



Resilience and
Flood Risk

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Washington Road, Goldthorpe Preliminary Drainage Feasibility Assessment

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Version 1.0
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1.0 Introduction

RAB Consultants has been appointed by Coda Planning to undertake a Preliminary Drainage Feasibility Assessment (PDFA) to support a planning application for the construction of 12 residential dwellings on land south of Washington Road, Goldthorpe. The area to be developed is split into 2 parts '35A' and '37A' Washington Road.

The Government's Ministerial Statement issued in December 2014 set out plans that from 6 April 2015 local planning policies and decisions on planning applications relating to major development will require sustainable drainage systems (SuDS) for the management of surface water. This means that SuDS are a material consideration in all major development (development of 10 dwellings or more), irrespective of location, wherever sustainable drainage systems would be appropriate. At this stage Barnsley Metropolitan Borough Council (BMBC), the Lead Local Flood Authority (LLFA), has not published its requirements for SuDS design for which planning applications will be assessed against. This PDFA investigates the existing surface water drainage arrangement on site, the options for surface water disposal and details the communication held with BMBC and Yorkshire Water to determine the level of detail required to support a full planning application.

2.0 Site location

Table 1 – Site details		
Site name	Washington Road, Goldthorpe	
Site area	35A - 750 m ²	37A - 690 m ²
Existing land use	Residential dwellings & associated garden areas	
OS NGR	35A - SE 45849 03849	37A - SE 45802 03849
		

3.0 Existing site & development proposal

Plots 35A and 37A are located to the south of Washington Road which is located east of Goldthorpe Road. Between the sites is the Dearne Playhouse building. Both sites currently consist of a residential dwelling, impermeable walkways and permeable garden areas. Plot 35A has an impermeable area of approximately 192m² and plot 37A has an impermeable area of 133m². Roof water on both plots appears to be collected by downpipes and guttering and discharged into an on-site drainage system and conveyed into a Yorkshire Water sewer. Water falling on the impermeable surfaces has no formal drainage and runs off the areas before infiltrating into the permeable areas on site. Photographs of the site can be found in Figure 1 below.



Figure 1 – Existing site photographs

The proposal is to demolish the existing dwellings within each site and replace them with a total of 12 residential dwellings (6 dwellings per site) with associated car parking and garden areas (see development plan in Appendix A). The total impermeable area post development for ‘35 A’ will be 522m² and plot ‘37 A’ will be 493m² thereby providing 172% and 271% increase in impermeable surfaces respectively.

4.0 Consultation

4.1 Barnsley Metropolitan Borough Council

BMBC has confirmed that the general approach to SuDS should be in line with SuDS management train (see Paragraph 1.3.2 from the SuDS manual (C697)) which is intended to mimic the natural catchment process as closely as is possible. Table 2 gives examples of the hierarchy of techniques that can be used to achieve the management train.

Table 2: Hierarchy of SuDS techniques and their descriptions	
Technique	Description
Prevention	The use of good house design and housekeeping measures to prevent run-off and pollution; rainwater re-use/ harvesting
Source control	Soakaways, porous and pervious surfaces, water butts, green roofs



Site control	Routing water to large soakaways, infiltration or detention basins
Regional control	Balancing pond, wetlands, swales, retention ponds

Infiltration techniques (source control techniques) are feasible for managing some surface water run-off from the site. BMBC has confirmed it is working with other Risk Management Authorities including the Environment Agency and Yorkshire Water to produce local SuDS guidance document to support ‘major development’. This is likely to be available in autumn 2015.

In the meantime, BMBC has stated the following information is required to support a full planning application:

- Existing drainage arrangements on site
- Details of proposed method for managing surface water on site
- Proposed site plan showing exceedance flow routes
- Drainage layout plan (to include SuDS, sewer, drains and watercourse)
- Design calculations as necessary to demonstrate the functionality of the SuDS
- Construction Management Plan
- Details of inlets, outlets and flow controls
- Details of the organisation responsible for adopting the SuDS
- A new maintenance plan for the development to include:
 - Confirmation of the maintenance responsibility for each of the drainage elements
 - Lifespan, maintenance schedule and costs (annual and whole life costing) of SuDS
 - Risk assessments for each of the maintenance activities
 - Method statements for undergoing the routine maintenance

BMBC has confirmed that indicative options for surface water drainage should be submitted to its drainage team for comment. BMBC will confirm the detail necessary to meet the surface water drainage requirements for a full planning application, although this is likely to be in line with the above.

4.2 Yorkshire Water

Yorkshire Water (YW) has confirmed that discharge of surface water to a combined/highway sewer will only be granted if the developer can show infiltration techniques and discharge to a watercourse (in line with the SuDS management train) are not feasible.

YW should be consulted by BMBC via the formal planning process to determine its surface water drainage requirements for a full planning application. YW has indicated the following are required:

- Details of the existing drainage on site and evidence that the site drains via an existing sewer
- Evidence that infiltration techniques are not feasible for managing surface water for the entire site
- Details of proposed method for managing surface water on site (including at least a 30% peak flow rate reduction from existing)
- Proposed site plan showing exceedance flow routes
- Drainage layout plan (to include SuDS, sewer, drains and watercourse)
- Design calculations as necessary to demonstrate the functionality of the SuDS

- Detailed design drawings
- Cross sections including design levels

5.0 Infiltration testing results

Infiltration tests were undertaken by RAB Consultants (in line with Building Regulations H2 1.34) within the site boundary.

Trial pits were dug to a depth of 1m with a 0.3m x 0.3m hole dug in the base (for locations see Figure 2). The trial pit locations are considered to represent similar ground conditions within plot 37A. The test was performed on 15.09.2015. The day was wet and the days preceding the test included heavy downpours.



Figure 2 – Trial pit photographs

The results of the testing were:

- Trial Pit 1 – test 1 - Infiltration rates of 0.042 m / hr
- Trial Pit 1 – test 2 - Infiltration rates of 0.032 m / hr
- Trial Pit 2 – test 1 - Infiltration rates of 0.130 m / hr
- Trial Pit 2 – test 2 - Infiltration rates of 0.085 m / hr

The 'Quick Storage Estimate' tool in the Source Control module of WinDes 2015.1 has been used to estimate required storage volumes on the sites as a result of the proposed development. The BRE Digest 365 guidance advises the lowest infiltration rate measured at the trial pit is used. An infiltration coefficient of 0.032 m / hr has been used to represent the lowest infiltration rate.



Table 3: Windes 2015:1 Quick Storage Estimate components	
Inflow	Rainfall data
Region	England and Wales
M5-60 (mm)	18.500 mm
Ration R	0.390
Storms	Summer and winter
Cv	Summer: 0.750 Winter: 0.840
Impermeable areas (proposed for plot 35A and 37A)	35A - 0.52 ha 37A – 0.49 ha
Maximum allowable discharge (l/s)	0 (assume 100% infiltration)
Infiltration coefficient (m/hr)	0.032
Safety factor	2

The ‘Quick Storage Estimate’ tool confirmed that infiltration techniques are feasible on the site and that the following storage volumes are required to manage a range of rainfall events.

Table 4: Storage volumes		
Rainfall event	Storage volume (plot 35A)	Storage volume (plot 37A)
1 in 10 year	70 m ³ – 190 m ³	66 m ³ – 179 m ³
1 in 30 year	90 m ³ – 235 m ³	85 m ³ – 221 m ³
1 in 100 year	119 m ³ – 296 m ³	112 m ³ – 279 m ³
1 in 100 year & 30% CC	154 m ³ – 386 m ³	145 m ³ – 364 m ³

Discharge options

1. Infiltration

The development proposal includes plans to increase the impermeable areas on plots 35A and 37A by 172% and 271% respectively and therefore significantly increase surface water run-off from the plots and the load on the local sewer network. Infiltration techniques could be feasible on both plots, however, the development density restricts the areas where soakaways/infiltration basins could be located. Consideration should be given to utilising alternative infiltration systems (e.g. permeable paving for driveways and walkways) to help reduce the increase in surface water run-off from the site.

2. Discharge to watercourse

There are no local watercourses in the local area available to discharge surface water.

3. Discharge to surface water sewer

There is unlikely to be a surface water sewer in the local area available to discharge surface water.



4. Discharge to combined sewer

The existing site appears to drain into a combined sewer within Washington Road (confirmation of this is required). Increasing impermeable areas by 172% and 271% will significantly increase surface water run-off from the plots and therefore the load on the local sewer network. It is likely that a connection to a Yorkshire Water sewer will be required for rainfall events which exceed the capacity of infiltration systems.

6.0 Recommendations

- This report should be submitted to BMBC to determine its surface water drainage requirements for a full planning application
- Consideration is given to using alternative infiltration systems (e.g. permeable paving) to help reduce the increase in surface water and load on local sewer networks
- The developer seeks advice from Yorkshire Water to determine whether discharging into a sewer is feasible



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Appendix A – Development plan

