

FLOOD RISK ASSESSMENT

15383 DUNFORD ROAD,
HADE EDGE

Produced in accordance with NPPF, this Site Specific Flood Risk Assessment will assess the vulnerability of the site to flooding from all sources and will consider the effect of the new development.

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1. Introduction

This Flood Risk Assessment (FRA) has been prepared by Dudleys Consulting Engineers on behalf of Jones Homes (the Client). Every effort has been made to ensure that the information contained herewith is accurate at the time of creation. Any advice, opinions, or recommendations provided should be read in the context of the report as a whole.

This FRA has been prepared for the Planning Application at Dunford Road, Hade Edge and should be read in conjunction with Niemen's schematic site layout, to be submitted with the Planning Application.

2. The Site

SITE LOCATION

The site lies within the village of Hade Edge, within the Metropolitan Borough of Kirklees, West Yorkshire. The majority of the site is surrounded by farmland, with Greave Road to the north, Dunford Road to the west and Snittle Road to the east. The site is located 12 miles from the M62 motorway and 10 miles from Huddersfield town centre. The site location is described below:

- Postcode HD9 2TG
- OS X (Eastings) 414751
- OS Y (Northings) 405282
- Nat Grid SE 14751 05282

The site location is illustrated in Figure 1 below.

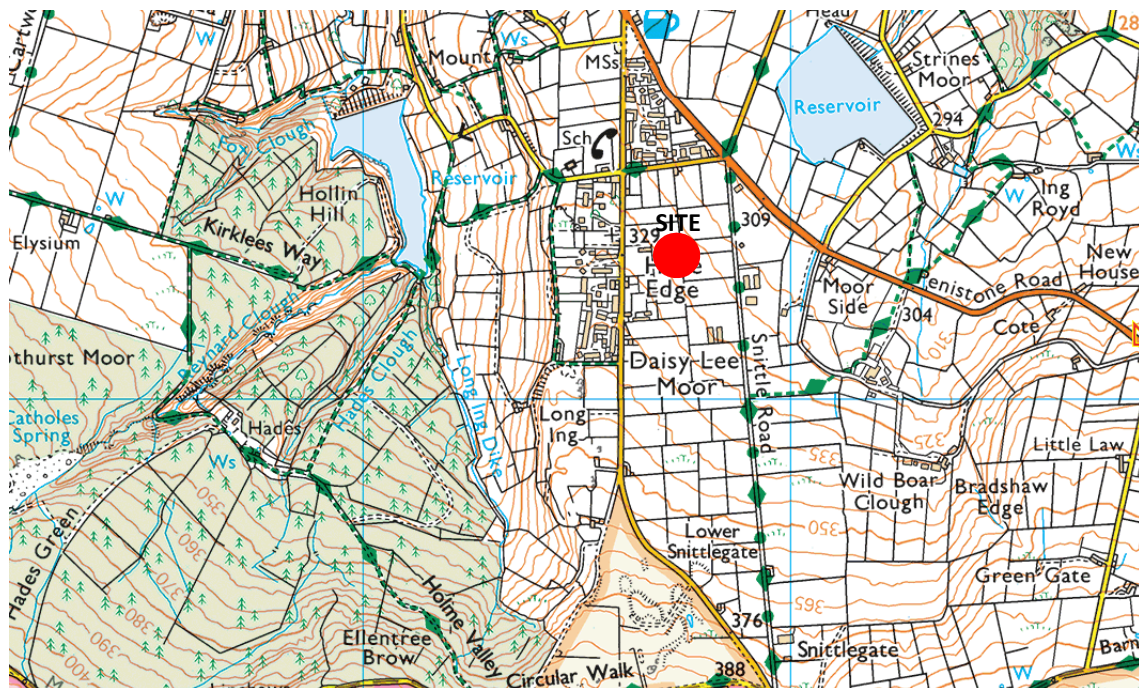


Figure 1: Site Location Plan

THE SITE

SITE DESCRIPTION

The scheme comprises a Greenfield site with a total area of 2.88 hectares to be developed with circa 70 traditional load bearing masonry residential properties onto a new highway footprint with separate adoptable systems of foul and surface water drainage. Existing levels fall steadily from southwest to northwest (approximately 10 - 15m of fall across the site). A stretch of land to the east of the site, allocated as greenbelt, is provided for drainage and attenuation.

The site and its associated boundary are shown in Figure 2.



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Figure 2: Aerial Photography

3. Sources of Flooding

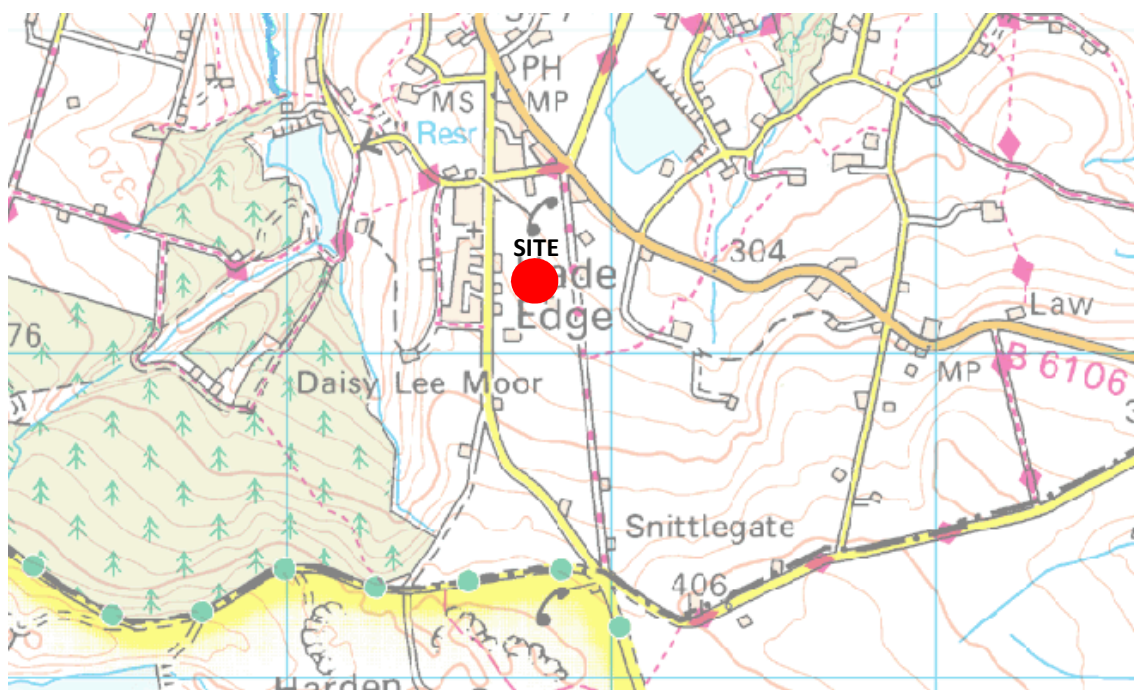
The following Environment Agency (EA) data was collected to ensure that the most up to date information regarding flooding issues was considered for the Planning Application.

FLOOD MAP FOR PLANNING (RIVERS AND SEA)

Fluvial flooding occurs when high flows exceed the capacity of the river channel and spill out onto the floodplain, usually after a period of prolonged or heavy rainfall.

The Environment Agency Flood Map for Planning (Rivers and Sea) is shown in Figure 3.

The site is located within Flood Zone 1, which comprises land assessed as having a less than 1 in 1000 annual probability of flooding from rivers or sea. The flood zone is based upon the 'undefended' scenario. This is judged to be a precautionary scenario.



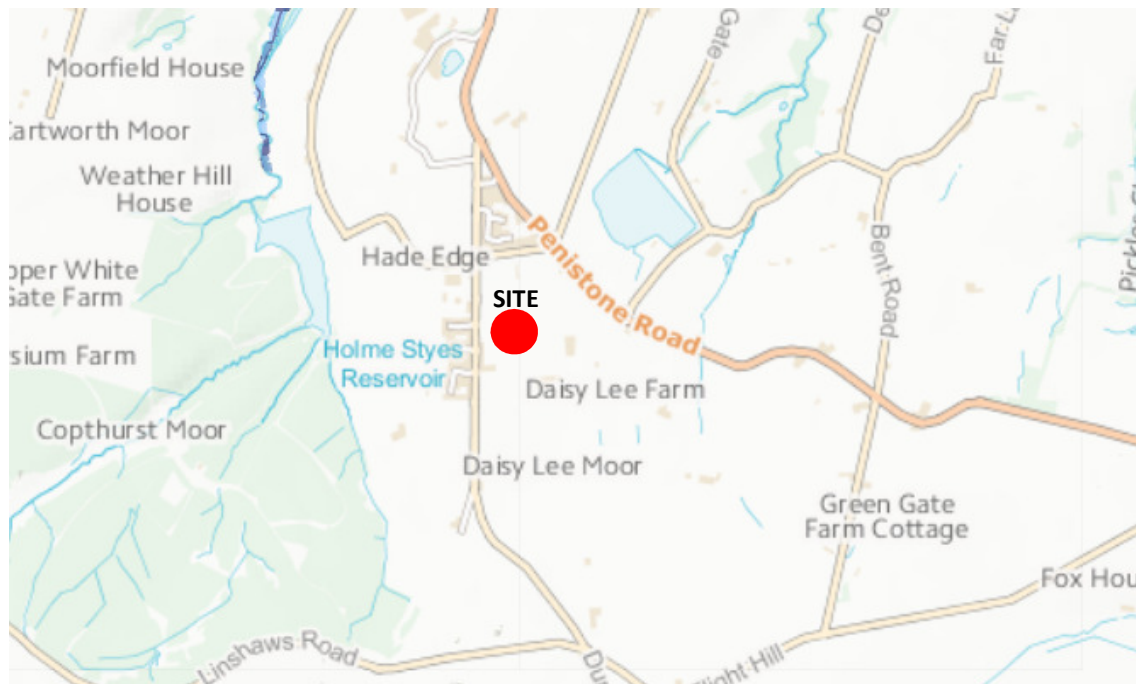
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Figure 3: Environment Agency Flood Map for Planning (Rivers and Sea)

SOURCES OF FLOODING

Figure 4 shows the risk of flooding from rivers and sea based on the flood defences which currently exist.

The developed area of the site is at 'very low' risk, indicating a less than 1 in 1000 annual probability of flooding.



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Figure 4: Environment Agency Risk of Flooding From Rivers and Sea Map

SOURCES OF FLOODING

FLOOD RISK VULNERABILITY

The Flood Risk Vulnerability Classification has been determined in accordance with Planning Practice Guidance, Flood Risk and Coastal Change. The Flood Risk Vulnerability Classification is 'More Vulnerable'. This classification includes '*Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels*'.

FLOOD ZONE COMPATIBILITY

The Flood Zone Compatibility has been reviewed in accordance with Planning Practice Guidance, Flood Risk and Coastal Change, paragraph 067.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	X	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	X	X	X	✓*

Key:

✓ Development is appropriate

X Development should not be permitted

Table 1: Flood risk vulnerability and Flood Zone 'Compatibility'

The site is located within Flood Zone 1. The vulnerability classification is 'more vulnerable'. The scheme proposals are therefore considered appropriate in accordance with Planning Practice Guidance.

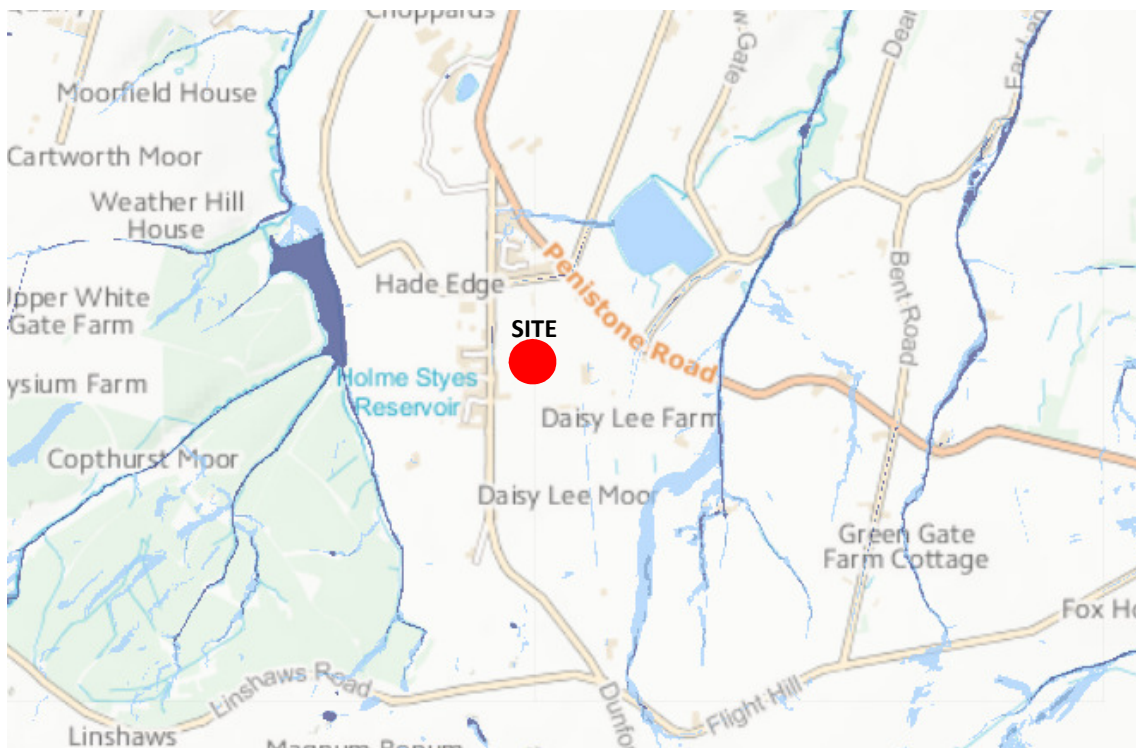
SOURCES OF FLOODING

FLOODING FROM LAND (PLUVIAL FLOODING)

The EA Flood Map showing Risk of Flooding from Surface Water is shown in Figure 5. This type of flooding can be difficult to predict, much more so than river or sea flooding as it is hard to forecast exactly where or how much rain will fall in any storm.

The map indicates that the developed area of the site has a 'very low' chance of flooding with a less than 1 in 1000 annual probability of flooding.

The map is not definitive and is based on the best information available to the Environment Agency, such as ground levels and drainage.



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Figure 5: Risk of Flooding from Surface Water

The site will be positively drained by a dedicated surface water drainage network and will cater for storm events up to and including the 1 in 100 year Critical Duration Event, with an allowance for climate change and urban creep. This will mitigate the likelihood of pluvial flooding to and from the site.

SOURCES OF FLOODING

FLOODING FROM GROUNDWATER

Groundwater flooding occurs when water levels in the ground rise above surface levels, and is more likely to occur in low lying areas.

The nearest British Geological Survey (BGS) borehole logs are located approximately 500m north (SE10NW33) and 500m south of the site (SE10SW25). Neither borehole gives any indication of groundwater being an issue, however a Geotechnical Investigation will need to be carried out in order to confirm this.

FLOODING FROM SEWERS

Yorkshire Water asset plans indicate that there are no sewers crossing the site. The asset plans can be found in Appendix B.

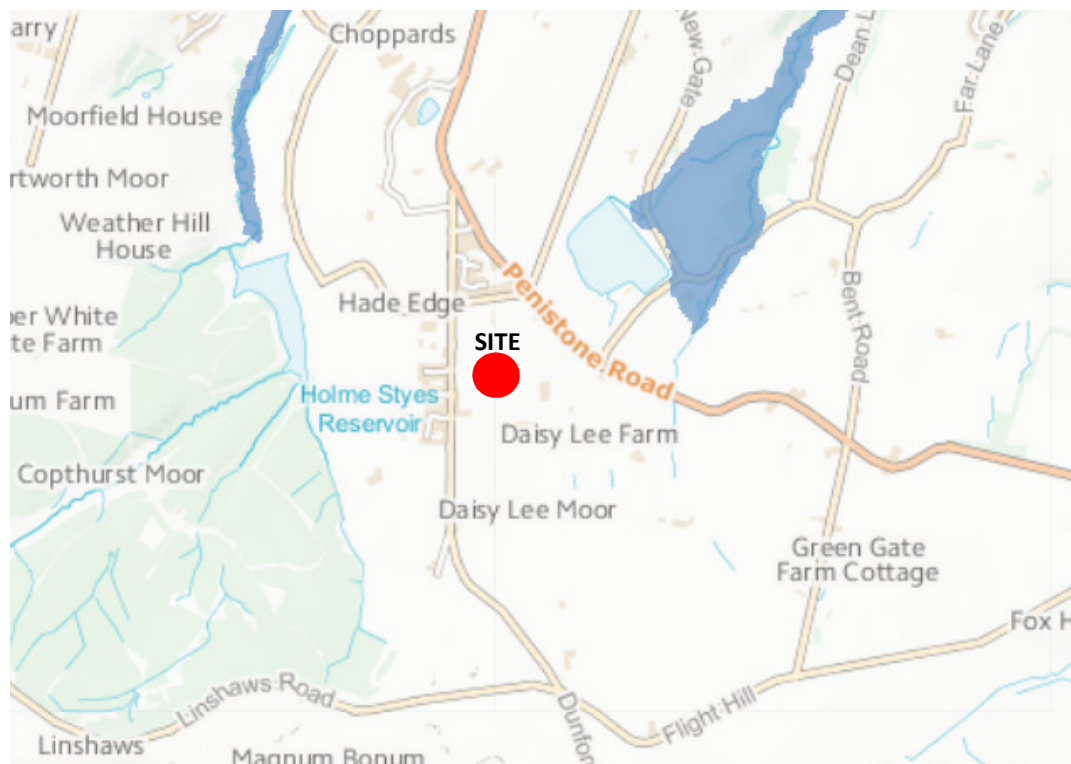
SOURCES OF FLOODING

FLOODING FROM RESERVOIRS

Reservoir flooding is extremely unlikely to happen. There has been no loss of life in the UK from reservoir flooding since 1925. All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, the EA ensure that reservoirs are inspected regularly and essential safety work is carried out.

However, in the unlikely event that a reservoir dam failed, a large volume of water would escape at once and flooding could happen with little or no warning.

The EA flood map showing risk of flooding from reservoirs is shown in Figure 6.



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Figure 6: Risk of Flooding from Reservoirs

The shading illustrates that in the unlikely event of a reservoir failure, the site would be unaffected.

4. Design Proposals

PROPOSED SCHEME

The outline planning application proposes a residential redevelopment including affordable housing provision, a convenience store and open space provision, with a new vehicular access from Dunford Road. The proposed layout is contained within Appendix A.

PROPOSED DRAINAGE STRATEGY

It is the intention to develop the Greenfield site at Dunford Road, Hade Edge, with separate systems for surface and foul water drainage. Every effort will be taken during the design process to utilise SuDS.

In accordance with best practice, the following hierarchy of techniques has been considered in order of preference: Infiltration; Watercourse; Surface Water Sewer; Combined Sewer.

Infiltration

British Geological Survey 1:50 000 scale mapping indicates that the majority of the site is underlain with sandstone, favorable for infiltration. Intrusive testing will need to be conducted in accordance with BRE Digest 365 to confirm this and determine the rate of percolation. Should infiltration be viable it is proposed that the surface water soakaway will be located in Greenbelt land to the east of the residential development, a minimum of five meters from any existing or proposed buildings.

Watercourse

Should infiltration not be viable, discharge to watercourse is to be considered. The site is not riparian and there are no known culverts adjacent to the site. The nearest watercourses are Long Ing Dike, located some 0.5km to the west and Wild Boar Clough 0.5km to the east. Both would involve crossing 3rd party land, and may require pumping. It is considered that it is not practicable to form a new connection to this watercourse. Discharge to watercourse has been discounted.

Surface Water Sewer

Yorkshire Water asset plans indicate that there are no surface water sewers in the vicinity of the site. Discharge to surface water sewer is not considered practicable.

Combined Sewer

Only in the event that all other options are not viable, discharge to combined sewer can be considered.

Should infiltration not be viable, it is proposed that surface water flows will discharge to Yorkshire Water Combined Sewer at the Greenfield Equivalent rate. In accordance with best practice this will be calculated using the Flood Estimation for Small Catchments (IH124) methodology based on the ratio of the site area to 50 ha. The rate and point of connection will be subject to agreement with Yorkshire Water following testing will need to be conducted in accordance with BRE Digest 365.

Attenuation Requirement

In line with Yorkshire Water requirements, both the peak 1 in 1 year and 1 in 30 year storm events are to be stored below ground, whereas the peak 1 in 100 year plus 40% climate change and 10% urban creep event

DESIGN PROPOSALS

can be stored above ground. Assuming infiltration is not viable, the approximate attenuation requirement is circa 1000m³.

Due to the topography of the site, we would highly recommend locating the attenuation allowance at the lowest feasible location. Provision should therefore be made for surface water attenuation over a plan area of circa 670m² at the natural low point of the site.

Further Design

The surface water management train will be further refined in collaboration with Kirklees Council and the landscape architect.

Should surface water drainage connect to sewer, it will be subject to agreement under Section 104 of the Water Industry Act.

Foul water flows will be separated from surface water and will be collected by a dedicated foul water gravity system, designed in accordance with BS EN 752 2008. Foul water flows will be discharged to Yorkshire Water Combined sewer, subject to agreement from Yorkshire Water.

Climate Change

The drainage strategy will include an increase in the storm intensity of 40%, which is consistent with the effects of climate change for a development with a design life of 100 years. A 10% allowance for urban creep has also been included.

5. Conclusions

This FRA has been prepared for the Planning Application at Dunford Road, Hade Edge and should be read in conjunction with Niemen's schematic site layout, to be submitted with the Planning Application.

The planning application proposes a residential redevelopment, with new vehicular access served from Dunford Road.

The site is located within Flood Zone 1. The Flood Risk Vulnerability Classification for the proposed development is 'More Vulnerable'. The development is therefore considered appropriate according to the Planning Practice Guidance compatibility test.

Environment Agency data indicates a very low risk of flooding from rivers and sea.

Environment Agency data indicates a very low risk of flooding from surface water. Overland flood flow routes have been considered as part of the on-site civil engineering scheme design.

In accordance with best practice, the following hierarchy of techniques has been considered in order of preference: Infiltration; Watercourse; Surface Water Sewer; Combined Sewer.

Percolation testing is to be carried out in order to calculate an infiltration rate.

If infiltration is not viable surface water flows will be collected by a dedicated gravity network with an outfall to Yorkshire Water network, subject to Yorkshire Water approval. Flow Control devices will be used to restrict discharge rates of surface water to the Greenfield Equivalent Rate.

Approximately 1000m³ of attenuation storage will be used to store storm water up to and including the 1 in 100 year return period Critical Duration Event with an allowance for climate change and urban creep.

Foul water flows will be collected by a separate dedicated gravity network and will discharge to existing Yorkshire Water Combined Sewer, subject to approval from Yorkshire Water.

6. Appendices

Appendix A: Proposed Layout

Appendix B: Asset Records

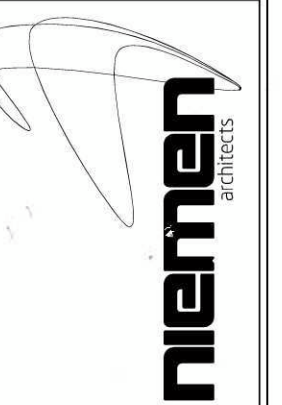
APPENDICES

APPENDIX A: PROPOSED LAYOUT



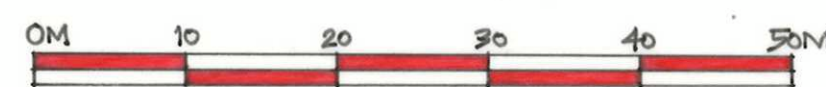
SKETCH
 subject to structural review
 subject to accurate measured survey

revision	date	content	initials
project			
PROPOSED RESIDENTIAL DUNFORD ROAD HAIDE EDGE			
client			
JONES HOMES			
title			
SCHEMATIC SITE LAYOUT			
date	scale	drawn	
26.04.16	1:500@A1	SAN	
drawing number	checked		
2847-0-001-D			



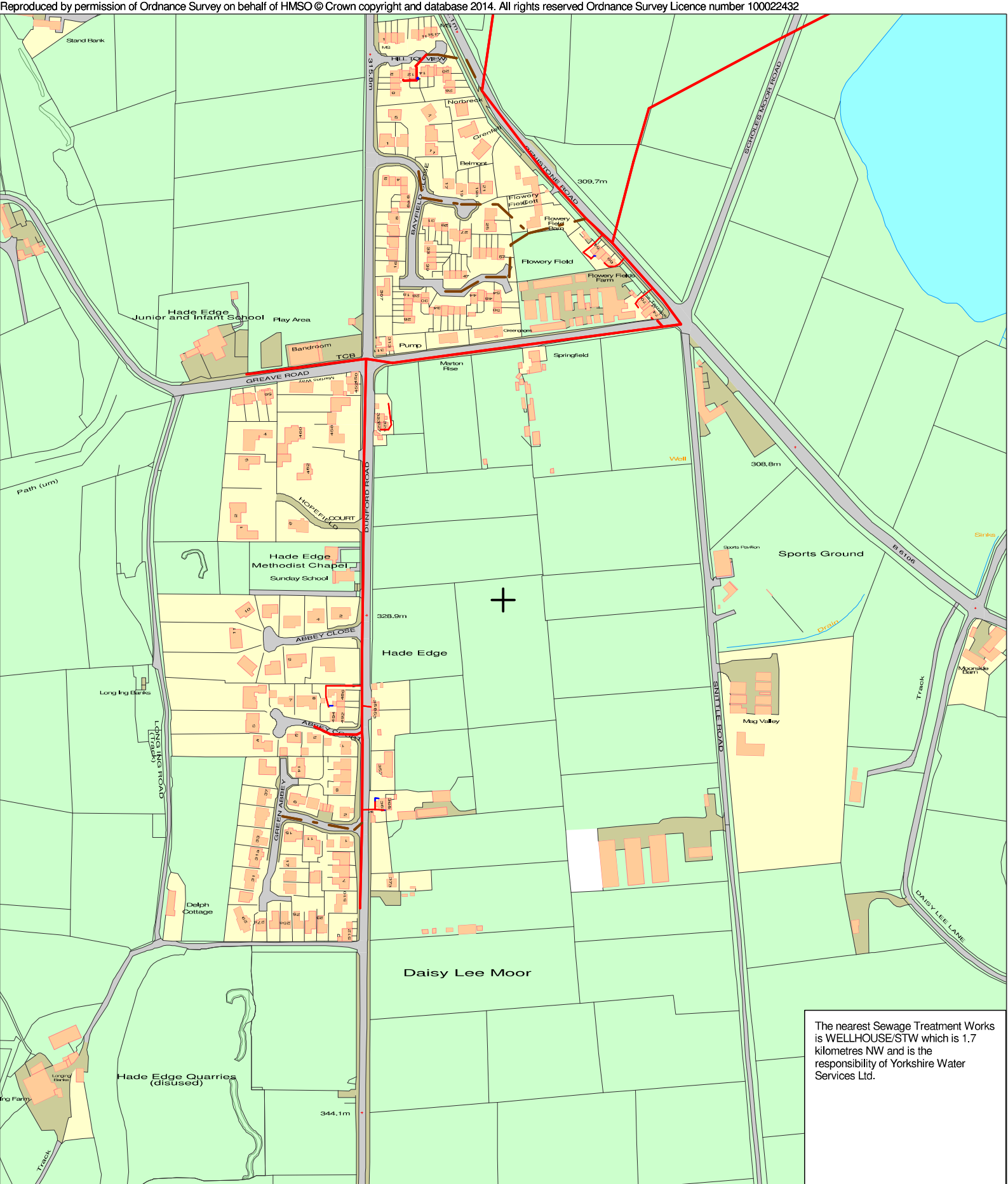
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APPENDICES

APPENDIX B: ASSET RECORDS



Public Waste Water Network 27/11/2015 13:41:48 OS Grid Coordinates: 414329 : 404898 Map Name : SE1404NW KAYA