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WSP

Old Mill Lane, Barnsley
Flood Risk Assessment
Peel Holdings Limited

June 2012

QM

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	Draft	Rev 1 - Draft		
Date	07/10//2011	20/06/12		
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Project number	11171504-IF1			
File reference	S:\OLD MILL LANE, BARNSLEY\TEXT\REPORTS\FRA\120620 REV1 OLD MILL LANE FRA.DOCX			

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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: 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-Dearne 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 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.

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 paring 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 m^2 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;