Resilience and Flood Risk

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Grove Street, Barnsley Preliminary Drainage Feasibility Assessment

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Revision history

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1 0	14.07.2015		Coda Planning

Quality control

Action	Signature	Date
Prepared	Andrew McHugh BSc (Hons) MCIWEM	13.07.2015
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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 full planning application for 32 residential dwellings on land at Grove Street, Barnsley.

The Government's Ministerial Statement issued in December 2014 set out plans that from 6th 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	Grove Street, Barnsley
Site area	4575 m^2 (0.46 hectares)
Existing land use	Brownfield land (previously used as school/factory)
OS NGR	SE 35245 06317



3.0 Existing site & development proposal

The site is located to the west of Grove Street, south of Belgrave Road and north of Grasmere Road and currently consists of a school building and associated hardstanding areas (see location plan in Appendix A). The total impermeable area on site is estimated to be 4080 m^2. The site slopes from west to east and north to south (see topographic survey in Appendix B). Surface water is collected by an on-site drainage system and conveyed in an easterly direction towards Grove Street where it is believed to enter a Yorkshire Water combined sewer. Photographs of the site can be found in Figure 1 below.



Figure 1 – Existing site photographs

The proposal is to demolish the school and associated hardstanding areas and replace them with 32 residential dwellings with associated driveways and garden areas (see development plan in Appendix C). The total impermeable area post development will be 2122 m^2 thereby providing a 48% reduction in impermeable surface on the site.

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 (in line with Building Regulations H2 1.34) at the two locations within the site boundary (see Figure 2 below).



Figure 2 – Trial pit locations

The pits were dug to a 1 m depth with a 0.3 m x 0.3 m hole dug in the base (see Figure 3). The test was performed on 08.07.2015. The day was wet and the days preceding the test included heavy downpours. The holes were pre-wetted the day before, and no water was evident at the time of carrying out the tests.



Figure 3 – Trial pit photographs

The results of the testing were:

- Trial Pit 1 – test 1 - Infiltration rates of 0.046 m / hr
- Trial Pit 1 – test 2 - Infiltration rates of 0.035 m / hr
- Trial Pit 2 – test 1 - Infiltration rates of 0.094 m / hr
- Trial Pit 2 – test 1 - Infiltration rates of 0.075 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 site as a result of the proposed development. The BRE Digest 365 guidance says to use the lowest infiltration rate measured at the trail pits. An infiltration coefficient of 0.035 m / hr has been used to represent the lowest infiltration rate of the two infiltration tests carried out.

Table 3: Windes 2015:1 Quick Storage Estimate components	
Inflow	Rainfall data
Region	England and Wales
M5-60 (mm)	18.500 mm
Ration R	0.376
Storms	Summer and winter
Cv	Summer: 0.750 Winter: 0.840
Impermeable area	0.21 ha
Maximum allowable discharge (l/s)	0 (assume 100% infiltration)
Infiltration coefficient (m/hr)	0.035
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
1 in 10 year	28 m^3 – 81 m^3
1 in 30 year	36 m^3 – 100 m^3
1 in 100 year	47 m^3 – 125 m^3
1 in 100 year & 30% climate change	61 m^3 – 162 m^3

Discharge options

1. Infiltration

The development proposal includes plans to reduce the impermeable area on site by 48% which will encourage natural infiltration and therefore significantly improve the load on the sewer in Grove Street. There is also land available within the garden areas of the site which can be utilised to accommodate soakaways and/or alternative infiltration systems to manage run-off from hardstanding areas for small scale rainfall events. As a result of the development there will be a decrease in surface water run-off rates and volumes 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 in Grove Street. Reducing the impermeable area by 48% will allow for natural infiltration to take place and utilising garden areas for soakaways to manage smaller scale rainfall events will significantly reduce the load on the sewer. However, a connection to a Yorkshire Water sewer could be required for rainfall events which exceed the capacity of soakaways/infiltration systems.

6.0 Recommendations

- This report should be submitted to BMBC to determine its surface water drainage requirements for a full planning application
- Investigations to confirm the groundwater level, will need to be conducted to ensure that the infiltration unit surface is at least 1 metre above the maximum anticipated groundwater level

Appendix A – Site location plan

Revision	Date
-	-



SCALE 1/500 @ A1



SCALE 1/1250 @ A1

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GROVE STREET, BARNSLEY	Job
LOCATION & RED LINE PLAN	Title

DRAWN	CHECKED	DATE	SCALE	
MB		04 2015	A3 ISSUE: VARIES	A1 ISSUE: VARIES

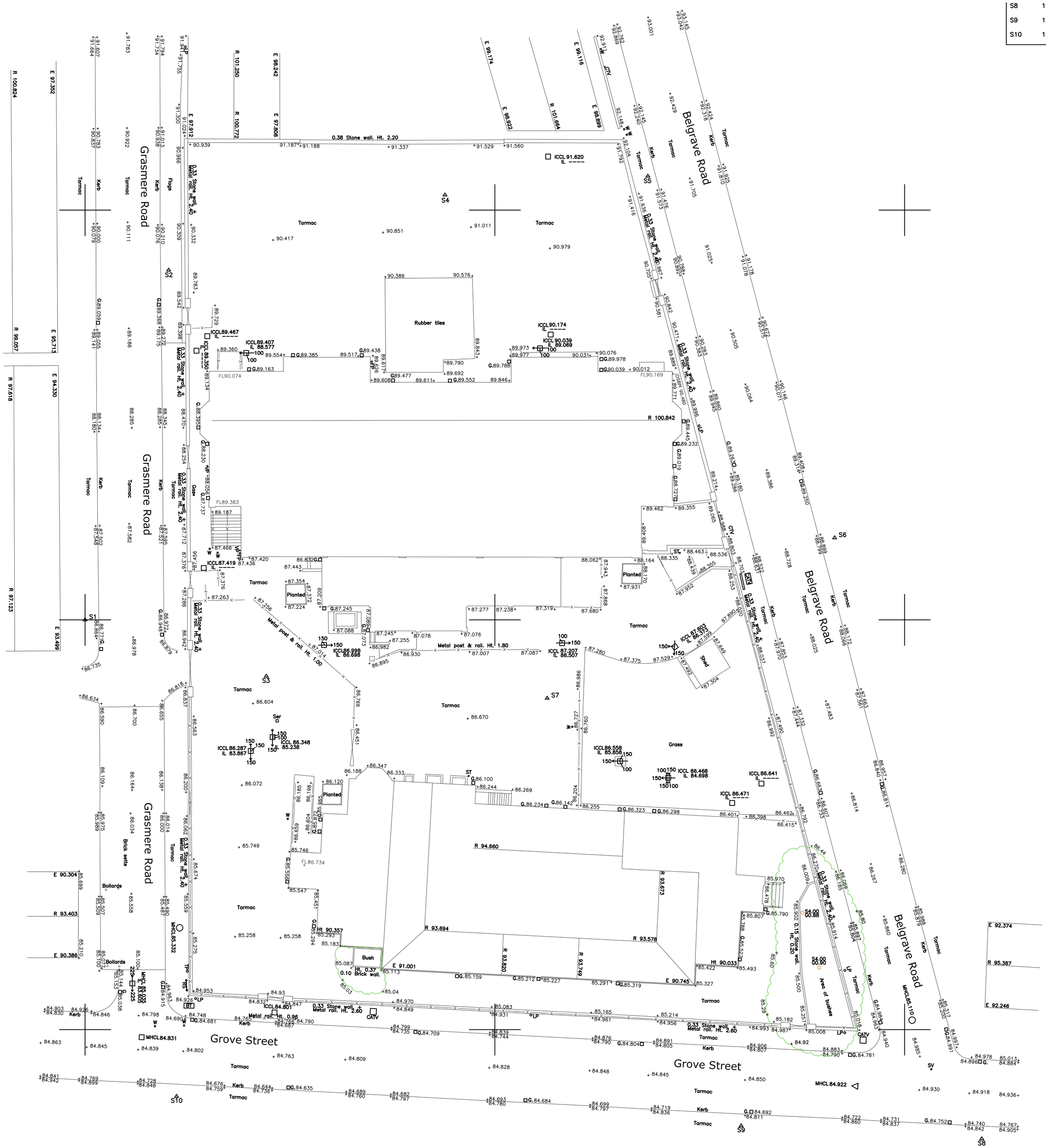
REVISION	DRAWING STATUS	DRAWING NUMBER
-	PLANNING	2256_101

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Appendix B – Topographic survey

S8	1087.532	949
S9	1064.043	950
S10	1008.927	953

Revision	Date
-	-



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Appendix C – Proposed development plan



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-	-

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CARL LEE	Client
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PROPOSED SITE PLAN	Title

DRAWN	CHECKED	DATE	SCALE	
MB		04 2015	A3 ISSUE:	A1 ISSUE: 1/200

REVISION	DRAWING STATUS	DRAWING NUMBER
-	PLANNING	2256_104

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