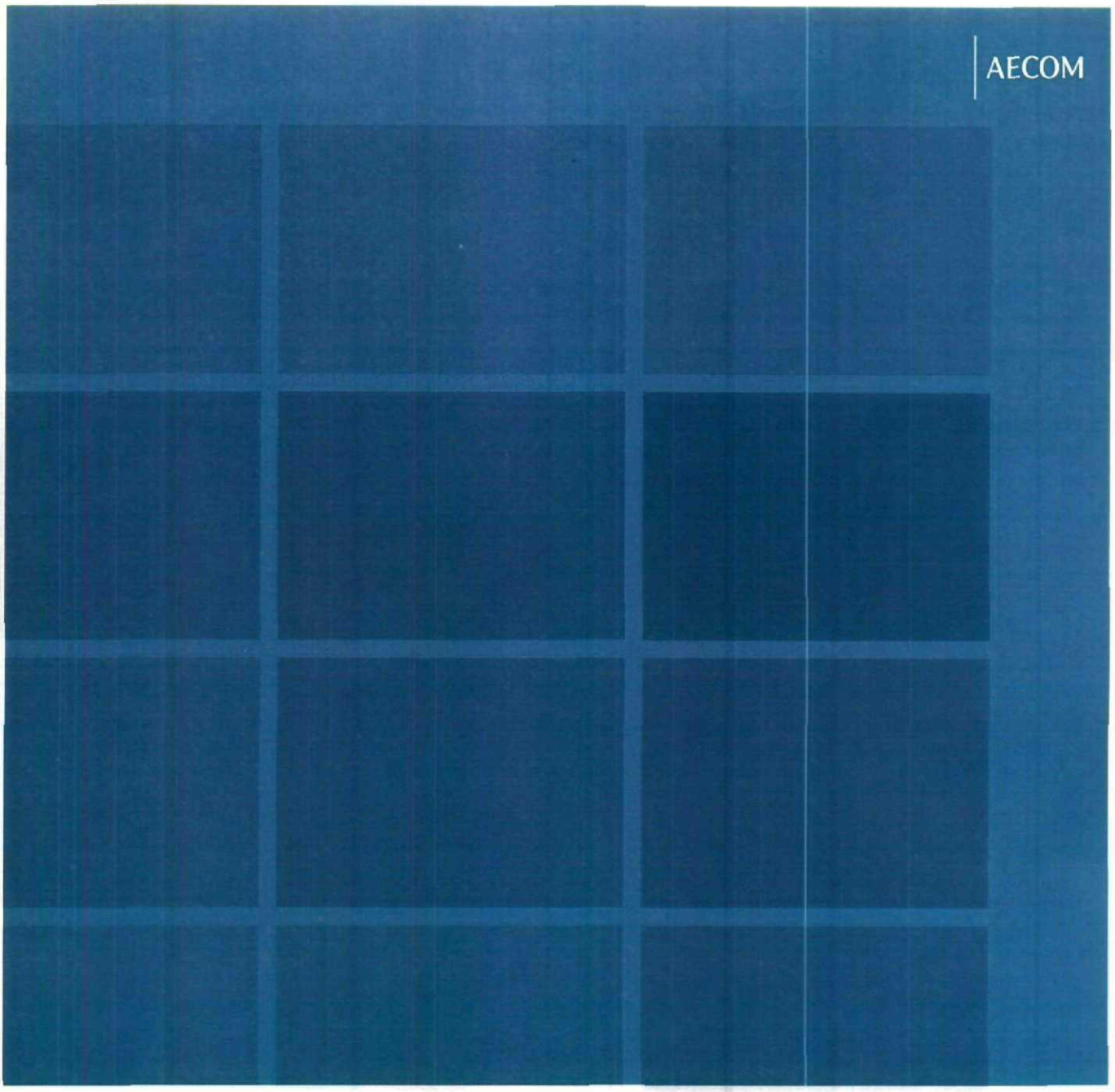


Lundwood
Flood Risk Assessment

The Co-operative Group
November 2009

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Rev No	Comments	Checked by	Approved by	Date
1	Final Report	AWC	GEK	10/11/2009
1	First Issue Report	AWC	GEK	06/11/2009

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Job No 60140636 Reference LWD_FRA Date Created October 2009

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Executive Summary

AECOM has prepared this Flood Risk Assessment for The Co-operative Group to support an outline planning application for a residential development. The proposed development site is located on Foxen Croft, in Lundwood Barnsley. A Flood Risk Assessment is required because the site is located in Flood Zone 1 and is over one hectare in area.

The site is approximately 3.5 ha in area and is currently greenfield land. The outline planning application is for residential development.

The site is considered to be an appropriate site for development within the planning context since it is located in Flood Zone 1. The Sequential Test should therefore be passed and the Exception Test is not required. All forms of development are appropriate within Flood Zone 1 based on Planning Policy Statement 25: Development and Flood Risk.

AECOM has considered all the potential sources of flooding to the site, including tidal (sea), fluvial (river), groundwater, land drainage, pluvial (surface water and overland flow), sewers, water mains and other artificial sources. Climate change has also been considered, which is expected to increase the peak rainfall intensity and peak river flow by up to 30% over the lifetime of the development.

AECOM has shown that all potential sources of flooding can be mitigated to an acceptable level of risk. We have also shown that safe disposal of foul and surface water from the site is possible and that these should be managed sustainably and appropriately.

The developer should determine the existing drainage regime at the detailed planning application stage and agree the proposed drainage arrangements in advance of construction with Barnsley Metropolitan Borough Council, the Dearne and Dove Internal Drainage Board and Yorkshire Water as appropriate. Wherever possible, the developer should use Sustainable Drainage Systems to manage surface water runoff.

At this stage, AECOM considers that the flood risk to and from the proposed development site can be mitigated to an acceptable level. It is therefore anticipated that outline planning permission can be granted, subject to a detailed planning application with appropriate conditions being applied to the redevelopment of the site.

AECOM

Introduction

1 Introduction

AECOM has been commissioned by The Co-operative Group to produce a Flood Risk Assessment (FRA) for an outline planning application. The outline planning application is for a residential development on Foxen Croft, in Lundwood, Barnsley. A Flood Risk Assessment is required because the site is located in Flood Zone 1 and is over one hectare in area.

This section of the report provides an introduction to the FRA, and also provides an introduction to latest planning guidance on development and flood risk in England.

1.1 Introduction to the Report

The site is approximately 3.5 ha in area and is located on Foxen Croft, in Lundwood Barnsley. Section 2 of this report provides further information on the site, and the location of the site is shown in Figures 1 and 2 in section 2.

In order to assess the flood risk to the site, consultation was undertaken. The parties involved in this consultation are listed below, and section 3 of this report details the information gathered through this consultation.

- Environment Agency
- Yorkshire Water
- Barnsley Metropolitan Borough Council

Section 4 of this report considers the proposed development plans for the site. The development proposals are considered in relation to the current planning guidance on development and flood risk, and what type of development is considered appropriate in different Flood Risk Zones.

Planning Policy Statement 25: Development and Flood Risk (Communities and Local Government, 2006) (PPS25) is the current guide on development and flood risk in England. An introduction to PPS25 is provided below (section 1.2).

Section 5 of this report considers potential drainage arrangements for the proposed development. The existing site information, the information gathered through the consultation process and the proposed development plans are all used to inform potential drainage arrangements.

Section 6 of this report assesses the flood risk to the site from all types of flooding. The assessment of flood risk is based on PPS25, and uses all the information gathered as part of the FRA.

Based on this assessment of flood risk, section 6 of this report considers the mitigation measures required to address the risk of flooding on site.

1.2 Introduction to PPS25

Planning Policy Statement 25: Development and Flood Risk (Communities and Local Government, 2006) (PPS25) is the current guide on development and flood risk. This is also supplemented by 'Development and Flood Risk: A Practice Guide (Communities and Local Government, 2008). Together, these documents guide planners on how to evaluate sites in respect of flood risk. A summary of the requirements of PPS25 is provided below.

1.2.1 Flood Risk

Flood risk takes account of both the probability and the consequences of flooding (i.e. Vulnerability of the development, etc.). Flood frequency is usually interpreted in terms of the return period e.g. 1 in 100 and 1 in 200 year event etc. In terms of probability, there is a 1 in 100 (1%) chance of one or more 1 in 100 year floods occurring in a given year. In flood risk terms this is frequently referred to as an Annual Exceedance Probability (AEP).

1.2.2 *Sources of Flooding*

PPS25 requires a FRA to consider all aspects of flooding, including *fluvial (river), tidal (sea),* groundwater, sewers, surface water and overland flow (pluvial), land drainage, and artificial sources (i.e. reservoirs, canals, water mains etc.). PPS25 requires this assessment of flood risk to consider the impact on both the proposed development and off site parties and land.

1.2.3 *Flood Zones*

There are four classifications for flood zones, as defined in PPS25:

- Zone 1
  - Low probability (less than 1 in 1,000 annual probability of river or sea flooding in any year).
- Zone 2
  - Medium probability (between 1 in 100 and 1 in 1,000 annual probability of river flooding or between 1 in 200 and 1 in 1,000 annual probability of sea flooding in any year).
- Zone 3a
  - High probability (1 in 100 or greater annual probability of river flooding in any year or 1 in 200 or greater annual probability of sea flooding in any given year).
- Zone 3b
  - High probability (1 in 20 or greater annual *probability of flooding* in any given year). This is also classified as functional floodplain.

1.2.4 *Vulnerability*

PPS25 classifies the vulnerability of developments to flooding into five categories. These categories are:

- Essential Infrastructure (e.g. transport routes, electricity generating power stations);
- Highly Vulnerable (e.g. emergency services, mobile home parks);
- More Vulnerable (e.g. residential and educational establishments, hospitals);
- Less Vulnerable (e.g. commercial buildings and offices); and
- Water Compatible Development (e.g. docks, marinas, water transmission infrastructure).

Based on the vulnerability of a development, PPS25 states what Flood Zone(s) the development is appropriate within. The flood risk vulnerability and Flood Zone 'compatibility' of developments is summarised in Table 1 below.

Table 1: Flood Risk Vulnerability and Flood Zone Compatibility (Extract from PPS25, Table D.3)

Flood Risk Vulnerability Classification		**Essential Infrastructure**	**Water Compatible**	**Highly Vulnerable**	***More* Vulnerable**	**Less Vulnerable**
Flood Zone	**1**	✓	✓	✓	✓	✓
	2	✓	✓	Exception Test required	✓	✓
	3a	Exception Test required	✓	×	Exception Test required	✓
	3b	Exception Test required	✓	×	×	×

Residential development for example, is classified as 'More Vulnerable'. According to Table 1, residential development can be located in Flood Zone 1 and 2. The Exception Test is required for residential development to be located in Flood Zone 3a, and residential development cannot be located in Flood Zone 3b.

1.2.5 *The Sequential Test, Exception Test and Sequential Approach*

The Sequential Test is a risk-based test that should be applied at all stages of development and aims to steer new development to areas with the lowest probability of flooding (Zone 1). This is applied by the Local Planning Authority by means of a Strategic Flood Risk Assessment (SFRA).

The SFRA and PPS25 may require the Exception Test to be applied to certain forms of new development. The test considers the vulnerability of the new development to flood risk and, to be passed, must demonstrate that:

- There are sustainability benefits that outweigh the flood risk;
- It is on previously developed land or there are no other suitable previously developed sites in lower flood risk zones; and
- The new development is safe and does not increase flood risk elsewhere.

The Sequential Approach is also a risk based approach to development. In a development site located in several flood zones or with other flood risks, the sequential approach directs the most vulnerable types of development towards the areas of least risk within the site.

1.2.6 *Climate Change*

PPS25 makes it a planning requirement to account for climate change in the proposed design. The recommended allowances are summarised in Table 2.

Table 2: Climate Change Allowances (Extract from PPS25, Table B.2)

Parameter / Horizon	1990 to 2025	2025 to 2055	2055 to 2085	2085 to 2115
Peak rainfall intensity	+5%	+10%	+20%	+30%
Peak river flow	+10%	+20%		
Offshore wind speed	+5%		+10%	
Extreme wave height	+5%		+10%	

1.2.7 *Sustainable Drainage*

The key planning objectives in PPS25 are to appraise, manage and where possible, reduce flood risk. Sustainable Drainage Systems (SuDS) provide an effective way of achieving some of these objective, and PPS25 and Part H of the Building Regulations (DTLR, 2002) directs developers towards the use of SuDS wherever possible.

PPS25 and Part H of the Building Regulations states a hierarchy of where surface water should be discharged. This should be followed were practicable, and is listed below:

1) *Infiltration*

2) Watercourses

3) Public Sewers

1.2.8 *FRA Pro-Forma*

The FRA pro-forma, from the Practice Guide to PPS25 is contained in Appendix 1.

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Existing Site

2 Existing Site

During the course of the assessment, a site visit was undertaken and the existing site was inspected. This section reviews the existing site.

2.1 Site Description

2.1.1 *Site Visit*

AECOM undertook a site visit on the 28th October 2009. The site is detailed in Figures 1 and 2 (on page 13) and photographs to support the description below are contained in Appendix 2.

2.1.2 *Existing Site*

The site is approximately 3.5 ha in area and is currently greenfield land. The main entrance to site is located on Foxen Croft, which is located to the south of the site.

Residential housing forms the southern boundary of the site. An unnamed drain forms the northern and western boundary of the site. A second unnamed drain also forms part of the eastern boundary of the site. A warehouse site makes up the remainder of the site's eastern boundary.

2.1.3 *Topography*

A topographical survey of the site has not been undertaken at this stage. Based on Ordnance Survey information the site is located at approximately 50mAOD.

Based on the site visit, the topography of the site generally falls towards the north eastern corner. Within the site, the site also falls from the eastern and western boundaries towards the centre line running through the site.

2.1.4 *Geology*

The British Geological Survey (BGS) solid geological map indicates that the bedrock underlying the site comprises of the Middle Coal Measures, which consists of mudstone, siltstone and sandstone interbedded with coal seams.

The drift geological map indicates that the site is located on the border of an area where there are no superficial deposits, and the border of area where there are Boulder Clay superficial deposits.

2.1.5 *Flood Zones*

Based on the Environment Agency's Flood Map the site lies within Flood Zone 1 (Figure 3).

2.1.6 *Local Watercourses*

There are a number of unnamed drains located within close proximity of the site, and unnamed drains form the western, northern and eastern boundaries of the site.

The northern boundary drain flows in to the eastern boundary drain approximately 50m to the north of the site. The eastern boundary drain flows towards, and eventually into Small Bridge Dike, via a network of unnamed drains. Small Bridge Dike flows into the River Dearne.

Small Bridge Dike is located 500m to the east of the site, and the River Dearne is located approximately 1.2km to the south of the site.

The unnamed drains, Small Bridge Dike and the River Dearne are not tidally influenced.

2.1.7 *Flood Defences*

Based on the Environment Agency's Flood Map (Figure 3) there are no formal Environment Agency defences protecting the site or located within close vicinity of the site.

2.1.8 *Local Artificial Waterbodies*

There are a number of small ponds (unnamed on the Ordnance Survey map) located approximately 1km to the north of the site. There are no other artificial waterbodies located within close proximity of the site.

2.1.9 *Sewers*

A 750mm combined public sewer runs through the site. To the south of a site, 150mm combined public sewers run along Wilson Grove, Harold Avenue and Priory Place. Surface water sewers also run along Harold Avenue and Priory Place, and two section 104 sewers run along Foxen Croft.

The location of all the public sewers in the vicinity of the site are shown on the asset plan contained in Appendix 2.

2.1.10 *Water Mains*

There are no public water mains on site. Public water mains up to 4inches in diameter run along Foxen Croft, Wilson Grove, Priory Place and Harold Avenue to the south of site. A public water main up to 4inches in diameter, and several public water mains over 4inches in diameter run along Pontefract Road to the east of the site.

The location of all the public water mains in the vicinity of the site is shown on the asset plan contained in Appendix 2.

Figure 1: General Location Plan

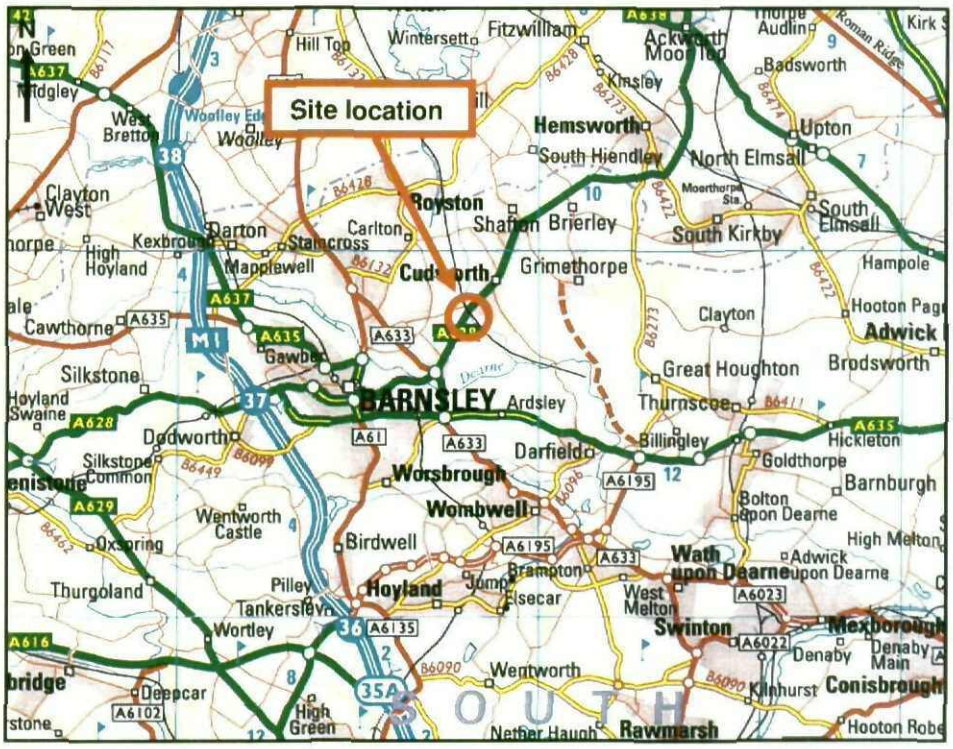
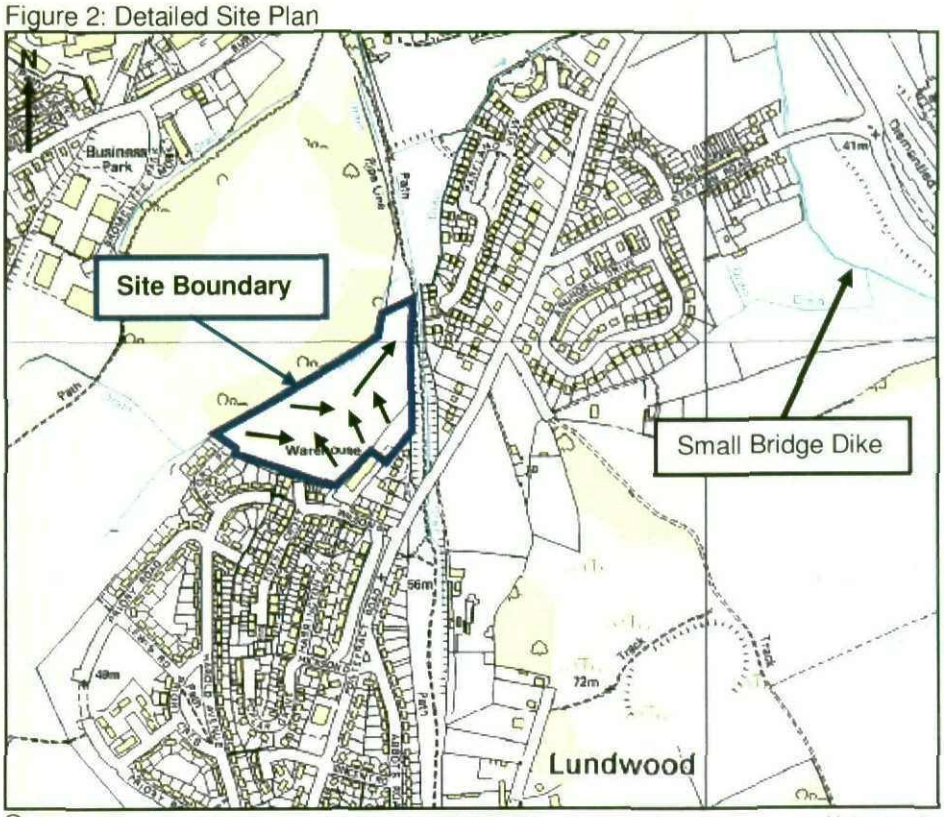
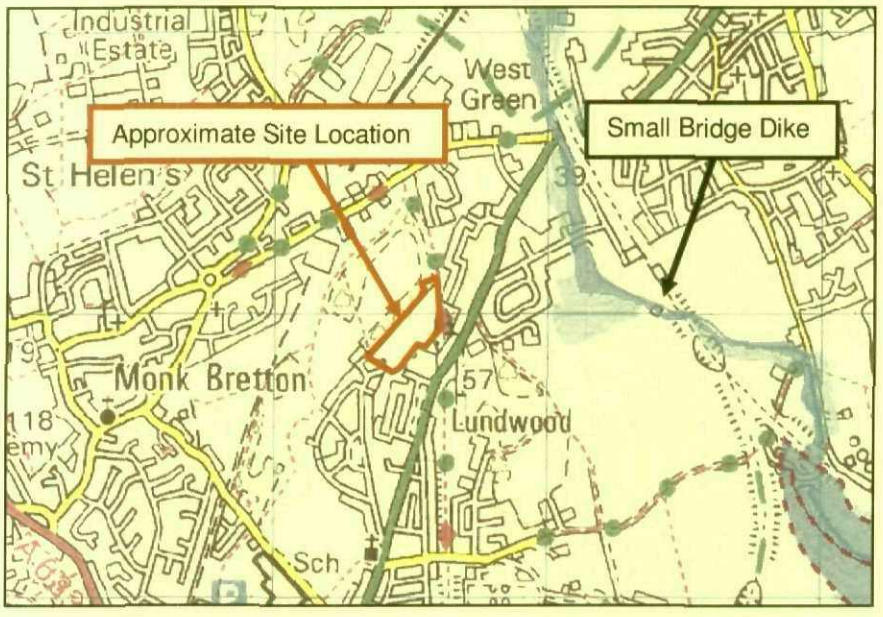


Figure 2: Detailed Site Plan



© Crown Copyright: ProMap, Licence number: 100020449 Not to scale

Figure 3: Environment Agency Flood Map (October 2009)



(Source: www.environment–agency.gov.uk)

Key to Flood Zone Map	
	Flood Zone 1
	Flood Zone 2
	Flood Zone 3
	Flood defences

AECOM

Consultation

3 Consultation

During the course of the assessment, the Environment Agency, Barnsley Metropolitan Borough Council and Yorkshire Water were consulted. The information gathered from these parties to support the FRA is documented within this section.

3.1 Environment Agency

AECOM consulted the Environment Agency to discuss their requirements and to request detailed flood risk information.

The information provided by the Environment Agency is provided in Appendix 3 for information, and is summarised below:

3.1.1 *Flood Zones*
According to the information gathered from the Environment Agency's website the site lies within Flood Zone 1 (Figure 3). The Environment Agency confirmed this in writing.

3.1.2 *Sources of Flooding*
The site may be subject to flooding from a number of different sources (small or culverted watercourses, public sewers, highway drains, overland surface water flow). The Environment Agency recommended contacting the Local Authority Main Drainage Department, as they may have more detailed information.

3.1.3 *Flood Risk Assessment Requirements*
A FRA must be submitted with a planning application on any proposed development over 1ha, to assess the existing and proposed surface water drainage from the site.

3.1.4 *Surface Water Drainage*
There should be no increase in surface water runoff from the new development.

If the existing site is designated as brownfield, we would expect surface water runoff from the re-developed site to be reduced by a minimum of 30% from the existing runoff rate. If the site is greenfield, surface water runoff from the developed site should be restricted to the 1 in 100 year greenfield run-off rate which is considered to be 5 l/sec/ha.

The Environment Agency would seek to promote the use of SuDS techniques to the site when it is developed and would expect any potential developer of the site to submit detailed information indicating that the use of SuDS has been fully explored.

3.2 Barnsley Metropolitan Borough Council

Barnsley Metropolitan Borough Council were contacted to discuss their requirements and to request local flood risk and drainage information.

The information provided by the Council is provided in Appendix 3 for information, and is summarised below:

3.2.1 *Strategic Flood Risk Assessment*
Barnsley Metropolitan Borough Council is currently completing an SFRA. At the time of writing, the SFRA is at the draft stage.

3.2.2 *Historic Flooding*
The Council has no record of any flooding events on site.

The housing estate to the south of the site has suffered from waterlogged ground and groundwater issuing at the surface. This is assumed to be a combination of a high water table and areas of heavy clay substrata which prevents water from permeating back into the ground. It is recommended that this condition is confirmed for this site by using a series of boreholes and permeability tests to allow a judgement be made of the extent of the problem.

3.2.3 *Watercourses*

There are a number of drainage ditches directly adjacent to the site [referred to as unnamed drains in section 2]. These are specifically to drain the reclaimed colliery tip and disused railway line bounding your site and are not regarded as "natural" watercourses. The only natural watercourse which could be used to dispose of attenuated flows is located some 300 metres to the north of your site, starting at the eastern boundary of the disused railway line.

3.2.4 *Surface Water Drainage*

3.2.4.1 Greenfield Sites

Surface water discharge is limited to the equivalent greenfield runoff rate, which is normally set at a rate of 5 litres per second per hectare. However, this figure may be reduced where known drainage problems are present in a receiving watercourse.

3.2.4.2 Brownfield Sites

The allowable peak flow discharge will be a reduction of at least 30% from the "existing" outflows. This policy may be subject to future change in particular catchments in line with any surface water management plans or if differing criteria are agreed following consultation with the EA.

3.2.4.3 Storage Requirements

All drainage, including sustainable systems, (CIRIA C 609 p.80) must meet Sewers for Adoption Edition 6 standards.

3.3 Yorkshire Water

Yorkshire Water were consulted to obtain asset plans for the site and immediate surrounding area.

The asset plans provided by Yorkshire Water are provided in Appendix 2 for information, and what these plans show was summarised in section 2 (2.1.8 and 2.1.9).

3.4 Dearne and Dove Internal Drainage Board

The site is not located within an Internal Drainage Board District. However, the Dearne and Dove Internal Drainage Board, which is part of the Shire Group of Internal Drainage Boards, covers Small Bridge Dike and the River Dearne.

The Dearne and Dove Internal Drainage Board have not been contacted at this stage. It is recommended that the Dearne and Dove Internal Drainage Board are contacted at the detailed planning application stage, if the proposed surface water drainage arrangements will affect the watercourses within their district. The Dearne and Dove Internal Drainage Board may have surface water discharge requirements.

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Development Description

4 Development Description

During the course of the assessment, the development proposals for the site were considered in relation to the current flood risk planning guidance (PPS25). This section details the site proposals in relation to PPS25.

4.1 Proposed Development

The outline planning application is for residential development.

4.2 Lifetime of the Development

PPS25 provides guidance on the lifetime of developments. This guidance states that residential developments should be designed for a 100 year lifetime, and that educational, retail and commercial developments should be designed for a 60 year lifetime.

The lifetime of the residential development will therefore be taken as 100 years.

4.3 Flood Risk Vulnerability and Flood Zone Compatibility of the Development

The vulnerability classifications of developments to flooding, as defined by PPS25 were outlined *in section 1. Residential development is classified as more 'More Vulnerable'*.

Based on PPS25 guidance (Table 2), 'More Vulnerable' residential development can be located in Flood Zone 1 and 2. The Exception Test is required for residential development to be located in Flood Zone 3a, and residential development cannot be located in Flood Zone 3b.

Since the site is located entirely within Flood Zone 1, the proposed residential development has been located in an appropriate flood zone.

4.4 The Sequential and Exception Test

The Sequential Test, as outlined in section 1, is a risk-based test that should be applied at all stages of development, which aims to steer new development to areas at the lowest probability of flooding (Zone 1).

Since the site is located entirely within Flood Zone 1, the Sequential Test should be passed for the site. The Exception Test is not required.

4.5 The Sequential Approach

The Sequential Approach was detailed in section 1, and directs the most vulnerable types of development towards the areas of least risk within a site. Since the site is located entirely within Flood Zone 1, the Sequential Approach is not required for this site.

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Drainage Assessment

5 Drainage Assessment

This drainage assessment seeks to demonstrate that the proposed redevelopment is able to discharge foul and surface water flows without increasing the flood risk both on and off site. The strategy should be confirmed by the developer at the detailed design stage and prior to construction. This assessment considers the following:

- Proposed redevelopment and discharge arrangements;
- Climate change; and
- The mitigation measures needed for surface water disposal.

5.1 Foul Water Drainage

The site is currently greenfield land, and there is no foul water discharge from the site. The outline planning application is for residential housing, and developing the site for residential use will generate foul flow from the site.

At the detailed application stage, once plans of the proposed development have been designed, an approximate peak foul flow from the proposed residential development should be calculated. For residential, a peak flow of 4000 litres/dwelling/day should be used in accordance with the standard guidance given in Sewers for Adoption (6th Edition).

A 750mm combined public sewer that runs through the site. Foul flows from the proposed development could potentially discharge this to combined public sewer. Foul water disposal and new connections to the public sewer system will require consent from Yorkshire Water. Yorkshire Water's permission should be sought prior to development.

As the invert levels of the existing public sewer systems are currently unknown, it may be necessary to install a pumping station to discharge the proposed flows. In the event of pump failure, a pumping station could pose a flood risk. This is considered in section 6.

5.2 Surface Water Drainage

5.2.1 *Existing Drainage Arrangements*

The site is currently greenfield land, and drains via a network of unnamed drains. There are no formal surface water drainage arrangements on site.

5.2.2 *Methods of Surface Water Management*

As outlined in section 1, PPS25 and Part H of the Building Regulations state a hierarchy of where surface water should discharge to. This hierarchy should be followed were practicable, and is listed below:

1) Infiltration
2) Watercourses
3) Public Sewers

At the detailed design stage it should be determined whether it is possible to discharge surface water via infiltration. However, given that the site is underlain by Middle Coal Measures consisting of mudstone, siltstone and sandstone interbedded with coal seams, infiltration may not be possible on site. The housing estate to the south of the site has also suffered from waterlogged ground and groundwater issuing at the surface.

There are a number of drains located within close vicinity of the site. The drainage ditches directly adjacent to the site drain the reclaimed colliery tip and disused railway line. Barnsley Metropolitan Borough Council stated these drains could not be used for surface water disposal. The Council stated that the closest watercourse, which could potentially be used for surface water disposal is located approximately 300 metres to the north of the site.

It is unclear how surface water from the proposed development could be discharged to the recommended watercourse, without using the existing network of drainage ditches. It is

therefore recommended that possibility of discharging surface water to watercourses in the area is discussed further with Barnsley Metropolitan Borough Council at the detailed planning application stage. The Dearne and Dove Internal Drainage Board should also be consulted at this stage.

If it is ascertained that it is not possible to discharge surface water via infiltration or to a watercourse, then surface water should be discharged to the public sewer system. Yorkshire Water's permission would be required for this and should be sought prior to development.

5.2.3 *Sustainable Drainage Systems (SuDS)*

As outlined in section 1, PPS25 and Part H of the Building Regulations direct developers towards the use of SuDS wherever possible. The Environment Agency also encourages the use of SuDS.

In order to protect the receiving aquifer, watercourse or sewer from pollution, Ciria Report C522 (Sustainable Urban Drainage Systems – Design Manual for England and Wales, 2000) suggests an approach for setting the level of treatment that surface water runoff will pass through before being discharged. The Ciria Report suggests that one level of treatment is provided for residential developments, two levels of treatment are provided for non-residential developments and three levels of treatment are provided for industrial developments. These levels of treatment could be provided in the form of one (or more) of the following:

- Permeable surfaces;
- Filter strips;
- Filter drains;
- Pavement sub-base;
- Swales;
- Retention basins;
- Detention basins.

These systems must be maintained correctly to ensure their safe operation and that flood risk to the site or off site is not increased.

Table 4 on the following page outlines the type of SuDS that could be used on site.

Table 3: Capability of different SuDS techniques (Extract from CIRIA C697, Table 1.7)

Technique	Description	Management Train Suitability						Water Quantity				Water Quality								Environmental Benefits		
		Prevention	Conveyance	Pre-treatment	Source control	Site Control	Regional Control	Conveyance	Detention	Infiltration	Water Harvesting	Sedimentation	Filtration	Adsorption	Biodegradation	Volatilisation	Precipitation	Uptake by plants	Nitrification	Aesthetics	Amenity	Ecology
Water butts, site layout and management	Good housekeeping and design practices.	■	▲		■			▲	▲	■	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Pervious pavement	Allow infiltration of rainwater into underlying construction/soil.	■			■	▲			■	■	▲	■	■	■	■	■				▲	▲	▲
Filter drain	Linear drains/ trenches filled with a permeable, often with a perforated pipe at the base of the trench.		■		■	▲		■	■				■	■	■	■						
Filter strips	Vegetated strips of gently sloping ground designed to drain water from impermeable areas and filter out silt and other particulates.			■	■			▲	▲	▲		■	■	■	■					▲	▲	▲
Swales	Shallow vegetated channels that conduct and/or retain water (and can permit infiltration when underlined). The vegetation filters particulates.		■		■	■		■	■	▲		■	■	■	■			▲		▲	▲	▲
Ponds	Depressions used for storing and treating water. They have a permanent pool and bankside emergent and aquatic vegetation.					■	■		■	▲	■	■	■	■	■	■	■	■	■	■	■	■
Wetlands	As ponds, but the runoff flows slowly but continuously through aquatic vegetation that attenuates and filters the flow. Shallower than ponds.		▲			■	■	▲	■	▲	■	■	■	■	■	■	■	■	■	■	■	■
Detention Basin	Dry depressions designed to store water for a specified retention time.					■	■		■			■	▲	▲	■			▲		▲	▲	▲
Soakaways	Sub-surface structures that store and dispose of water via infiltration.				■					■			■	■	■							
Infiltration Trenches	As filter drains, but allowing infiltration through trench base and sides.		▲		■	■		▲	■	■			■	■	■	■						
Infiltration basins	Depressions that store and dispose of water via infiltration.					■	■		■	■			■	■	■	■				▲	▲	▲
Green roofs	Vegetated roofs that reduce runoff volume and rate.	■		■	■				■				■	■	■	■	■	■	■	■	■	■
Bioretention areas	Vegetated areas for collecting and treating water before discharge downstream, or to the ground via infiltration.				■	■			■	■		■	■	■	■	■	■	■	■	■	■	■
Sand filters	Treatment devices using sand beds as filter media.			■		■	▲		■	▲			■	■	■	■	■					
Silt removal devices	Manhole and/or proprietary devices to remove silt.			■								■										
Pipes, subsurface storage	Conduits and their accessories as conveyance measures and/or storage. Water quality can be targeted using sedimentation and filter media.		■			■		■	■			▲	▲	▲								

Key	
■	Recommended
▲	Some opportunities, subject to design

5.2.4 *Proposed Drainage Arrangements*

Since the development proposals for the site are still at the outline planning stage, it is not possible to consider surface water drainage arrangements for the proposed development in detail. However, surface water drainage arrangements can still be considered.

5.2.4.1 Impermeable Areas

The development of the site will change the proportion of impermeable and permeable areas on site. At this stage it is not known how the proposed development will exactly affect proportion of impermeable and permeable areas. However, given that the existing site is greenfield land, constructing new residential housing will increase the proportion of impermeable areas on site.

5.2.4.2 Climate Change

PPS25 requires climate change to be taken into account. According to PPS25 (Table 2), rainfall intensity is estimated to increase by 20% until 2085 to allow for climate change. Beyond this it is expected there will be up to 30% increase in rainfall intensity.

In accordance with PPS25, and the expected lifetime of the proposed residential development (100 years), the residential development must be designed to account for 30% increase in rainfall intensity, over its lifetime.

5.2.4.3 Barnsley Metropolitan Borough Council and Environment Agency Requirements

Barnsley Metropolitan Borough Council and the Environment Agency both require surface water runoff to be limited to the 1 in 100 year greenfield run-off rate on a greenfield site. The 1 in 100 year greenfield run-off rate is considered to be 5 l/sec/ha.

5.2.4.4 Attenuation Storage

In order to meet Barnsley Metropolitan Borough Council's, and the Environment Agency's requirements, attenuation storage is likely to be required on site.

Attenuation storage could be in the form of a detention basin, retention basin, geo-cellular storage modules, a formal concrete tank or other appropriate SuDS systems.

As prescribed within Building Regulations and PPS25, surface water should be stored within the drainage system either below ground or in formal above ground systems for the 1 in 30 year storm event with an allowance for climate change. In excess of this up to the 1 in 100 year plus climate change event, ponding is tolerated above ground on the site. This ponding would need to be controlled in areas such as formal landscaping or car park areas.

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Flood Risk Assessment

6 Flood Risk Assessment

In accordance with PPS25, flood risk must be assessed for all sources of flooding and redevelopment of the site should be carried out in such a way as to mitigate any potential flood risk to both the site and third parties and their property. This section identifies all possible sources of flooding and assesses the flood risk associated with each source of flooding.

6.1 Flood Risk Assessment

Flood risk from the following sources has been considered:

6.1.1 *Tidal Flooding (Sea)*

The site is located over 60km from the sea (Humber Estuary and North Sea), at a height of approximately 50mAOD. The unnamed drains, Small Bridge Dike and the River Dearne are not tidally influenced as they flow past the site.

The flood risk to the site from sea flooding is therefore considered to be negligible.

6.1.2 *Fluvial Flooding (Rivers)*

The Environment Agency's Flood Map shows the site is located within Flood Zone 1 (Figure 3). The probability of fluvial flooding occurring on site is therefore less than 0.1% per year, and is considered low.

The risk of fluvial flooding on site is therefore considered to be low and acceptable.

6.1.3 *Groundwater Flooding*

Based on the British Geological Survey Groundwater Flood Susceptibility Map (Appendix 2), the susceptibility of groundwater flooding on site is negligible.

However, Barnsley Metropolitan Borough Council informed AECOM that the housing estate to the south of the site has suffered from waterlogged ground and groundwater issuing at the surface. The Council recommended drilling a series of boreholes and undertaking permeability tests to assess the probability of groundwater flooding on site.

The colliery tip could also have a water pumping system in place, which pumps water out from the old mine. If this pumping regime was altered, the probability of groundwater flooding occurring could potentially change.

The risk of groundwater flooding therefore needs further investigation.

6.1.4 *Pluvial Flooding (Overland Flow)*

The probability of pluvial flooding is based on the RMS Flood Maps (Appendix 2) and the site visit undertaken. Based on the RMS Flood Maps, part of the site is potentially at risk from pluvial flooding during a 1 in 75 year rainfall event. Developing the site for residential use will change pluvial flow routing through the site, and could potentially increase the probability of pluvial flooding.

The risk of pluvial flooding on site is therefore considered to be moderate and unacceptable without mitigation.

6.1.5 *Land Drainage*

There is a network of drains located within close proximity of the site, and unnamed drains form the western, northern and eastern boundaries of the site. The drainage ditches adjacent to the site are approximately 0.5m metres deep, and drain the reclaimed colliery tip and disused railway line.

During the site visit, no water was observed in the drainage ditches adjacent to the site. Significant amounts of debris and vegetation was observed within several of the drainage ditches.

During periods of severe rainfall the site could potentially flood from these drainage ditches, as a result of their capacity being exceeded or blockages within the drains.

The risk of flooding on site from land drainage is therefore considered to be moderate and unacceptable without mitigation.

6.1.6 *Flooding from Sewers and Water Mains*

Yorkshire Water were only consulted to obtain asset plans at this stage, and not information on flooding from their assets. A pre-development enquiry should be submitted to Yorkshire Water at the detailed planning application stage, to obtain flood risk information and determine Yorkshire Water's foul and surface water drainage requirements.

It is particularly important to obtain information on the combined public sewer that runs through the site. This sewer runs along the surface of the site, and problems with this asset could cause flooding and pollution on site. An easement will also need to be provided around the combined public sewer, in order to allow maintenance access.

The risk of the site flooding from sewers or water mains is therefore unknown at this stage, and needs further investigation.

6.1.7 *Flooding from Other Artificial Sources*

There are no other artificial sources of water (i.e canals, lakes or ponds and excluding sewers and water mains) located within 1km of the site. The small ponds (unnamed on the Ordnance Survey map) located approximately 1km to the north of the site are located at a lower elevation than the site (approximately 40mAOD compared to the site at approximately 50mAOD).

The risk of flooding on site from other artificial sources is therefore considered to be low and acceptable.

6.1.8 *Flooding from Proposed Drainage Arrangements*

6.1.8.1 Foul Water Drainage

Waste water from the development should be discharged to public sewers (subject to agreement with Yorkshire Water).

Foul sewers for the residential development should be designed to Building Regulations Part H. Assuming that the sewers will be designed and constructed to these standards, the risk of flooding on site and off site from foul sewers is considered to be low and acceptable.

6.1.8.2 Surface Water Drainage

At this stage it is not known exactly how the redevelopment will affect the proportion of impermeable and permeable areas on site. However, constructing new residential housing will increase the proportion of impermeable areas on site. With this, and an increase in rainfall intensity by 30% over the lifetime of the residential development, surface water runoff from the site is likely to increase. As a result, there is likely to be an increased risk of surface water flooding both on site and off site if an appropriate drainage system is not installed.

It was demonstrated in section 5 that safe discharge of surface water is possible, with the implementation of an appropriate drainage system including SuDS. A more detailed surface water drainage assessment should be undertaken at the detailed planning application stage.

Assuming that an appropriate surface water drainage system is installed, and maintained by routine inspection and clearance the risk of flooding on site and off site from surface foul sewers is considered to be low and acceptable.

6.1.8.3 Foul and Surface Water Drainage

Foul and surface water discharges should be achieved by gravity. If this is not possible (this should be proven at the detailed design stage) a pumping station may be required. In the event of failure, overflow from the pumping station could pose a flood risk.

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Mitigation Measures

7 Mitigation Measures

This section demonstrates that it is possible to mitigate the flood risks identified in the previous section. The mitigation measures outlined below are designed to protect both the users of the proposed residential development and the residential development itself from the effects of flooding.

Based on the flood risks identified in the previous section, flood mitigation is considered below.

7.1 Mitigation Measures

7.1.1 *Groundwater Flooding*

While it has not been possible to fully assess the risk of groundwater flooding, high groundwater levels are not an unusual hazard on a development site and can be easily mitigated. Measures that can be utilised to mitigate the risk of groundwater flooding include tanking, raised finished floor levels, appropriate flood routing through the site and installing appropriate drainage.

Based on the adopting appropriate mitigation measures as outlined above, the risk of the site flooding from groundwater should therefore be low and acceptable. The details of the groundwater mitigation strategy should be detailed further at the detailed design stage; if it is determined that groundwater flooding presents a problem.

7.1.2 *Pluvial Flooding (Overland Flow)*

There is a risk of pluvial flooding on site. Developing the site for residential use could increase this risk.

In order to mitigate the risk of pluvial flooding, the landscaping and drainage (SuDS) of the site should be designed to route flows away from the proposed residential buildings towards the less vulnerable open areas. Finished floor levels should also be 150mm above external ground levels to prevent the proposed development flooding from pluvial flow.

Based on implementing the above mitigation measures, the risk of fluvial flooding occurring on site is considered low and acceptable.

7.1.3 *Land Drainage*

There is a risk of land drainage flooding on site.

In order to mitigate the risk of land drainage flooding, the landscaping and drainage (SuDS) of the site should be designed appropriately (detailed above) and finished floor levels should be 150mm above external ground levels. In addition, regular inspection and maintenance should be undertaken to ensure the drains remain clear and free of debris.

Based on implementing these mitigation measures, the risk of land drainage flooding occurring on site is considered to be low and acceptable.

7.1.4 *Residual Risks of Flooding from Proposed Drainage Arrangements*

7.1.4.1 Pumping Stations

In the event of failure, overflow from a pumping station could pose a flood risk. However, a pumping station should be designed to Building Regulations Part H which allows for the provision of emergency storage and telemetry to warn of high levels/pump failure. Regular inspection and maintenance should ensure the pumping station remains in a suitable condition

The residual risk from pumping station failure is therefore considered to be low and acceptable.

7.1.4.2 Sewerage System

There is a residual risk of flooding from blockage of the sewer system (including SuDS) if it is poorly maintained. Regular inspection and maintenance should be undertaken to ensure the infrastructure remains in a suitable condition.

The residual risk of flooding from the sewer system is therefore considered to be low and acceptable.

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Conclusion and Recommendations

8 Conclusion and Recommendations

AECOM has prepared this FRA to support an outline planning application for the development of a greenfield site on Foxen Croft, in Lundwood, Barnsley. The outline planning application is for residential development.

All the appropriate agencies have been consulted to obtain information; the Environment Agency, Barnsley Metropolitan Borough Council, and Yorkshire Water.

The site is considered to be an appropriate site for development within the planning context since it is located in Flood Zone 1. The Sequential Test should therefore be passed and the Exception Test should not be required. All forms of development are appropriate within Flood Zone 1 based on Planning Policy Statement 25: Development and Flood Risk.

We have considered all the potential sources of flooding to the site, including tidal (sea), fluvial (river), groundwater, land drainage, pluvial (surface water and overland flow), sewers, water mains and other artificial sources. Climate change has also been considered, which is expected to increase the peak rainfall intensity and peak river flow by up to 30% over the lifetime of the development.

We have shown that all potential sources of flooding can be mitigated to an acceptable level of risk. We have also demonstrated that safe disposal of foul and surface water from the site is possible and that these should be managed sustainably and appropriately.

The developer should determine the existing drainage regime at the detailed planning application stage and agree the proposed drainage arrangements in advance of construction with Barnsley Metropolitan Borough Council, the Dearne and Dove Internal Drainage Board and Yorkshire Water as appropriate. Wherever possible, the developer should use Sustainable Drainage Systems to manage surface water runoff.

At this stage, AECOM considers that the flood risk to and from the proposed development site can be mitigated to an acceptable level. It is therefore anticipated that outline planning permission can be granted, subject to a detailed planning application with appropriate conditions being applied to the redevelopment of the site.

Recommendations

- The risk of groundwater, land drainage and sewer flooding on site should be investigated further. Based on the risks identified, an appropriate mitigation strategy should be finalised.
- Landscaping and drainage of the site should be designed to route flows away from the proposed residential development, towards the less vulnerable open areas.
- Finished Floor Levels should be located 150mm above external ground levels.
- A more detailed drainage assessment should be undertaken at the detailed planning application stage.
- Foul and surface water disposal and any new connections to the public sewer system will require consent from Yorkshire Water. Yorkshire Water's permission should be sought prior to the redevelopment. An easement will also need to be agreed with Yorkshire Water, to provide maintenance access to the combined public sewer running through the site.
- Surface water disposal arrangements may also require approval from Barnsley Metropolitan Borough Council, the Dearne and Dove Internal Drainage Board and the Environment Agency. Further consultation with these agencies is recommended, as appropriate.
- Surface water runoff from the site should be limited to the 1 in 100 year greenfield run-off rate, which is considered to be 5 l/sec/ha.
- Surface water should be stored within the drainage system either below ground or in formal above ground systems for the 1 in 30 year storm event with an allowance for climate change. In excess of this up to the 1 in 100 year plus climate change event, surface water should be stored in controlled areas such as car parks and landscaped features to ensure the proposed residential development does not flood.

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Appendices

Appendix 1 : FRA Pro-Forma

1. Development description and location
1a. What *type of development is proposed and where will it be located?* *The site located on Foxen Croft in Lundwood, Barnsley. The site currently greenfield, and plans are to develop the site for residential use.*
1b. What is the vulnerability classification? *Residential developments are classified as 'More Vulnerable'.*
1c. Is the proposed development consistent with the Local Development Documents? *The site is not mentioned in the Local Development Documents.*
1d. Please provide evidence that the Sequential Test or Exception Test has been applied in the selection of this site for this development type. *The site is considered to be an appropriate site for development within the planning context, since it is located in Flood Zone 1. The Sequential Test should therefore be passed and the Exception Test is not required.*
2. Definition of the flood hazard
2a. What sources of flooding could affect the site? (see Annex C PPS25) *Pluvial Flooding(Overland Flow), Land Drainage and possibly Groundwater Flooding*
2b. For each identified source, describe how flooding would occur, with reference to any historic records wherever these are available. *Flooding from overland flow and surface water runoff would occur when surface water run-off exceeds the capacity of the drainage system.* *During periods of severe rainfall the site could potentially flood from the adjacent drainage ditches, as a result of their capacity being exceeded or blockages.* *Flooding from groundwater could occur when groundwater levels are high.*
2c. What are the existing surface water drainage arrangements for the site? *The site is currently greenfield land, and drains via a network of unnamed drains. There are no formal surface water drainage arrangements on site.*
3. Probability
3a. Which Flood Zone is the site within? *Flood Zone 1.*
3b. If there is a Strategic Flood Risk Assessment covering this site, what does it show? *Barnsley Metropolitan Borough Council are currently completing a Strategic Flood Risk Assessment.*
3c. What is the probability of the site flooding taking account of the contents of the SFRA and of any further site specific assessment? *Based on Environment Agency Flood Map: Low*
3d. What are the existing rates of run-off generated by the site? *Not calculated at this stage. Will be calculated when a more detailed drainage assessment is undertaken at the detailed planning application stage.*
4. Climate change
4a. How is flood risk at the site likely to be affected by climate change? *Increase in rainfall intensity (by 30% for this redevelopment) will create additional surface water runoff and without mitigation, flood risk would increase.*

5. Detailed development proposals

5a. Please provide details of the development layout referring to any relevant drawings.

No Indicative layout has been produced at this stage. This will be provided at the detailed planning application stage.

5b. Where appropriate, demonstrate how land-uses most sensitive to flood damage have been placed in areas within the site that are at least risk of flooding.

Not applicable. The whole site is located in Flood Zone 1.

6. Flood risk management measures

6a. How will the site be protected from flooding, including the potential impacts of climate change, over the development's lifetime?

Mitigation measures to protect the site from flooding are detailed in section 7, and include installing appropriate drainage systems and raised finished floor levels.

The proposed residential development should be designed to account for a 30% increase in rainfall intensity In line with PPS25.

Adequate attenuation storage will be designed to accommodate for the 1 in 100 year + climate change critical storms, based on agreed discharge rates.

7. Off site impacts

7a. How will you ensure that your proposed development and the measures to protect your site from flooding will not increase flood risk elsewhere?

Potential increases in surface water runoff will be limited to an agreed discharge rate. The rates and details should be agreed in advance of construction at the detailed design stage.

7b. How will you prevent run-off from the completed development causing an impact elsewhere?

Ensure surface water sewer system designed accordingly and design for exceedence events will be considered as above.

8. Residual risks

8a. What flood-related risks will remain after you have implemented the measures to protect the site from flooding?

Potential risk of flooding occurring from poorly maintained attenuation/ surface water runoff storage, foul and surface water sewers and pumping stations.

8b. How, and by whom, will these risks be managed over the lifetime of the development?

Regular inspection and maintenance should be undertaken to ensure the infrastructure remains in a suitable condition.

Appendix 2 : Site Information

YORKSHIRE WATER ASSET PLANS

BRITISH GEOLOGICAL SURVEY GROUNDWATER FLOOD SUSCEPTIBILITY MAP

RMS RETURN FLOOD MAPS

PHOTOGRAPHS



1) Southern part of the site.



2) Entrance onto the site from Foxen Croft, looking across the site



3) Eastern part of the site.



4) Looking across the site, from the eastern boundary.



5) Sewer running through site.



6). Eastern boundary of the site, and the adjacent Warehouse building.



7) Southern boundary of the site, and the adjacent residential housing



8) Drainage ditch along eastern boundary of the site.



9) Drainage ditch along western boundary of the site.



10) Where the northern boundary drain flows in to the eastern boundary drain approximately 50m to the north of the site.

Sewer Legend



Combined Sewer

S24 Combined Sewer



Surface Water Sewer



S24 Surface Water Sewer



Foul Sewer

S24 Foul Sewer



Section 104 Sewer



Public Rising Main



Pumping Station



Abandoned Sewer



Public Sewage
Treatment Works



Syphon Sewer &
Vacuum Sewer



Manhole

Water Legend

Water Main 4" and below

Water Main 4" and above

Raw Water Main

Private Water Main



Fire Hydrant



Pumping Station



437087 407656

Map Name SE3707NW

Title

Yorkshire Water,
PO Box 500,
Halifax Road
Bradford BD6 2LZ
Contact Name
Ms H Webster
Contact Tel

Notes

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Partial Key

Foul Sewer = F
Combined Sewer = C
Surface Water Sewer = SW
Trade Sewer = TD
Partially Separate = PS

This plan is furnished as a general guide only and no warranty as to its correctness is given or implied. This plan must not be relied upon in the event of excavations or other works made in the vicinity of public sewers. No house or property connection

Date Req 21/10/2009, 12:34:43

Date Gen 21/10/2009, 12:34:45

Source Sewer Network Enquiry

UPN Undefined

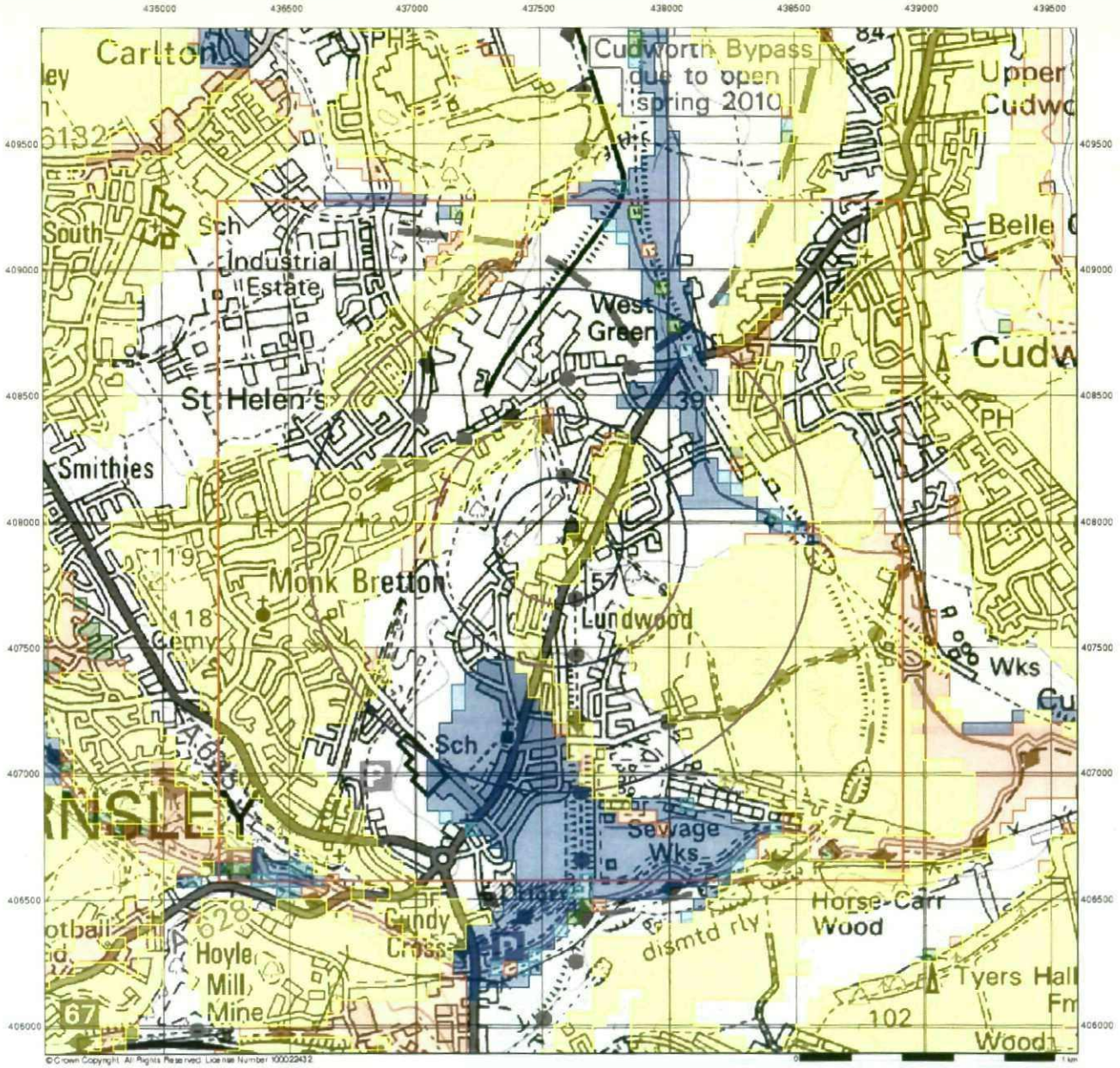
Originator H Webster, Safe Move,



Water Network features are not shown above a scale of 1:50,000

437087 407656	Map Name SE3707NW	Title	Partial Key Water mains up to 4" in diameter Water mains over 4" in diameter Raw water mains Private water mains
YorkshireWater Yorkshire Water. PO Box 500. Halifax Road. Bradford BD6 2LZ Contact Name : Ms H Webster Contact Tel :		Notes	The position and depths of apparatus shown on this plan are approximate only. The exact positions and depths should be obtained by excavation trial holes Scale 1:2500
		(Ody) COPYRIGHT STATEMENTS: Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database 2004. All rights reserved Ordnance Survey Licence number 100019559	Drg No Maris No Date Req 21/10/2009 12:33:49 Date Gen 21/10/2009 12:33:50 Source Water Network Enquiry

UPN Undefined Originator H Webster, Safe Move.



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BGS Flood Data (1:50,000)

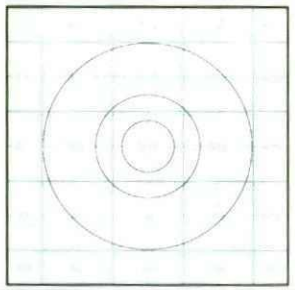
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

BGS Groundwater Flooding Susceptibility

- High Susceptibility
- Moderately High Susceptibility
- Moderate Susceptibility
- Low Susceptibility
- Negligible Susceptibility

BGS Flood Data Map - Slice A

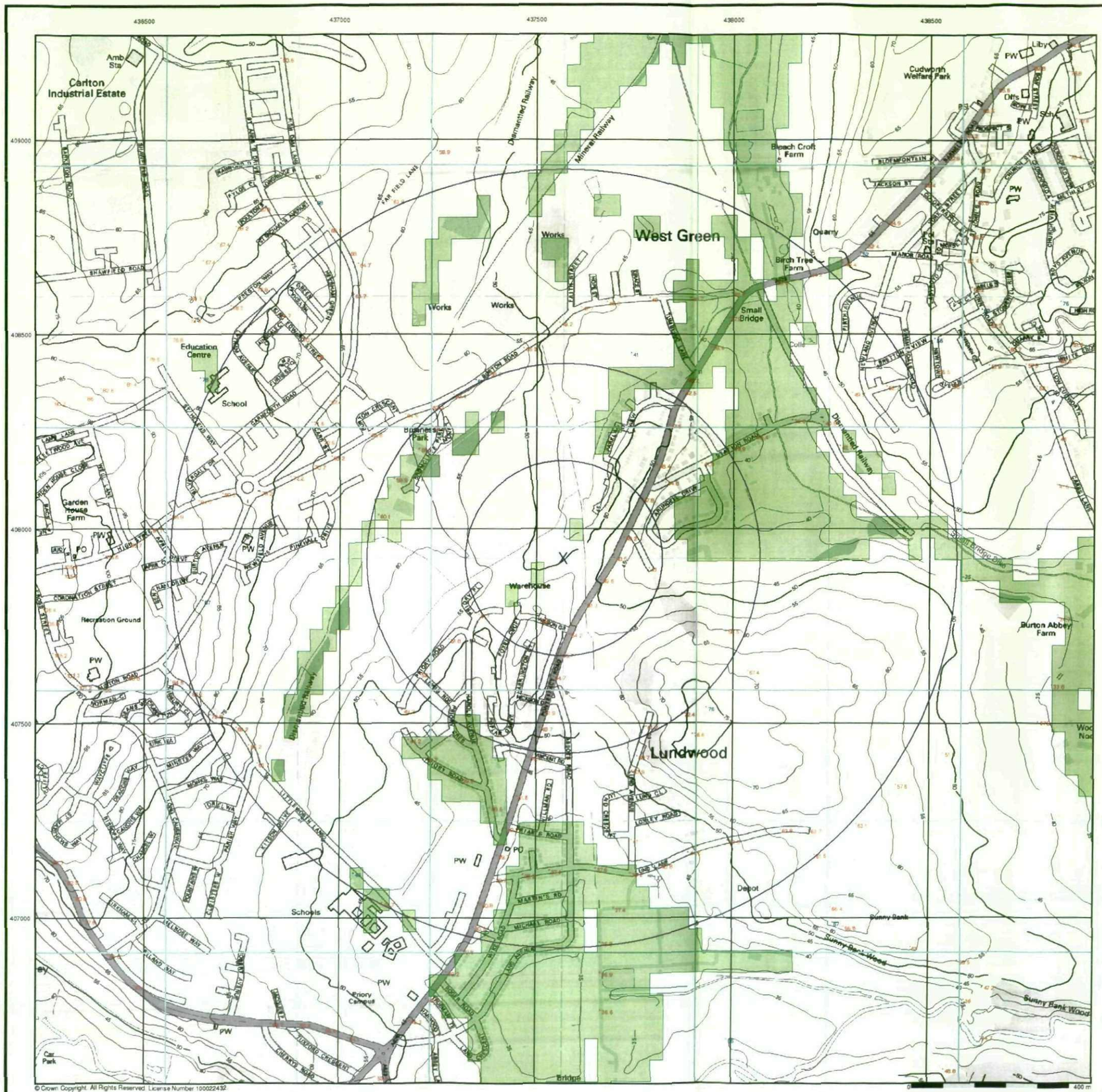


Order Details

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Customer Ref:	Co-op Barnsley
National Grid Reference:	437570, 407920
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

107 Grange Lane, BARNSLEY, South Yorkshire, S71 5QH



AECOM

RMS 75 year Return Flood Map (1:10,000)

General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

RMS 75 year Return Flood Data

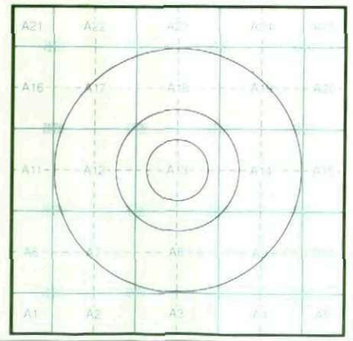
Flood Depth (mm)	Flood Type: Defended Flood	Flood Type: Undefended Flood	Flood Type: Pluvial Flood (flood depth n/a)
0 - 200			
201 - 500			
501 - 2000			
2001 +			

Contours (height in metres)

Standard Contour — 105
Index Contour — 100 — 95

167.3 Spot Height
145.8 Air Height

RMS 75 year Return Flood Map - Slice A



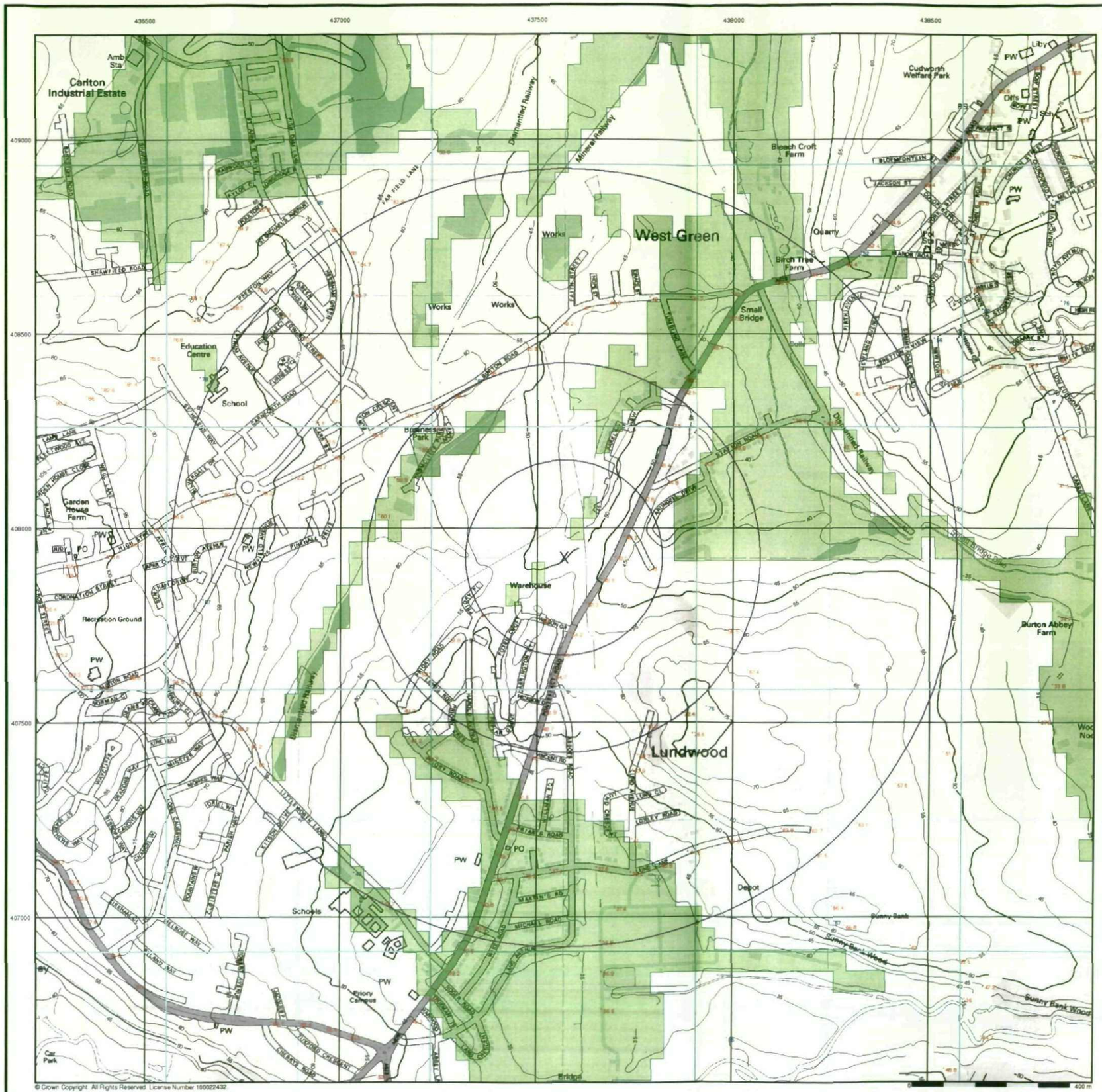
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Order Number:	29135976_1_1
Customer Ref:	Co-op Barnsley
National Grid Reference:	437570, 407920
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

107 Grange Lane, BARNSLEY, South Yorkshire, S71 5QH

Landmark Information Group
Tel 0844 844 9952
Fax 0844 844 9951
Web www.envirocheck.co.uk



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AECOM

RMS 100 year Return Flood Map (1:10,000)

General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

RMS 100 year Return Flood Data

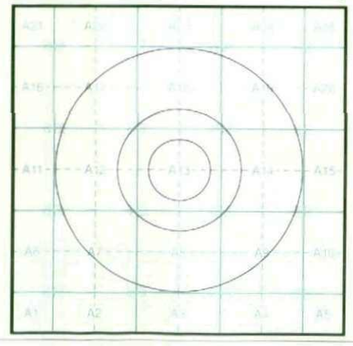
Flood Depth (mm)	Flood Type: Defended Flood	Flood Type: Undefended Flood	Pluvial Flood (flood depth n/a)
0 - 200			
201 - 500			
501 - 2000			
2001 +			

Contours (height in metres)

Standard Contour — 105 — 100 — 95 — 167.3 Spot Height

Index Contour — 45.8 Air Height

RMS 100 year Return Flood Map - Slice A



Order Details

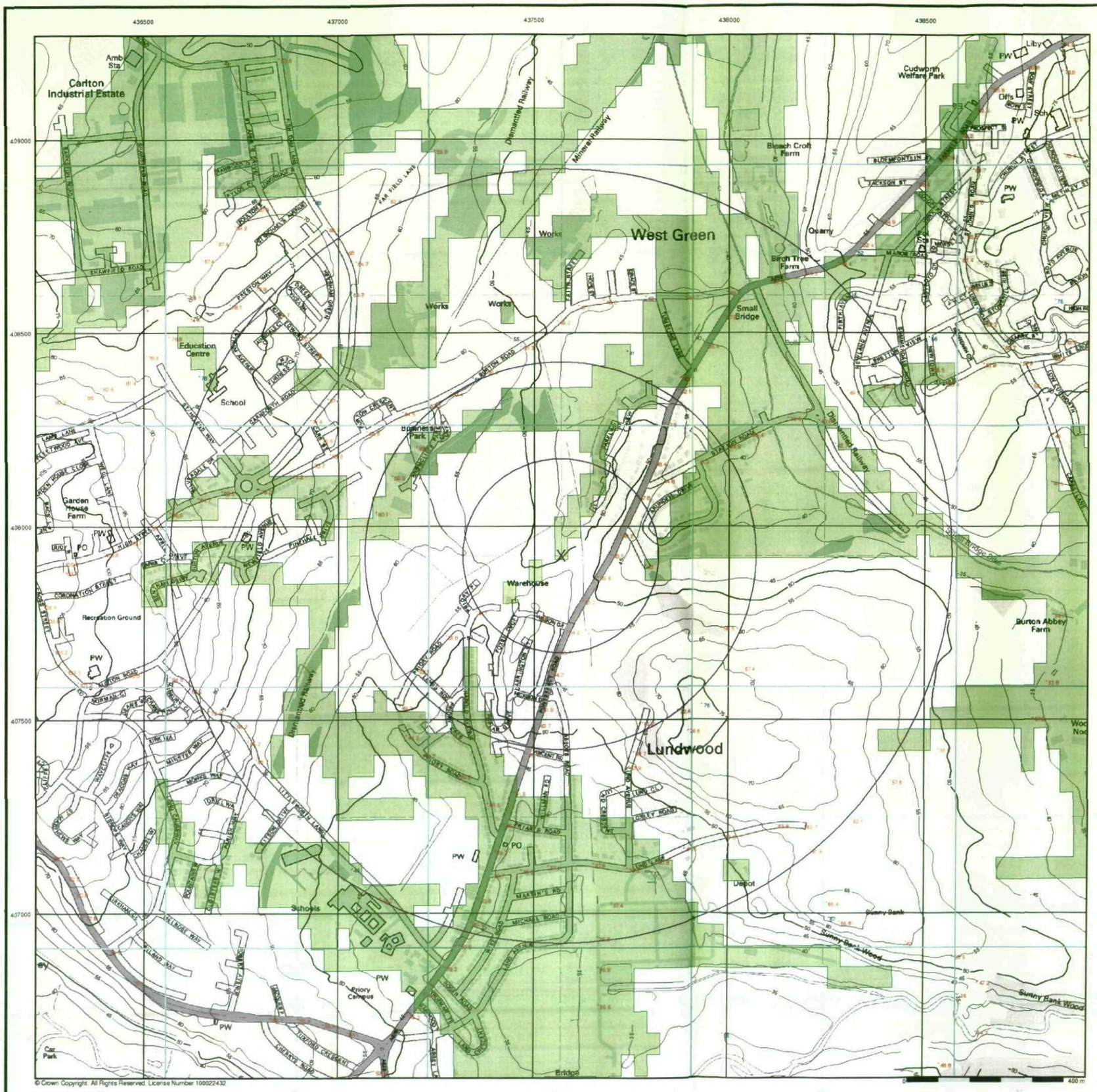
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Customer Ref:	Co-op Barnsley
National Grid Reference:	437570, 407920
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

107 Grange Lane, BARNSLEY, South Yorkshire, S71 5QH

Landmark Information Group

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Fax: 0844 844 9951
Web www.envirocheck.co.uk



AECOM

RMS 1000 year Return Flood Map (1:10,000)

General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

RMS 1000 year Return Flood Data

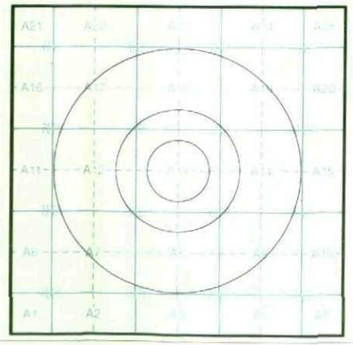
Flood Depth (mm)	Flood Type: Defended Flood	Flood Type: Undefended Flood	Flood Type: Pluvial Flood (flood depth n/a)
0 - 200			
201 - 500			
501 - 2000			
2001 +			

Contours (height in metres)

Standard Contour — 105 — 100 — 95 — 167.3 Spot Height

Index Contour — 45.8 Air Height

RMS 1000 year Return Flood Map - Slice A



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Web: www.envirocheck.co.uk

Appendix 3 : Correspondence

CORRESPONDENCE WITH THE ENVIRONMENT AGENCY

CORRESPONDENCE WITH BARNSLEY METROPOLITAN BOROUGH COUNCIL

Belcher, Jenny

From: Riley, Stacey [stacey.riley@environment-agency.gov.uk]
Sent: 23 October 2009 13:56
To: Belcher, Jenny
Subject: Your Enquiry: RFI/2009/12151
Attachments: Standard Notice Commercial (Feb 2008).doc

Follow Up Flag: Reviewed by Belcher, Jenny
Flag Status: Completed

Our Ref: RFI/2009/12151

Dear Jenny

RE: Pontefract Road Lunwood Barnsley

Thank you for your enquiry dated 14th October 2009.

We have no knowledge or history of any water course in the area .The site is located in Flood Zone 1, which is land outside the floodplain as shown on the Environment Agency's Flood Zone Maps. Whilst the site is outside the floodplain, developments of this size can generate significant volumes of surface water.

However the site may be subject to flooding from a number of different sources (small or culverted watercourses, public sewers, highway drains, overland surface water flow) and I would suggest that you contact the Local Authority Main Drainage Department who may hold more detailed information for the site and may be able to advise further.

Whilst the site is outside the floodplain, any development over a hectare could generate significant volumes of surface water. A flood risk assessment must be submitted with a planning application on any proposed development over 1ha, to assess the existing and proposed surface water drainage from the site.

There should be no increase in surface water runoff from the new development. If the existing site is designated as brownfield, then we would expect surface water from the re-developed site to be reduced by a minimum of 30% from the existing rate. Greenfield development sites should balance surface water discharge to the 1 in 100 year Greenfield run-off rate, this is considered to be 5 l/sec/ha.

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. We would seek to promote the use of SUDs techniques to the site when it is developed and would expect any potential developer of the site to submit detailed information indicating that the use of SUD's has been fully explored. For more information on SUD's can be found at: http://www.ciria.org.uk/suds/

I would suggest you contact the local planning authority as all Strategic Flood Risk Assessment (SFRA) are the responsibility of the local planning authority.

This information is based on data that is currently available to the Environment Agency and is subject to our standard notice. The Agency accepts no liability for any loss or damage arising from its use. The interpretation of the information is your responsibility.

If you require any further help, please do not hesitate to contact me.

Yours sincerely,

Stacey Riley

External Relations Officer

☎ 0113 3954506 (Internal 728 4506)

✉ stacey.riley@environment-agency.gov.uk

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Belcher, Jenny

From: Kilner , Steve [SteveKilner@barnsley.gov.uk]
Sent: 22 October 2009 16:17
To: *Belcher, Jenny*
Cc: Joy , Matthew
Subject: RE: Flood Risk Statement for a site in Lundwood, Barnsley
Attachments: Discharge of surface water from development sites rev.doc

Hi Jenny, I would comment on the points raised in your email as below

(1) I have no record of, nor am I aware of any specific flooding events to the area of land shown on your plan.

(2) I am aware that the housing estate to the south of your site has suffered from "waterlogged" ground, together with groundwater issuing at the surface. This is assumed to be a combination of a high water table and areas of heavy clay substrata which prevents water from permeating back into the ground. It is recommended that this condition is confirmed for this site by using a series of boreholes and permeability tests to allow a judgement be made of the extent of the problem

(3) I attach for your information a copy of our standard document which describes our approach to limiting run off rates from development land. Attenuation would need to be calculated for a green field site in accordance with the document attached. BMBC are the principal landowner in this area, and permission would need to be sought from our Estates service to cross our land and connect.

(4) There are a number of drainage ditches directly adjacent to the site (marked on your plan as "drains"), but these are specifically to drain the reclaimed colliery tip and disused railway line bounding your site and are not regarded as "natural" watercourses. The only natural watercourse which could be used to dispose of attenuated flows is located some 300 metres to the north of your, starting at the eastern boundary of the disused railway line.

(5) Our SFRA is still in draft stage and is expected to be published shortly. This document is being prepared by my colleague, Matthew Joy in our Planning Policy unit, and Matthew can be contacted at matthewjoy@barnsley.gov.uk

If you have any further queries, please do not hesitate to ring

Regards

Steve Kilner

Principal Engineer
Policy and Programming, Drainage and Highways

Development Directorate

Highways, Engineering and Waste

Telephone: 01226 772116
Fax: 01226 772196

email: stevekilner@barnsley.gov.uk

From: Belcher, Jenny [mailto:jenny.belcher@aecom.com]
Sent: 19 October 2009 10:53

BARNSLEY
Metropolitan Borough Council

Highways, Engineering and Waste Management
Assistant Director: D. A. Richardson , BSc, M.C.I.O.B, M.I.H.T.
PO Box 601 Barnsley S70 9FA

DISCHARGE OF SURFACE WATER FROM DEVELOPMENT SITES - BMBC POLICY IN ACCORDANCE WITH PPS25

For all small sites < 0.05ha (500sq.m) or < 5 houses, no surface water limiting condition is required. Redevelopment of existing buildings in this category which re-use existing surface water drainage systems are exempt.

Greenfield Sites

Surface water discharge is limited to the equivalent greenfield run-off from the area of land naturally flowing to that watercourse. This is normally set at a rate of 5 litres per second per hectare (the area being the gross site area, but excluding any areas which remain as public open space, significant landscaped areas or other undeveloped land). This figure may be reduced where known drainage problems are present in a receiving watercourse.

For sites <1ha and > 0.05ha (500sq.m) a figure of 5 l/sec is used as the practical minima for flow control devices.

Brownfield Sites

The allowable peak flow discharge will be a reduction of at least 30% from the "existing" outflows. This policy may be subject to future change in particular catchments in line with any surface water management plans or if differing criteria are agreed following consultation with the EA.

For a site to be considered for the brownfield allowance, it must have an "existing" surface water discharge at the time of the planning application. This must include a positive drainage system of pipework which discharges to the same outlet as the proposed surface water system.

The developer will need to submit full supporting details with his planning application to qualify for this allowance. Such details will include the existing drainage layout including pipe sizes, gradients and capacities together with connection point at outlets and CCTV surveys showing the outlet positions.

Agreement to existing flows can be sought from BMBC drainage engineers before planning submission stage and any such prior agreement will be honoured against any subsequent change of policy for applications submitted within 6 months.

The prior agreement of Yorkshire Water is also advised where the proposed surface water discharge is to a public sewer. YW may enforce a lower limitation for sewer discharges than that given in planning advice for connection to public sewers. The existing flow used for the calculation of the allowable discharge rate will be taken as the smaller of either the existing pipe capacity or the calculated flow (Q l/sec =140A, where A is the contributing impermeable area in hectares).

Brownfield allowance will not be given where the proposed outlet differs from the existing (e.g. *existing to sewer, proposed to watercourse) or for the redevelopment of previous large grassed* or garden areas. Brownfield allowance will not be considered where the existing surface water flow is less than 10 l/sec.

Where insufficient or unreliable evidence of existing brownfield discharge is provided, where the proposed surface water outlet is not evident or where connection is made to a different location on the watercourse, then the greenfield rate described above will be used.

Irrespective of the amount of reduction in the peak flows, there is also a requirement to reduce the total volume of surface water. This can be achieved by utilising infiltration SUDs techniques where feasible, by increasing the amount of green space, garden areas, soft landscaping or by using green roofs and water recycling.

Note however that infiltration techniques must not result in ground water problems to downslope landowners or there could be a liability on developers or subsequent owners of the soakaway installation. Full ground investigations and hydro-geological surveys and tests to demonstrate this will not be a problem may be required.

Note that soakaways are currently considered to be the least acceptable option for BMBC adoptable highway drainage systems.

All Sites

For outline applications, developers would not normally submit the existing drainage details and the greenfield allowance will be conditioned. Where appropriate this strategy can be changed to the brownfield condition at full planning stage.

If an application site (regardless of size) is a sub-division of a larger development, then the site discharge allowance will be given pro-rata to the total area and developers will need to collaborate on their provision of surface water drainage systems.

Developers are reminded that whilst planning approvals may condition surface water discharges, there is no right of connection of surface water into off-site watercourses, whether culverted or open channel. Right of discharge must be obtained from the relevant riparian landowner in whose land the watercourse is located. Where a culverted watercourse lies in public highway, this right of connection must be obtained from BMBC.

Developers will be expected to confirm as part of any planning application where the responsibility is to lie for ownership and maintenance of any sustainable urban drainage system or attenuation facilities. Where responsibility is to lie with private owners or management companies, the developer will need to include appropriate legal coverage within deed documentation in accordance with the disclosure requirements.

Storage Requirements

All drainage, including sustainable systems, (CIRIA C 609 p.80) must meet the following standards, which are consistent with Sewers for Adoption Edition 6 :-

"Pipe full in 1 in 2 year storm, no site flooding in 1 in 30 year storm, no internal flooding in 1 in 100 year storm plus 30% climate change allowance (PPS 25 para. 4.7)"

Flows between the 1 in 30 year storm and the 1 in 100 year storm plus climate change should be stored on site or may be discharged off-site over-ground, but only provided there are no unreasonable impacts on off-site property compared to the existing situation. (PPS 25 Annex F paragraph F9)