

OUTLINE SUSTAINABLE DRAINAGE STRATEGY

**Change of Use to Residential
North Street, Roxby**

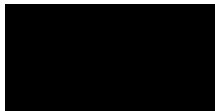
**The Trustees of
the R Elwes Fund
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1.0 INTRODUCTION

1.1 This Outline Sustainable Drainage Strategy, (OSDS), has been produced on behalf of the Trustees of the R Elwes Fund of the Elwes Children's 1989 Settlement Trust in respect of a planning application for a change of use residential at North Street, Roxby.

Data Used

1.2 This OSDS is based on the following information:

- Proposed Plans
- British Geological Survey Drift & Geology Maps
- British Geological Survey Hydrogeology Data
- Anglian Water Sewer Records
- Site visit

Existing Site

1.3 The site is located at grid reference SE9275717288 as shown in **Figure 1.1** below and covers an area of approximately 5.0ha.

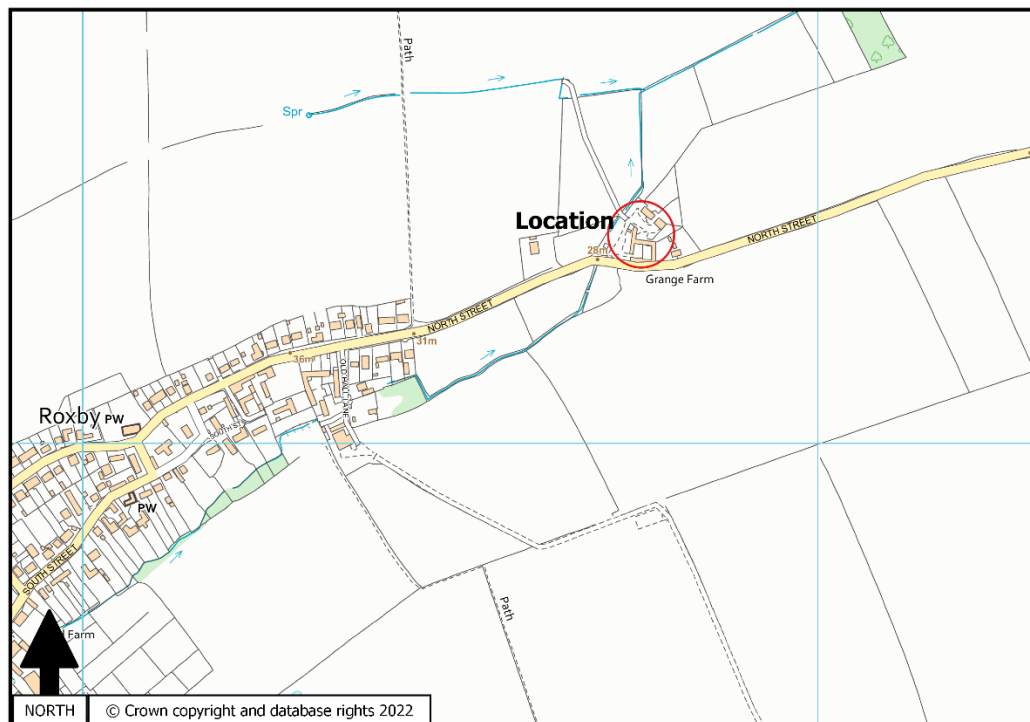


Figure 1.1 Site Location

- 1.4 The online British Geological Survey maps indicates that the site is located on superficial deposits of sand and gravel over a bedrock of mudstone.

Proposed Development

- 1.5 The proposed development consists of a change of use residential as shown on the extract of the proposed plan below in **Figure 1.2**



Figure 1.2 Proposed Plan

Development Foul & Surface Water

- 1.6 The proposed development will require the disposal of foul and surface water which could impact on existing systems and developments. This OSDS will demonstrate that the development will not increase flood risk elsewhere.

2.0 CLIMATE CHANGE

- 2.1 The NPPF sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change.
- 2.2 As the Government's expert on flood risk on 19th February 2016 the Environment Agency, (EA), published revised climate change allowances to support the NPPF. The sea level rise allowances were revised on the 17th December 2019, the peak river flows revised on the 20th July 2021 and the peak rainfall allowances were revised on 10th May 2022.
- 2.3 The climate change allowances are based on projections and different scenarios of carbon dioxide (CO₂) emissions to the atmosphere and provide predictions of anticipated change for:
- peak river flow and peak rainfall intensity by river Management Catchment;
 - sea level rise;
 - offshore wind speed and extreme wave height.
- 2.4 The peak river flow allowances, sea level rise; and offshore wind speed and extreme wave height allowances a form part of the FRA and only the peak rainfall intensity allowances are relevant to the OSDS .

Peak Rainfall Intensity Allowance

- 2.5 Increased rainfall affects river levels and land and urban drainage and should be applied to surface water drainage systems. Theses allowances are based on the Management Catchment with two allowances; central; and upper end and change over two periods of time over the next century. This proposed development is in the Lower Trent & Erewash Management Catchment.
- 2.6 The appropriate allowance should be chosen based on the expected lifetime of the development and for developments with a lifetime up to 2100 that is the Central allowance and for developments with a lifetime from 2100 to 2125 that is the Upper End allowance.
- 2.7 This proposed development has a lifetime from 2100 to 2125. The following climate change allowances in peak rainfall intensity therefore need to be applied:

Epoch	Percentage Increase
2050s	40
2070s	40

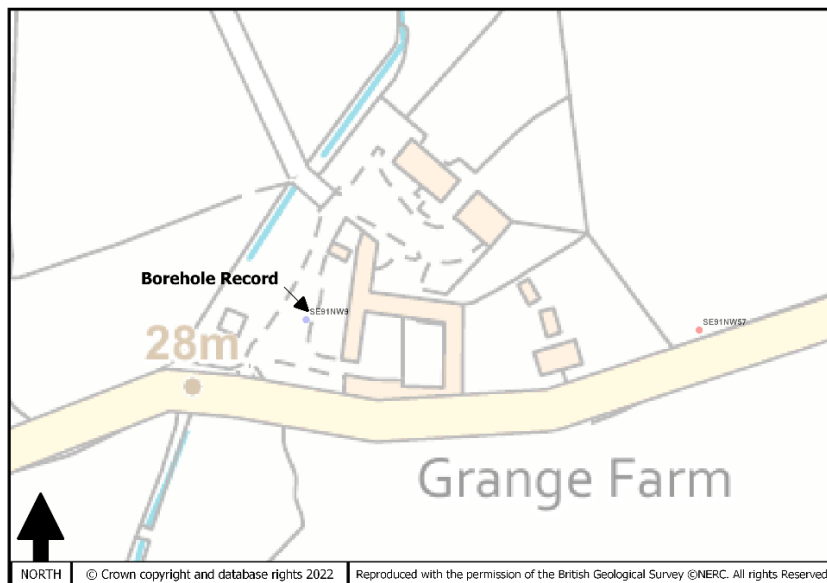
Table 2.1 Climate Change Allowances for Peak Rainfall Intensity

3.0 SURFACE WATER DRAINAGE

- 3.1 When rain falls on a natural landscape it soaks into the ground, evaporates, is taken up by plants and some of it eventually finds its way into streams and rivers.
- 3.2 These stages of the water cycle can be impeded when land is developed and there tends to be less permeable ground available for infiltration and less vegetation for evapotranspiration. When rain falls on impermeable surfaces much more of it turns to surface water runoff, which can cause flooding, pollution and erosion problems.
- 3.3 Sustainable drainage systems, (SuDS), are designed to maximise the opportunities and benefits that can be secured from surface water management.

Hierarchy of Surface Water Drainage

- 3.4 The recommended surface water drainage hierarchy is to utilise soakaway, or infiltration as the preferred option, followed by discharging to an appropriate watercourse or if this is not available the final option is to an existing public sewer.
- 3.5 The online British Geological Survey maps indicates that the site is located on superficial deposits of sand and gravel. This is confirmed by a historic borehole record taken on the site and the location and record are shown below in **Figure 3.1**.



SE91NW/9	SE 91 NW 9281 1726	249
	4. Well at Roxby Grange.	
[Lower Estuarine Series]	Soil -	Ft. in.
	Gravelly stuff (probably broken rock)	2 0
	Shale	0 0
	Greystone, very hard	4 0
		0 0
		15 0

Handwritten notes: SE91/9, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

Figure 3.1 Location & Record of Borehole

Appendix 1

Soakaway Size

Rectangular soakaway 2	
Width (m)	1
Length (m)	1
Soakaway base area (m2)	1

Porosity	0.3
Infiltration coefficient (m/h)	0.036
Factor of safety	1.5

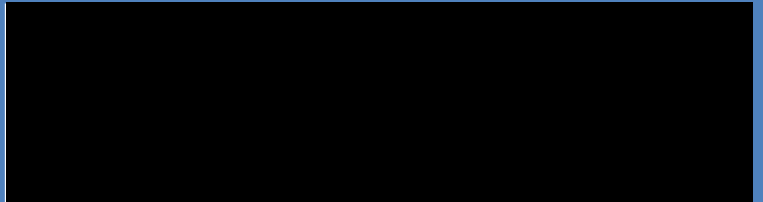
Contributing area	
Area driang to 1m2 of gravel	2
Total area (m2)	2

M5-60 rainfall depth (mm)	20
Rainfall ratio r	0.4
Climate change factor	1.4
FEH factor	1
Return period (years)	100

Rainfall Duration (h)	Intensity (mm/h)
0.083333333	240.66
0.166666667	168.462
0.25	141.306
0.5	89.598
1	56.84
2	33.909
4	19.83
6	14.663
10	9.504
24	4.935

Maximum water depth (m)	0.26
Time for half-emptying (h)	0.92

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