1 in 100 year event with an allowance for climate change made.

From our records the site does not lie in an EA flood warning area.

Policy

- *Details of any EA flood risk strategy / management documents that cover the site e.g. CFMP, RBMP, SMP, FRM Strategy;*
- *Whether there is a local EA policy in terms of climate change allowances;*

Details of our flood risk strategy/management documents that cover the site such as CFMP, RBMP, SMP, FRM Strategy are all available from our website. I have attached a link to our website www.environment-agency.gov.uk .

Sequential / Exceptions Test

- *Please can you confirm that the Sequential / Exceptions Test is not required?*

Guidance on when and how to apply the Sequential and Exception Test is set out in national planning policy statement PPS25: Development and Flood Risk and its accompanying Practice Guide. These documents may be downloaded from the Communities and Local Government website using the following link

<http://www.communities.gov.uk/planningandbuilding/planningsystem/planningpolicy/planningpolicystatements/> .

We would also advise you to discuss Sequential and Exception Test requirements with the relevant local planning authority.

This information is provided subject to the enclosed notice, which you should read.

If you have any queries or would like to discuss the content of this letter further please do not hesitate to contact us on the number below.

Yours sincerely



Cheryl Beech
External Relations Team
Direct Dial 0113 2134732
Email neyorkshire@environment-agency.gov.uk

Days of work - Mon to Thurs

Environment Agency
Phoenix House
Global Avenue
Leeds LS11 8PG

Part of the Environment Agency's Yorkshire and North East Region

Encs Detailed FRA/FCA Map on disk

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