

Minerals and Waste Joint Plan



Preferred Options

Draft Strategic Flood Risk Assessment (Level 1)

Volume 1 - Review Document and Volume 2—Supporting document with sequential test results for submitted sites

November 2015

DRAFT Strategic Flood Risk Assessment (Level 1)

Volume 1: Mineral, Waste and Flood Risk: A Data Review Document

To support the Joint Minerals and Waste Plan produced by North Yorkshire County Council, City of York Council and the North York Moors National Park Authority.

DRAFT

Contents

1.	Introduction.....	4
2.	The Strategic Flood Risk Assessments across the Joint Minerals and Waste Plan Area.....	5
2.1	What is an SFRA?.....	5
2.2	Aligning the Joint Plan SFRA with the Environment Agency's Preferred Approach.....	6
2.2.1	Aligning the SFRA Approach with Environment Agency Suggestions.....	7
2.3	Review of Existing SFRAs.....	9
2.3.1	North West Yorkshire Strategic Flood Risk Assessment.....	9
2.3.2	Northeast Yorkshire Strategic Flood Risk Assessment.....	10
2.3.3	Hambleton Strategic Flood Risk Assessment.....	10
2.3.4	Selby Strategic Flood Risk Assessment.....	11
2.3.5	North Yorkshire Preliminary Flood Risk Assessment.....	11
2.3.6	City of York Strategic Flood Risk Assessment.....	11
3.	Flood Risk Data Sources: Datasets that can supplement the Local SFRAs.....	16
3.1	Sources of Flooding.....	16
3.2	Evolving Data.....	17
3.3	The Environment Agency Flood Map and Fluvial Flooding.....	17
3.4	Surface Water and Sewer Flooding.....	19
3.5	Groundwater Flooding.....	20
3.6	Flooding from Reservoirs and Artificial Sources.....	23
4.	Updating the Functional Floodplain.....	25
4.1	From a local to a plan-wide approach.....	25
5.	Considering Climate Change.....	28
5.1	Considering Climate Change Effects on Rivers and the Sea.....	28
5.2	Climate Change Effects on Surface Water.....	30
6.	Bringing it all Together: Applying the Sequential Test to Minerals and Waste Sites.....	31
6.1	What is the Sequential Test?.....	31
6.2	The Sequential Approach: other forms of flooding and climate change.....	36
6.3	The Sequential Test.....	40
6.4	Other Planning Issues to Consider when choosing alternative sites / undertaking the Sequential Test.....	41
7.	Sustainability and SFRA.....	42
	Appendix 1: Sustainable Drainage.....	45
	Guidance on SuDS Application.....	45
	Overview.....	45
	Types of SUDS Systems.....	45
	Choosing and consulting on the Correct Scheme.....	47

SUDS and the Regulatory Framework.....	47
Finding out More	48

DRAFT

1. Introduction

Flooding is a regular occurrence in the United Kingdom and across the North Yorkshire and the City of York. There are regular media reports of disruption to travel, damage to infrastructure and even danger to life as a result of flooding. Many of us will, if we haven't at some point been affected by flooding ourselves, know an individual or a business that has been affected by a flood.

The causes of flooding are often debated. Climate change is predicted to make flooding more likely as rainfall may become more intense and sea levels are expected to rise at an increasing rate. However, it is clear that flooding is already a problem, and while climate change may already be having an influence, factors such as the increased area of impermeable land, such as that found in urban areas, is also a contributing factor.

Minerals and waste development is not immune from the risk of flooding and the National Planning Policy Framework requires that a 'sequential' approach to avoiding flood risk should be taken. That same document asserts that a Strategic Flood Risk Assessment (SFRA) must be undertaken.

North Yorkshire County Council, City of York Council and the North York Moors National Park are working together to produce a Minerals and Waste Joint Plan. Planning policy in the National Planning Policy Framework dictates that this Plan must take account of flood risk:

"Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere."

In addition:

"Local Plans should apply a sequential, risk-based approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account of the impacts of climate change, by:

- *applying the Sequential Test;*
- *if necessary, applying the Exception Test;*
- *safeguarding land from development that is required for current and future flood management;*
- *using opportunities offered by new development to reduce the causes and impacts of flooding; and*
- *where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to facilitate the relocation of development, including housing, to more sustainable locations."*

The NPPF advises that a Strategic Flood Risk Assessment will provide the basis for applying the Sequential Test.

2. The Strategic Flood Risk Assessments across the Joint Minerals and Waste Plan Area

2.1 What is an SFRA?

A Strategic Flood Risk Assessment (SFRA) is an assessment of the risk posed by flooding from a range of sources to a range of locations in a defined geographical area. The Government has published guidance on SFRA on the Planning Practice Guidance website that accompanies the National Planning Policy Framework. Within that document a definition is offered which states:

“A Strategic Flood Risk Assessment is a study carried out by one or more local planning authorities to assess the risk to an area from flooding from all sources, now and in the future, taking account of the impacts of climate change, and to assess the impact that changes or development in the area will have on flood risk”¹.

A central function of SFRA is to apply the Sequential Approach to allocating development. This seeks to direct development to those areas at least risk of flooding and is explained in detail in chapter 6 of this report. However, wherever the local planning authority are unable to allocate all proposed development and infrastructure in accordance with the Sequential Test (taking into account the flood risk vulnerability of the intended land use), the scope of the SFRA will need to be increased to provide the necessary information in order to apply the Exception Test².

This means that a Strategic Flood Risk Assessment should be undertaken over two distinct levels. The first level should provide the information necessary to apply the Sequential Approach taking into account climate change, the impact of development on flood risk and measures to manage those impacts; the second level should provide the information necessary to apply the Exception Test.

This Document forms Level 1 of the Strategic Flood Risk Assessment process.

However, The Environment Agency has advised us that there are already a number of SFRAs at a district / unitary authority level across the Joint Plan Area. This requires an approach that will make the best use of existing work, but supplementing it with new work to ensure that the evidence that supports the Joint Plan is up to date with contemporary planning policy and the latest available flood risk data.

This draft SFRA does not replace any existing SFRAs, it seeks only to inform site submissions to the Minerals and Waste Joint Plan. It does not apply to other forms of development and for minerals and waste development should only be considered for plan making purposes.

¹ Department for Communities and Local Government. Planning Practice Guidance: Flood Risk and Coastal Change [URL: <http://planningguidance.communities.gov.uk/blog/guidance/flood-risk-and-coastal-change/strategic-flood-risk-assessment/>]

² See chapter 3 for an explanation of the exception test.

2.2 Aligning the Joint Plan SFRA with the Environment Agency's Preferred Approach

Prior to the switch from County Minerals and Waste Core Strategies to a Joint Plan North Yorkshire County Council had undertaken various stages of work on SFRA. This largely focussed on assembling evidence for SFRA via two volumes: a Technical Volume that included the methodology for the assessment and a compendium of data sources; and a 'Decision Support Volume' that gave guidance on undertaking the sequential test and implementing flood management measures at future development sites. As the Joint Plan developed a certain amount of updating work had been undertaken, though the intention was to move to a further stage of undertaking 'sequential tests' of sites and presenting a volume of maps.

The Environment Agency made key several suggestions during a meeting held in summer 2014. These are summarised as follows:

- Concerns were raised about coverage of the whole Joint Plan area using one methodology, but taking account of existing 'district tier' SFRAs. The Agency felt that as minerals and waste sites are not particularly prone to flooding the existing district tier SFRAs should be used as the starting point, and that the current SFRA should address gaps, but should undertake sequential testing using the existing SFRA's;
- The EA agreed that a key opportunity for the SFRA is that sites can be restored for flood alleviation and biodiversity;
- The EA drew attention to a recent examination into the Doncaster Site Allocation DPD. The inspector was critical of the way that submitted sites had been sequentially tested and suggested that flood risk should be given greater weight. In line with para 100 and 102 of the NPPF the Inspector suggested that all allocations should be accompanied by a site specific FRA.

Following this meeting a review was undertaken of some of the key differences between local level SFRAs compared to some of the key requirements of NPPF compliant SFRA.

This showed that there is already a great deal of valuable information in existing SFRAs, though as Government guidance and data continue to change there are several areas where further information could support existing SFRAs.. Areas with the most divergence from current guidance are:

- Consideration of climate change – most extant SFRAs include some consideration of this but data has evolved since the publication of some earlier SFRA work;
- Consideration of non-fluvial flood information – no assessments make use of the updated flood map for surface water, and most rely on historical records;

- Descriptions of the sequential test – most SFRA consider fluvial flooding though consideration of other forms of flooding is variable;
- Applicability of SuDs – some assessments vary in their approach to this.

Any divergence from current guidance on SFRA is inevitable, given that many SFRA pre-date the NPPF and the latest Environment Agency mapping.

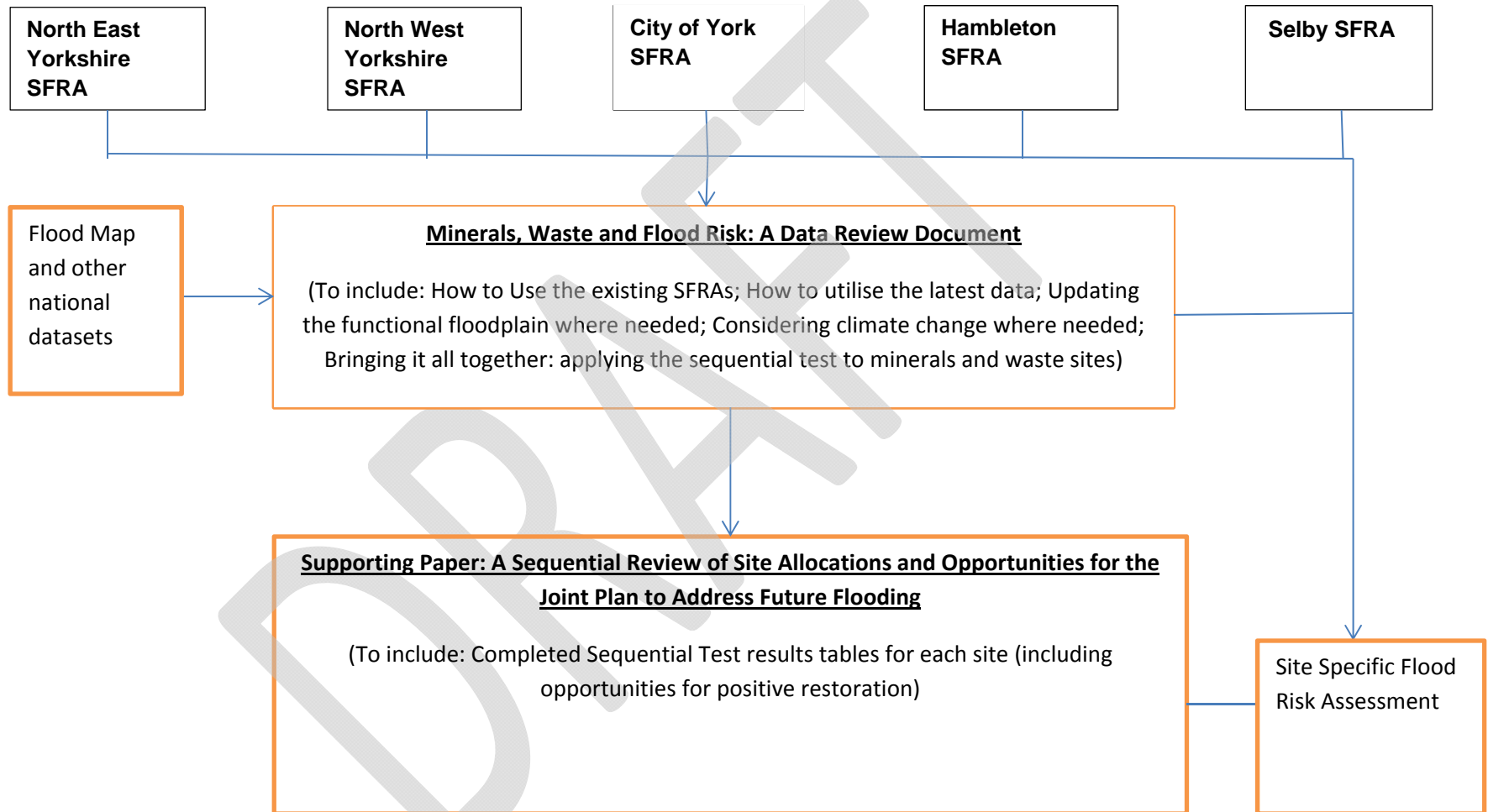
While there is some variation in approach, there are areas of similarity too, particularly in the consideration of assets such as flood management measures, and in the approach to functional floodplain amongst the more contemporary SFRA.

2.2.1 Aligning the SFRA Approach with Environment Agency Suggestions

Having considered the differences and similarities between local level SFRA a proposed structure for a Joint Plan SFRA was set out that maximises the use of existing SFRA whilst ensuring consistency with current guidance. This is illustrated in figure 1 below.

DRAFT

Figure 1: The Structure of this SFRA



This new structure for the SFRA attempts to bring together the results of existing local SFRA's with the work that has already been undertaken in North Yorkshire to create an NPPF compliant SFRA. This should ensure that the minimal necessary work is undertaken to create a level platform for arriving at sequential test results for minerals and waste sites. As such, it dispenses with the previous notion of a decision support document and mapping document, but retains elements of the technical document, thought only in as much as is relevant to 'adding value' to existing SFRA's by enabling the utilisation of up to date data and, where necessary, providing a methodological bridge between some of the older SFRA's and the latest thinking on issues such as mapping climate change.

This new structure also includes a supporting paper where sites are mapped and the results of sequential testing can be explained. This volume will recognise that minerals development in particular has the potential to play a unique role in the management of flooding. This will include consideration of flood storage and SuDS (considered in a way aligned with the County Council's and York's role as SuDS Approval Bodies).

2.3 Review of Existing SFRA's

As stated above, this Strategic Flood Risk Assessment covers the Minerals and Waste Joint Plan area. Due to the administrative structure of North Yorkshire, this County Matters plan encompasses the plan areas of District level Local Planning Authorities. These Local Planning Authorities, to support their Local Development Frameworks, have in some cases individually, and in other cases as groups, produced their own Strategic Flood Risk Assessments to inform District level planning (including employment and housing sites). Similarly the City of York has its own Strategic Flood Risk Assessment, and the North York Moors National Park is covered by district / local authority level Strategic Flood Risk Assessments covering its area.

In this review we have only considered Strategic Flood Risk Assessments that are relevant to the site submissions to the Minerals and Waste Joint Plan.

2.3.1 North West Yorkshire Strategic Flood Risk Assessment

This SFRA was produced in 2010 by JBA Consulting. The SFRA comprises a User Guide, a Technical Report and a series of supporting maps. The study covers 'the local authority areas of Craven District Council, Harrogate Borough Council, and Richmondshire Council' though the study states that the 'Yorkshire Dales National Park is not part of this assessment although actions taken in the National Park have the potential to influence flood risk downstream and we have considered these where appropriate'. The SFRA goes on to describe the main urban centres, including 'Skipton, Harrogate, Knaresborough, Ripon, Richmond and a number of villages' stating that 'the SFRA concentrates on future development within the districts, which will generally occur around these urban centres'.

In addition to mapping Flood Zones 2 and 3a, the study maps the functional floodplain (Flood Zone 3b) using 1 in 25 year flood outlines provided by the Environment Agency (excluding developed and defended areas). In addition an extension to the functional flood plain is suggested (Candidate Flood Zone 3b). Other sources of flooding are considered and river modelling studies, historical data and LIDAR data add resolution to the assessment.

The SFRA includes strategic maps of selected areas for the following types of flood risk:

- PPS25 Flood Zones;
- 1 in 100 year flood depths;

- 1 in 100 year flood hazards;
- Climate change sensitivity;
- Flood risk management;
- Refined surface water flooding;
- Historical Flooding.

The North West Yorkshire SFRA also proposes 7 Critical Drainage Areas, where runoff associated with new development might increase flood risk from surface water drainage and / or sewer capacity.

The SFRA is available from the following sources:

<http://www1.harrogate.gov.uk/sfra/>

<http://www.cravendc.gov.uk/CHttpHandler.ashx?id=915&p=0>

<http://www1.harrogate.gov.uk/sfra/reports/2009s0266%20NW%20Yorkshire%20SFRA%20Volume%202%20Technical%20Report%20FINAL.pdf>

2.3.2 Northeast Yorkshire Strategic Flood Risk Assessment

The Northeast Yorkshire Strategic Flood Risk Assessment was commissioned by Ryedale District Council, Scarborough Borough Council and the North York Moors National Park Authority and undertaken by Arup. It was published in March 2006 and updated in February 2010.

The study area covers the whole of the local authority areas of Ryedale and Scarborough including the North York Moors National Park.

The study delineates Flood Zones 2, 3a, and 3b (the functional floodplain) and goes further by defining 3 sub zones to Flood Zone 3a (3a (i), 3a (ii) and 3a (iii)). In addition to flooding from rivers and the sea, groundwater flooding, surface water flooding, sewer flooding, drainage incidents and flooding from reservoirs are considered. Consideration of climate change is based on topographical data to discern the relative sensitivity of settlements to increased water levels arising from climate change.

The study goes into greater detail in certain locations where there is significant development pressure (Malton and Norton, Pickering and Whitby) In particular flood depth mapping has taken place using a Digital Elevation Map based on LIDAR remote sensing data. Rapid Inundation Zones are also defined by assigning a hazard rating to areas behind flood defences where overtopping could occur.

The SFRA also defines Critical Drainage Areas, including areas that drain behind defences and former 'critical ordinary watercourses' within these Areas.

The SFRA (2010 update) is available from the following source:

<http://www.ryedaleplan.org.uk/other-documents/evidence-base/122-north-east-yorkshire-strategic-flood-risk-assessment-2006>

2.3.3 Hambleton Strategic Flood Risk Assessment

Hambleton SFRA was published in 2006. Flood Zones 2 and 3 are mapped on maps generated for individual settlements. Town and village maps / descriptions consider historical flood risk as well as flooding from rivers, overflowing of drainage infrastructure, surface water flooding and areas of potential high water table.

2.3.4 Selby Strategic Flood Risk Assessment

Selby District Council commissioned Scott Wilson Consultancy to carry out a Level 1 Strategic Flood Risk Assessment, the updated version of which was published in 2008. The study area of the report is the administrative boundary of Selby District Council. The study maps Flood Zones 1, 2, 3a and 3b, as well as historical flooding incidents, storm water sewer flooding, flood defences, flood warning areas, and reservoir flooding.

Flood Zone 3b is defined as Flood Zone 3 when it is undefended and outside of development limits. Flood Zone 2 is used as a surrogate to represent the potential impact of climate change.

Selby District Council has also commissioned a level 2 SFRA.

Both the Level 1 and Level 2 SFRA are available at:
<http://www.selby.gov.uk/strategic-flood-risk-assessment>

2.3.5 North Yorkshire Preliminary Flood Risk Assessment

In response to the Flood Risk Regulations 2009 North Yorkshire County Council, as Lead Local Flood Authority, submitted a Preliminary Flood Risk Assessment to the Environment Agency in 2011. The report was written by the consultancy Jacobs.

The Flood Risk Regulations implement the European Floods Directive which requires the completion of a four stage process (undertaken on a six yearly cycle) that comprises the following:

- Preliminary Flood Risk Assessment and reporting;
- Identify Flood Risk Areas;
- Prepare Flood hazard and Flood Risk Maps
- Prepare Flood Risk Management Plans

As the LLFA North Yorkshire County Council is required to implement the regulations in relation to local (ordinary watercourses) flood risk. The preliminary Flood Risk Assessment represents the first step in the process, representing a high level screening exercise that involves collecting information on historic and future floods.

Of most relevance to this SFRA, two objectives of the PFRA are to:

- Assess historic flood events within the study area from local sources of flooding (including flooding from surface water, groundwater and ordinary watercourses), and, where possible, the consequences and impacts of these events; and
- Establish an evidence base of historic flood risk information, which will be built upon in the future and used to support and inform the preparation of NYCC's Local Flood Risk Strategy.

The PFRA is available from:
https://www3.northyorks.gov.uk/n3cabinet_scru/transporeconom_/reports_/20110608_/06preliminaryfl/06preliminaryfl.pdf

2.3.6 City of York Strategic Flood Risk Assessment

Produced in March 2013 (Revision 2) this SFRA was produced in response to the NPPF and associated Technical Guidance. It provides an overview of flood risk issues in the York area,

maps of flood risk zones (including Flood Zone 3b) and a summary of the sequential and exception tests in the York context. It also identified Rapid Inundation Zones (RIZs), defined as follows:

“Where detailed flood levels and topographic data were available, depth of flooding likely from the 1 in 100-year (1%) event has been shown. This provides an indication of the flood risk within Zone 3, and allows for the calculation of rapid inundation zones where the combination of depth and velocity could lead to a potential loss of life”.

Historical records and flood defences have also been reviewed. Climate change is considered and highlighted as a consideration for FRAs for all development sites in Flood Zone 2, 3a and 3b and as a part of considering surface water drainage.

The SFRA is available from

https://www.york.gov.uk/downloads/download/2369/strategic_flood_risk_assessment_documents

Table 2 summarised the variability between SFRA as well as their common elements.

Table 1: Review of local level SFRA

SFRA component ³	North East Yorkshire SFRA	North West Yorkshire SFRA	City of York SFRA	Hambleton SFRA / SFRA Supplement	Selby SFRA
Year produced / policy framework	2006 / PPG25 // 2010 / PPS25	2010 / PPS25			2008 / PPS25
Maps showing main rivers, ordinary watercourses and flood zones including functional floodplain if appropriate	Yes – subdivide floodplain into 3a (i/ii/iii) / 3b / 3c (functional floodplain) / Rapid Inundation Zones	Yes – Flood Zones 3 and 3b defined. In the north west Yorkshire SFRA Flood zones 3b is defined as undeveloped areas in Flood Zone 3.		Flood Zones 2 and 3.	Yes – for functional floodplain use an approach where Flood Zone 3 outside of urban areas is represented as Flood Zone 3b.
An assessment of the implications of climate change for flood risk ⁴		modelling studies with a +20% adjustment for climate change from rivers. Climate change also considered for 1 in 200 year surface	Described and advised for FRA (river and surface).	Not considered	Consider only for rivers and use flood Zone 2 as a surrogate for flood zone 3 under climate change.
Areas at risk of other sources of flooding, such as surface water or reservoirs	surface water flooding,	Sophisticated both surface water	Groundwater and overland flow recommended for FRA.	Flooding on ordinary watercourses / sewers noted based on historical data. Useful	Rely on historic flooding and sewer flooding records, though FRAs are

³ As suggested in the Government’s Planning Practice Guidance and linked Environment Agency document ‘Strategic Flood Risk Assessments: Guidance to Support the National Planning Policy Framework’.

⁴ Consistent with the Environment Agency document ‘Climate Change Allowance for Planners: Guidance to Support the National Planning Policy Framework’.

	groundwater flooding, sewer flooding)	by using bespoke JFLOW modelling.		consideration of high water tables for groundwater flood risk.	required to investigate flooding from different sources.
Flood risk management measures, including location and standard of infrastructure and the coverage of flood warning systems	Yes for flood management measures (relatively detailed assessment of coverage).	Draw from National Flood and Coastal Defence Database and EA mapping on areas benefitting from flood defences.	Flood defences (including standard of protection) and flood warning systems documented. Also contains guidance on flood risk management measures.	Defences noted and standard of protection described.	Data on flood defences gathered. Areas benefitting from flood defences mapped. Flood warning areas mapped.
Locations where additional development may significantly increase flood risk elsewhere	Yes – define drainage sensitive areas.	Critical drainage areas perform this role	Yes – contains a review of specific sites which have certain flooding issues, including where they may increase flood risk.	Yes – some locations are described.	No
Recommendations about the identification of critical drainage areas / surface water management plans	Yes – lists Critical Ordinary Watercourses	Consider national critical drainage areas and propose new critical drainage areas.	No, but may not be relevant	No, but may not be relevant.	No, but may not be relevant
Guidance on the preparation of flood risk assessments	Yes	Yes – detailed approach laid out in volume 1	Yes	SFRA as a whole could be used as an information source.	Yes.
Advice on the applicability of SuDS	SuDS referred to but specific guidance not available.	Yes chapter based on CIRIA guidance	Yes, as part of a chapter on general surface water guidance.	No	Yes
Explanation of sequential test for all forms of flooding	Yes – include flow charts for both rivers and other sources of flooding	Clear application of sequential test for rivers.	Sequential test set out for fluvial flooding.	Sequential test set out for fluvial flooding.	Sequential test for rivers clearly laid out.

Rural coverage ⁵	Chapter on rural land management –some other flood risks are reported for whole area.	Yes	Some maps (flood zones / defences) show all parts of York.	Published maps and records relate to settlements rather than open countryside, though there is a considerable buffer where flooding is mapped around each settlement.	Yes – provide district wide maps
-----------------------------	---	-----	--	---	----------------------------------

DRAFT

⁵ A key requirement with SFRAs in the Joint Plan Area will be their applicability to the areas where sites may be developed.

3. Flood Risk Data Sources: Datasets that can supplement the Local SFRAs

3.1 Sources of Flooding

Flooding can occur for a variety of reasons and from several sources. Table 1 summarises the possible sources of flooding in the Joint Plan Area and some key reasons why they might contribute to flooding.

Table 2: Sources of Flooding

Flooding from Rivers and Ordinary watercourses	Flooding of rivers is usually caused by prolonged intense rainfall, often intensified by changes in the drainage regime or restrictions in a watercourse's capacity to flood adjacent land further up the catchment. Soil permeability and other factors such as the extent to which surfaces over which runoff can flow are paved, compacted or covered by trees and vegetation ⁶ also affects the rate at which water enters rivers.
Flooding from surface water and sewers	Flooding from surface water and sewers occurs when the drainage system cannot cope with rainfall. Flooding may occur as water flows downhill and gathers in depressions in the land, or when the drainage system is near to capacity water can be forced back up surface water sewers or combined sewer overflows.
Flooding from High Groundwater Levels	According to the British Geological Survey <i>'Groundwater flooding occurs as a result of water rising up from the underlying rocks or from water flowing from dormant springs. This tends to occur after long periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels'</i> . ⁷ 'Groundwater rebound' may also occur, which is where a phenomena such as built development causes groundwater abstraction to cease, which is followed by a rise in groundwater levels. A similar process can happen in disused mines and is called 'minewater rebound'

⁶ The Woodland Trust highlight research by the University of Manchester on the relative run off rates for land with different surfaces, including tree covering: *"The university's experiment involved creating nine test areas, each with three separate plots. These contained one plot containing a tree surrounded by asphalt, another with just asphalt and a third with just grass. Surface runoff was directed towards a drain and measured using a tipping bucket gauge to measure both the total amount and rate of water runoff. This suggests that the plots with trees helped reduce runoff by as much as 80% compared with the asphalt surface."* See: Woodland Trust, undated. New Research Suggests Trees can Protect Businesses from Flooding [URL: <http://www.woodlandtrust.org.uk/en/news-media/corporate/Pages/floods-and-business.aspx>] (accessed on 17 July, 2012).

⁷ British Geological Survey. 2010. Science Briefing 2010: Groundwater Flooding. [URL: <http://www.bgs.ac.uk/research/groundwater/flooding/groundwaterHomesFAQ.html>] (accessed on 17 July, 2011)

Flooding from reservoirs and artificial sources	There are several non-natural sources of flood risk including flooding from canals, reservoirs and man-made lakes. These sources of flooding can occur when the facility is overwhelmed by high rainfall or when a dam or bank fails. Flooding from such sources can happen suddenly and can cause significant damage and danger to life.
---	---

3.2 Evolving Data

Flood risk data is evolving rapidly as methodologies improve for more accurately predicting flood risk and the effect of climate change. It is important that the sequential testing of minerals and waste developments is consistent both with local level work that has been carried out through local level SFRAs and the latest available data. This chapter summarise the key data sources that have been utilised which are additional to local level SFRA data.

3.3 The Environment Agency Flood Map and Fluvial Flooding

The Flood Map is produced and regularly updated by the Environment Agency. It combines detailed local data with information from a national model of England and Wales. According to the Environment Agency:

“The likelihood of flooding has been calculated using predicted water levels and taking the currently shown on the Flood Map”⁸.

The flood map shows the following:

“Flooding from rivers or sea without defences - the natural flood plain area that could be affected in the event of flooding from rivers and the sea

For flooding from rivers the map indicates the extent of a flood with a 1% (1 in 100) or greater chance of happening each year

For flooding from the sea the map shows the extent of a flood with a 0.5% (1 in 200) or greater chance of happening each year

Extent of extreme flood - the extent of a flood with a 0.1% (1 in 1000) or greater chance of happening each year

Flood defences - flood defences such as embankments and walls, and flood storage areas (which are areas of land designed and operated to store flood water)

Areas benefiting from flood defences - where possible we show the areas that benefit from the flood defences shown, in the event of a river flood with a 1% (1 in 100) chance of happening each year, or a flood from the sea with a 0.5% (1 in 200) chance of happening

⁸ Environment Agency, 2014. Flood Map – Your Questions Answered [URL: <http://apps.environment-agency.gov.uk/wiyby/31662.aspx>]

each year. If the defences were not there, these areas would flood. Note that we do not show all areas that benefit from flood defences”.⁹

Main rivers - these are usually larger streams and rivers. Our powers to carry out flood defence works apply to main rivers only. In England, Defra decides which are the main rivers. The Welsh Assembly Government does this in Wales.

The Flood Map does not provide information on flood depth, speed or volume of flow. It doesn't show flooding from other sources, such as groundwater, direct runoff from fields, or overflowing sewers”.

AS THE FLOOD MAP IS THE LATEST AVAILABLE SOURCE OF FLOOD DATA ACROSS THE PLAN AREA IT WILL ALWAYS BE USED AS THE STARTING POINT FOR THE SEQUENTIAL TESTS IN THIS SFRA.

We have supplemented data from the Flood Map in this SFRA with additional data, where it is available, to give a more accurate picture of flooding, and to allow us to further identify potential functional floodplain and climate change where they aren't already found in local level SFRAs.

Table 3 outlines the data sources used in this review.

Table 3: Data Sources used in the Review of Flooding from Rivers

Data	Format	Source
Flood Zone 2	MapInfo file	Environment Agency
Flood Zone 3	MapInfo file	Environment Agency
River Centrelines	MapInfo file	Environment Agency
River Network (detailed)	MapInfo file	Environment Agency
National Flood and Coastal Defence Database - Defences	MapInfo file	Environment Agency
Flood Storage Areas	MapInfo file	Environment Agency
Detailed Flood Modelling (Modelled Flood Outlines) for locations where available.	MapInfo files	Environment Agency
CFMP JFLOW Modelled Flood Outlines where available (Ouse, Esk and Derwent)	MapInfo files	Environment Agency
Environment Agency Historic Flood Map	Shape File	Environment Agency
District Council Flooding records	MapInfo file	North Yorkshire County Council LFRMS
North Yorkshire County Council Highway Local Flooding – by area	MapInfo file	North Yorkshire County Council LFRMS

⁹ *Ibid*

(checked for fluvial flooding)		
North Yorkshire Fire and Rescue (only where flood cause is clearly fluvial)	MapInfo file	North Yorkshire County Council LFRMS
NYCC Flooding Incidents Recorded (only where flood cause is clearly fluvial)	MapInfo file	North Yorkshire County Council LFRMS
North Yorkshire Preliminary Flood Risk Assessment Locally Significant Flooding Issues and Potential Schemes (checked for coincidence of rivers and single / multiple flood events)	MapInfo file	North Yorkshire County Council LFRMS

3.4 Surface Water and Sewer Flooding

Until recently the Environment Agency produced maps of 'areas susceptible to surface water flooding' and a separate 'flood map for surface water' which looked at the areas that may become flooded by surface water during an extreme rainfall event. However, in December 2013, a new Updated Flood Map for Surface Water was launched. This new map shows areas at risk of flooding from surface water. The Updated Flood Map for Surface Water (UFMSW):

"Used a sophisticated computer model to simulate rain falling on the ground to see where rain water flows and ponds, based on a ground model of 2m squares. The ground height was raised to represent buildings (typically by 0.3m), flow paths were better represented through structures such as bridges and rail embankments, and roads were lowered (by 0.125m) so flood flow paths are better represented. Ground roughness was varied to take account different land use.

Total rainfall depths were calculated on 5km squares: using rainfall with a 1 in 30, 1 in 100 and 1 in 1000 chance of occurring in any year and three different storm durations (1, 3 and 6 hours). These were adjusted to take into account infiltration (to represent the difference between urban and rural areas) and drainage (assuming a constant rate of flow is removed in all urban areas) Very shallow flooding and very small areas of flooding were removed. The results were validated using historical observations and local modelling data in three pilot areas."¹⁰

The UFMSW assigns new risk categories to surface water flooding. These are:

High – the chance of flooding in any year is greater than 3.3% (1 in 30)

Medium – the chance of flooding in any year is 3.3% (1 in 30) or less but greater than 1% (1 in 100)

Low – the chance of flooding in any year is 1% (1 in 100) or less but greater than 0.1% (1 in 1000)

Very low – the chance of flooding each year is 0.1% (1 in 1000) or less

¹⁰ Environment Agency, 2013. Risk of Flooding from Surface Water: Updated Flood Map for Surface Water.

In our assessment data was provided to us at 3 levels: 1 in 30 year risk, 1 in 100 year risk and 1 in 1000 year risk. This would represent the outer boundary of each of the first 3 categories listed above, i.e. 'high', 'medium' and 'low'.

As rivers tend to follow valley lines, which represent the low points in a landscape, surface water flooding also often occurs near these features. In addition, surface water flooding will often occur next to other water bodies, such as reservoirs and along ordinary watercourses. However, areas of surface water flooding may also occur in the wider landscape.

Table 4 shows the data sets that have been used to determine flood risk from surface water (where it is not already covered in a contemporary fashion in local level SFRAs).

Table 5: Surface Water Flooding Data Sources

Data source	Source	Format
Updated Flood Map for Surface Water	Environment Agency	Mapinfo file
District Council Flooding records	North Yorkshire County Council LFRMS	Mapinfo file
North Yorkshire County Council Highway Local Flooding – by area (checked for surface flooding)	North Yorkshire County Council LFRMS	Mapinfo file
North Yorkshire Fire and Rescue (only where flood cause is clearly surface water flooding)	North Yorkshire County Council LFRMS	Mapinfo file
NYCC Flooding Incidents Recorded (only where flood cause is clearly surface water flooding)	North Yorkshire County Council LFRMS	Mapinfo file
North Yorkshire Preliminary Flood Risk Assessment Locally Significant Flooding Issues and Potential Schemes (checked for surface water flooding)	North Yorkshire County Council PFRA	Mapinfo file
Yorkshire water – other flooding DG5 data	North Yorkshire County Council LFRMS	Mapinfo file

3.5 Groundwater Flooding

Groundwater flooding is caused by the emergence of water from underground aquifers. It can be caused by a range of factors, including:

- Prolonged periods of rainfall – this cause of groundwater flooding happens mostly in areas underlain by high permeability aquifers where groundwater levels rise and flood overlying land;
- Flooding of the superficial aquifer resulting from high river levels – as river levels become elevated they can flow through the bank into the superficial aquifer which

may ultimately flood, particularly if the river bank is higher than the adjacent floodplain;

- Rebound – where abstraction of groundwater ceases, the groundwater level can return to a natural level. This may cause problems if springs start to reform in areas that have since been developed. A similar phenomenon, 'mine water rebound' occurs when mines refill with water after pumping / removal of water that previously entered the mine ceases. As water levels build this can cause flooding from previously dry points in the mine network, and may cause pollution episodes in surface water or overlying aquifers.¹¹

Data sources for groundwater flooding are noted in Table 5, below. We supplement local level SFRAs with consideration of this data where needed.

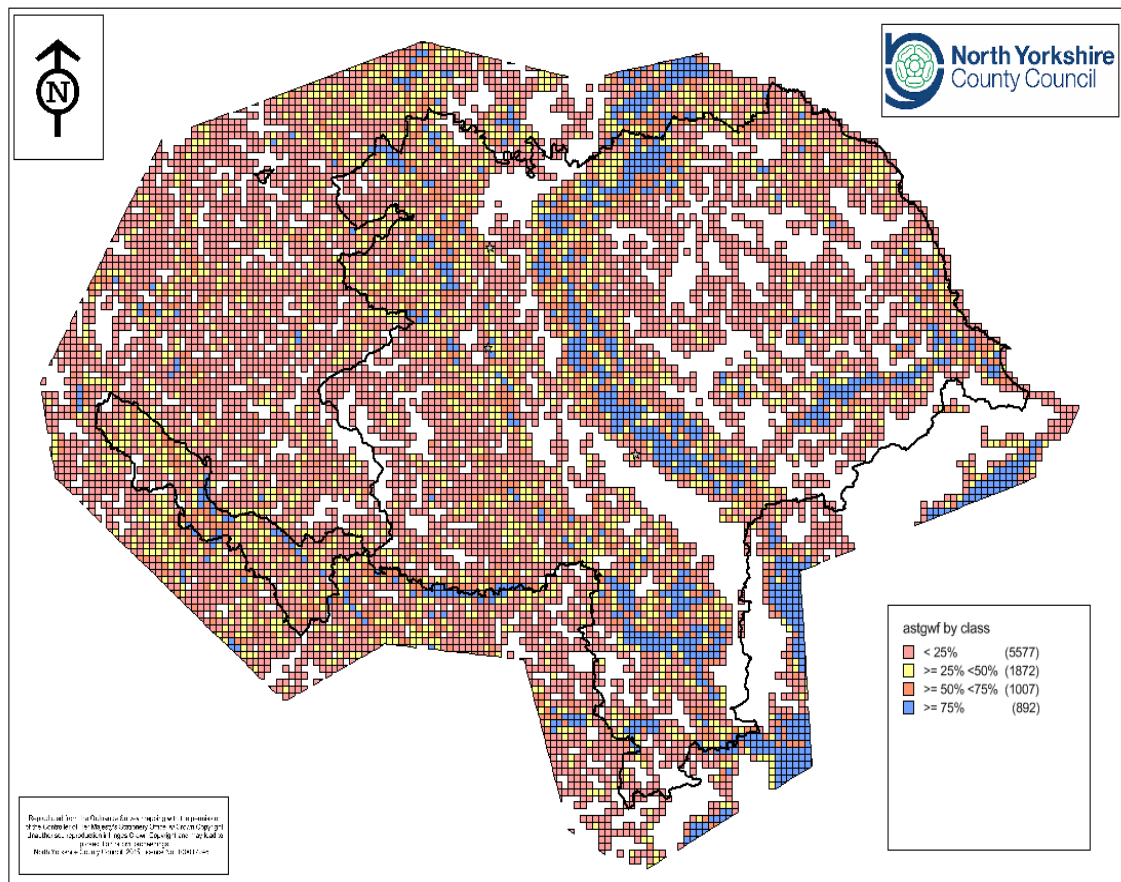
Table 5: Data sources for Groundwater Flooding

Data	Source	Details
Areas susceptible to Groundwater Flooding	Environment Agency	Mapinfo
North Yorkshire Preliminary Flood Risk Assessment Locally Significant Flooding Issues and Potential Schemes (checked for groundwater flooding events)	North Yorkshire County Council	Mapinfo. According to the PFRA groundwater flooding is known to be a cause of flooding to a small number of properties throughout North Yorkshire in some areas as a result of natural springs in the hillside next to properties, and, because both groundwater and surface water flooding ponds in nearby low lying areas.
District level historic flooding records (checked for possible groundwater flooding)	North Yorkshire Local Flood Risk Management Strategy	Mapinfo. Checked for possible groundwater flooding if site falls within an area of high groundwater risk.
North Yorkshire Fire and Rescue (checked for where flood cause is probable groundwater flooding)	North Yorkshire Local Flood Risk Management Strategy	Mapinfo. Mapinfo. Checked for possible groundwater flooding if site falls within an area of high groundwater risk.
Borehole data	Submitted planning applications	Nearby minerals planning applications checked for all submitted sites as these often give borehole data.

Map 1 shows the Areas Susceptible to Surface Water Flooding. The blue squares represent those with the largest proportion of area where groundwater may emerge.

¹¹ Sunderland City Council, 2010. Strategic Flood Risk Assessment 2010: Volume 1 Guidance

Map 1: Environment Agency Areas Susceptible to Groundwater Flooding



As can be seen from the map much of the catchment has a relatively low proportion of land area that is susceptible to groundwater flooding, though areas of higher susceptibility do exist in localised bands bordering higher land in the east of the plan area, as well as along the Wharfe as it straddles the county boundary and in the lower Ouse catchment in Selby District.

Sometimes flooding results from the interaction of groundwater with surface water. According to North Yorkshire's Preliminary Flood Risk Assessment:

"There is no substantial evidence of direct groundwater flooding in the majority of North Yorkshire. However, it is known to be a contributing factor in specific circumstances and that it may exacerbate surface water flooding. For example, it is known to be a cause of flooding to a small number of properties in some areas as a result of natural springs in the hillside next to properties, and, that both groundwater and surface water flooding ponds in nearby low lying areas."

The PFRA predicted that there are 138 properties and 123 dwellings at risk of flooding in the whole of the County.

Within the Plan area there are small areas which are prone to clearwater¹² flooding and small areas which are prone to flooding because they lie on superficial permeable

¹² Clearwater flooding is caused by the water table in an unconfined aquifer rising above the ground surface. It occurs when high groundwater levels combine with high unsaturated zone moisture and heavy rainfall. (Source:

deposits¹³. This data has informed the areas susceptible to groundwater flooding map above. Distinguishing between clearwater and superficial permeable sources of flooding can help inform how flooding may occur. For instance, localised sands and gravels on top of less permeable bedrock, particularly in valley bottoms where a high water table can flow into a depression, or close to a river or stream may indicate that flooding from a superficial permeable source is possible¹⁴.

Minerals development, where it involves extracting from beneath the surface is particularly vulnerable to groundwater flooding. The depth of minerals sites is often critical, and minerals sites may be affected by ingress of groundwater in areas where surface development would not normally be affected by groundwater flooding.

3.6 Flooding from Reservoirs and Artificial Sources

Reservoirs are very unlikely to flood, and there are no incidents resulting in loss of life since 1925¹⁵. However, during the exceptionally wet summer of 2007 serious structural damage to a dam at Ulley Reservoir, Rotherham was reported nationally. This highlighted the potentially catastrophic risk presented by a damaged reservoir facility. If a dam were to collapse a large volume of water would be released, quickly flooding a large area.

Nationally 14 incidents where emergency drawdown of reservoir waters was required took place between 2004 and 2008¹⁶. The Environment Agency publishes outline maps of where water would flow in a worst case scenario of reservoir failure.

Canals may flood in a similar fashion to reservoirs, for instance by overtopping as facilities become overwhelmed or as a result of bank failure. As with reservoirs, water can be released quickly from canal floods.

Flooding can occur from other sources where water is retained above ground level, such as quarrying and gravel extraction sites. This may increase floodwater depths and velocities in adjacent areas.

Table 6 shows the data sources we have used to consider this sort of flooding (where it is not already covered in a contemporary fashion in local level SFRAs).

British Geological Survey, undated. Groundwater Flooding in an Unconfined Major Aquifer Setting [URL: <http://www.bgs.ac.uk/research/groundwater/flooding/major.html>]

¹³ Flooding from superficial permeable deposits is also referred to as flooding in a shallow unconsolidated sedimentary aquifer setting. According to the BGS “These aquifers are susceptible to flooding as the storage capacity is often limited, direct rainfall recharge can be relatively high and the sediment may be very permeable, creating a good hydraulic connection with adjacent river networks”. (Source: Flooding in a Shallow Unconsolidated Sedimentary Aquifer Setting [URL: <http://www.bgs.ac.uk/research/groundwater/flooding/unconsolidated.html>]

¹⁴ See for example UK Groundwater Forum, undated. My Property may be Affected by Groundwater Flooding, what can I do? [URL: http://www.groundwateruk.org/faq_groundwater_flooding.aspx]

¹⁵ Environment Agency, undated. Am I at Risk of Reservoir Flooding? [URL: <http://www.environment-agency.gov.uk/homeandleisure/floods/124783.aspx>]

¹⁶ Gateshead Council, undated. Flooding Reservoirs [URL: <http://www.gateshead.gov.uk/Council%20and%20Democracy/emergency/Flooding-Reservoirs.aspx>]

Table 6: Data Sources used in the Review of Flooding from Artificial Sources

Data	Source	Format
Reservoir Flood Map	Environment Agency	Web based mapping tool. As the risk of reservoir flooding is extremely low we have not referred to this in the sequential testing of sites, though this should be considered in Flood Risk Assessments for all sites in proximity to rivers.
British Waterways Canal breaches and overtopping	North Yorkshire Local Flood Risk Management Strategy	Mapinfo
North Yorkshire County Council Highway Local Flooding – by area (checked for artificial source flooding)	North Yorkshire County Council LFRMS	MapInfo file
District Flooding incidents (checked for artificial source flooding)	North Yorkshire County Council LFRMS	MapInfo file
North Yorkshire Fire and Rescue (checked for artificial source flooding)	North Yorkshire County Council LFRMS	MapInfo file

4. Updating the Functional Floodplain

4.1 From a local to a plan-wide approach

The Planning Practice Guidance which accompanies the National Planning Policy Framework gives details of what land should be considered 'functional floodplain'. The functional floodplain comprises land where water has to flow or be stored in times of flood. According to the Guidance:

*"The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. However, land which would naturally flood with an annual probability of 1 in 20 (5%) or greater in any year, or is designed to flood (such as a flood attenuation scheme) in an extreme (0.1% annual probability) flood, should provide a starting point for consideration and discussions to identify the functional floodplain."*¹⁷

Across the plan area local level SFRA's take a very varied approach to mapping the functional flood plain. This ranges from simply stating that Flood Zone 3 should be considered as functional floodplain when it lies outside of settlements to use of 1 in 25 year flood risk modelling.

Table 7 summarises the different approaches taken by local level SFRA's.

Table 7: Different approaches to functional floodplain.

SFRA	North East Yorkshire SFRA	North West Yorkshire SFRA	City of York SFRA	Hambleton SFRA / SFRA Supplement	Selby SFRA
Approach to climate change for rivers and the sea.	Yes – subdivide floodplain into 3a (i/ii/iii) / 3b / 3c (functional floodplain).	Yes – Flood Zones 3 and 3b defined. In the north west Yorkshire SFRA Flood zones 3b is defined as undeveloped areas in Flood Zone 3.	Yes – 2, 3, 3b (functional floodplain).	Flood Zones 2 and 3. Flood zone 3 is defined as being made up of 3 types of land, including functional floodplain.	Yes – for functional floodplain use an approach where Flood Zone 3 outside of urban areas is represented as Flood Zone 3b.

However, the Environment Agency have provided the authors of this SFRA with 1 in 20 flood risk data which would allow a methodology consistent with current planning practice to be developed.

¹⁷ Department for Community Local Government, 2015.

We have therefore taken the following tiered approach:

1. In areas where functional floodplain has been defined in a local SFRA we rely on the mapped data or definition in that SFRA to define functional floodplain.
2. In areas where 1 in 20 flood risk data is available to the authors of this report this is used as the basis for defining the functional floodplain. We have referred to this as potential functional floodplain in our strategic review of minerals and waste sites as a more detailed mapping exercise would be required to remove small scale features that are not functional, in line with the definition presented in this SFRA.

While 1 in 20 data can provide the starting point for functional floodplain, further data can be added to add or remove areas from the functional floodplain to make it more accurate. Table 8 shows the data that we have collected to help define the functional floodplain.

Table 8: Data used to define the Functional Floodplain

Data Layer	Source	Shown on map as
Historic Flood Event Outline	Environment Agency	Historic Flood Outline
Broadscale Modelled Outline (1 in 20 year flood where available)	Environment Agency	1 in 20 risk
Modelled Outline (1 in 25 year flood where available)	Environment Agency	1 in 25 risk
Flood storage areas	Environment Agency	Flood Storage Area
Areas Benefiting from Flood Defences	Environment Agency	Areas Benefitting from Defences
Flood defence	NFCDD	Defence
Main River Centreline	Environment Agency	Main River
Road Rail Infrastructure	North Yorkshire County Council	Road / Rail
Historic Flood Record	NYCC	Historic flooding
Other areas considered to be defended with a suitable standard of protection	Qualitative judgement on NFCDD data	Only shown where relevant / where flood defences are shown

Submitted minerals and waste sites which contain land that is defined as being potential functional floodplain should use the methodologies outlined in relevant SFRAs to further delineate the functional floodplain. Where such a definition is not available the following definition should be used:

Functional Floodplain = IF 3 or more historic flood records¹⁸ occur in one location within Flood Zone 3, OR the area is defined as flood storage OR the area is defined as having a 1 in 20 flood risk AND the areas benefitting from flood defences, other areas considered to be

¹⁸ These must relate to separate flood events which are clearly related to fluvial flooding, and suggest a frequent return period for flooding (i.e. the pattern of flooding would be broadly consistent with a =>1 in 20 return period).

defended with a suitable standard of protection, road and rail infrastructure and built development are removed from that area THEN the remaining area is functional floodplain. The formula is varied accordingly according to whether 1 in 20 (first preference), 1 in 25 (second preference), or a Flood Zone 3 proxy (third preference) is used.

While we show key information layers that make up potential functional floodplain in our sequential testing of minerals and waste sites in this SFRA, site specific flood risk assessments in proximity to functional floodplain should attempt to further delineate the functional floodplain by cleaning up the maps to remove anomalies, such as where functional floodplain apparently lies behind an area benefitting from flood defences, whether those flood defences are 'maintained and functional'¹⁹, and to check inconsistencies, for instance where an area benefitting from flood defences lies in a place where there is no linear or non-linear (e.g. a pumping station) defence. In some cases a defence may be indicated though no area benefitting from the defence is shown or no Standard of Protection for that defence is shown. These potential functional floodplain areas should be considered for their potential to be defined as actual functional floodplain in site specific Flood Risk Assessments.

In some cases the functional flood plain area overlaps existing developed areas. While these are excluded from the definition of Flood Zone 3b, they can be described at a site and level as flood zone 3a(i). In flood zone 3a(i) land (for instance gardens and parks) may still play a functional role in terms of the storage and flow of water. This should be considered during site specific flood risk assessment, which should look at the predicted flow path of water.

¹⁹ Maintained and functional defences are determined by(insert something about NFCDD database – possibly 'condition met')

5. Considering Climate Change

5.1 Considering Climate Change Effects on Rivers and the Sea

Climate change is expected to increase flood risk by increasing the area of rivers expected to flood due to increased rainfall and rising sea levels. The National Planning Policy Framework states the importance of accounting for climate change when considering flood risk:

“Local Plans should apply a sequential, risk based-approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account of the impacts of climate change, by:

-applying the Sequential Test;

-if necessary, applying the Exception Test;

-Safeguarding land from development that is required for current and future flood management;

-Using opportunities offered by new development to reduce the causes and impacts of flooding; and

-Where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to facilitate the relocation of development, including housing, to more sustainable locations²⁰.

Because local level SFRAs have been undertaken at different periods of time, under different guidance and different climate change projections, consideration of climate change varies considerably between areas.

Table 9 shows the ways in which district level SFRAs consider climate change from rivers.

Table 9: Climate change consideration in existing SFRAs

SFRA	North East Yorkshire SFRA	North West Yorkshire SFRA	City of York SFRA	Hambleton SFRA / SFRA Supplement	Selby SFRA
Approach to climate change for rivers and the sea.	Described – qualitative analysis done for settlements using local topography.	Uses river modelling studies with a +20% adjustment for climate change from rivers.	Described and advised for FRA (river and surface).	Not considered	Considered only for rivers and use flood zone 2 as a surrogate for flood zone 3.

²⁰ Department for Communities and Local Government. 2012. National Planning Policy Framework [URL: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf]

As there is no one prevailing methodology, and an evident need to apply as consistent an approach as possible across the Plan Area we have tried to draw on the most relevant elements of the local SFRA in proposing a cross-plan methodology.

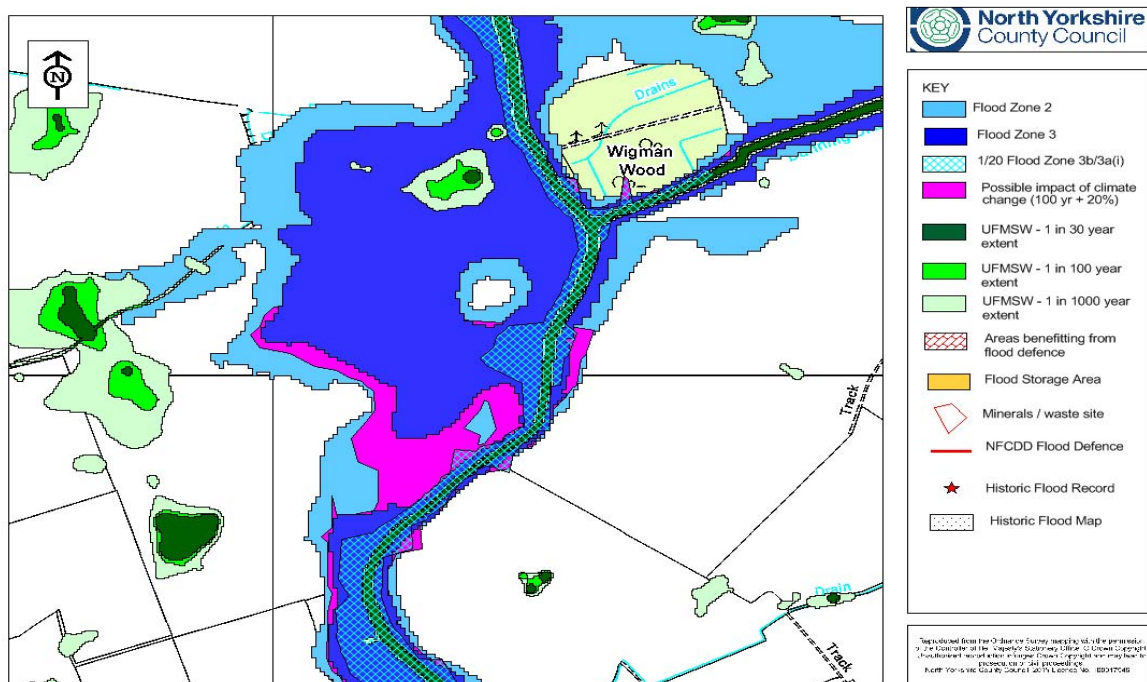
The Environment Agency have supplied the Joint Plan Authorities with a broad scale modelled outline of 1 in 100 year flooding for some river catchments 'up-scaled' to account for a 20 per cent increase in flood levels in line with national precautionary sensitivity ranges. This data takes into account tidal as well as river flooding (however, coastal flooding is not considered based on advice from the Environment Agency due to the fact that sites will predominantly, not be placed at coastal locations). In addition a number of more detailed modelling studies account for climate change at the same level. A +20 per cent increase in river flow is consistent with government guidance for rivers after 2025 and before 2115.

We have taken a precautionary approach in the interpretation of this modelled data and assumed that, where it extends beyond the boundary of present Flood Zone 3 that boundary should be extended by an equivalent amount for the period after 2025, subject to visual checks on other constraints (such as the presence of a flood defence).

This data-led approach is broadly consistent with the methodology used in the North-west Yorkshire SFRA. However, the data we have obtained does not cover all areas of the plan area. Where modelled studies do not exist (or model climate change in a different way), we have broadly followed the approach taken by the Selby SFRA whereby, as a precaution, Flood Zone 2 should be considered as Flood Zone 3 for the period after 2025.

Maps 2 shows how the additional extent of climate change is typically mapped. The map shows an area (coloured pink) where 1 in 100 year flood models have factored in a 20 per cent increase to peak river flow. This should be therefore be considered the boundary of Flood Zone 3 after 2025.

Map A: Typical Part of Plan Area Mapped for Climate Change



5.2 Climate Change Effects on Surface Water

Local level SFRA's give very limited consideration to the effects of climate change on surface water²¹. The Planning Practice Guidance to the National Planning Policy Framework states that SFRA should "assess the risk to an area from flooding from all sources, now and in the future, taking account of the impacts of climate change..." The Environment Agency 'climate change allowances for planners' guidance to support the NPPF²² gives an indication of the possible effects of climate change, stating that recommended national precautionary sensitivity ranges for peak rainfall intensity will rise by:

- +5% per cent between 1990 and 2025;
- +10% between 2025 and 2055;
- +20% between 2055 and 2085; and
- +30% from 2085 to 2115.

In the absence of appropriate data to support this degree of resolution, in this SFRA the effect of climate change in relation to surface water is taken to be:

-Flooding at a <1 in 30 year (high risk), >1 in 100 year (medium risk) and 100 to >1000 year (low risk) level up to 2055 should be taken to occur at the stated rate;

-Flooding at a >1 in 100 to >1 in 1000 year level (low risk) should be considered to occur at a >1 in 100 year (medium risk) rate and >1 in 100 year (medium risk) should be considered as being >1 in 30 year (high risk) level after 2055.

²¹ Some limited qualitative information is included in the north east Yorkshire SFRA but it is largely focussed on fluvial flooding.

²² Environment Agency (2013) Climate Change Allowances for Planners - Guidance to support the National Planning Policy Framework. Available at: http://cdn.environment-agency.gov.uk/LIT_8496_5306da.pdf (Accessed: 18/03/2014).

6. Bringing it all Together: Applying the Sequential Test to Minerals and Waste Sites

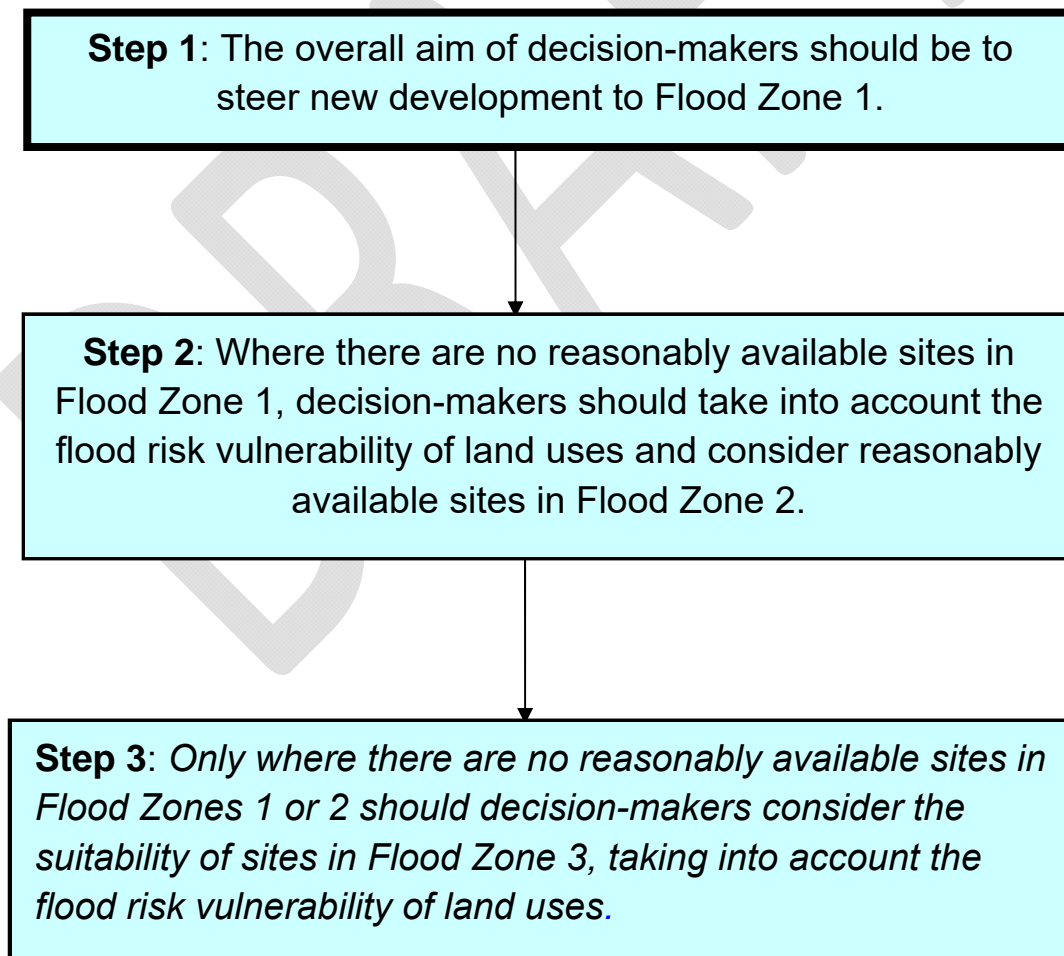
6.1 What is the Sequential Test?

The Sequential Approach, as it relates to rivers and the sea, is described in the Planning Practice Guidance to the National Planning Policy Framework as follows:

“The aim is to steer new development to Flood Zone 1 (areas with a low probability of river or sea flooding). Where there are no reasonably available sites in Flood Zone 1, local planning authorities in their decision making should take into account the flood risk vulnerability of land uses and consider reasonably available sites in Flood Zone 2 (areas with a medium probability of river or sea flooding), applying the Exception Test if required. Only where there are no reasonably available sites in Flood Zones 1 or 2 should the suitability of sites in Flood Zone 3 (areas with a high probability of river or sea flooding) be considered, taking into account the flood risk vulnerability of land uses and applying the Exception Test if required”²³.

This is summarised by Figure 2 below.

Figure 2: The Sequential Approach



²³ DCLG, 2015. Planning Practice Guidance [URL: <http://planningguidance.communities.gov.uk/blog/guidance/flood-risk-and-coastal-change/the-aim-of-the-sequential-test/>]

As Figure 1 illustrates, when undertaking the sequential test, it is important to consider the flood risk vulnerability of land uses when considering sites for development outside of Flood Zone 1. This is described in the Planning Practice Guidance and summarised in Table 10 below. The categories of development which are considered most likely to be considered in the Joint Plan have been highlighted.

As the Planning Practice Guidance only covers the issue of land use vulnerability in relation to fluvial flooding we have adapted Table 10 to show land use vulnerability to consider the other sources of flooding considered in this SFRA and local SFRAs.

DRAFT

Table 10: The Flood Risk Vulnerability of Land Uses

Flood risk vulnerability classification	Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Types of development ²⁴	<ul style="list-style-type: none"> -Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk; -Essential utility infrastructure which has to be located in flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood; -Wind turbines. 	<ul style="list-style-type: none"> -Flood control infrastructure -Water transmission infrastructure and pumping stations -Sewage transmission infrastructure and pumping stations -sand and gravel working -Docks, marinas and wharves -Navigation facilities -Ministry of defence installations -Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. -Water-based recreation (excluding sleeping accommodation); -Lifeguard and coastguard stations; -Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential 	<ul style="list-style-type: none"> -Police stations, ambulance stations and fire stations and command centres and telecommunications installations required to be operational during flooding; -Emergency dispersal points; -Basement dwellings; -Caravans, mobile homes and park homes intended for permanent residential use; -Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'essential infrastructure'). 	<ul style="list-style-type: none"> -Hospitals; -Residential institutions such as residential care homes, children's homes, social services, prisons and hostels; -Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels; -Non-residential uses for health services, nurseries and educational establishments; -Landfill and sites used for waste management facilities for hazardous waste -Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan. 	<ul style="list-style-type: none"> -Police, ambulance and fire stations which are not required to be operational during flooding; -Buildings used for shops, financial professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in 'more vulnerable' and assembly and leisure; - Land and buildings used for agriculture and forestry; -Waste treatment (except landfill and hazardous waste facilities); -Minerals working and processing (except for sand and gravel

²⁴ Those types of development highlighted are anticipated to be the most common forms of development to take place in the Plan Area.

Flood risk vulnerability classification	Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
		facilities such as changing rooms; -Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.			working); that do not need to remain operational during times of flood; -Sewage treatment
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	✓	Exception test required	✓	✓
Zone 3a	Exception test required	✓	x	Exception test required	✓
Zone 3b: Functional Floodplain	Exception test required	✓*	x	x	x
Consideration of other forms of flooding (significant categories are shaded blue)					
Surface water very low probability	✓	✓	✓	✓	✓
Surface water low probability	✓	✓	✓	✓	✓

Flood risk vulnerability classification	Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Surface water moderate probability	✓	✓	Exception test required where supported by other risk factors ²⁵	✓	✓
Surface water high probability	Exception test required where supported by other risk factors	✓	Exception test required where supported by other risk factors	Exception test required where supported by other risk factors	✓
Groundwater very low / low probability	✓	✓	✓	✓	✓
Groundwater moderate probability	✓	✓	Exception test required where supported by other risk factors	✓	✓
Groundwater high probability	Exception test required where supported by other risk factors	✓	Exception test required where supported by other risk factors	Exception test required where supported by other risk factors	✓

* In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- Remain operational and safe for users in times of flood;
- Result in no net loss of floodplain storage;
- Not impede water flows and not increase flood risk elsewhere.

²⁵ See 4.22 below for additional detail on other risk factors.

6.2 The Sequential Approach: other forms of flooding and climate change

In addition to applying the Sequential Test to flooding from rivers and the sea, the National Planning Policy Framework requires other forms of flood risk to be taken into account. In this SFRA data on the following types of flood risk (excluding rivers and the sea) has been gathered:

- Flooding from surface water and sewers;
- Groundwater flooding; and
- Flooding from artificial sources (reservoirs and impounded water bodies such as canals).

The SFRA relies to a significant degree on national surface, groundwater and artificial flood risk data. However, conditions on the ground may create significant variation in susceptibility to flooding. Therefore, these other sources of flooding will, even when considered to be low risk in national datasets, be investigated further through site specific flood risk assessment to ascertain if they are significant and present a greater level of risk. The list below highlights some of the risk factors for the key types of other flooding that are considered for groundwater and artificial flooding when undertaking the sequential test:

- History of groundwater or surface / artificial sources water flooding;
- Presence of a gradient greater than 1 in 100 over which water might flow
- High groundwater levels or the presence of marsh vegetation;
- Large impervious areas adjacent to the site or geological faults and arrangements of permeable and non-permeable strata that may facilitate groundwater flooding;
- Presence of ditches, springs, canals or other water features adjacent to the site²⁶

As stated previously, the National Planning Policy Framework states that Local Plans should take account of climate change in the longer term²⁷. In addition the Environment Agency's 'climate change allowances for planners' guidance to support the NPPF suggests how climate change can be considered within a Strategic Flood Risk Assessment. Chapter 5 of this SFRA shows the methodologies by which climate change has been taken into account in this SFRA.

Where development is proposed in an area affected by climate change induced flood risk, that development should be steered away from that area unless it can be demonstrated that the time frame for the development is sufficiently short so as to render the development unaffected by climate change, or the flood risk vulnerability of the development proposed suggests that even with climate change, the development would remain suitable.

In order to bring all these flooding variables together Table 11 sets out a more complete sequential test process for those sites where multiple sources of flooding exist

It should be noted that in some cases a particular flood risk may be confined to only a small part of a development site. It may be possible to avoid the risk through restricting development to only that part of the site that is at an appropriate level of flood risk, thereby avoiding the need to find alternative sites.

²⁶ West Sussex County Council, 2010. Strategic Flood Risk Assessment of West Sussex: Volume II Technical Report. [URL: http://www2.westsussex.gov.uk/yourcouncil/ppri/mwdf/sfra_vol2technical_jan10.pdf], East Riding of Yorkshire Council, 2011. Flood Risk Note for the Planning Application Process [URL: <http://www.eastriding.gov.uk/corp-docs/forwardplanning/docs/spg/floodrisknote.pdf>]

²⁷ Paragraph 99 of the NPPF

Table 11: Taking Account of Other forms of Flooding and Climate Change in the Sequential Approach

Sequential question	Yes	No
1. Is the site located in Flood Zone 1 in an area that <u>will not</u> be significantly affected by other sources of flooding or the impacts of climate change? ²⁸	Allocation or site can proceed	Progress to Step 2
2. Is the site located in Flood Zone 1 in an area that <u>will be</u> affected by other forms of flooding / climate change?	Allocation can proceed provided it is appropriate for its flood risk vulnerability classification. Undertake exception test if <u>other</u> sources of flooding (including the effects of climate change on those other types of flooding) are significant and required by the flood vulnerability of land uses table (Table 10).	Progress to step 3
3. Is the site located in Flood Zone 2 in an area that <u>will not</u> be significantly affected by other sources of flooding or the impacts of climate change?	Allocation can proceed provided it is appropriate for its flood risk vulnerability classification. Undertake exception test fluvial or <u>other</u> sources of flooding (including the effects of climate change on those other types of flooding) are significant and required by the flood vulnerability of land uses table (Table 10).	Progress to Step 4
4. Is the site located in Flood Zone 2 in an area that <u>will be</u> affected by other forms of flooding / climate change?	Establish whether the development type is suitable for Flood Zone 2 and other forms of flooding having considered the flood risk vulnerability of land uses (Table 10).	Progress to Step 5

²⁸ The effect of climate change in this assessment is the extension of Flood Zone 3. If an allocation falls into such an area treat as Flood Zone 3.

	<p>Undertake exception test fluvial or <u>other</u> sources of flooding (including the effects of climate change on those other types of flooding) are significant and required by the flood vulnerability of land uses table (Table 10).</p>	
<p>5. Is the site located in Flood Zone 3 in an area that <u>will not</u> be significantly affected by other sources of flooding or the impacts of climate change?</p>	<p>Establish whether the development type is suitable for Flood Zone 3 having considered the flood risk vulnerability of land uses (Table 10).</p> <p>Undertake exception test fluvial or <u>other</u> sources of flooding (including the effects of climate change on those other types of flooding) are significant and required by the flood vulnerability of land uses table (Table 10).</p>	<p>Progress to Step 6</p>
<p>6. Is the site located in Flood Zone 3 in an area that <u>will be</u> affected by other forms of flooding / climate change?</p>	<p>Establish whether the development type is suitable for Flood Zone 3 and other forms of flooding having considered the flood risk vulnerability of land uses (Table 10).</p> <p>Undertake exception test fluvial or <u>other</u> sources of flooding (including the effects of climate change on those other types of flooding) are significant and required by the flood vulnerability of land uses table (Table 10).</p>	<p>Progress to Step 7</p>
<p>7. Can the site be located in Flood Zone 3b?</p>	<p>Establish whether the development type is suitable for Flood Zone 3b and other forms of flooding having</p>	<p>No further options are available. Allocation should be rejected.</p>

	<p>considered the flood risk vulnerability of land uses (Table 10).</p> <p>Undertake exception test if site is defined as 'essential infrastructure' in flood risk vulnerability of land uses table (Table 10).</p>	
--	---	--

DRAFT

As stated above the sequential test should consider other forms of flooding in addition to river/sea flooding. It can be useful to distinguish between different levels of significance in relation to flooding from surface water, groundwater and artificial sources. This can help when deciding whether to take a particular category of flooding into account during the sequential test. It can also help consider the appropriateness of mitigation that should be explored when undertaking a site specific Flood Risk Assessment.

Table 12 shows low (and very low where applicable²⁹), moderate and high significance for different forms of flooding and indicates which categories of significance should be considered during sequential testing. All categories of significance should be considered during site specific Flood Risk Assessment and also during Exception Testing.

Users should note that more than one type of flood risk may affect a given location.

Table 12: Significance categories – other forms of flooding
(Boxes coloured blue indicate that the category is to be considered significant during sequential testing (however, even low probability flooding may be revealed to be significant during a site based flood risk assessment / may still require mitigation measures to ensure safety).

Flooding type	High probability	Moderate probability	Low probability	Very Low
Surface water and sewers (using updated flood map for surface water).	The chance of flooding in any year is greater than 3.3% (1 in 30)	The chance of flooding in any year is 3.3% (1 in 30) or less but greater than 1 % (1 in 100)	The chance of flooding each year is 1% (1 in 100) or less but greater than 0.1% (1 in 1000)	The chance of flooding each year is 0.1% (1 in 1000) or less.
Groundwater flooding	>75% of 1km square 'at risk'	>25% - 75% of area 'at risk'	<25% area 'at risk', i.e. unmarked on map.	
Artificial Sources	Judgement based assessment			

6.3 The Sequential Test

To demonstrate that any given development has been planned for consistently with the Sequential Approach it is necessary to document the extent to which the approach has been taken into account. Table 11 (above) should be seen as the mechanism by which the sequential test can be carried out for all forms of flooding. This approach has been followed in the sequential testing of site proposals for the Joint Plan, where standardised forms have been used to record the information required by following the sequential approach (completed standardised forms for Joint Plan allocations are shown in the supporting paper (volume II) of this SFRA).

²⁹ The four categories of risk for the updated flood map for surface water include 'very low', 'low', 'medium' and 'high'

6.4 Other Planning Issues to Consider when choosing alternative sites / undertaking the Sequential Test

The consideration of the sequential approach and the exception test does not operate in isolation. Table 11 shows that, after flooding from rivers, other forms of flood risk and climate change have been considered it may be necessary to choose a viable alternative site.

Environment Agency standing advice³⁰ provides some guidance regarding the identification of 'reasonably available' alternative sites stating "*these sites will usually be drawn from the evidence base/background documents that have been produced to inform the emerging Local Plan. In the absence of background documents, 'reasonably available' sites would include any sites that are known to the LPA and that meet the functional requirements of the application in question, and where necessary, meet the Local Plan Policy criterion for windfall development*".

The reality in a Minerals and Waste Plan is that minerals can often only be extracted where they are found which may limit the choice of available sites. Similarly, infrastructure availability, visual amenity, wildlife and the historic environment are taken into consideration. The search for reasonably available sites through the sequential test is therefore less relevant in some instances, but where this is the case, it is explained clearly in the SFRA supporting document. Where this happens, a decision is required as to whether to proceed to the exceptions test, or whether to abandon the site completely.

In seeking alternative sites we have defined a 10 km area of search around each site. We feel that 10 kilometres is a suitable radius to define around each site because:

- This is more likely to identify alternative sites that utilise the same mineral resource;
- This is less likely to consider alternative sites that are more distant from the market that the submitted site was intended to serve.

³⁰ Environment Agency (2012) Flood Risk Standing Advice for Local Planning Authorities, Version 3.1. Available at: http://cdn.environment-agency.gov.uk/LIT_9002_5a96ba.pdf (Accessed 21/03/2014).

7. Sustainability and SFRA

This Strategic Flood Risk Assessment can be seen as an important piece of evidence to support the Joint Plan. Sustainability is also seen as a fundamental consideration in passing the Exception Test.

The Joint Plan Authorities are required to produce a Sustainability Appraisal of the Joint Plan. Sustainability Appraisal (SA) is an assessment of the likely significant environment, economic and social effects of a plan.

The Authorities' approach to SA can be termed an 'objectives led appraisal'. This means that environmental, social and economic objectives have been defined for the SA. The SA will then consider the extent to which the plan is compatible and contributes to these objectives.

The SA's sustainability objectives are listed in table 13, and can also be found on the North Yorkshire County Council website at:

<http://www.northyorks.gov.uk/article/26217/Sustainability-appraisal>

Table 13: Sustainability Appraisal Objectives for the Assessment of the Joint Plan

Sustainability Appraisal Objective
Protect and enhance biodiversity and geo-diversity and improve habitat connectivity
Enhance or maintain water quality and supply and improve efficiency of water use
Reduce transport miles and associated emissions from transport and encourage the use of sustainable modes of transportation
Protect and improve air quality
Use soil and land efficiently and safeguard or enhance their quality
Reduce the causes of climate change
Respond and adapt to the effects of climate change
Minimise the use of resources and encourage their re-use or safeguarding
Minimise waste generation and prioritise management of waste as high up the waste hierarchy as practicable
Conserve and enhance the historic environment, heritage assets and their settings
Protect and enhance the quality and character of landscapes and townscapes
Achieve economic growth and create and support jobs
Maintain and enhance the viability and vitality of local communities
Provide opportunities to enable recreation, leisure and learning
Protect and improve the wellbeing, health and safety of local communities
Minimise flood risk and reduce the impact of flooding
Address the needs of a changing population in a sustainable and inclusive manner

This SFRA has been written with two overarching purposes in mind. Firstly, it has been written to provide evidence on how flood risk should be considered for the Sustainability Appraisal of the Joint Plan, in particular the objective to 'minimise flood risk and reduce the impact of flooding'; secondly it has been written to inform the selection of submitted sites to the Joint Plan.

The table below shows key ways in which the SFRA can inform and contribute to the most relevant SA objectives.

Table B2: How the SFRA Supports the Sustainability Appraisal

SA Objective	How
Protect and enhance biodiversity and geo-diversity and improve habitat connectivity	SFRA and supporting volume shows that SuDS (see appendix 1) and flood storage areas are achievable at many development sites which will be a key means of creating habitats.
Enhance or maintain water quality and supply and improve efficiency of water use	SFRA provides guidance on improving the quality of water input from SuDS to groundwater and surface water. SFRA helps ensure new development is less prone to flooding thus helping to reduce ingress of pollutants to watercourses caused by floods washing over built infrastructure.
Minimise flood risk and reduce the impact of flooding	By enabling the sequential test to be undertaken, the SFRA will ensure that development will be located in the least flood prone locations and incorporate measures to deal with residual risk. Guidance on flood management measures in this SFRA, will help to promote reduction in downstream flood risk.
Respond and adapt to the effects of climate change	SFRA will help ensure that development is resilient to future flood risk which is a predicted consequence of climate change.

Sustainability Appraisal and the Exception Test

The National Planning Policy Framework sets out two key requirements that must be fulfilled for the Exception Test to be passed. These are:

- *'It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a Strategic Flood Risk Assessment where one has been prepared; and*
- *A site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall'.*

In meeting the first part of the Exception Test 'wider sustainability benefits' should help fulfil two or more sustainability objectives. So, if a development has the wider benefit of, for example, significantly reducing climate change impacts and the level of construction waste generated, this should be expressed in terms of the sustainability objectives that it helps fulfil.

The question of whether those sustainability benefits outweigh flood risk is a matter of judgement. Clearly the more SA objectives that are met the more likely the sustainability benefits will be seen to outweigh the flood risk. Similarly the extent to which those objectives are met will be a consideration. So, for example, a development which reduces transport through the provision of a small amount of cycle parking is likely to be seen as being of

lesser benefit than a development which, through its geographical position or through its integration with the rail network will cut emissions from transport by a significant quantum.

These sustainability benefits should be quantified wherever possible so that an assessment of the magnitude of benefit can be made.

Whatever the benefits, however, the second part of the Exception Test must also be satisfied. This will require that the development itself will be made safe, and that flood risk will not be increased anywhere else. Wherever possible mitigation and management measures should be consistent with the sustainability objectives and the wider strategic context, in particular local Catchment Flood Management Plans.

The supporting volume to this SFRA sets out which sites have passed the Sequential Test, and which, if they are still to be pursued, will need to have the Exception Test applied to them.

DRAFT

Appendix 1: Sustainable Drainage

Guidance on SuDS Application

Overview

Sustainable Drainage Systems (SuDS) encompass a range of drainage approaches that can be used to manage surface water drainage in a way that mimics the natural environment. SuDS are supported in the National Planning Policy Framework and Planning Practice Guidance which state that the use of SuDS should be given priority.

Most SuDS systems share some common principles. CIRIA describe a 'management train approach' to SuDS, where flood management starts with prevention or good practice measures, and source control is preferred to larger downstream site and regional controls. Indeed CIRIA state that as *'a general principle it is better to deal with runoff locally, returning the water to the natural drainage system as near to the source as possible. Only if the water cannot be managed on site should it be conveyed elsewhere'*³¹.

There are a number of benefits to sustainable drainage systems. These include:

- Reducing peak flows to sewers and watercourses which can lessen the risk of flooding downstream;
- Improvements to water quality, particularly compared to conventional surface water sewers;
- Reduction in water demand through rainwater harvesting;
- Creation of habitats; and
- Allowing natural groundwater recharge where appropriate³².

Types of SUDS Systems

There are a number of attenuation and infiltration elements that may come together to form SuDS systems. These include:

Source Control and Prevention Techniques

Green roofs and rainwater harvesting: Green roofs are vegetated roofs which offer a means of reducing the volume and rate of run off from roofed areas and can also offer additional benefits such as improving the insulation of buildings and extending the life of the roof.

Rainwater harvesting can be used to collect rainwater from roofs and other appropriate hard surfaces. Typically water is held in containers and pumped to the point of use, often for flushing toilets.

³¹ CIRIA, 2011. SUDS Management Train. [URL: http://www.ciria.org.uk/suds/suds_management_train.htm] (accessed 21/10/11)

³² CIRIA, 2007, Environment Agency, undated.

Permeable pavements: Permeable pavements allow water to filter through a hard standing area rather than simply running off. Infiltration is usually achieved through the use of a pervious surface material and substrate. While in some circumstances drainage may simply be to the ground, a need to protect the aquifer or unsuitable drainage may require the construction of a storage reservoir area, usually beneath the surface. Water then discharges, having been filtered through the surface and substrate, into an appropriate receptor such as a stream, or may be required to go through further SUDS stages.

Infiltration trenches and basins: Infiltration basins are depressions into which run off collects and then infiltrates into the ground. Infiltration trenches also allow infiltration of water through their base and sides, and are filled with a permeable material.

Conveyance

Swales: Swales are channels that can be constructed along roads or incorporated within green areas. They can be used to transfer runoff to storage areas or may form a limited storage area themselves. They provide an alternative to a traditional piped drainage system, and the flow of water, across vegetation, when at low velocity, provides a filtering function.

Filter drains: Filter drains are trenches that have been lined with a geotextile and filled with gravel³³. They contain a perforated pipe that carries flow along the trench. Oil residues and sediments are removed by filtering, absorption and microbial action in the surrounding soil³⁴.

Passive Treatment (Site control or regional control)

Ponds and wetlands: Ponds and wetlands, as well as being key landscaping features, can be integrated into a sustainable drainage system to provide a storage area for runoff. The vegetation around wetlands can provide a cleaning function and the volume of water itself may provide a dilution function. Allowing native plant species to colonise wetlands, or using species of local provenance, can also ensure a sustainable drainage system provides the maximum opportunities for wildlife.

Filter strips and bio-retention areas: Filter strips are vegetated sections of land that are designed to receive runoff from upstream development. They are usually positioned between a hard surfaced area and a receptor for the water, such as a stream or another SUDS component. Runoff is cleaned of some pollutants and sediments by vegetated filtering, settlement and infiltration. Filter strips also slow run off velocity and can be designed to enhance the biodiversity value of a site.

Bio-retention areas are made up of shallow landscaped depressions that include a number of soil and vegetation features aimed at filtering and reducing runoff. CIRIA guidance states that bio-retention areas should contain components including grass filter strips, ponding

³³ Environment Agency, undated Sustainable Drainage Systems: An Introduction [URL: <http://publications.environment-agency.gov.uk/PDF/GEHO0308BNSS-E-E.pdf>]

³⁴ Environment Agency, undated. Sustainable Drainage Systems: A guide for developers [URL: <http://publications.environment-agency.gov.uk/PDF/GEHO0308BNST-E-E.pdf>]

areas, organic / mulch areas, soil, woody and herbaceous plants and a sand bed for drainage³⁵.

Detention basins: Detention basins allow temporary storage and a controlled release of runoff during storm events. They are, in normal circumstances, dry vegetated depressions that can often be used for other recreational purposes during dry weather. However, during a flood event they form a storage pool, receiving runoff and storing it, allowing water to continue on its journey only when the outflow level is reached. They can also be used as a means of temporary sediment control during construction, provided they are re-instated after the construction phase³⁶.

Choosing and consulting on the Correct Scheme

Different SUDS are appropriate in different locations and for different types of development. Factors to consider include:

- The type of development;
- The sensitivity of receptors for the drained water;
- The quality of drained water and the regulations that govern discharge;
- The physical and hydrogeological properties of the soil and underlying geology.

North Yorkshire County Council has published guidance on the design and maintenance of SUDS.

http://www.northyorks.gov.uk/media/30769/North-Yorkshire-County-Council-SuDS-design-guidance/pdf/SDG150617Rev3_LLFA_Design_Guidance.pdf

The Flood and Water Management Act, 2010 establishes a role for county and unitary local authorities as SuDS Approving Bodies (SABs).

From 6 April 2015 local planning policies and decisions on planning applications relating to major development are required to ensure that sustainable drainage systems (SuDS) are used for the management of surface water.

Major development is development including:

- The winning and working of minerals or the use of land for mineral-working deposits
- Waste development
- Development carried out on a site having an area of one hectare or more.

SUDS and the Regulatory Framework

It is essential that discharges to water are compliant with environmental legislation and where relevant authorisations, consents or permits must be obtained

SuDS that involve infiltration are potentially subject to legislation such as the Water Framework Directive, which places restrictions on the discharge of pollutants to

³⁵ CIRIA, 2007. The SuDS Manual, CIRIA, London

³⁶ CIRIA, 2007. The SuDS Manual, CIRIA, London

groundwater. In addition, the Environmental Permitting Regulations, 2010, provide a consolidated regime for the granting of permits to discharge polluted water.

Further guidance is available through the Environment Agency's Groundwater Protection Principals and Practice (GP3) guidance

(https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297347/LIT_7660_9a3742.pdf)

Finding out More

There are a number of detailed sources of information on SuDS. A short list of useful information sources is described below:

- **CIRIA** (the Construction Industry Research and Information Association) have produced a number of documents on SuDS. Several publications are available free from their website, though other publications incur a charge. The publication 'The SuDS Manual (CIRIA, 2007) gives extensive information on the selection and design on different SuDS elements. Plans to update the SuDS Manual are currently underway;
- The **SUDSNET** website features a useful photo library and speakers presentations / conference proceedings from regular SUDSnet national conferences - <http://sudsnet.abertay.ac.uk/index.htm>;
- The **British Geological Survey** publish information on the effect of geology on infiltration-based SuDS – see <http://www.bgs.ac.uk/suds/>;
- The **University of Sheffield's Green Roof Centre** website contains numerous cases studies and discussions of the benefits of green roofs, which can be an important component of SuDS - http://www.thegreenroofcentre.co.uk/about_us.

DRAFT Strategic Flood Risk Assessment (Level 1)

Volume 2: Minerals, Waste and Flood Risk: Supporting Document

SEQUENTIAL TEST RESULTS FOR SUBMITTED SITES

To support the Joint Minerals and Waste Plan produced by North Yorkshire County Council, City of York Council and the North York Moors National Park Authority.

DRAFT

Contents

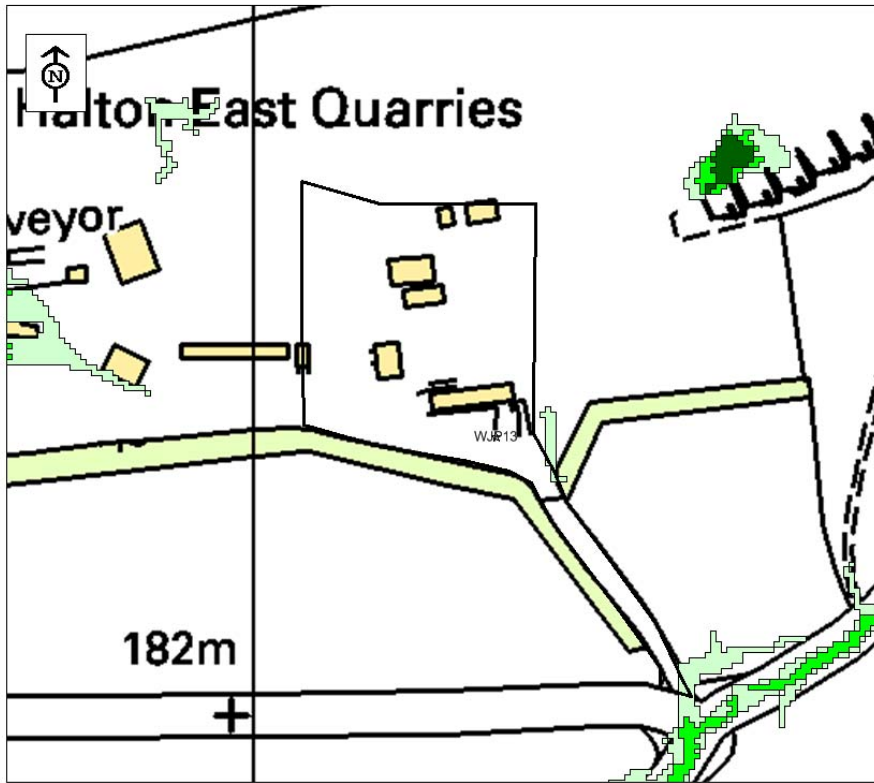
1. Craven Sites.....	3
2. Hambleton Sites.....	7
3. Hambleton and Harrogate and Hambleton and Richmondshire Sites	15
4. Harrogate Sites.....	23
5. Richmondshire Sites.....	50
6. Ryedale Sites	60
7. York Sites.....	76
8. Selby Sites	85
9. Scarborough Sites	132

DRAFT

1. Craven Sites

Key to Sequential Test Results		
Pass	Pass subject to further consideration of the site's contribution to the supply of minerals.	Site is not suitable or would require an Exception Test demonstrated through a Level 2 SFRA to proceed.

Site Reference: WJP13 Halton East, near Skipton	
Site Information	Currently a waste transfer station. This proposal is to extend the use of the site from 2019 for 20 years.
Proposed Land Use	Retention of waste transfer station with higher vehicle numbers and hours of operation.
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>Site is in Flood Zone 1. 1/1000 year surface water flooding (low risk) affects a negligible part of this site.</p> <p>Site is in a km square identified as susceptible to Clearwater and superficial deposit flooding across <25% of the area. However, no additional risk factors are noted and this development is above ground so is likely to be at a lower risk.</p>
Area of site	0.85 ha
Relevant Local SFRA	North west Yorkshire
Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable
Climate change	Not applicable as only surface water flooding affects the site which would not change its risk value during the lifespan of this site.
Sequential Test result	Pass. Negligible flood risk so no alternative locations have been reviewed.
Exception Test Needed	No
Is there an alternative site?	No. Negligible flood risk so no alternative locations have been reviewed.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment is not required as this site is below 1ha.



KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- ★ Historic Flood Record
- Historic Flood Map

Reproduced from the Ofsted Survey, subject to the permission of the Controller of the Copyright Material Office. © Crown Copyright. Conditioned as to the Crown Copyright and other rights reserved. Produced by J.H. Pritchard & Co. North Yorkshire County Council 2013. Licence No. 10017046

DRAFT

Site Reference: WJP17 Skibeden, near Skipton	
Site Information	Retention of Household Waste Recycling Centre for waste transfer of household and some commercial waste. Proposed date of commencement is 2015 and life of site is unknown.
Proposed Land Use	Retention of Household Waste Recycling Centre for waste transfer of household and some commercial waste
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>Site is in Flood Zone 1. Medium risk surface water flooding (1/100 years) affects less than 5% of this site. Low risk (1/1000 years) affects a similar amount.</p> <p>Site is in a km square identified as susceptible to Clearwater and superficial deposit flooding across 25 to 50% of the area. However, no additional risk factors are noted and this development is above ground so is likely to be at a lower risk.</p>
Area of site	0.39 ha
Relevant Local SFRA	North west Yorkshire
Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable
Climate change	It is possible low risk surface water flooding could become medium risk, and medium risk could become high risk after 2055, if the site is still operational.
Sequential Test result	Pass
Exception Test Needed	No
Is there an alternative site?	Two potential additional sites in Skipton with theoretical waste management capacity were identified in the evidence base (CRAV1 and CRAV2). However these sites are at broadly similar or higher levels of Flood Risk with low risk surface water flooding at one site and a small patch of Flood Zone 3 and 2 at the other.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment is not required as this site is below 1ha.



KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCCD Flood Defence
- ★ Historic Flood Record
- Historic Flood Map

Reproduced from the O-Blue Ice Survey, subject to the permission of the Controller of the Copyright Material, Office of Copyright Licensing, 100 Tottenham Court Road, London W1P 0LP. Copyright © 2008. All rights reserved. North Yorkshire County Council 2013. Licence No. 03017046

DRAFT

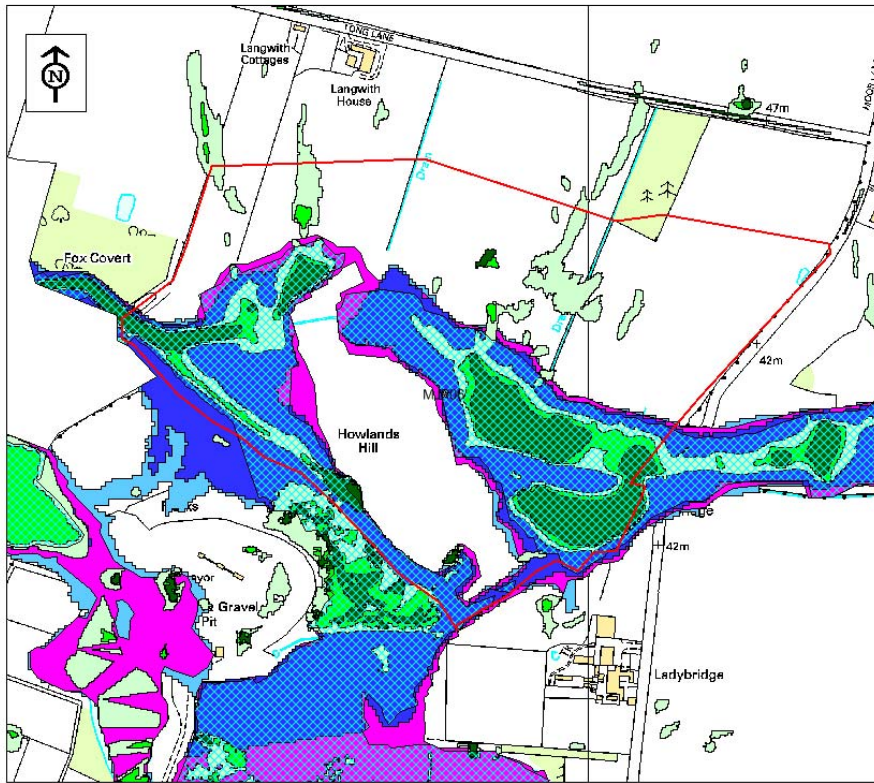
2. Hambleton Sites

Key to Sequential Test Results		
Pass	Pass subject to further consideration of the site's contribution to the supply of minerals.	Site is not suitable or would require an Exception Test demonstrated through a Level 2 SFRA to proceed.

Site Reference: MJP06 Langwith Hall Farm, east of Well	
Site Information	This is a proposed extension to an existing quarry for the purposes of sand and gravel extraction. Proposal includes diversion of the Ings Goit stream. Planning application (NY/2011/0242/ENV) is awaiting determination for a similar, but not identical area. An application (NY/2014/0271/ENV) for the continuation of extraction from the existing site and the retention of the plant site is also awaiting determination. Proposed life of site is 4 to 5 years from 2016.
Proposed Land Use	Extraction of sand and gravel
NPPF Vulnerability Classification	Water compatible
Overview of flooding	<p>About 20% of this site is in Flood Zone 3 and 1 in 20 flood plain data shows that a similar area is likely to be functional floodplain. About 10 to 15% of the site is also subject to surface water flooding, much of which is at a higher risk of 1 in 30 year flooding. However, as extraction is likely to change the topography of the site where flooding occurs across this site is likely to change as extraction progresses.</p> <p>Strategic groundwater flooding maps show that most of the site lies in a 1km square where 25% to 50% of the area has conditions that might support superficial deposits flooding. The southern tip of the site (about 5% of the area) is in a 1km square where greater than 75% of the area has conditions that might support superficial deposits flooding.</p> <p>A recent application which included this site showed that extraction would take place below the water table which during the maximum extent of the development would lie at 39m AOD (so that application stated that the site would be wet worked)¹. Working below the water table is a routine element of sand and gravel extraction for many sites.</p>
Area of site	43.1 ha
Relevant Local SFRA	Hambleton

¹ Tarmac Ltd, 2011. Nosterfield Quarry Langwith House fm extension Volume V – Non-technical summary [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=8037>]

Local Functional Floodplain or 1 in 20/25 flood risk	<p>In the Hambleton SFRA although Flood Zone 3 is defined as being made up of 3 types of land, including functional floodplain and undeveloped areas. These areas are not mapped.</p> <p>Our mapping shows about 20% of this site is in Flood Zone 3 and 1 in 20 flood plain data shows that a similar area is likely to be functional floodplain.</p>
Climate change	<p>Modelled Flood Outlines (+20%) in this area show that climate change is likely to extend the area of Flood Zone 3. However, as extraction is only likely to be for 4 to 5 years from 2016, this is not thought to be a significant issue for this site.</p>
Sequential Test result	<p>Pass (though from a flood risk perspective MJP17, MJP62 and MJP21 should be considered alongside this site).</p>
Exception Test Needed	<p>No. This site is water compatible.</p>
Is there an alternative site?	<p>In terms of sand and gravel MJP07, MJP43, MJP21, MJP17, MJP62 and MJP33 are all within 10km. MJP17, MJP62 and MJP21 are at a lower or similar risk of flooding than this site, while MJP07 and MJP33 are at a higher risk.</p> <p>From a flood risk perspective MJP43, MJP17, MJP62 and MJP21 should be considered alongside this site, though this site is preferable to MJP07 and MJP33.</p>
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	<p>A site specific flood risk assessment should further consider groundwater flooding and how SUDS can be used to drain the site. Drainage of site should not increase flooding elsewhere.</p> <p><u>All sites in functional flood plain must: remain operational and safe for users in times of flood; result in no net loss of floodplain storage; not impede water flows and not increase flood risk elsewhere.</u></p>



KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCCD Flood Defence
- Historic Flood Record
- Historic Flood Map

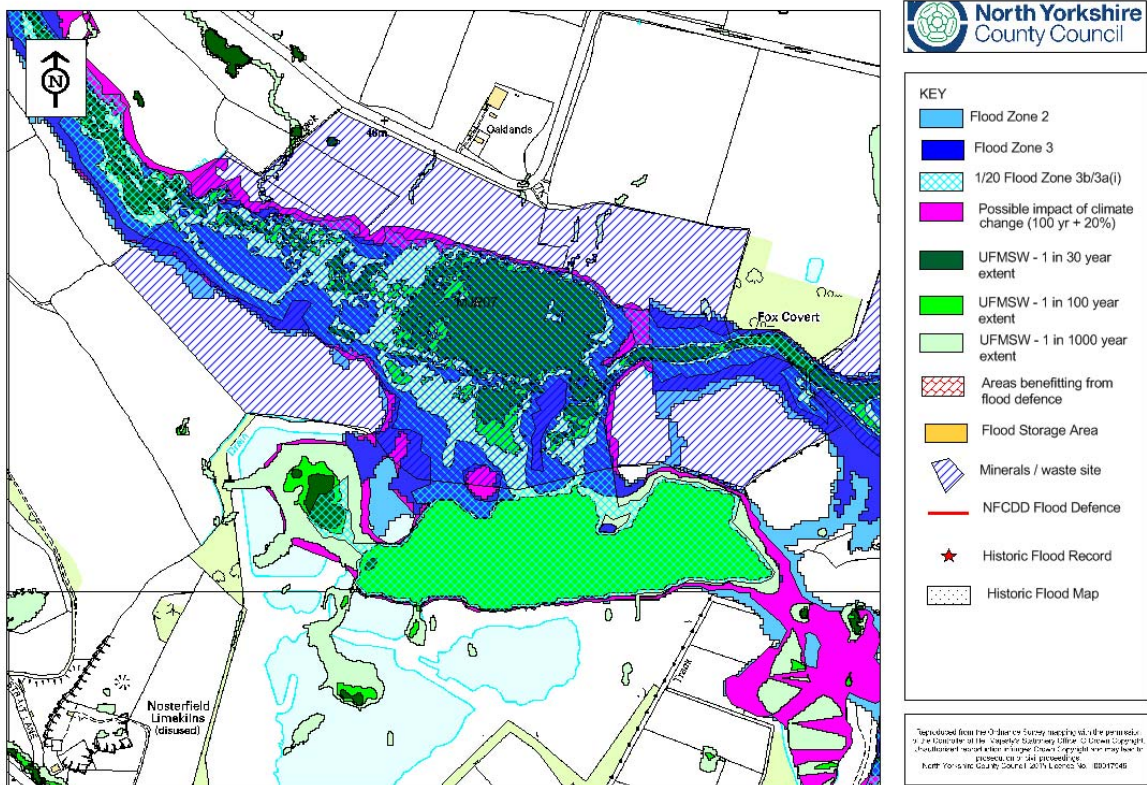
Reproduced from the O-Blue Survey, mapping, as of the permission of the Controller of the Copyright Subsidy Office. © Crown Copyright. Ordnance Survey. All rights reserved. Ordnance Survey Licence No. 100017046. North Yorkshire County Council 2019. Licence No. 10017046

DRAFT

Site Reference: MJP07 Oaklands, near Well	
Site Information	This is a proposed extension to an existing sand and gravel quarry. Proposal includes diversion of the Ings Goit stream and extraction by suction dredger with material to be pumped by pipeline to the existing conveyor system for transport to the existing processing plant. Proposed life of site is 6 years from 2020-21 (to follow MJP06).
Proposed Land Use	Extraction of sand and gravel
NPPF Vulnerability Classification	Water compatible
Overview of flooding	<p>Flood Zone 3 travels through the centre of this site affecting about half of its area. Much of this floods on a 1 in 20 year return period, so is also probable functional floodplain. Flood Zone 2 extends the area subject to flooding slightly.</p> <p>About a third of the site is at a high (1/30yr) risk of surface water flooding with a further 5% at medium (1/100yr risk).</p> <p>Strategic groundwater flooding maps show that most of the site lies in a 1km square where less than 25% of the areas have conditions that might support Clearwater flooding. About 25% of the site (the eastern part) lies in a 1km square where 25% to 50% of the area has conditions that might support superficial deposits groundwater flooding.</p> <p>A recent application for a site immediately to the east of this site showed that extraction would take place below the water table which during the maximum extent of the development would lie at 39m AOD (so that application stated that the site would be wet worked)². In addition, sand and gravel working to the south of the site has been restored to water suggesting that groundwater will be an issue at this site too. Working below the water table is a routine element of sand and gravel extraction for many sites.</p>
Area of site	44.6 ha (NOTE AT PREFERRED OPTIONS THE WESTERN PART OF THIS SITE IIS PROPOSED FOR EXCLUSION)
Relevant Local SFRA	Hambleton
Local Functional Floodplain or 1 in 20/25 flood risk	<p>In the Hambleton SFRA although Flood Zone 3 is defined as being made up of 3 types of land, including functional floodplain and undeveloped areas. These areas are not mapped.</p> <p>Flood Zone 3 travels through the centre of this site affecting about half of its area. Much of this floods on a 1 in 20 year return period, so is also probable functional floodplain.</p>
Climate change	Modelled Flood Outlines (+20%) show that climate change would extend the area of Flood Zone 3 after 2025. This would only just affect the site with a possible risk as the site

² Tarmac Ltd, 2011. Nosterfield Quarry Langwith House Farm extension Volume V – Non-technical summary [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=8037>]

	is only likely to operate until 2027 at the latest.
Sequential Test result	Pass. From a flood risk perspective MJP06 should be considered for allocation alongside this site, though this site is preferable to MJP39 and MJP14.
Exception Test Needed	No. This site is water compatible.
Is there an alternative site?	The following sand and gravel site options lie within 10km: MJP06; MJP39 and MJP14. MJP06 has a lower overall flood risk, while MJP14 and MJP39 have a higher flood risk. From a flood risk perspective MJP06 should be considered for allocation alongside this site, though this site is preferable to MJP39 and MJP14.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment should further consider groundwater flooding and how SUDS can be used to drain the site. Drainage of site should not increase flooding elsewhere. Climate change effects may also be of lesser significance than stated in this assessment so a site specific flood risk assessment may further clarify the potential for any impacts. <u>All sites in functional flood plain must: remain operational and safe for users in times of flood; result in no net loss of floodplain storage; not impede water flows and not increase flood risk elsewhere.</u>

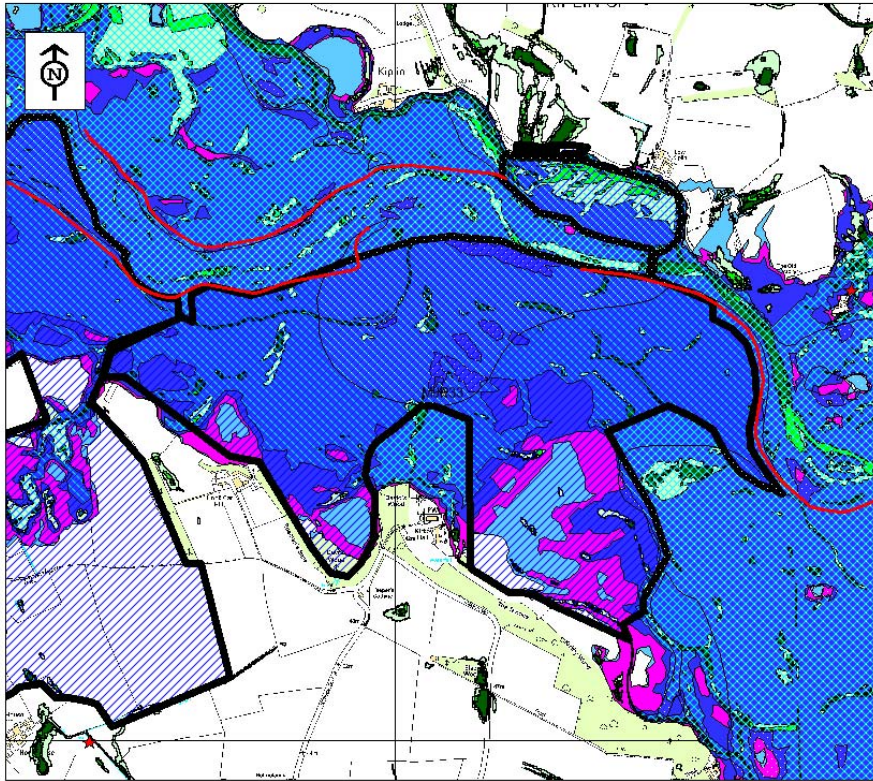


Site Reference: MJP33 Home Farm, Kirkby Fleetham	
Site Information	This is a new sand and gravel extension site. Proposed life of site is 17 years from 2019.
Proposed Land Use	Extraction of sand and gravel
NPPF Vulnerability Classification	Water compatible
Overview of flooding	<p>This site is almost entirely within Flood Zone 3 and 1 in 20 flood risk data shows that much of this area is also probable functional floodplain. The remainder of the site outside of Flood Zone 3 (about 10%) is either Flood Zone 2 or would be likely to flood as Flood Zone 3 after 2025 due to climate change. A tiny area (<5%) is in Flood Zone 1.</p> <p>Surface water flooding also affects small patches of this site, with low (1/1000) to high (1/30) risk pools distributed across the site, but covering >10%, with a concentration of medium (1/100) risk north of the river. The distribution of surface water flooding is highly likely to change during extraction.</p> <p>Flood defences along the north western boundary of the site may offer some protection (though the standard of protection is not known).</p> <p>This site lies across 4 separate 1km squares of differing groundwater vulnerability according to the Environment Agency's 'Areas Susceptible to Groundwater Flooding' map. The northwest of the site lies in area where 50 to 75 per cent of the area has conditions that could support superficial deposits flooding. The south west lies in an area where 25 to 50% of the area has conditions that could support superficial deposits groundwater flooding. The north east lies in an area where less than 25 per cent of the area has conditions that might support Clearwater and superficial deposits flooding. The south east part of the site (largely excluded at Preferred Options) is in an area where between 25% and 50% of the land have conditions that could support clearwater and superficial deposits flooding.</p> <p>A nearby site to the north of the river (at Kiplin Hall) has shown that 'generally the natural water table appears to lie between the levels of 36 metres and 38 metres above Ordnance Datum and therefore the depth to the water is between 1 and 2 metres below the flat lying ground"³. With this in mind it is thought that the site is likely to encounter groundwater during extraction.</p> <p>A scoping report for sand and gravel extraction at this site suggests that 'as a guide water strikes display a gradual hydraulic gradient in the drift from 37.3m AOD in the west to</p>














³ Steetley Quarry Products Limited, 1987, Proposed Extraction of Sand and Gravel and the Erection of Processing Plan and associated facilities on land at Kiplin Hall, Scorton, North Yorkshire, part Hambleton, part Richmondshire Districts North Yorkshire: Written Statement to Accompany Planning Application [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=1615>]

	31.5m AOD in the east. This represents an easterly hydraulic gradient of 1 in 341 ⁷⁴ . Again, this would suggest the water table is just below the surface. Working below the water table is a routine element of sand and gravel extraction for many sites.
Area of site	190 ha. (NOTE AT PREFERRED OPTIONS THE SOUTH-EASTERN PART OF THIS SITE IS PROPOSED FOR EXCLUSION)
Relevant Local SFRA	Hambleton
Local Functional Floodplain or 1 in 20/25 flood risk	In the Hambleton SFRA although Flood Zone 3 is defined as being made up of 3 types of land, including functional floodplain and undeveloped areas. These areas are not mapped. This site is almost entirely within Flood Zone 3 and 1 in 20 flood risk data shows that much of this area is also probable functional floodplain.
Climate change	The remainder of the site outside of Flood Zone 3 (about 10%) is either Flood Zone 2 or would be likely to flood as Flood Zone 3 after 2025 due to climate change. For surface water flooding climate change is not taken into account in this assessment for sites such as this one that are predicted to finish prior to 2055.
Sequential Test result	MJP43 (lowest risk), MJP60, MJP17, MJP62 and MJP21 are all at lower risk of flooding than this site. From a purely flood risk perspective these site should be considered alongside MJP33.
Exception Test Needed	No
Is there an alternative site?	There are several sand and gravel sites within 10km. These are MJP60, MJP21, MJP17, MJP62 and MJP43. MJP43 (lowest risk), MJP60, MJP17, MJP62 and MJP21 are all at lower risk of flooding than this site. From a purely flood risk perspective these site should be considered alongside MJP33.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment should further consider the standard of protection and purpose of flood defences, groundwater flooding and how SUDS can be used to drain the site. Drainage of site / dewatering should not increase flooding elsewhere. It will be critically important for a site of this size to ensure that floodplain storage capacity is not lost. <u>All sites in functional flood plain must: remain operational and safe for users in times of flood; result in no net loss of floodplain storage; not impede water flows and not increase flood risk elsewhere.</u>

⁴ Aggregate Industries, 2008. Home Farm, Kirkby Fleetham, North Yorkshire: Town and Country Planning Act (Environmental Impact Assessment) Regulations, 1999 (as amended) Regulation 10 (1) Scoping Report [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=5269>]



KEY

	Flood Zone 2
	Flood Zone 3
	1/20 Flood Zone 3b/3a(i)
	Possible impact of climate change (100 yr + 20%)
	UFMSW - 1 in 30 year extent
	UFMSW - 1 in 100 year extent
	UFMSW - 1 in 1000 year extent
	Areas benefiting from flood defence
	Flood Storage Area
	Minerals / waste site
	NFCDD Flood Defence
	Historic Flood Record
	Historic Flood Map

Reproduced from the Ordnance Survey map(s) with the permission of the Controller of Her Majesty's Stationery Office. © Crown Copyright. All rights reserved. No part of this publication may be reproduced without the prior written permission of the Controller of Her Majesty's Stationery Office. ISBN 978-0-11-000000-0

DRAFT

3. Hambleton and Harrogate and Hambleton and Richmondshire Sites

Key to Sequential Test Results		
Pass	Pass subject to further consideration of the site's contribution to the supply of minerals.	Site is not suitable or would require an Exception Test demonstrated through a Level 2 SFRA to proceed.

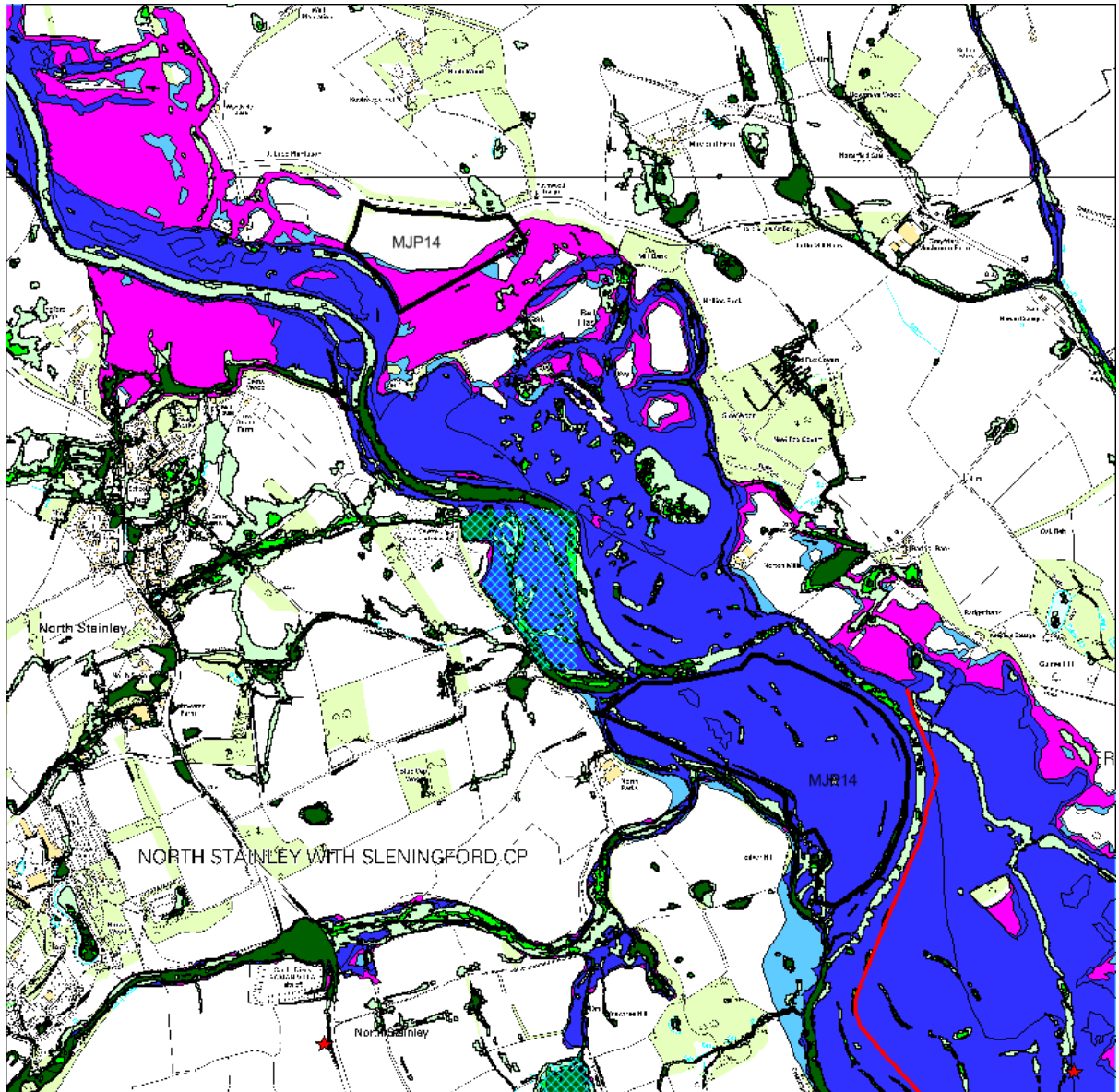
Site Reference: MJP14 Ripon Quarry, North Stainley	
Site Information	Extraction of sand and gravel as proposed extension to existing quarry. Proposed life of site is 15 years (Pennycroft and Thorneyfields – commencing in 2015/16) and up 4 years (Manor Farm West- commencing in 2018). Possible restoration: Pennycroft and Thorneyfields: lake, reed bed and wet woodland; Manor Farm West: to be compatible with restoration of existing site which is to lakes, agriculture, reed beds, wet grassland and woodland. Pennycroft and Thorneyfields is subject to an application (NY/2011/0429/ENV) which is awaiting determination.
Proposed Land Use	Extraction of sand and gravel
NPPF Vulnerability Classification	Water compatible
Overview of flooding	<p>Southern site is in Flood Zone 3, with modelled outline data showing a 1 in 20 year flood risk across the site. Small patches where there is a low to high risk of surface water flooding occurring affect less than 5% of the site.</p> <p>The northern site (Manor Farm West) is mainly in Flood Zone 1, but approximately a quarter is in Flood Zone 2. Flood Zone 3 and 1 in 20 modelled flood risk affect a tiny part of the western boundary (<2% of the site). There is a low to medium risk of surface water flooding in the north-east corner of the site (<2% of the site).</p> <p>The southern site lies across two km squares in the Environment Agency's Areas Susceptible to Groundwater Flooding maps. The northern part of the southern site is in an area identified as being susceptible to superficial deposits flooding across 75% or more of the km square. The southern part of the southern site is in a km square that is 50 to 75 per cent at risk of superficial deposits flooding.</p> <p>The northern site is in a km square in which 75% or greater of the area is vulnerable to clearwater and superficial deposits flooding.</p> <p>According to the planning application for this site <i>"in order to</i></p>

	<i>facilitate mineral extraction, it is proposed to continue the current practice of lowering the natural groundwater level by dewatering. It is envisaged that the water table will be lowered to around 8.6 m below ground level⁵.</i>
Area of site	30.22 ha (Pennycroft and Thorneyfields) 6.2 ha (Manor Farm West)
Relevant Local SFRA	Hambleton and Harrogate (North-west Yorkshire SFRA)
Local Functional Floodplain or 1 in 20/25 flood risk	In the Hambleton SFRA although Flood Zone 3 is defined as being made up of 3 types of land, including functional floodplain and undeveloped areas. These areas are not mapped. In the north west Yorkshire SFRA Flood zones 3b is defined as undeveloped areas in Flood Zone 3. Although this land is not defined as being at a 1 in 20 year risk the southern site should be regarded as potentially being in functional floodplain in line with the north-west SFRA.
Climate change	Climate change could affects fluvial flooding in the northern part of the site, making much of the area of Flood Zone 2 behave more like Flood Zone 3. However, the northern part of the site will no longer be operational when climate change is considered to increase the risk. Climate change effects on surface water flooding are also not considered likely to be evident during the period of operation of this site.
Sequential Test result	Pass if necessary to contribute to overall supply. This is water compatible development. However, MJP06, MJP38 and MJP07 should also be considered alongside this site from a flood risk point of view.
Exception Test Needed	No
Is there an alternative site?	The following proposed sand and gravel sites are within 10 km of this site: MJP39, MJP38, MJP06 and MJP07. In terms of overall flood risk MJP39 has the highest overall risk, followed by this site. MJP06, MJP38 and MJP07 are at lower risk ⁶ .
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment has already been submitted for this site which concluded that the site have an evacuation plan be developed, that work stop during high rainfall events, and that works will have little potential to impact on the flows in the River Ure ⁷ .

⁵ Hanson Quarry Products Europe Limited, 2011. Extension to existing sand and gravel workings at Ripon Quarry, North Stainley, North Yorkshire: Environmental Statement Non-Technical Summary [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=8225>]

⁶ It should be noted that this is a draft strategic test of sites to inform potential allocations that does not have a bearing the specific flood risk assessment provided with any planning application for the site.

⁷ Hafren Water, 2011. Flood Risk Assessment for Ripon Quarry Extension into Pennycroft Area [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=8225>]

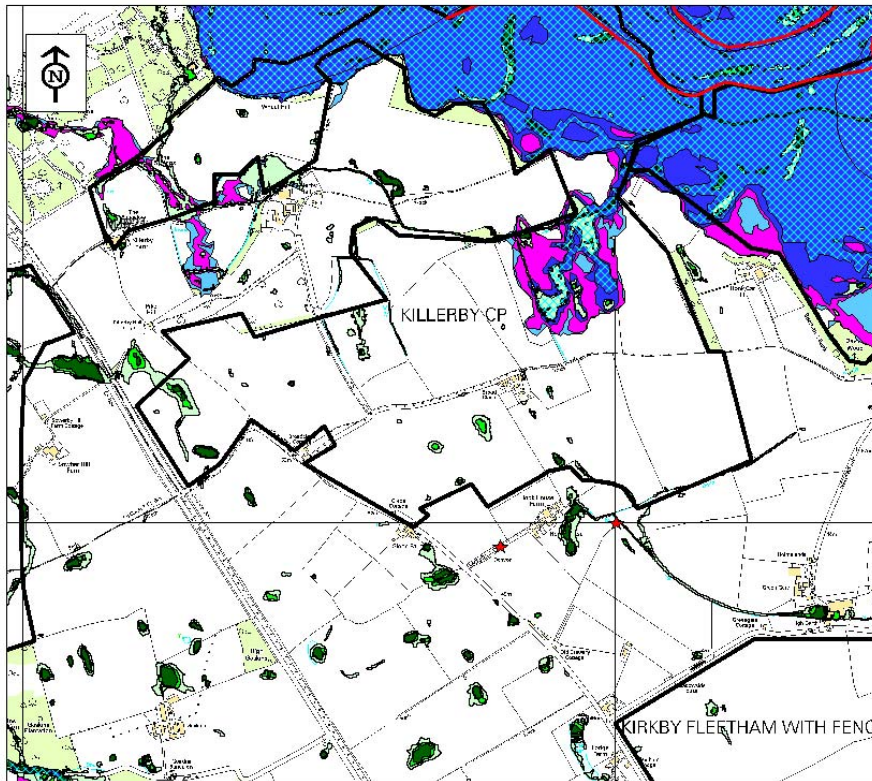


Site Reference: MJP21 Land at Killerby	
Site Information	Extraction of sand and gravel from a new extraction site. Proposed life of site: Extraction would occur for an initial period of 2 years, after which the remaining permitted reserves at Ellerton Quarry would be extracted (5-6 years), then the remainder of the Killerby reserves would be extracted during a period of 14 years. The proposed commencement date is 2020 -21. Possible restoration to agriculture, marshland, lakes and woodland.
Proposed Land Use	Extraction of sand and gravel
NPPF Vulnerability Classification	Water compatible
Overview of flooding	<p>Using 2015 Flood Map data the north-east part of this large site is in Flood Zone 3, and much of this area is also susceptible to 1 in 20 fluvial flood risk. Further small patches of Flood Zone 2 affect small patches of the site. Flood defences are also evident in the north-east corner, though the area is not shown as an area benefiting from flood defences and the standard of protection is not clear. More detailed modelling is available through the 2010 Flood Risk Assessment for this site that showed that some protection is afforded by flood defences⁸.</p> <p>Small patches of low to high surface water flood risk affect >5% of the site.</p> <p>In terms of groundwater flooding site lies across 6 kilometre squares on the 'Areas Susceptible to Groundwater Flooding Map' all of which are areas that support superficial deposits flooding (at varying rates from less than 25% of a km square to 50 to 75% of a kilometre square), apart from the south west corner which supports clearwater and superficial deposits flooding (across less than 25% of the km square). A planning application at this site was accompanied by a Flood Risk Assessment that reported that "groundwater levels across all 3 areas are in the range of 37 to 43m AOD and range 1m to 9m below ground level" with Killerby East being at high risk of groundwater flooding due to good hydraulic connectivity with the river and Killerby West and South being at low to moderate risk⁹.</p>
Area of site	213 ha (of which 122 is proposed for extraction)
Relevant Local SFRA	Hambleton and Richmondshire (North west Yorkshire SFRA)
Local Functional Floodplain or 1 in 20/25 flood risk	In the Hambleton SFRA although Flood Zone 3 is defined as being made up of 3 types of land, including functional floodplain and undeveloped areas these areas are not mapped and advice is not given on how to define them. In the north west Yorkshire SFRA Flood zones 3b is defined as undeveloped areas in Flood Zone 3.

⁸ Hafren Water, 2010. Flood Risk Assessment for Killerby Quarry, Catterick [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=7585>]

⁹ Ibid

	<p>Much of the area in Flood Zone 3 is also considered to be at a 1 in 20 flood risk. However, the presence of a flood defence would mean that although the area could still flood in a 1 in 20 event, more frequent events may benefit from the flood defences, so the area behind the defence would not be functional. This has been investigated through a Flood Risk Assessment at the site which states that they are in the form of an earth bank 1 to 2m high which reduces the risk of fluvial flooding. This assessment also refers to a steep bank above the mean stage level for the River Swale which helps protect Killerby West.</p>
Climate change	<p>As this site would be active beyond 2025, fluvial flooding may increase in significance beyond 2025. This would increase the area of Flood Zone 3 in areas that are mostly coincidental with Flood Zone 2.</p> <p>The site is not likely to be operational during the period when climate change is expected to make surface water flooding more significant.</p>
Sequential Test result	<p>Pass if necessary to contribute to overall supply. MJP43, MJP60, MJP17 and MJP62 are at lower risk of flooding and should be considered alongside this site from a flood risk point of view. However, this site is water compatible so would be appropriate at this location.</p>
Exception Test Needed	<p>No</p>
Is there an alternative site?	<p>The following alternative sand and gravel proposed sites are within 10km: MJP17, MJP33, MJP60, MJP43 and MJP62.</p> <p>MJP43, MJP60, MJP17 and MJP62 are at lower risk of flooding overall, while MJP33 is at a higher risk.</p>
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	<p>A Flood Risk Assessment has already been carried out for this site.</p>



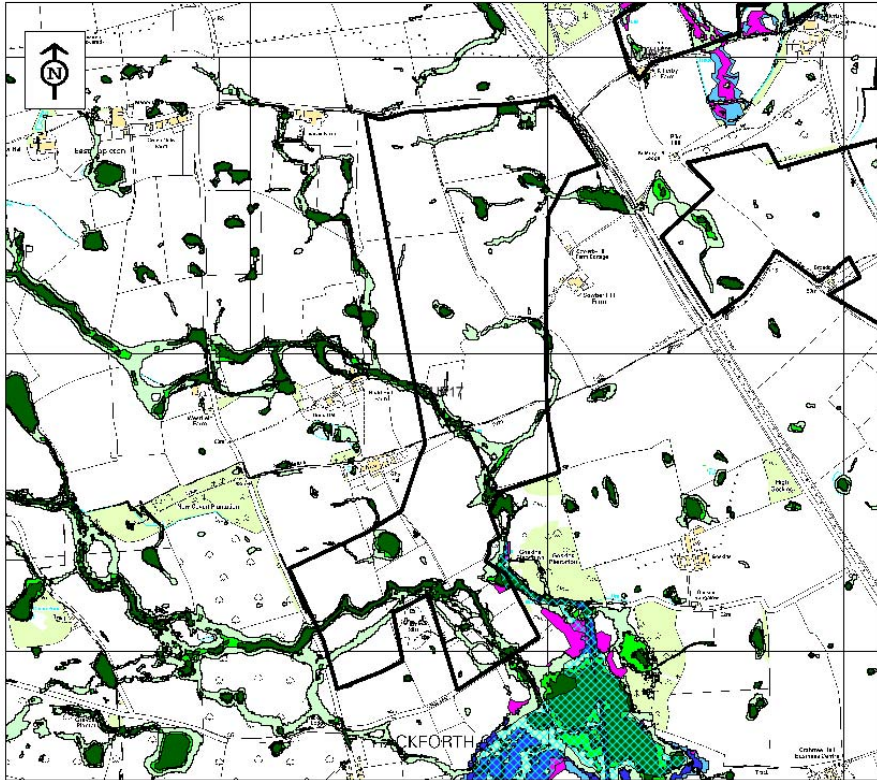
KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- ★ Historic Flood Record
- Historic Flood Map

Reproduced from the O-Blue Ice Survey, mapping, subject to the permission of the Controller of the Copyright Material, Office of Copyright, Intellectual Property and Cultural Affairs, Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, USA. Copyright © 2017 North Yorkshire County Council. All rights reserved. 03017546

DRAFT

Site Reference: MJP17 Land to the south of Catterick	
Site Information	<p>Extraction of sand and gravel from a new extraction site. Start date is not known though likely to be in the later part of the plan period. The life of the site is unknown.</p> <p>Restoration may include lake(s), fen, conservation grassland, agriculture and woodland.</p>
Proposed Land Use	Extraction of sand and gravel
NPPF Vulnerability Classification	Water compatible
Overview of flooding	<p>This site is in Flood Zone 1. Surface water flooding (low to high risk) affects about 10% of the site. Ditches and small streams on the site are the focal point for much of the surface water flooding.</p> <p>The site lies across 5 kilometre squares on the Environment Agency's 'Areas Susceptible to Groundwater Flooding Map', 4 of which have details of levels susceptibility to groundwater flooding and one of which has no data. The kilometre square at the extreme south of this site is susceptible to superficial deposits flooding (25 to <50% of the kilometre square is susceptible), while the km other squares are subject to clearwater and superficial deposits flooding (25 to 50% in the centre and <25% in the north-east), apart from a square along the central eastern edge of the site which is susceptible to clear water flooding (<25%).</p>
Area of site	102.1ha. FOLLOWING ADDITIONAL PLANNING ASSESSMENTS THE WESTERN PART OF THIS SITE HAS BEEN EXCLUDED.
Relevant Local SFRA	Hambleton and Richmondshire (North west Yorkshire SFRA)
Local Functional Floodplain or 1 in 20/25 flood risk	This site is in Flood Zone 1. It is not in functional floodplain.
Climate change	Climate change would not affect the site in the latter part of the plan period (though if the site is operational beyond 2055 surface water flooding would be at elevated risk).
Sequential Test result	Pass
Exception Test Needed	No
Is there an alternative site?	<p>The following alternative proposed sand and gravel sites are within 10km: MJP21, MJP33, MJP60, MJP62 and MJP43.</p> <p>This site is amongst the lowest risk group of sites (which also include MJP60 and MJP43, although this site has a marginally higher surface water flood risk). Other sites have a higher flood risk.</p>
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment should further consider groundwater flooding and how SUDS can be used to drain the site. Drainage of site should not increase flooding elsewhere. Diversion of ditches / streams on the site should not increase flooding elsewhere.



KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCCD Flood Defence
- Historic Flood Record
- Historic Flood Map

Reproduced from the Ouse to Survey, 1993, at the permission of the Controller of the Copyright Material, 1993. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage or retrieval system, without the prior written permission of the Controller of the Copyright Material, 1993.

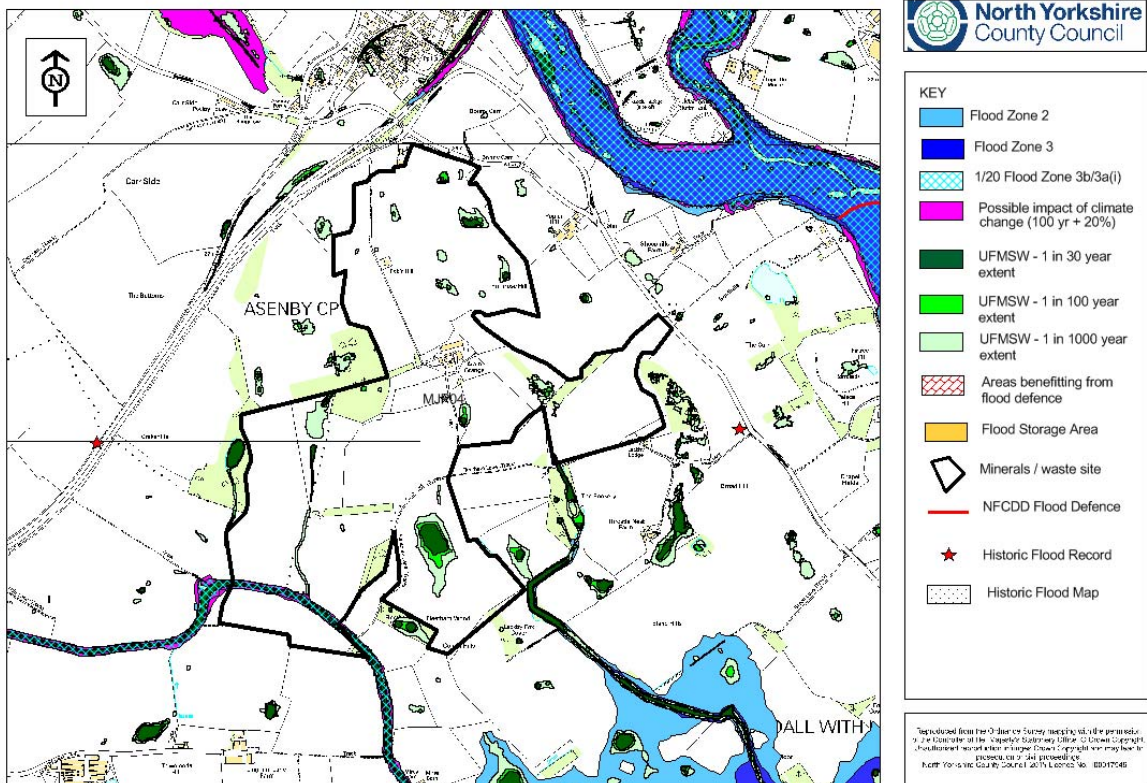
DRAFT

4. Harrogate Sites

Key to Sequential Test Results		
Pass	Pass subject to further consideration of the site's contribution to the supply of minerals.	Site is not suitable or would require an Exception Test demonstrated through a Level 2 SFRA to proceed.

Site Reference: MJP04 Aram Grange	
Site Information	Extraction of sand and gravel from a new extraction site. The date of commencement and life of site is unknown at present. Submitter wishes to return the site to agriculture at original levels.
Proposed Land Use	Extraction of sand and gravel
NPPF Vulnerability Classification	Water compatible.
Overview of flooding	<p>This site is mainly in Flood Zone 1. A small area of 1 in 20 flood risk follows a stream on site near the southern boundary which is also in Flood Zone 2. Surface water flooding (low to high risk) is distributed across the site and affects about 5% of its area.</p> <p>As a new site there is no data on current groundwater levels.</p> <p>The site lies across 3 km squares on the Environment Agency Areas Susceptible to Groundwater Flooding map. In the south-west less than 25% is of the relevant km square includes conditions that might support clearwater flooding; in the north-west less than 25% is of the relevant km square includes conditions that might support clearwater and superficial deposits flooding; in the north east square less than 25% of the area is susceptible to superficial deposits flooding. Although generally this would suggest a low risk of groundwater flooding, because this is a sand and gravel extraction site superficial deposit flooding might be a risk. Management of groundwater is a routine aspect of many sand and gravel sites.</p>
Area of site	117.1ha
Relevant Local SFRA	North west Yorkshire SFRA.
Local Functional Floodplain or 1 in 20/25 flood risk	There is a small area of 1/20 flood risk following the stream, that is currently in Flood Zone 2. There is therefore a possibility that this may be a mapping anomaly. However, taking a precautionary approach we have considered this as potential functional floodplain.
Climate change	Climate change may affect flooding on the stream after 2025, as indicated by the map. Extraction in this area would need to divert the stream (and unless it can be disproved that this is not functional floodplain would need to provide compensation for loss of flood storage).

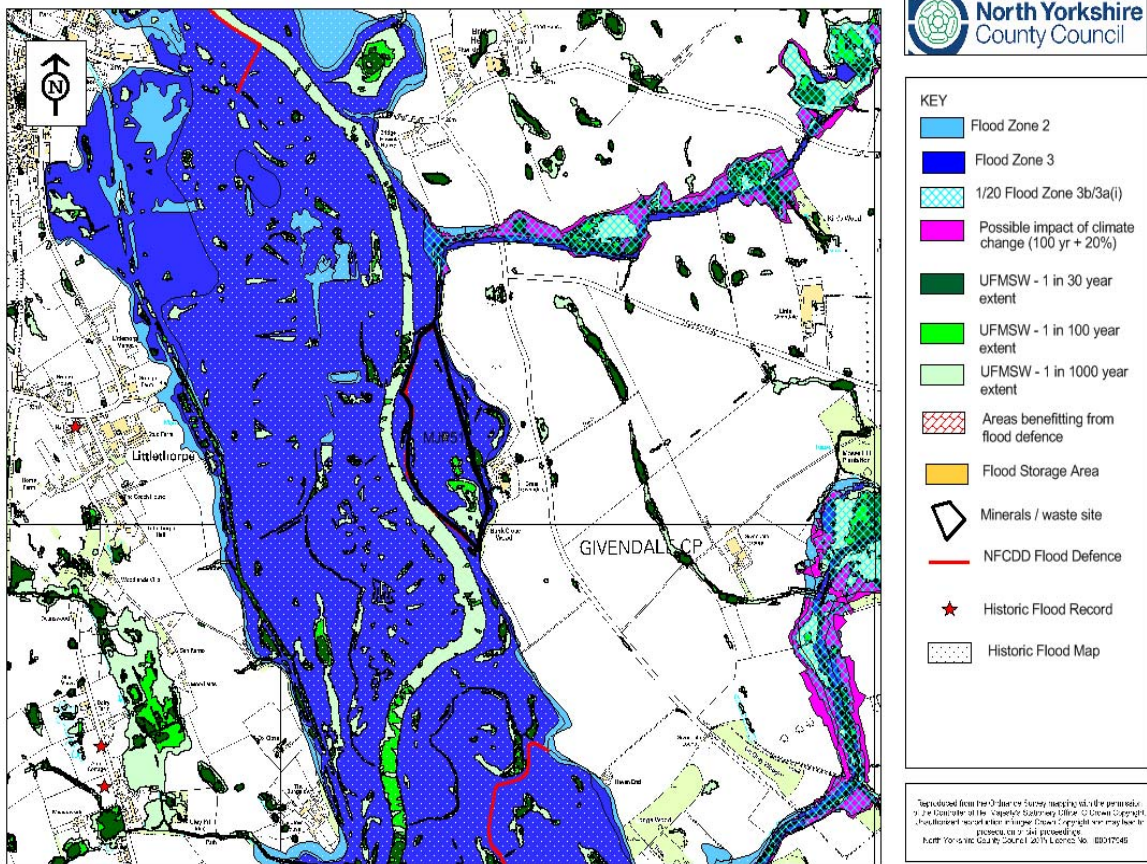
	If the site operates beyond 2055 climate change could elevate the risk of surface water flooding so that higher risk areas extend into medium risk areas.
Sequential Test result	Pass
Exception Test Needed	No, site is water compatible.
Is there an alternative site?	The following sand and gravel sites are within 10km of MJP04: MJP14 and MJP51. This site has a lower flood risk than both of these other sites (both of which have significant areas of Flood Zone 3) despite this site having a very small (and potentially avoidable) area of potential functional floodplain).
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific FRA will need to investigate groundwater flooding issues, and whether the area shown as 1 in 20 flood risk is correct. Appropriate use of SUDS should also be utilised to manage surface water, and this should not increase the risk of flooding elsewhere. If the on-site stream is to be diverted the alternative route of the stream will need to be given special attention so it does not increase flood risk elsewhere.



Site Reference: MJP51 Great Givendale, Ripon	
Site Information	Extraction of sand and gravel as an extension to existing quarry. Estimated date of commencement is 2020 and the proposed life of the site is 6 years. North part of site to be restored to arable agriculture and south end to grazing
Proposed Land Use	Extraction of sand and gravel
NPPF Vulnerability Classification	Water compatible
Overview of flooding	<p>This site is largely (about 85%) in Flood Zone 3 (in an area that coincides with historic flood outlines). The site also lies in an area identified as being at 1 in 25 year flood risk according to the Ripon Data Improvements Post Scheme Modelled Flood Outline.</p> <p>Small patches of the site are at medium risk of surface water flooding. The site lies behind a flood defence (standard of protection not known – though presumably some protection is offered).</p> <p>Site is mainly in a km square 25 to 50% of which has conditions which support superficial deposits flooding. The southern tip of the site is in a km square where 25 to 50% of the area is potentially at risk from clearwater and superficial deposit flooding. As a sand and gravel extraction site this may mean that there is potential risk of some flooding from superficial deposits in particular.</p> <p>Extraction at the other side of the river associated with Ripon City Quarry where dewatering operations take place¹⁰ suggesting groundwater would need to be managed. Management of groundwater is a routine aspect of many sand and gravel sites.</p>
Area of site	13.04ha
Relevant Local SFRA	North west Yorkshire SFRA.
Local Functional Floodplain or 1 in 20/25 flood risk	In the north west Yorkshire SFRA Flood Zone 3b is defined as undeveloped areas in Flood Zone 3. Although this land is not defined as being at a 1 in 20 year risk the area of this site in Flood Zone 3 should be regarded as potentially being in functional floodplain in line with the north-west SFRA.
Climate change	As this site is already in Flood Zone 3 with no Flood Zone 2, climate change is unlikely to increase the level of flood risk. Given the timescales of this site climate change will not affect surface water flooding.
Sequential Test result	Pass if necessary to contribute to overall supply. From a flood risk perspective MJP04 and MJP14 should be considered alongside by this site.
Exception Test Needed	No, site is water compatible
Is there an alternative site?	This site is within 10km of MJP04 and MJP14. This site has a higher flood risk than each of these sites.

¹⁰ Aggregate Industries, 2013, Ripon City Quarry Scheme of Groundwater Monitoring {URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=8057> }

	<p>From a flood risk perspective MJP04 should be allocated ahead of this site, followed by MJP14 and this site (which are broadly similar in terms of flood risk).</p>
<p>Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk</p>	<p>A site specific flood risk assessment would need to further examine the issues of the standard of protection offered by the flood defence, risk of groundwater flooding, emergency evacuation procedures, and how SUDS could help manage run off. It will be important that during times of flood there is no net loss of flood storage (including when the site is restored). Drainage of site should not increase flooding elsewhere.</p> <p><u>All sites in functional flood plain must: remain operational and safe for users in times of flood; result in no net loss of floodplain storage; not impede water flows and not increase flood risk elsewhere.</u></p>



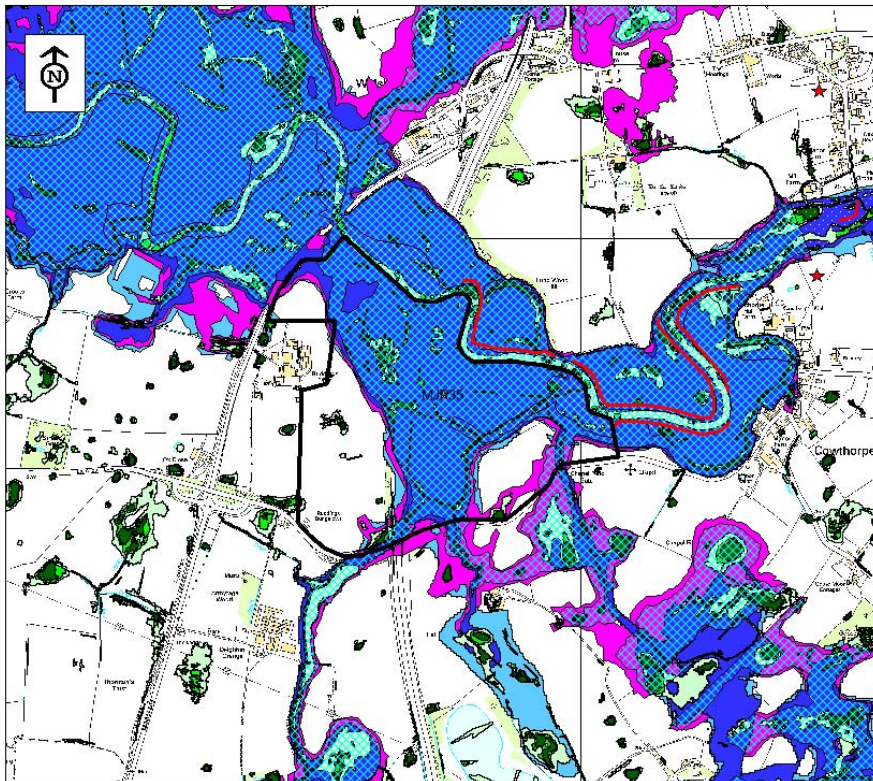
Site Reference: MJP35 Ruddings Farm, Walshford	
Site Information	Extraction of sand and gravel from a new extraction site. The date of commencement and life of site is unknown at present. Possible restoration is unknown.
Proposed Land Use	Extraction of sand and gravel
NPPF Vulnerability Classification	Water compatible.
Overview of flooding	<p>About 2/3 of this site lies in Flood Zone 3 in an area that is also shown as vulnerable to a 1 in 20 fluvial flood risk. Small patches of surface water flooding (low to high risk) covering about 5%.</p> <p>Most of this site is in a km square where more than 75% of the area is susceptible to clearwater and superficial deposits groundwater flooding, with small parts of the fringes of this site in 4 other km squares (the squares to the west and southwest are susceptible to clearwater and superficial deposits flooding, while the north and east squares are susceptible to just clearwater flooding). As a sand and gravel extraction site this may mean that there is potential risk of some flooding from superficial deposits in particular.</p> <p>A flood risk assessment for an adjacent waste transfer site found no risk of groundwater flooding¹¹. Management of groundwater is a routine aspect of many sand and gravel sites.</p>
Area of site	40.5
Relevant Local SFRA	North west Yorkshire SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	In the north west Yorkshire SFRA Flood zones 3b is defined as undeveloped areas in Flood Zone 3. Much of Flood Zone 3 is also shown as being at a 1 in 20 flood risk. The area of this site in Flood Zone 3 should be regarded as potentially being in functional floodplain in line with the north-west SFRA.
Climate change	If this site is operational beyond 2025 the area of the map below shown as being affected by climate change should be considered as Flood Zone 3. If the land is operational beyond 2055 medium risk surface water flooding should be considered as high risk and low risk surface water flooding should be considered as medium risk.
Sequential Test result	Pass if necessary to contribute to overall supply. From a flood risk perspective MJP37 and MJP41 should be considered alongside this site.
Exception Test Needed	No, site is water compatible
Is there an alternative site?	<p>The following proposed sand and gravel sites are within 10km: MJP41 and MJP37.</p> <p>From a flood risk perspective MJP37 and MJP41 have a lower overall risk from flooding.</p>
Site Specific Flood Risk	A site specific flood risk assessment should further consider

¹¹ Wetherby Skip Services Ltd.2012. Flood Risk Assessment, Waste Transfer Station, Walshford Bridge, Wetherby. [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=8581>]

Assessment Requirement and Mitigating Flood Risk

groundwater flooding and how SUDS can be used to drain the site. Drainage of site should not increase flooding elsewhere.

All sites in functional flood plain must: remain operational and safe for users in times of flood; result in no net loss of floodplain storage; not impede water flows and not increase flood risk elsewhere.



KEY	
	Flood Zone 2
	Flood Zone 3
	1/20 Flood Zone 3b/3a(i)
	Possible impact of climate change (100 yr + 20%)
	UFMSW - 1 in 30 year extent
	UFMSW - 1 in 100 year extent
	UFMSW - 1 in 1000 year extent
	Areas benefiting from flood defence
	Flood Storage Area
	Minerals / waste site
	NFCDD Flood Defence
	Historic Flood Record
	Historic Flood Map

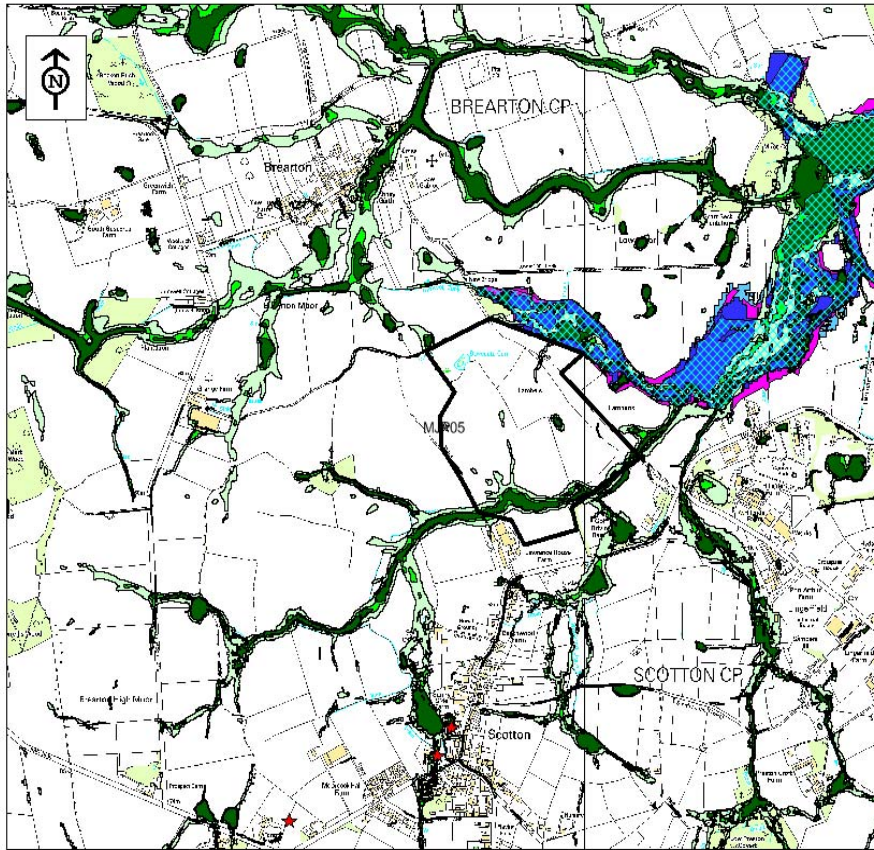
Reproduced from the O-Store by Survey, mapping and data provided by the Controller of the Copyright Database Office. © Crown Copyright. Unauthorised reproduction in any form is prohibited. Copyright information is provided on the O-Store. O-Store is a registered trademark of the Copyright Database Office.

Site Reference: MJP05 Lawrence House Farm, Scotton	
Site Information	Extraction of sand and gravel from a new extraction site. This site is estimated to commence within 5 years and would have a 15 year life. Submitter wishes to return site to agriculture.
Proposed Land Use	Extraction of sand and gravel.
NPPF Vulnerability Classification	Water compatible.
Overview of flooding	<p>This site is in Flood Zone 1. About 5% of this is site in areas subject to surface water flooding (low to high risk).</p> <p>This site lies across 3 km squares of differing susceptibility to groundwater flooding. The larger part of the site is in a km square where 50 to 75% of the area is susceptible to superficial deposits groundwater flooding. The eastern edge of the site is in a square where 25 to 50% of the area is susceptible to clearwater and superficial deposits flooding. The southern edge of the site is in a square where more than 75% of the area is susceptible to clearwater and superficial deposits flooding. As a sand and gravel extraction site this may mean that there is potential risk of some flooding from superficial deposits in particular.</p> <p>A historic application at this site shows that groundwater was encountered in several boreholes at levels from 4.30 to 12 metres below ground level¹², which, if still at this level, may mean that groundwater could be an on-site issue. Management of groundwater is a routine aspect of many sand and gravel sites.</p>
Area of site	23.35 ha
Relevant Local SFRA	North west Yorkshire SFRA.
Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable.
Climate change	Not applicable as fluvial flooding does not affect this site and surface water flooding would not increase in risk during the lifetime of this site.
Sequential Test result	Pass.
Exception Test Needed	No
Is there an alternative site?	<p>The following proposed sand and gravel sites are within 10 km: MJP41 and MJP37.</p> <p>Of the alternative sites considered MJP37 has the lowest level of flood risk though is broadly similar in terms of risk to this site, whereas MJP41 has a higher possibility of flooding (so, purely in terms of flood risk, this site should be preferred before MJP41).</p>
Site Specific Flood Risk	A site specific FRA will need to investigate groundwater

¹² Northern Aggregates Limited, 1987. Planning Application for the extraction of sand and gravel and the deposit of inert waste to enable restoration to agriculture at Lawrence House Farm, Scotton [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=2634>]

Assessment Requirement and Mitigating Flood Risk

flooding issues. Appropriate use of SUDS should also be utilised to manage surface water, and this should not increase the risk of flooding elsewhere. If the on-site stream is to be diverted the alternative route of the stream will need to be given special attention so it does not increase flood risk elsewhere.



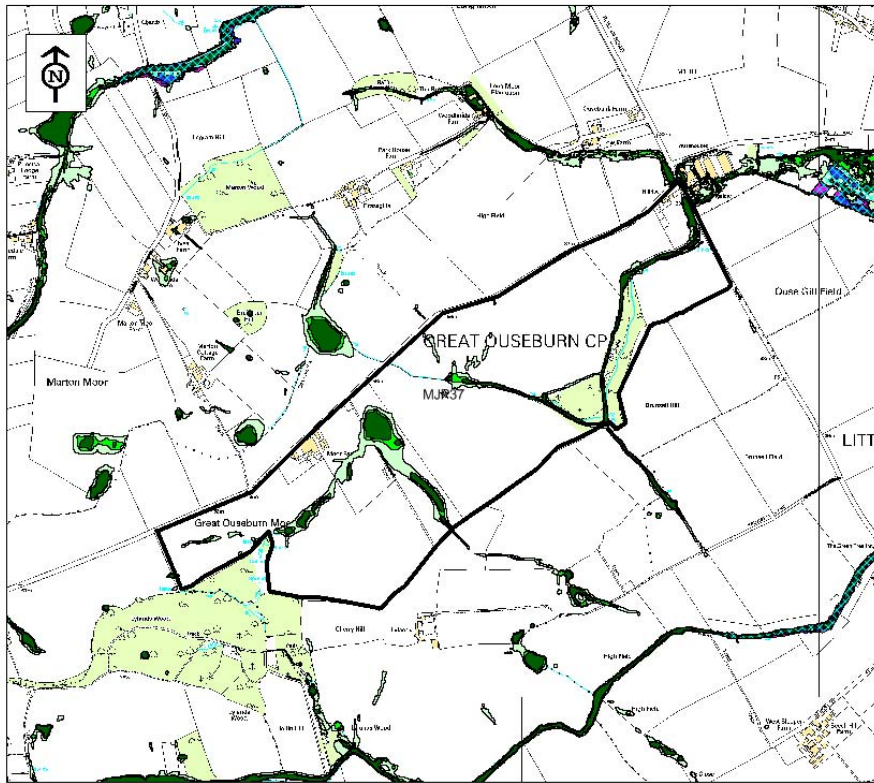
KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- Historic Flood Record
- Historic Flood Map

This document forms the 0 stage of a survey, representing the preliminary stage of the design process. It is not intended to be used for construction purposes. All rights reserved. Copyright © North Yorkshire County Council 2019. All rights reserved. No part of this document may be reproduced without the prior written permission of North Yorkshire County Council. 00017548



Site Reference: MJP37 Moor Lane Farm, Great Ouseburn	
Site Information	Extraction of sand and gravel from a new extraction site. The date of commencement and life of site is unknown at present. Restoration is also unknown.
Proposed Land Use	Extraction of sand and gravel
NPPF Vulnerability Classification	Water compatible
Overview of flooding	<p>This site is in Flood Zone 1. About 5% of this is site in areas subject to surface water flooding (low to high risk).</p> <p>The northern part of this site lies across 2 km squares which are mapped for their susceptibility for groundwater flooding. Both the north-western and north-eastern squares are susceptible to clearwater groundwater flooding across less than 25% of their areas. As a new site there is no historic information pertaining to groundwater close to this site. However, the fact that the vulnerability is to clearwater flooding suggests that this site is thought to be at a fairly low risk of groundwater flooding.</p>
Area of site	99ha
Relevant Local SFRA	North west Yorkshire SFRA.
Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable
Climate change	If the site operates beyond 2055 climate change could elevate the risk of surface water flooding so that higher risk areas extend into medium risk areas.
Sequential Test result	Pass.
Exception Test Needed	No
Is there an alternative site?	<p>The following proposed sites are within 10km of MJP37: MJP41; MJP35.</p> <p>Of the alternative sites considered MJP37 has the lowest level of flood risk whereas MJP41 and MJP35 have a higher overall risk of flooding.</p>
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific FRA will need to investigate groundwater flooding issues. Appropriate use of SUDS should also be utilised to manage surface water, and this should not increase the risk of flooding elsewhere. If the on-site stream is to be diverted the alternative route of the stream will need to be given special attention so it does not increase flood risk elsewhere.



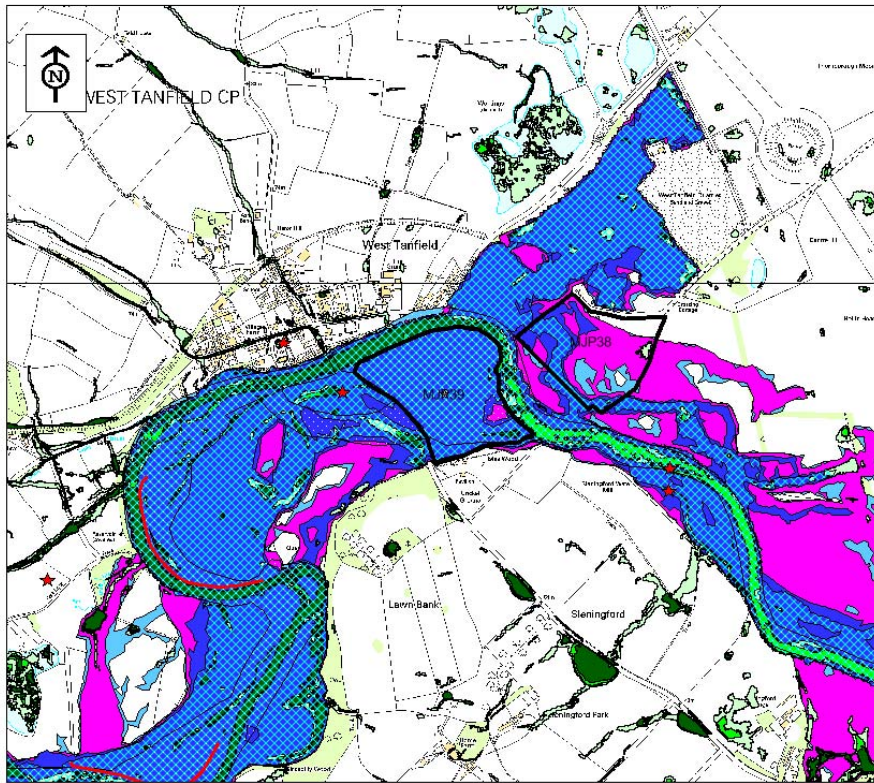
KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCCD Flood Defence
- Historic Flood Record
- Historic Flood Map

Reproduced from the Ouseburn Survey, subject to the permission of the Controller of the Copyright Material, Office of Copyright Licensing, 100 Broad Street, London, EC2M 2DL. Copyright © 2010 North Yorkshire County Council. All rights reserved.

DRAFT

Site Reference: MJP39 Quarry House, West Tanfield	
Site Information	Extraction of sand and gravel from a new extraction site. Estimated date of commencement is 2017-18 onwards with a proposed life of 3 years. Possible restoration: No detailed design available yet, but likely to be mainly to water.
Proposed Land Use	Extraction of sand and gravel
NPPF Vulnerability Classification	Water compatible
Overview of flooding	<p>95% if this site is in Flood Zone 3 and much of this is also at a 1 in 20 flood risk. A very small part (<2%) is vulnerable to surface water flooding (high risk).</p> <p>Site lies in a km square where less than 25% of the km square's area is susceptible to clearwater groundwater flooding. However, the site's proximity to the river and location at the bottom of a slope suggests groundwater flooding could be an issue. As a new site there is no historic information pertaining to groundwater close to this site.</p>
Area of site	13.5 ha
Relevant Local SFRA	North west Yorkshire SFRA.
Local Functional Floodplain or 1 in 20/25 flood risk	In the north west Yorkshire SFRA Flood zones 3b is defined as undeveloped areas in Flood Zone 3. Much of Flood Zone 3 is also shown as being at a 1 in 20 flood risk. The area of this site in Flood Zone 3 should be regarded as potentially being in functional floodplain in line with the north-west SFRA.
Climate change	Climate change is unlikely to affect this site due to its short lifespan.
Sequential Test result	Pass if necessary to contribute to overall supply. From a flood risk perspective MJP06, MJP38, MJP07 and then MJP14 should be considered alongside this site.
Exception Test Needed	No, this site is water compatible.
Is there an alternative site?	<p>The following proposed sand and gravel sites are within 10 km of MJP39: MJP38, MJP14; MJP06; MJP07.</p> <p>This site (MJP39) has the highest level of flood risk when compared to the alternatives considered.</p>
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	<p>A site specific flood risk assessment would need to further examine risk of groundwater flooding, emergency evacuation procedures, and how SUDS could help manage run off. It will be important that during times of flood there is no net loss of flood storage (including when the site is restored). Drainage of site should not increase flooding elsewhere.</p> <p><u>All sites in functional flood plain must: remain operational and safe for users in times of flood; result in no net loss of floodplain storage; not impede water flows and not increase flood risk elsewhere.</u></p>



KEY

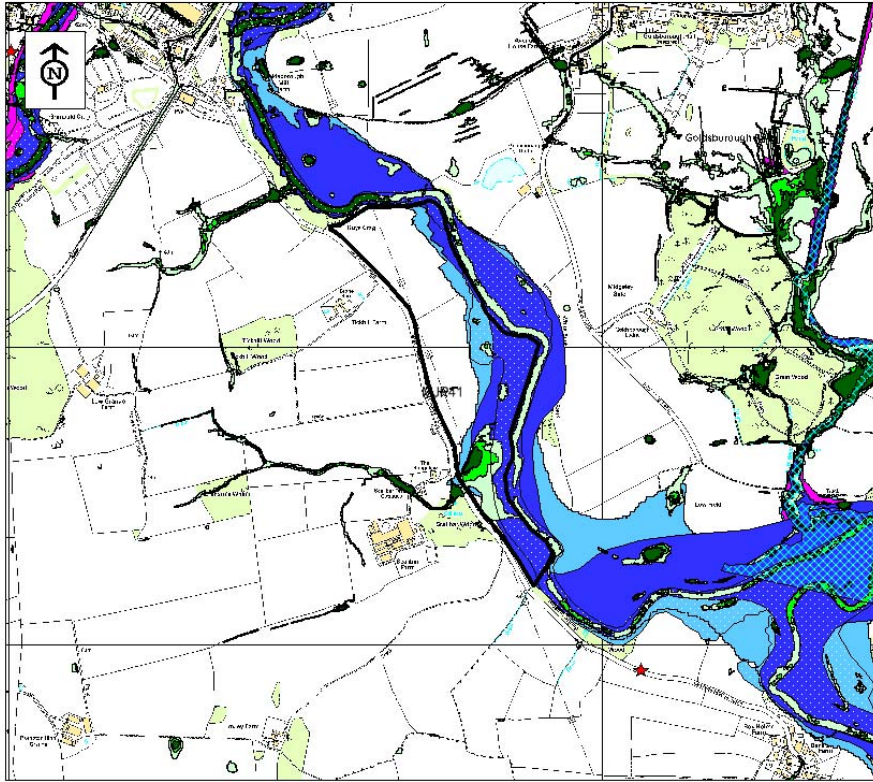
- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- Historic Flood Record
- Historic Flood Map

Reproduced from the Office for Survey Mapping, with the permission of the Controller of the Copyright Material Office. © Crown Copyright. All rights reserved. No part of this publication may be reproduced without the prior written permission of the Controller of the Copyright Material Office. Ordnance Survey Licence No. 100017546

DRAFT

Site Reference: MJP41 Scalibar Farm, Knaresborough	
Site Information	Extraction of sand and gravel from a new extraction site. The date of commencement and life of site is unknown at present. Restoration is unknown at present.
Proposed Land Use	Extraction of sand and gravel
NPPF Vulnerability Classification	Water compatible
Overview of flooding	<p>About a quarter of this site is in Flood Zone 3 (much of which is also marked on the historic flood map). The eastern edge of the site is also in an area identified as 1 in 25 year flood risk by the River Nidd Knaresborough Flood Model. A further slither of land along the edge of Flood Zone 3 lies in Flood Zone 2. Surface water flooding (low to high risk) affects a small area (around 5%) in the south of the site.</p> <p>The site lies across two km squares of differing susceptibility to groundwater flooding. The northern part of the site is in a square where 25 to 50% of the area has conditions that might support clearwater and superficial deposits groundwater flooding. The southern part of the site is in a square where 25% of the area is susceptible to groundwater flooding. The site's proximity to the river and location at the bottom of a slope suggests groundwater flooding could be an issue. As a new site there is no historic information pertaining to groundwater close to this site.</p>
Area of site	29.4ha
Relevant Local SFRA	North west Yorkshire SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	In the north west Yorkshire SFRA Flood Zone 3b is defined as undeveloped areas in Flood Zone 3. Although this land is not defined as being at a 1 in 20 year risk the area of this site in Flood Zone 3 should be regarded as potentially being in functional floodplain in line with the north-west SFRA.
Climate change	If this site is operational beyond 2025 the area of the map below shown as Flood Zone 2 should be considered as Flood Zone 3. If the land is operational beyond 2055 medium risk surface water flooding should be considered as high risk and low risk surface water flooding should be considered as medium risk.
Sequential Test result	Pass, however from a flood risk perspective MJP37 and MJP35 should be considered alongside this site.
Exception Test Needed	No. Site is water compatible.
Is there an alternative site?	<p>The following proposed sand and gravel sites are within 10km of MJP41: MJP35; MJP37; MJP05.</p> <p>Of the alternative sites considered MJP35 has the highest level of flood risk, while both MJP37 and MPP05 are less vulnerable to flooding.</p>
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment would need to further examine risk of groundwater flooding, emergency evacuation procedures, and how SUDS could help manage run off. It will be important that during times of flood there is no net loss of flood storage (including when the site is restored). Drainage of site should not increase flooding elsewhere.

All sites in functional flood plain must: remain operational and safe for users in times of flood; result in no net loss of floodplain storage; not impede water flows and not increase flood risk elsewhere.



KEY

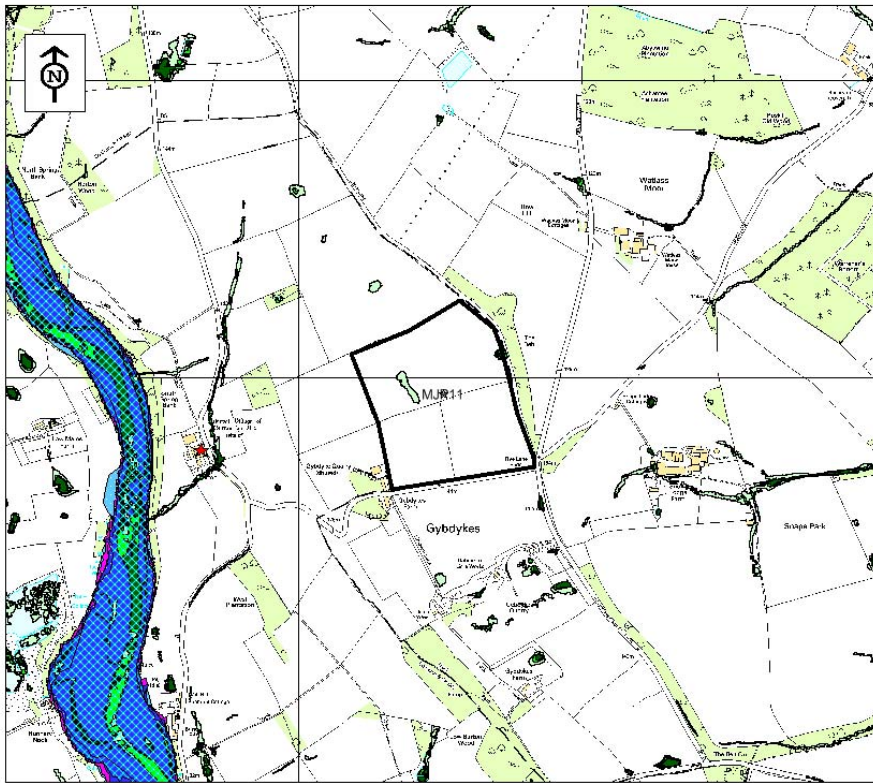
- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCCD Flood Defence
- ★ Historic Flood Record
- Historic Flood Map

Reproduced from the O'Brien Survey mapping, with the permission of the Controller of the Copyright Submarine Office. © Crown Copyright. Ordnance Survey Licence No. 100015466. North Yorkshire County Council. 2017. Licence No. 100170546



Site Reference: MJP11 Gebdykes Quarry, near Masham	
Site Information	Extraction of Magnesian limestone as proposed extension to existing quarry. Estimated date of commencement is 2025 to 2030. Proposed lifespan is unknown at present. Existing quarry site restoration is to agriculture and woodland.
Proposed Land Use	Extraction of Magnesian limestone
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>This site is in Flood Zone 1. Surface water flooding (low to high risk) affects a very small area (about 2%).</p> <p>This site is in an area that is not mapped in terms of its susceptibility to groundwater flooding. No reference to groundwater is made in the committee report for the adjacent site¹³.</p>
Area of site	25.8 ha
Relevant Local SFRA	North west Yorkshire SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable
Climate change	If this site is operational beyond 2055 then low risk surface water flooding should be considered medium risk (though the changed site profile will have affected where water gathers)
Sequential Test result	Pass
Exception Test Needed	No
Is there an alternative site?	<p>The following proposed Magnesian limestone sites are within 10km of MJP11: MJP10.</p> <p>In terms of the alternative site considered, MJP11 has a broadly similar overall flood risk to MJP10</p>
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment would need to further examine risk of groundwater flooding, any future climate change risk, and how SUDS could help manage run off.

¹³ North Yorkshire County Council Environmental Services Committee, 1996. North Yorkshire Minerals Local Plan, Gebdykes Quarry, near Masham [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=1591>]



KEY

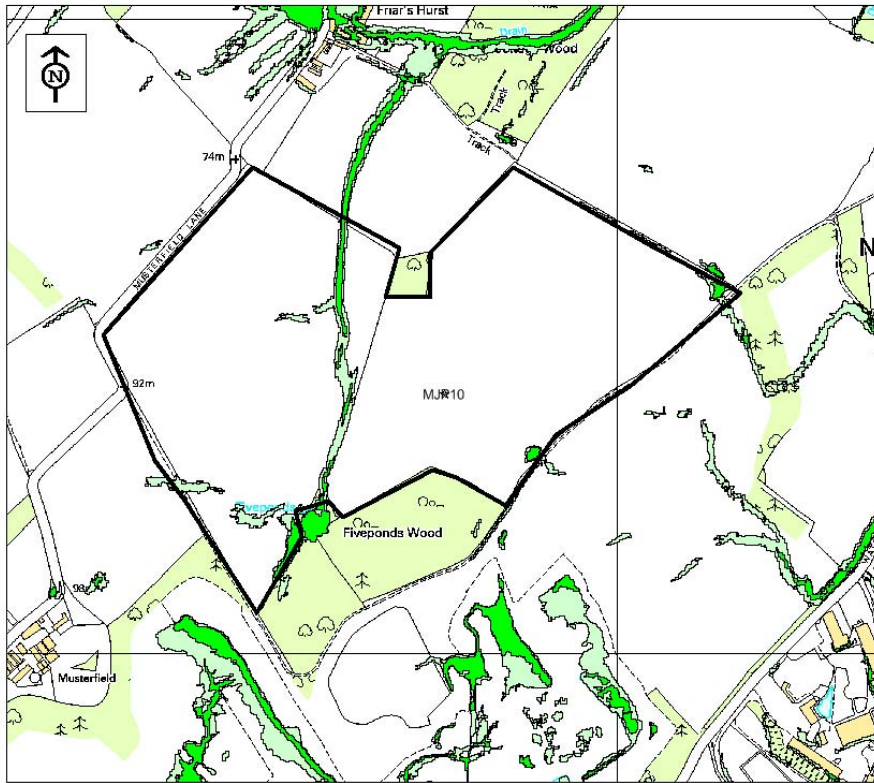
- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCCD Flood Defence
- ★ Historic Flood Record
- Historic Flood Map

Reproduced from the O-Blue Ice Survey, subject to the permission of the Controller of the Copyright Material, © Crown Copyright. All rights reserved. No part of this publication may be reproduced without the prior written permission of the Controller of the Copyright Material.

DRAFT

Site Reference: MJP10 Potgate Quarry, North Stainley	
Site Information	Extraction of Magnesian limestone as proposed extension to existing quarry. Estimated date of commencement is 2021. Proposed life of site is 17 years. Restoration to arable agriculture with some biodiversity habitats.
Proposed Land Use	Extraction of Magnesian limestone
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>This site is in Flood Zone 1. About 5% of this is site in areas subject to surface water flooding (low to high risk).</p> <p>Most of the site lies in a km square where less than 25% of the area is susceptible to clearwater groundwater flooding. The eastern part of the site is in a square where less in a square where groundwater flooding susceptibility information is not available.</p> <p>A nearby extension to the same quarry reports that “there are no obvious points of groundwater ingress in the quarry excavations and most of the joint surfaces show little or no evidence of solution despite some karstic features in the wider local area”¹⁴ A borehole on this site was dry to 12.19 m below ground level so much depends on the depth of extraction.</p>
Area of site	14.8ha
Relevant Local SFRA	North west Yorkshire SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable
Climate change	Not applicable as fluvial flooding does not affect this site and surface water flooding would not increase in risk during the lifetime of this site.
Sequential Test result	Pass
Exception Test Needed	No
Is there an alternative site?	<p>The following proposed Magnesian limestone sites are within 10km of MJP10: MJP11.</p> <p>In terms of the alternative site considered, MJP11 has a broadly similar flood risk than MJP10.</p>
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment would need to further examine risk of groundwater flooding and how SUDS could help manage run off.

¹⁴ Lightwater Quarries. 2012. Potgate Quarry: Planning Application for an extension to the existing mineral workings with restoration to nature conservation habitats: Environmental Statement prepared by David L Walker Ltd [URL <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=8602>]



KEY

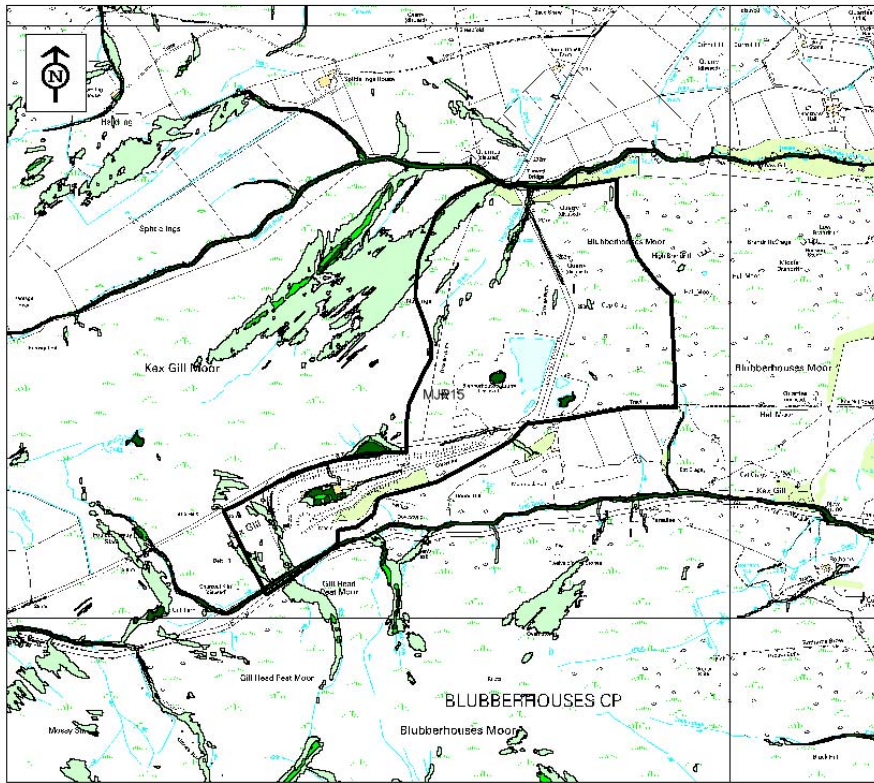
- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- ★ Historic Flood Record
- Historic Flood Map

Reproduced from the Ofsted Survey, subject to the permission of the Controller of the Copyright Material, © Crown Copyright. All rights reserved. No part of this publication may be reproduced without the prior written permission of the Controller of the Copyright Material. ISBN 978-0-7552-0000-0

DRAFT

Site Reference: MJP15 Blubberhouses Quarry, west of Harrogate	
Site Information	Extension of time to allow continuation of extraction of silica sand from existing site. Estimated date of commencement within next 5 to 10 years, with a proposed life of 25 years. Possible restoration to moorland and wet bog.
Proposed Land Use	Extraction of silica sand
NPPF Vulnerability Classification	Water compatible
Overview of flooding	<p>This site is in Flood Zone 1. About 5% of this is site in areas subject to surface water flooding (low to high risk).</p> <p>In terms of groundwater flooding although no information is available on the Areas Susceptible to Groundwater Flooding map for the eastern part of the site, the western half of the site lies across two km squares where less than 25% of the area has the potential for clearwater groundwater flooding to occur.</p> <p>A Flood risk assessment at the site confirmed that there was no risk of surface flooding. However, borehole data indicates that the natural groundwater table is within the workable sandstone and dewatering will be required to work the quarry dry¹⁵.</p>
Area of site	83.43 ha of which 38.66 is proposed for extraction
Relevant Local SFRA	North west Yorkshire SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable
Climate change	Not applicable as fluvial flooding does not affect this site and surface water flooding would not increase in risk during the lifetime of this site.
Sequential Test result	Pass
Exception Test Needed	No
Is there an alternative site?	There are no alternative proposed silica sand sites within 10km. Flood risk is generally considered to be low.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A Flood Risk Assessment has already been carried out for this site.

¹⁵ Hanson Quarry Products Ltd, 2011. Proposed Renewal of Time Limited Planning Permission Reference C6/105/6A/PA at Blubberhouses Silica Sand Quarry, Kex Gill, North Yorkshire: Environmental Statement [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=8261>]



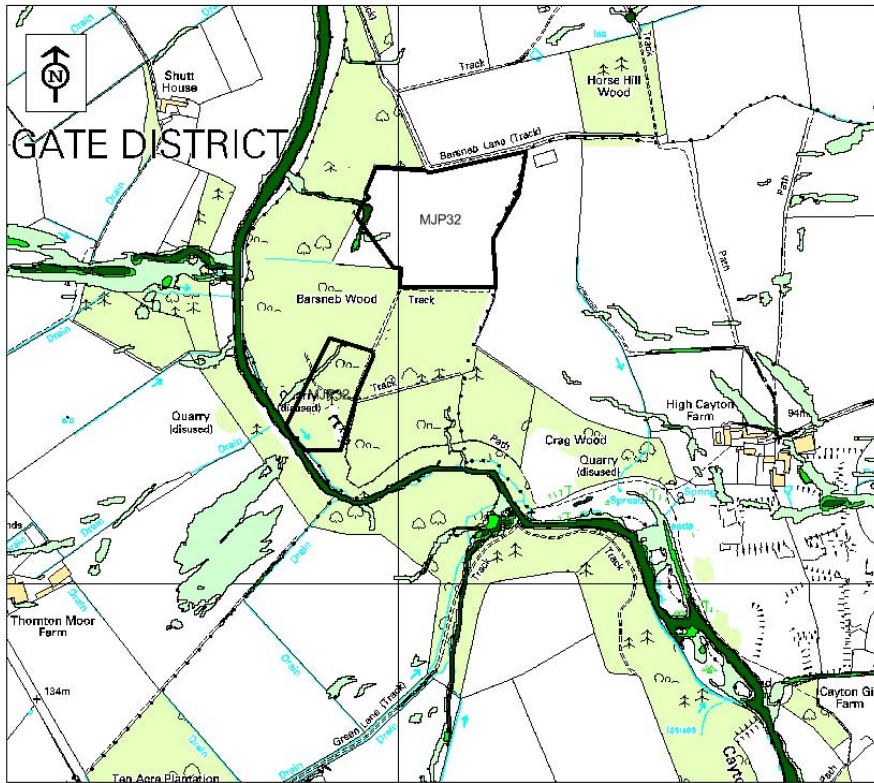
KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCCD Flood Defence
- Historic Flood Record
- Historic Flood Map

Reproduced from the Office for Survey, mapping, and the permission of the Controller of the Copyright Licensing Agency. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage or retrieval system, without the prior written permission of the Controller of the Copyright Licensing Agency.

DRAFT

Site Reference: MJP32: Barsneb Wood, Markington	
Site Information	Extraction of sandstone from part of a former quarry and a new extraction site to the north of that former quarry. Estimated date of commencement is 2017 and proposed life of site is 16 years. Restoration: South area: woodland on an inclined sloping shelf joining to existing contours on west side of site, with benched sides on the north, east and south sides linking to existing contours on those sides. North area: no detailed restoration design.
Proposed Land Use	Extraction of sandstone
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>This site (both north and south areas) is in Flood Zone 1. About 2% of this is site in areas subject to surface water flooding (low to high risk).</p> <p>The southern site is in a km square which the Environment Agency's Areas Susceptible to Groundwater Flooding indicates has a less than 25% vulnerability to clearwater flooding.</p> <p>No further groundwater information is available. Generally the site is thought to be fairly low risk of groundwater flooding.</p>
Area of site	6 ha
Relevant Local SFRA	North west Yorkshire SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable
Climate change	Not applicable as fluvial flooding does not affect this site and surface water flooding would not increase in risk during the lifetime of this site.
Sequential Test result	Pass
Exception Test Needed	No
Is there an alternative site?	There are no alternative sandstone sites within 10 km of MJP32. Flood risk is considered to be low.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment would need to further examine risk of groundwater flooding and how SUDS could help manage run off.



KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- ★ Historic Flood Record
- Historic Flood Map

Reproduced from the O-Blue OS Survey, respecting all of the provisions of the Ordnance Survey Act 1947 and the Ordnance Survey Act 1993. All rights reserved. © Crown Copyright. Ordnance Survey, 2014. Licence: CC BY-NC-ND. North Yorkshire County Council, 2017. Licence: CC BY-NC-ND.

DRAFT

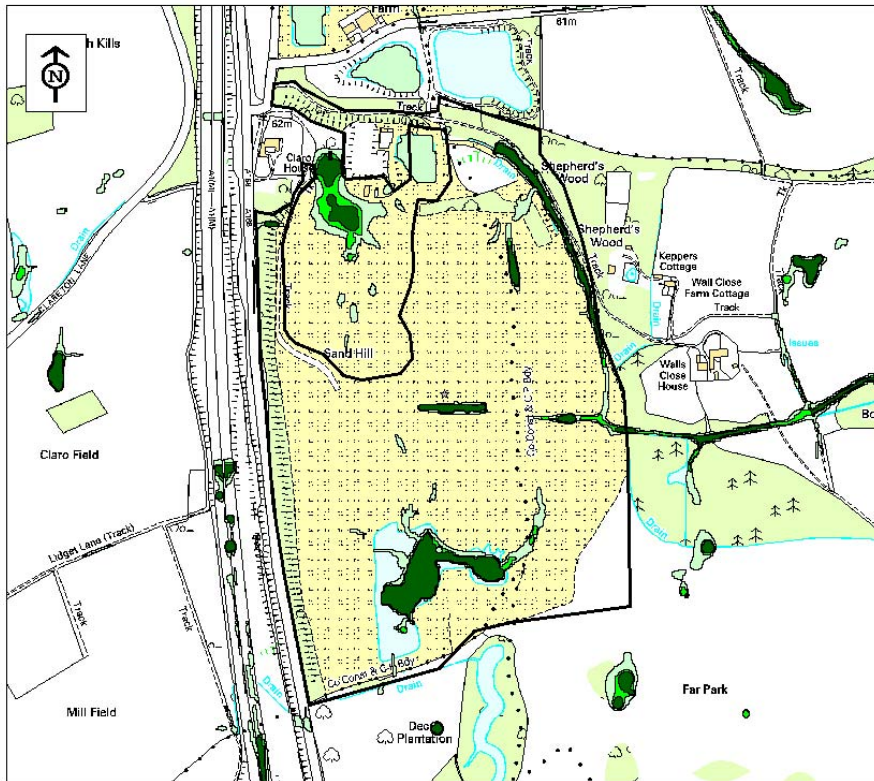
Site Reference: WJP08 Allerton Park, near Knaresborough	
Site Information	<p>Site is for retention of landfill and associated landfill gas utilisation plant and use of site for growth of energy/biomass crops beyond 2018. Proposed composting, transfer station and materials recycling facility, recycling (including of minerals for secondary aggregates).</p> <p>Estimated date of commencement is 2018 and the site will operate until 2033. In terms of restoration there is no detailed design at present, but current approved scheme is agriculture and woodland.</p>
Proposed Land Use	<p>Retention of landfill and associated landfill gas utilisation plant and use of site for growth of energy/biomass crops beyond 2018.</p> <p>Proposed composting, transfer station and materials recycling facility, recycling (including of minerals for secondary aggregates).</p>
NPPF Vulnerability Classification	Landfill is more vulnerable, other uses are less vulnerable.
Overview of flooding	<p>This site is in Flood Zone 1. About 5 to 10% of this is site in areas subject to surface water flooding (low to high risk).</p> <p>Most of this site is in two km squares which the Environment Agency's Areas Susceptible to Groundwater Flooding indicates have a less than 25% vulnerability to clearwater flooding. The remainder of the site (along the eastern boundary) is not mapped.</p> <p>A Flood Risk Assessment for construction of lagoons on part of the site did not consider groundwater but considered the site would not be at risk of flooding¹⁶. Earlier proposals for the extension of sand and gravel extraction at the site found 'hydraulic continuity between the Sherwood Sandstone Aquifer and sand and gravel though concluded that due to the size of the site impacts would be small¹⁷. However, as this development is unlikely to extend the depths of any features risks are considered to be low, but should still be investigated.</p>
Area of site	29ha
Relevant Local SFRA	North west Yorkshire SFRA

¹⁶ Hydrologic, 2009. Pro Forma for Undertaking a Flood Risk Assessment [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=5994>]

¹⁷ Hanson Aggregates –North. 1999. The extension of sand and gravel extraction and retention of existing and retention of existing quarry facilities at Allerton Park, Knaresborough, North Yorkshire – Environmental Impact Assessment Non-Technical Summary [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=3992>]

Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable
Climate change	If this site is operational beyond 2055 then low risk surface water flooding should be considered medium risk and medium risk surface water flooding should be considered high risk (though the changed site profile will have affected where water gathers).
Sequential Test result	Pass
Exception Test Needed	No
Is there an alternative site?	There are no alternative proposed waste management sites within 10km. The Evidence Base study ¹⁸ into potential waste management site locations identified a further 2 waste management sites within 10km: HAR2 (Claro Park, Harrogate) and HAR11 (St James Business Park, Knaresborough). WJP08 compares favourably with both HAR2 and HAR11, both of which have higher levels of flood risk, including historic records of flooding, and HAR11 has about 5% of its area in Flood Zone 3.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment would need to further examine risk of groundwater flooding and how SUDS could help manage run off.

¹⁸ North Yorkshire County Council, City of York Council and the North York Moors National Park Authority, 2015. Identification of potential locations for waste management facilities [URL: [http://www.northyorks.gov.uk/media/32597/Identification-of-potential-locations-for-waste-management-facilities-Jul-2015/pdf/Identification_of_potential_locations_for_waste_management_facilities_\(Jul_2015\).pdf](http://www.northyorks.gov.uk/media/32597/Identification-of-potential-locations-for-waste-management-facilities-Jul-2015/pdf/Identification_of_potential_locations_for_waste_management_facilities_(Jul_2015).pdf)]



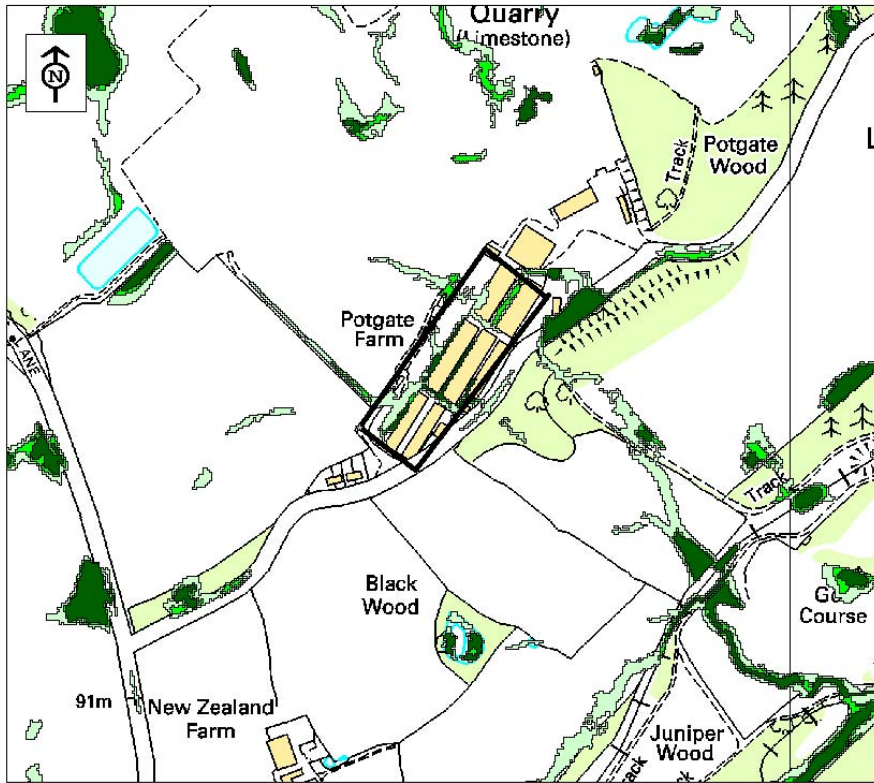
KEY

	Flood Zone 2
	Flood Zone 3
	1/20 Flood Zone 3b/3a(i)
	Possible impact of climate change (100 yr + 20%)
	UFMSW - 1 in 30 year extent
	UFMSW - 1 in 100 year extent
	UFMSW - 1 in 1000 year extent
	Areas benefiting from flood defence
	Flood Storage Area
	Minerals / waste site
	NFCDD Flood Defence
	Historic Flood Record
	Historic Flood Map

Reproduced from the O-Blue Ice Survey, subject to the permission of the Controller of the Copyright Material, Office of Copyright Licensing, 100 Tottenham Court Road, London W1P 0LP. Copyright © 2010 North Yorkshire County Council. All Rights Reserved. 03017546

DRAFT

Site Reference: WJP23 Potgate (former piggery), North Stainley	
Site Information	Site is for recycling of inert construction and demolition waste for secondary aggregates. Estimated date of commencement is 2016 and there is no end date known at present. This is a proposed long term facility, so no firm restoration plans, but potentially light industrial
Proposed Land Use	Recycling of inert construction and demolition waste for secondary aggregates
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>This site is in Flood Zone 1. About 10% of this is site in areas subject to surface water flooding (low to high risk).</p> <p>In terms of groundwater flooding the site is in a km square where less than 25% of the area has the potential for clearwater groundwater flooding. The nearby MJP10 reported a low risk of groundwater flooding, and coupled with the fact this site involves only surface development groundwater flooding is not thought to be significant.</p>
Area of site	6.3 ha
Relevant Local SFRA	North west Yorkshire SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable
Climate change	Not applicable as fluvial flooding does not affect this site and surface water flooding would not increase in risk during the lifetime of this site.
Sequential Test result	Pass
Exception Test Needed	No
Is there an alternative site?	There are no alternative proposed waste management sites within 10km. The Evidence Base study into potential waste management site locations identified a further potential waste management site within 10km: HAR9. HAR 9 is in Flood Zone 1 and has a broadly similar level of overall flood risk to this site.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment would need to further examine risk of groundwater flooding and how SUDS could help manage run off.



KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- ★ Historic Flood Record
- Historic Flood Map

Reproduced from the O-Blue Ice Survey, subject to the permission of the Controller of the Copyright Licensing Agency. © Crown Copyright. All rights reserved. No part of this publication may be reproduced without the prior written permission of the Controller of the Copyright Licensing Agency. North Yorkshire County Council 2019. Licence No. 10017546

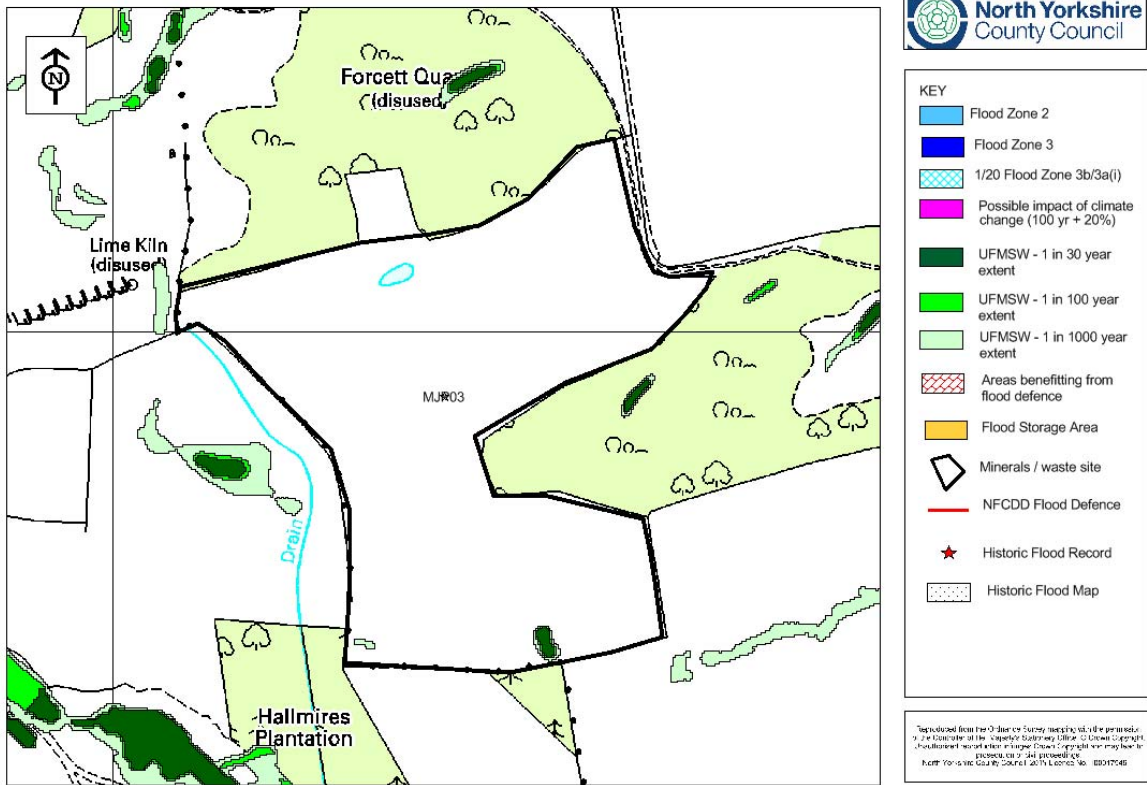
DRAFT

5. Richmondshire Sites

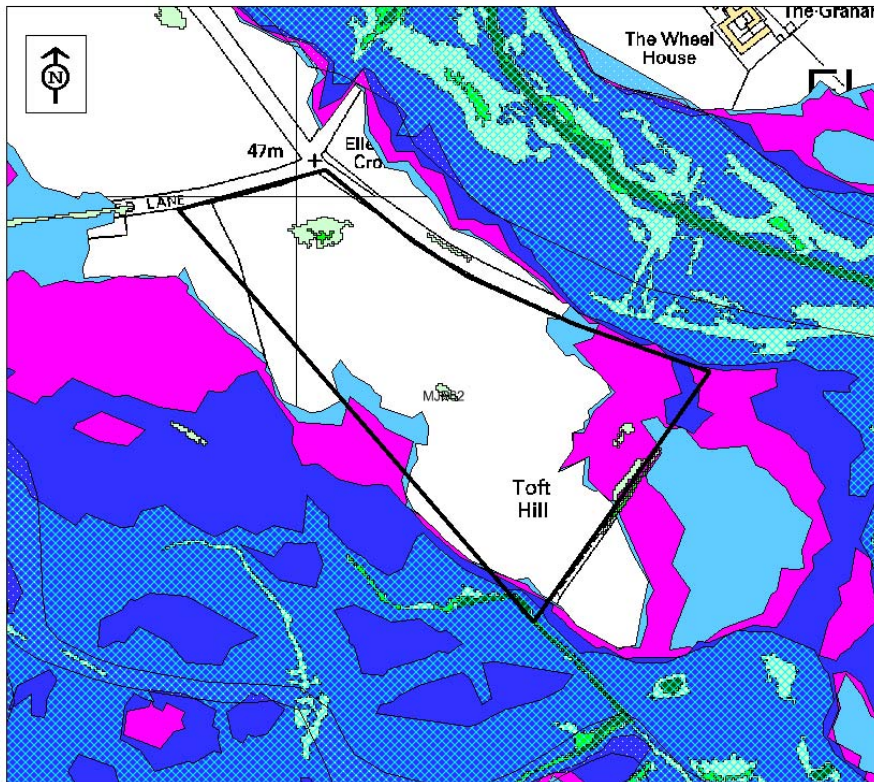
Key to Sequential Test Results		
Pass	Pass subject to further consideration of the site's contribution to the supply of minerals.	Site is not suitable or would require an Exception Test demonstrated through a Level 2 SFRA to proceed.

Site Reference: MJP03: Scarborough Field, adjacent to Forcett Quarry	
Site Information	Extraction of Carboniferous limestone as proposed extension to existing quarry. Estimated start date is unknown at present, but estimated to be after 2021. The proposed life of the site is 10 to 20 years. Restoration will be to agriculture in the base of the quarried area.
Proposed Land Use	Extraction of Carboniferous limestone
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>Site has a small patch of surface water flood risk (medium to high risk) and a very small patch of very low risk surface water flooding. (Overall area of surface water flooding is about 2%).</p> <p>In terms of groundwater flooding site lies across two separate km squares in the Environment Agency's Areas Susceptible to Groundwater Flooding maps. The northern part of the site lies in an area where 25 to 50% of land has conditions that could support clearwater and superficial deposit flooding. The southern part of the site is an area where less than 25% of land is susceptible to superficial deposits flooding.</p> <p>In the adjacent Forcett Quarry "Active water management has been undertaken for many years as a proportion of the limestone within the current extraction area is situated below the natural groundwater level", meaning that groundwater flooding at this site is possible, but likely to be routinely managed.</p>
Area of site	13.3 ha
Relevant Local SFRA	North west Yorkshire SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable.
Climate change	This site does not need to take account of climate change for surface water flooding as operations would cease before 2055.
Sequential Test result	Pass. Flood risk is generally low.














Exception Test Needed	No
Is there an alternative site?	There are no alternative carboniferous limestone sites within 10 km.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	SUDS would be a way of helping to manage surface water flooding and groundwater flooding. Management of surface water flooding should not increase flood risk on the receiving waterbody.



Site Reference: MJP62: Land at Toft Hill	
Site Information	Extraction of sand and gravel from a new extraction site. Estimated date of commencement is 2015/16. The proposed life of the site is 8 to 10 years. Possible restoration is lake with partial reed fringe, extension to Toft Hill Copse and grassland.
Proposed Land Use	Extraction of sand and gravel
NPPF Vulnerability Classification	Water compatible
Overview of flooding	<p>About 15% of this site is in Flood Zone 2. A small area is in Flood Zone 3. Small patches (<5%) of the site are subject to surface water flooding (low to medium risk)</p> <p>Most of this site lies in an area where 25 to 50% of land has conditions that could support superficial deposit flooding. The north west corner of the site lies in an area where 50 to 75% of land has conditions that could support superficial deposit flooding. The northern tip of the site is an area that is not mapped on the Areas Susceptible to Groundwater Flooding map.</p> <p>Other sites in this area have extracted below the water table and have routinely employed dewatering, so it seems likely that a similar situation will exist at this site.</p>
Area of site	8.7 ha
Relevant Local SFRA	North west SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	In the north west Yorkshire SFRA Flood zones 3b is defined as undeveloped areas in Flood Zone 3. A small area of this site is in Flood Zone 3 and is undeveloped – so should be considered as potential functional floodplain.
Climate change	As climate change's influence on fluvial flooding should be considered after 2025 if this site endures beyond 2025 much of Flood Zone 2 should be considered as Flood Zone 3 as climate change mapping broadly coincides with the Flood Zone 2 area.
Sequential Test result	Pass. Purely in flood risk terms this site should be considered ahead of MJP33 and MJP21, but MJP43, MJP17 and MJP60 should be considered alongside this site when considering allocations.
Exception Test Needed	No
Is there an alternative site?	The following proposed sand and gravel sites are within 10km: MJP33, MJP21, MJP43, MJP60 and MJP17. Of these sites MJP33 is the highest risk, followed by MJP21. MJP62 then follows these sites in terms of flood risk, with the other sites being slightly better as they are entirely within Flood Zone 1. Purely in flood risk terms this site should be considered ahead of MJP33 and MJP21, but MJP43, MJP17 and MJP60 should be considered alongside this site as they are broadly of lower risk.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	SUDS would be a way of helping to manage surface water flooding and groundwater flooding. Management of surface water flooding should not increase flood risk on the receiving waterbody.



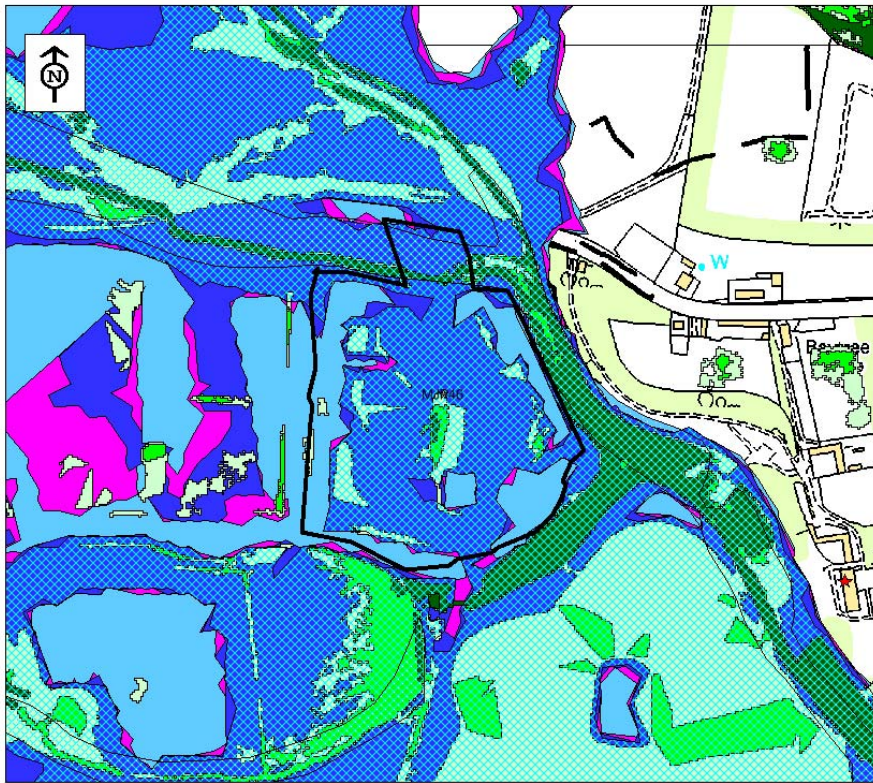
KEY

	Flood Zone 2
	Flood Zone 3
	1/20 Flood Zone 3b/3a(i)
	Possible impact of climate change (100 yr + 20%)
	UFMSW - 1 in 30 year extent
	UFMSW - 1 in 100 year extent
	UFMSW - 1 in 1000 year extent
	Areas benefiting from flood defence
	Flood Storage Area
	Minerals / waste site
	NFCDD Flood Defence
	Historic Flood Record
	Historic Flood Map














Reproduced from the O-Data for County, North Yorkshire, provided by the Yorkshire and the Humber Local Enterprise Partnership. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, without the prior written permission of the Yorkshire and the Humber Local Enterprise Partnership.

DRAFT

Site Reference: MJP46: Kiplin plant processing site, Kiplin	
Site Information	Retention of processing plant site to serve future sand and gravel extraction in the local area. Estimated date of commencement: 2015 to 2016. Proposed life of site: 12 years including restoration. Restoration is not yet detailed.
Proposed Land Use	Retention of sand and gravel processing plant site
NPPF Vulnerability Classification	Water compactible
Overview of flooding	<p>About 85% of this site is in Flood Zone 3, with the remainder in Flood Zone 2. There are a few very small patches of medium risk flooding (<2%).</p> <p>The western third of this site is in a km square, 25 to 50% of which has conditions which could support superficial deposit flooding. The eastern two thirds is in an area which is not mapped on the Environment Agency's Areas Susceptible to Groundwater Flooding map.</p> <p>This site is for retention of a processing plant which as surface development is not likely to be particularly vulnerable to groundwater issues (though should still be investigated in a FRA).</p>
Area of site	6.7 ha
Relevant Local SFRA	North west Yorkshire.
Local Functional Floodplain or 1 in 20/25 flood risk	<p>In the north west Yorkshire SFRA Flood zones 3b is defined as undeveloped areas in Flood Zone 3. As 85% of this site is in Flood Zone 3 and is undeveloped it should be considered as potential functional floodplain.</p> <p>Much of this area is also at a 1 in 20 flood risk.</p>
Climate change	As climate change's influence on fluvial flooding should be considered after 2025 if this site endures beyond 2025 the area indicated as possible impact of climate change on the map below should be considered as Flood Zone 3.
Sequential Test result	As this site is linked to processing in the area and is water compatible it is acceptable in its current location should the demand from sites for processing minerals off-site be sufficient to support it.
Exception Test Needed	No
Is there an alternative site?	Sites MJP21 and MJP33 are also proposing processing sites. However these facilities are within proposed sites, so may not have the capacity to deal with the output of other sites. Nonetheless, MJP33 has a broadly similar flood risk to this site, while MJP21 has a lesser flood risk.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	Run off from this site should be managed using a sustainable drainage system where appropriate. As functional floodplain will be utilised any loss of flood storage capacity would need to be compensated for and must not increase flooding elsewhere.



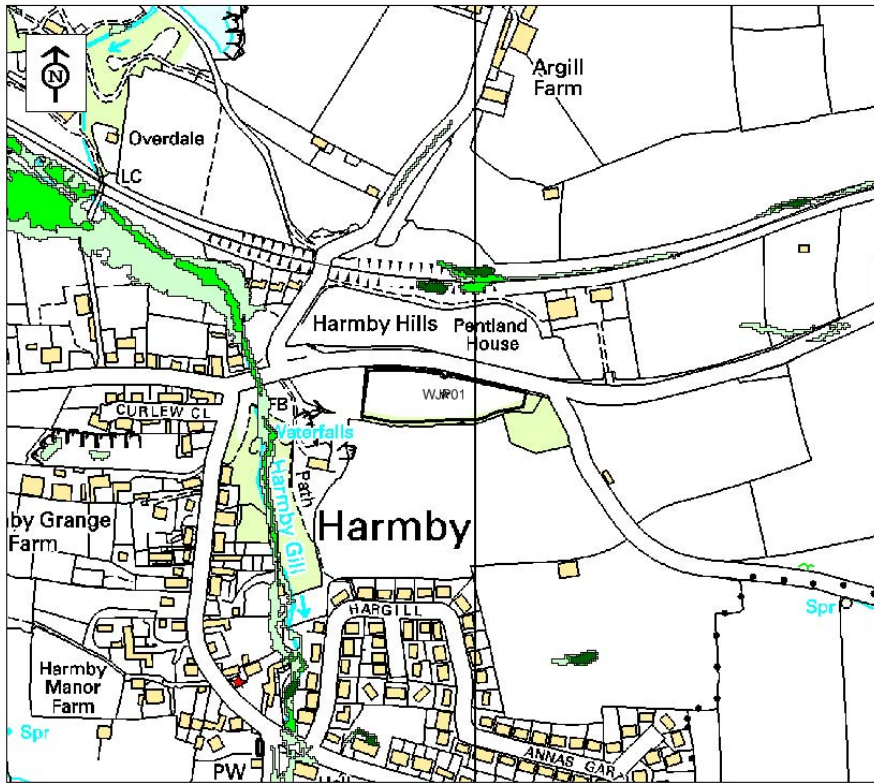
KEY

	Flood Zone 2
	Flood Zone 3
	1/20 Flood Zone 3b/3a(i)
	Possible impact of climate change (100 yr + 20%)
	UFMSW - 1 in 30 year extent
	UFMSW - 1 in 100 year extent
	UFMSW - 1 in 1000 year extent
	Areas benefiting from flood defence
	Flood Storage Area
	Minerals / waste site
	NFCDD Flood Defence
	Historic Flood Record
	Historic Flood Map

Reproduced from the Ordnance Survey mapping, used with the permission of the Controller of Her Majesty's Stationery Office. © Crown Copyright. All rights reserved. No part of this publication may be reproduced without the prior written permission of the Controller of Her Majesty's Stationery Office. ISBN 978-0-11-810000-0

DRAFT

Site Reference: WJP01 Hillcrest, Harmby	
Site Information	Waste Transfer Station (including recycling). Start date is 2015. Proposed life of site is permanent. No restoration proposed.
Proposed Land Use	Waste Transfer Station (including recycling)
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>Site is in Flood Zone 1. No surface water flood risk is recorded.</p> <p>In terms of groundwater flooding, the site lies across two km squares with different susceptibilities to groundwater flooding. The western part of the site is in an area in which 25 to 50% of land has conditions that could support clearwater and superficial deposit groundwater flooding. The eastern part of the site is in an area of 25 to 50% of land is susceptible to superficial deposit flooding. Although there is a relatively low risk of groundwater flooding the site is on a slope which might suggest some increased vulnerability.</p>
Area of site	0.64 ha
Relevant Local SFRA	North west Yorkshire SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable
Climate change	Not applicable
Sequential Test result	Pass.
Exception Test Needed	No
Is there an alternative site?	This site is in Flood Zone 1 and there are no alternative transfer sites within 10km.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	<p>Run off from this site should be managed using a sustainable drainage system where appropriate.</p> <p>Groundwater flooding should be further investigated in a site specific flood risk assessment.</p>



KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- Historic Flood Record
- Historic Flood Map

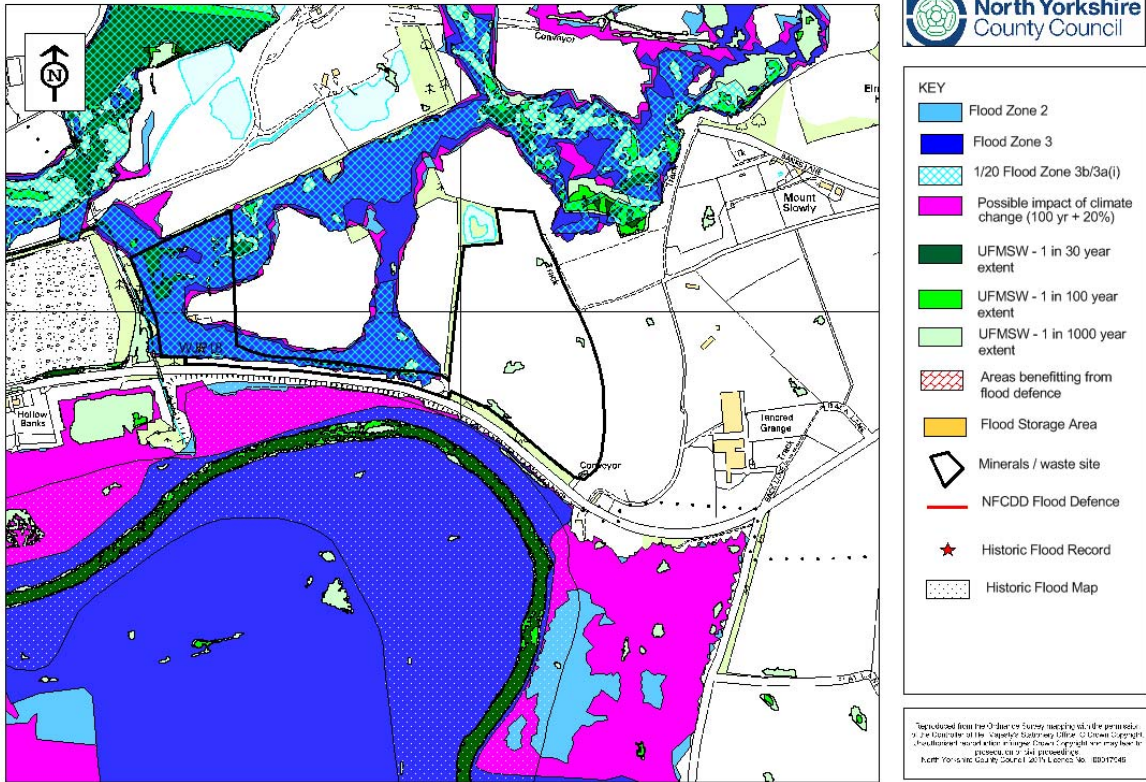
Reproduced from the Ofwat Survey, subject to the permission of the Controller of the Copyright Material Office. © Crown Copyright. Ordnance Survey, 2010. All rights reserved. North Yorkshire County Council, 2010. Licence No. 10017546

DRAFT

Site Reference: WJP18: Tancred, near Scorton	
Site Information	Proposed retention of landfill, recycling (including treatment, bulking and transfer) and open windrow composting facilities. Estimated date of commencement is 2016. Proposed life of site is 15 to 20 years.
Proposed Land Use	Landfill, recycling (including treatment, bulking and transfer), open windrow composting
NPPF Vulnerability Classification	More vulnerable (landfill). Other uses less vulnerable.
Overview of flooding	<p>About a third of the site is Flood Zone 3, most of which is also subject to a 1 in 20 year fluvial flood risk. Medium to high risk surface water flooding affects about 5% of the site.</p> <p>Site lies across 4 km squares of differing susceptibility to groundwater flooding. The north western part of the site is in a km square, 50 to 75% of which is vulnerable to superficial deposits groundwater flooding and the north eastern part of the site is in an area of <25% susceptibility to superficial deposits flooding. The south western part of the site is in an area where 75% or more of the area is susceptible to superficial deposits flooding, while the south-eastern corner is in an area of 25 to 50% susceptibility to superficial deposits flooding. Although there is a higher risk of groundwater flooding the above ground nature of the development makes it less vulnerable (though this risk should be further investigated to determine if design measures for mitigation are needed).</p>
Area of site	10 ha (inert landfill), 1.98 ha (recycling and composting facility)
Relevant Local SFRA	North west Yorkshire SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	<p>In the north west Yorkshire SFRA Flood zones 3b is defined as undeveloped areas in Flood Zone 3. As a third of this site is in Flood Zone 3 and is undeveloped it should be considered as potential functional floodplain.</p> <p>Much of this area is also at a 1 in 20 flood risk.</p>
Climate change	As climate change's influence on fluvial flooding should be considered after 2025 if this site endures beyond 2025 the area indicated as possible impact of climate change on the map below should be considered as Flood Zone 3.
Sequential Test result	<p>Part of this site is in potential functional floodplain, which would mean that landfill would not be permissible in that area. Less vulnerable uses would also not be suitable in this area. Development is acceptable on other parts of the site.</p> <p>No sites have been submitted for similar uses within 10km.</p>
Exception Test Needed	No
Is there an alternative site?	No sites have been submitted for similar uses within 10km.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	Run off from this site should be managed using a sustainable drainage system where appropriate. Groundwater flooding should be further investigated in a site specific flood risk assessment. Discharge of water must not

increase flooding elsewhere.

All sites in functional flood plain must: remain operational and safe for users in times of flood; result in no net loss of floodplain storage; not impede water flows and not increase flood risk elsewhere.



6. Ryedale Sites

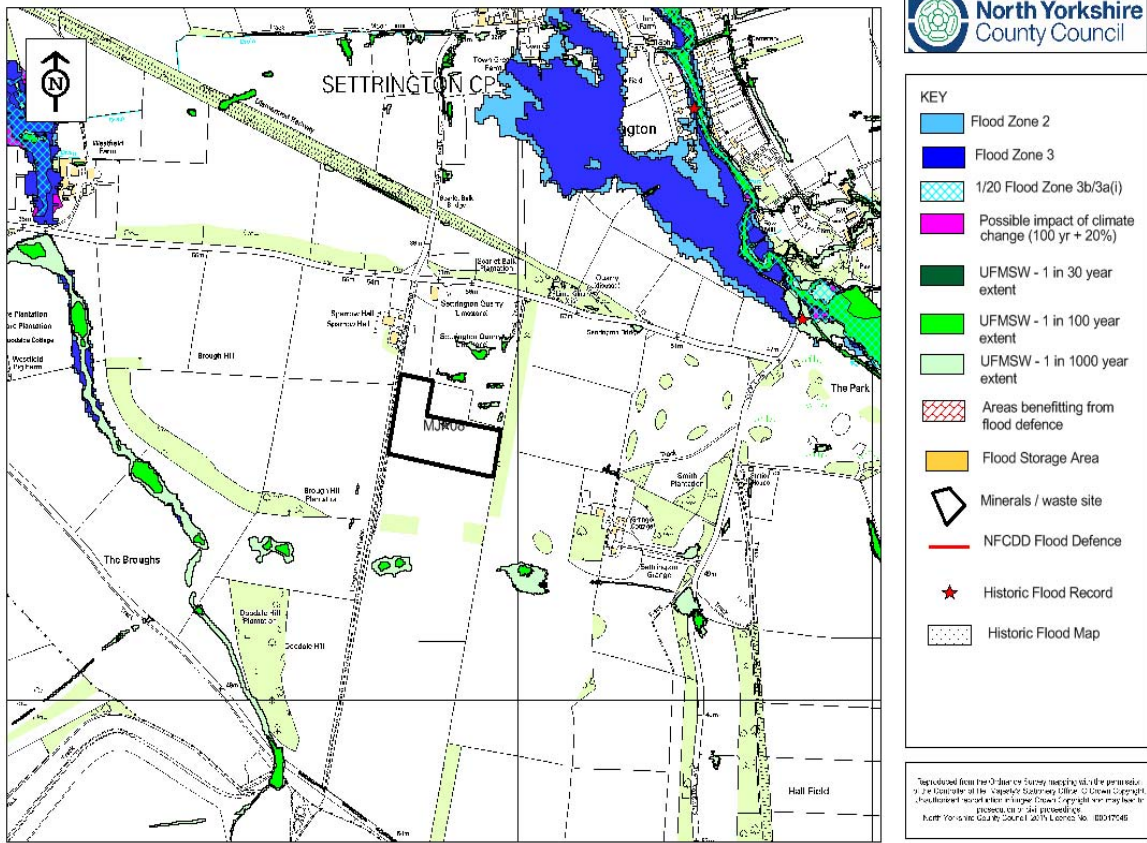
Key to Sequential Test Results		
Pass	Pass subject to further consideration of the site's contribution to the supply of minerals.	Site is not suitable or would require an Exception Test demonstrated through a Level 2 SFRA to proceed.

Site Reference: MJP08 Settrington Quarry	
Site Information	Extraction of Jurassic limestone as proposed extension to existing quarry and importation of soils for use in restoration. Estimated date of commencement is 2018 with a proposed life of site of 20 to 25 years. No detailed design for restoration but submitter proposes nature conservation and grazing.
Proposed Land Use	Extraction of Jurassic limestone
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	Site is in Flood Zone 1. No surface water flooding noted. According to the Environment Agency's 'Areas Susceptible to Groundwater Flooding' map site is in a kilometre square in which less than 25% of the area is susceptible to clearwater groundwater flooding. As the site is at the top of a hill groundwater flood risk is considered low, though much will depend on the depth of the quarry. Excavation in the existing site to the immediate north (which is at a similar elevation) is to 25 metres AOD which was above the water table ¹⁹ .
Area of site	5.6 ha
Relevant Local SFRA	North east Yorkshire SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable
Climate change	Not applicable
Sequential Test result	Pass
Exception Test Needed	No
Is there an alternative site?	This site is in Flood Zone 1 and it is considered that flood risk is negligible to non-existent at this site so alternative sites have not been sought.
Site Specific Flood Risk	A site specific flood risk assessment should consider any

¹⁹ North Yorkshire County Council Environmental Services Committee, Development Control Sub Committee. 1 February 2000. Proposed Extension Settrington Quarry for Fenstone Minerals Ltd (Ryedale District – Rillington Electoral Division) [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=3998>]

Assessment Requirement and Mitigating Flood Risk

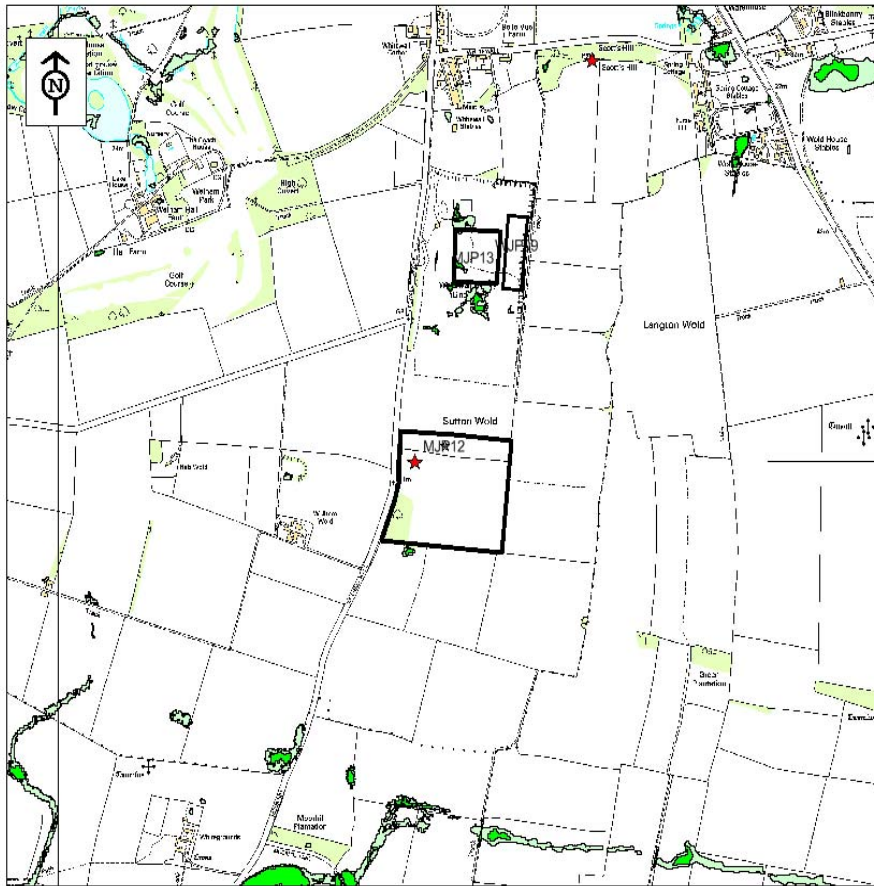
potential risk from groundwater flooding and seek to manage any runoff utilising SUDS where appropriate, ensuring that flood risk is not increased at any receiving waterbody.



DE

Site Reference: MJP12 Whitewall Quarry, Near Norton	
Site Information	Extraction of Jurassic limestone as proposed extension to existing quarry. Estimated start date is prior to 2023 with the proposed life of site until 2031. Restoration likely to be compatible with approved scheme for the existing quarry, which is undulating grassland with tree and shrub planting. The southern half of MJP12 would not be extracted, but would be used for screening purposes only.
Proposed Land Use	Extraction of Jurassic limestone
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>Site is in Flood Zone 1. No surface water flooding noted.</p> <p>According to the Environment Agency's 'Areas Susceptible to Groundwater Flooding' (ASTGWF) map the site lies between four kilometre squares which are subject to different types of groundwater flooding. The north-west of the site lies in a square in which less than 25% of the area is susceptible to clearwater and superficial deposits groundwater flooding. The north-east of the site lies in a square in which less than 25% of the area is susceptible to clearwater groundwater flooding while no data is available for the south western and south eastern ASTGWF squares.</p> <p>The adjacent quarry (for which this site is an extension) provides a further indication of local groundwater levels, and a 2007 supporting statement for an extension to that quarry notes that the water table was recorded at 25 metres AOD²⁰. This site is significantly higher than this (currently 75 to 80m AOD) so it is unlikely that even a deep quarry would be at risk of groundwater flooding.</p>
Area of site	9ha
Relevant Local SFRA	North east Yorkshire SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable
Climate change	Not applicable
Sequential Test result	Pass
Exception Test Needed	No
Is there an alternative site?	This site is in Flood Zone 1 and it is considered that flood risk is negligible to non-existent at this site so alternative sites have not been sought.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment should consider any potential risk from groundwater flooding and seek to manage any runoff utilising SUDS where appropriate, ensuring that flood risk is not increased at any receiving waterbody.

²⁰ W. Clifford Watts Limited, 2007. Proposal for Extension to Whitewall Quarry [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=5092>]



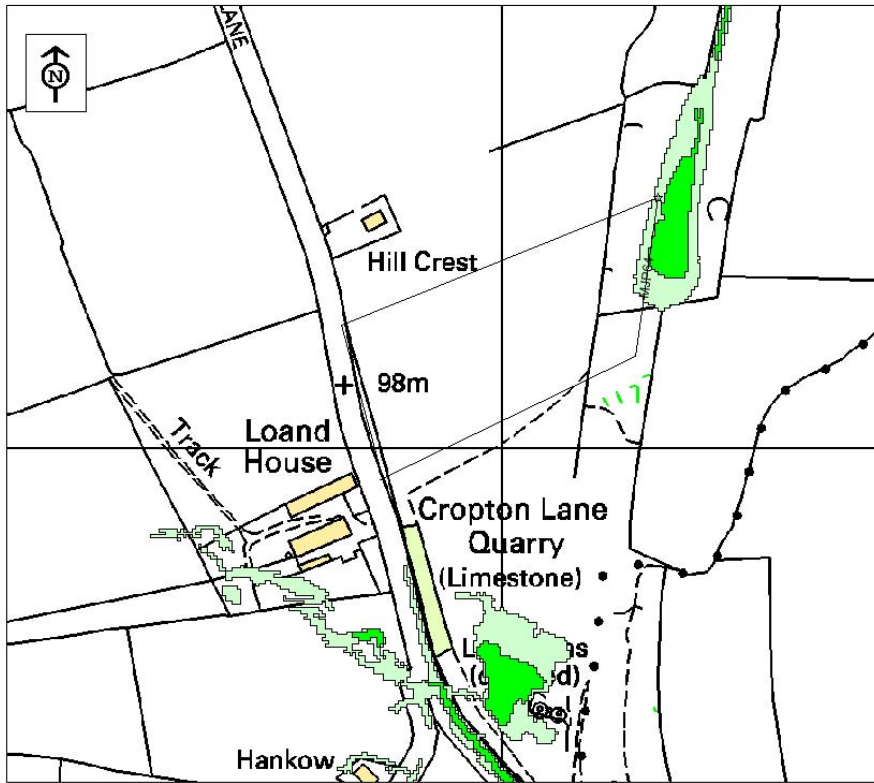
KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCCD Flood Defence
- Historic Flood Record
- Historic Flood Map

Reproduced from the 2015 Survey Mapping with the permission of the Controller of Her Majesty's Stationery Office. Crown Copyright. Publication and reproduction in any form or by any means without the prior written permission of the Controller of Her Majesty's Stationery Office. ISBN 978-0-11-831754-8



Site Reference: MJP64 Cropton Quarry, Cropton	
Site Information	Extraction of Jurassic limestone from proposed extension to former quarry. Estimated date of commencement is by 2020. The proposed life of the site is 10 years. No detailed design, but likely to be to be to nature conservation.
Proposed Land Use	Extraction of Jurassic limestone.
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>Site is in Flood Zone 1. A very small area of surface water flooding (1/1000 year risk) affects the eastern boundary.</p> <p>In terms of groundwater flooding, according to the Environment Agency's Areas Susceptible to Groundwater Flooding map the site is in a 1 km square where between 25 and 50% of the area has conditions that could support clearwater groundwater flooding. A former quarry next to this site remains dry.</p> <p>Although this site is considered to be at low risk of groundwater flooding further information would be needed on the depth of the quarry and the height of the local water table to rule out any risk.</p>
Area of site	2.4ha
Relevant Local SFRA	North east Yorkshire SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable
Climate change	Not applicable as site has to short a period of operation to be affected by this SFRA's approach to factoring in climate change effects on surface water flooding.
Sequential Test result	Pass
Exception Test Needed	No
Is there an alternative site?	There are no alternative Jurassic limestone sites within 10km.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment should consider any potential risk from groundwater flooding and seek to manage any runoff utilising SUDS where appropriate, ensuring that flood risk is not increased at any receiving waterbody.



KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- ★ Historic Flood Record
- Historic Flood Map

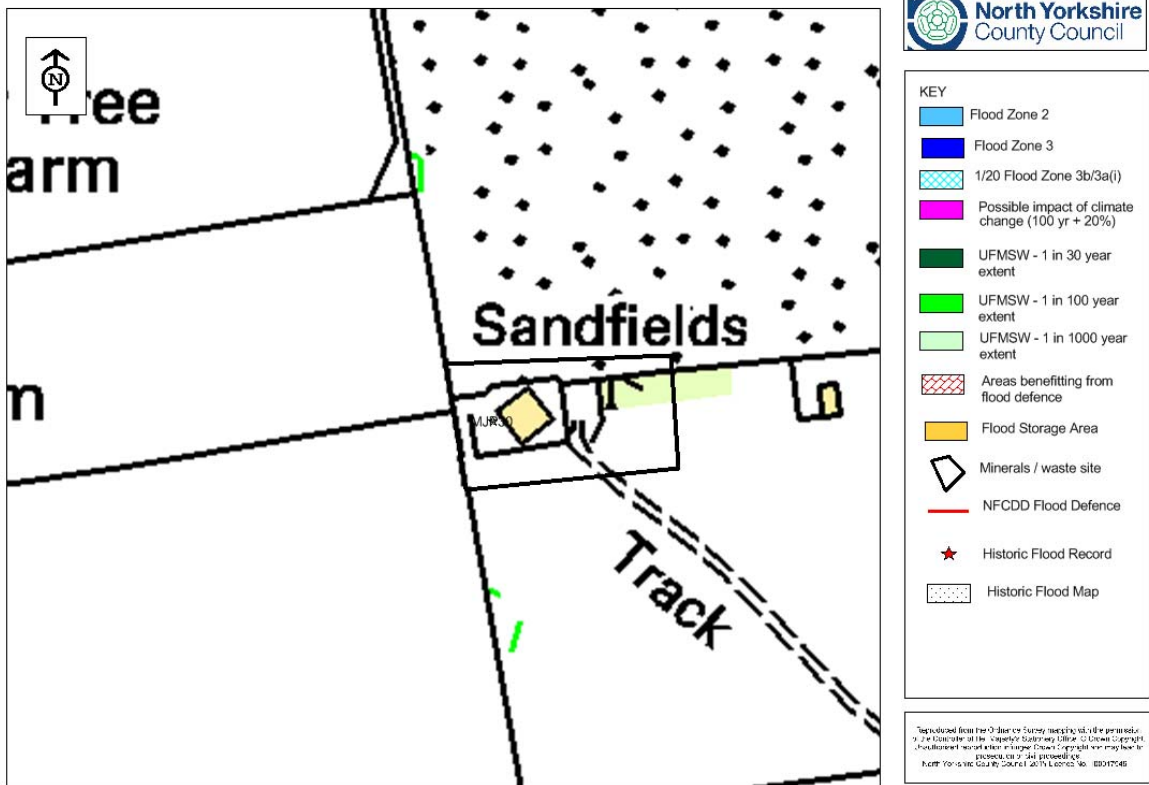
Reproduced from the O-Blue Survey, subject to the permission of the Controller of the Copyright Material, © Crown Copyright. Downloaded from the National Library of Science and Technology. For more information, please contact the Copyright Clearance Center, www.copyright.com. North Yorkshire County Council, 2019, L100103, 00, 00017046

DRAFT

Site Reference: MJP30 West Heslerton Quarry	
Site Information	Extraction of sand as proposed extension to existing quarry. Estimated date of commencement is 2016. Proposed life of site is 1 year. Restoration is to low level agriculture.
Proposed Land Use	Extraction of sand
NPPF Vulnerability Classification	Water compatible
Overview of flooding	<p>Site is in Flood Zone 1. No surface water flooding noted.</p> <p>In terms of groundwater flooding according to the Environment Agency's Areas Susceptible to Groundwater Flooding map the site is in a 1 km square where more than 75% of the area has conditions that could support superficial deposits groundwater flooding.</p> <p>A previous application at the existing quarry adjacent to this site stated that <i>"although little detailed information is available, rapid recharge by rainfall....combined with the highly permeable nature of unconsolidated superficial deposits, can be expected to give rise to considerable fluctuations in groundwater levels, with localised flooding and seasonal and or intermittent flow in nearby streams. Trial pitting, undertaken in August 1997, showed the depth to the water table at that time to vary considerably across the site, ranging from approximately 1.5, below surface in the worked northern section of the quarry to an estimated depth of up to ten metres in the unworked central and southern parts of the site"</i>²¹. Groundwater, however, is considered to be an inherent issue with many sand quarries.</p>
Area of site	0.29ha
Relevant Local SFRA	North east Yorkshire SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable
Climate change	Not applicable
Sequential Test result	Pass. Site is water compatible
Exception Test Needed	No
Is there an alternative site?	MJP50 is the only other submitted sand site within 10km. However, both of these sites have a broadly similar level of flood risk being at a low risk of fluvial and surface water flooding and a higher risk of groundwater flooding.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment should consider any potential risk from groundwater flooding and seek to manage any discharge from the site utilising SUDS where appropriate (unless it is wet worked), ensuring that flood risk is not increased at any receiving waterbody. Due to the

²¹ Hallett-Hughes Associates, 1999, Statement in support of an application for planning consent to extend sand workings at West Heslerton Quarry near Malton North Yorkshire [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=4092>]

highly fluctuating groundwater levels in this area the FRA should consider an evacuation / emergency plan for the site.



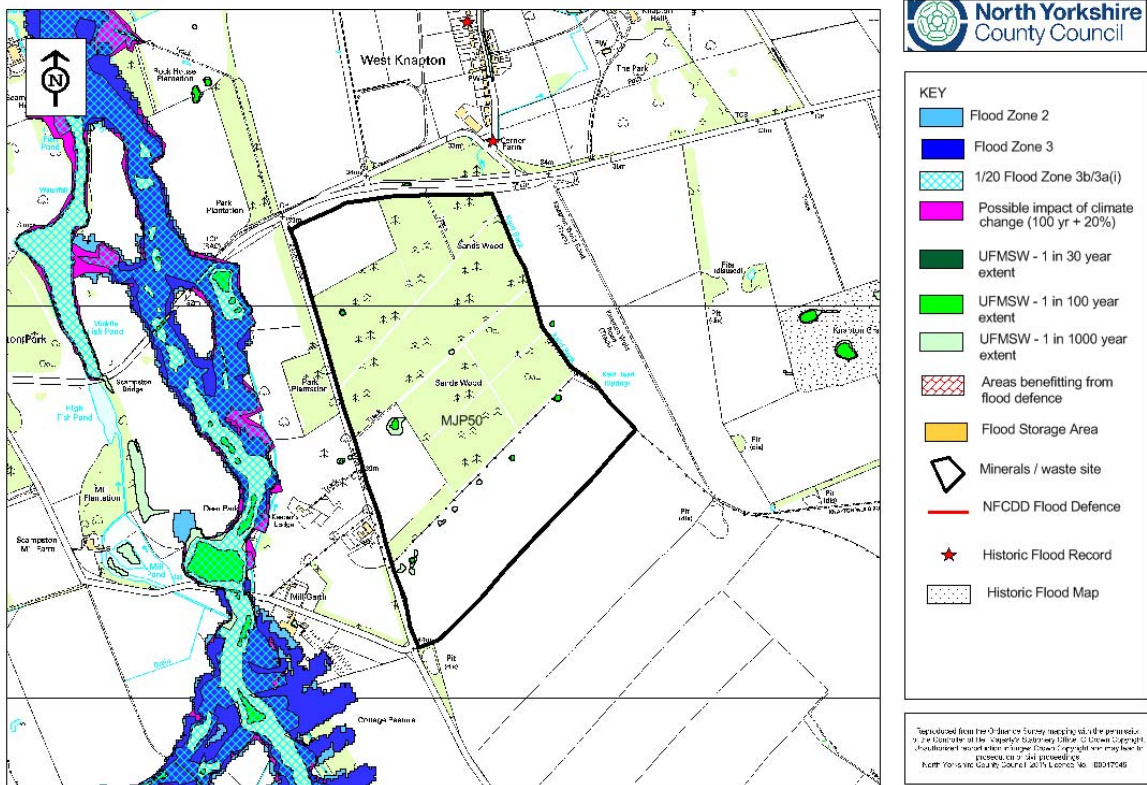
DRAFT

Site Reference: MJP50: Sands Wood, land to east of Sandy Lane, Wintringham	
Site Information	Extraction of sand from proposed new extraction site. Estimated date of commencement is unknown at present. The proposed life of the site is 20 years. Possible restoration is to woodland, agriculture and nature conservation areas.
Proposed Land Use	Extraction of sand
NPPF Vulnerability Classification	Water compatible
Overview of flooding	<p>This site is in Flood Zone 1. A very small amount of the site is subject to surface water flooding risk, though this is largely low risk (1/1000yr) with tiny patches of medium risk (1/100yr).</p> <p>In terms of groundwater flooding this site lies across three different kilometre squares on the Environment Agency 'Areas Susceptible to Groundwater Flooding' map. Most of the site lies in a square where 75% or more of the area is subject to 'clearwater and superficial deposits flooding', while the northern part of the site lies in a square which is subject to superficial deposits flooding ($\geq 75\%$) and the eastern square subject to clearwater flooding ($< 25\%$).</p> <p>Borehole data from the nearby extension to Knapton Quarry showed water at varying depths between 16 metres and 25 metres across that site at the point in time when samples were taken in 1996²². However, proximity to a nearby watercourse (Blakey Beck), numerous ponds in the vicinity, as well as the site's location at the foot of a hill, and the fact that any flooding here is more likely to be through superficial deposits than at Knapton Quarry suggest that groundwater levels may well come closer to the surface. A spring is also noted in the south eastern corner of the site.</p>
Area of site	56 ha
Relevant Local SFRA	North east Yorkshire SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable.
Climate change	Not applicable as, assuming this site would commence during the plan period, the life of site would not extend into the period when climate change must be taken into account for surface water flooding.
Sequential Test result	Pass. Site is water compatible.
Exception Test Needed	No
Is there an alternative site?	MJP30 is the only other submitted sand site within 10km. However, both of these sites have a broadly similar level of flood risk being at a low risk of fluvial and surface water flooding and a higher risk of groundwater flooding. MJP30 would also only operate for 1 year.

²² R Owen Waste Disposal, 1996. Planning Application for a 2.94 hectare extension to chalk working at Knapton Quarry,

Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk

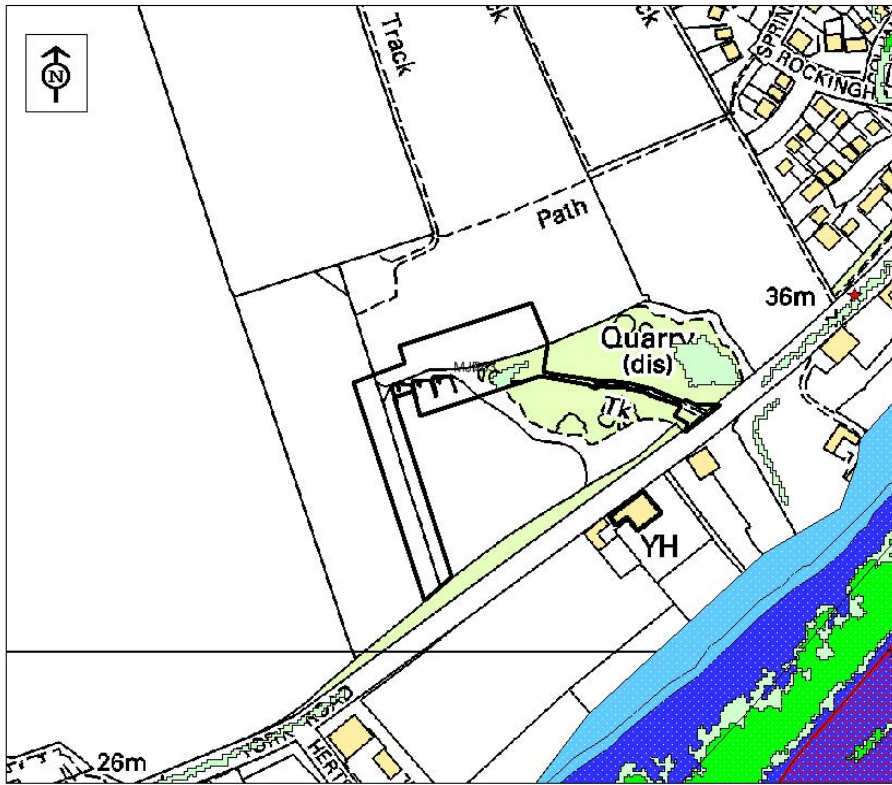
A site specific flood risk assessment should consider any potential risk from groundwater flooding and seek to manage any discharge from the site utilising SUDS where appropriate (unless it is wet worked), ensuring that flood risk is not increased at any receiving waterbody. Due to the potentially high groundwater levels in this area, the FRA should consider an evacuation / emergency plan for the site if groundwater flooding is proven to be significant.



Site Reference: MJP63 Brows Quarry, Malton	
Site Information	Extraction of building stone from part of a former quarry and a proposed extension to the quarry. Estimated date of commencement: 2015. Proposed life of site: 25 years. Possible restoration is shallow sloping valley to join quarry floor, which would be used for agriculture.
Proposed Land Use	Extraction of building stone
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>Site is in Flood Zone 1. A small area of low risk (1/1000) surface water flooding currently affects the site (as with all minerals sites, surface water flooding patterns are likely to change upon extraction).</p> <p>In terms of groundwater flooding, according to the Environment Agency's Areas Susceptible to Groundwater Flooding map the site is in a 1 km square where less than 25% of the area has conditions that could support 'superficial deposits' groundwater flooding.</p> <p>A previous planning application on part of the site did not raise any groundwater flooding concerns²³.</p>
Area of site	0.48ha
Relevant Local SFRA	North east Yorkshire SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable
Climate change	Not applicable as the life of site would not extend into the period when climate change must be taken into account for surface water flooding.
Sequential Test result	Pass
Exception Test Needed	No
Is there an alternative site?	This site is for building stone comprising predominantly of lower calcareous grit (a fine-grained sandstone) and Malton Oolitic limestone ²⁴ . There are no other submitted sites within 10km that would supply sandstone, and while there are other limestone sites these are broadly at the same level of flood risk.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment should consider any potential risk from groundwater flooding and seek to manage any runoff utilising SUDS where appropriate, ensuring that flood risk is not increased at any receiving waterbody.

²³ North Yorkshire County Council Planning and Regulatory Functions Committee. 4 August 2009. C3/07/01071/CPO – Planning application for the extraction of building stone on land at Brows Quarry, York Road, Malton on behalf of Fitzwilliam (Malton) Estates (Ryedale District) (Malton Electoral Division) [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=5138>]

²⁴ Ibid



KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- Historic Flood Record
- Historic Flood Map

Reproduced from the Office for Survey Mapping, with the permission of the Controller of the Copyright Material for the Crown. Copyright in the material contained in this document may be protected by the Copyright, Designs and Patents Act 1988. North Yorkshire County Council 2017. Licence No. 03017045

DRAFT

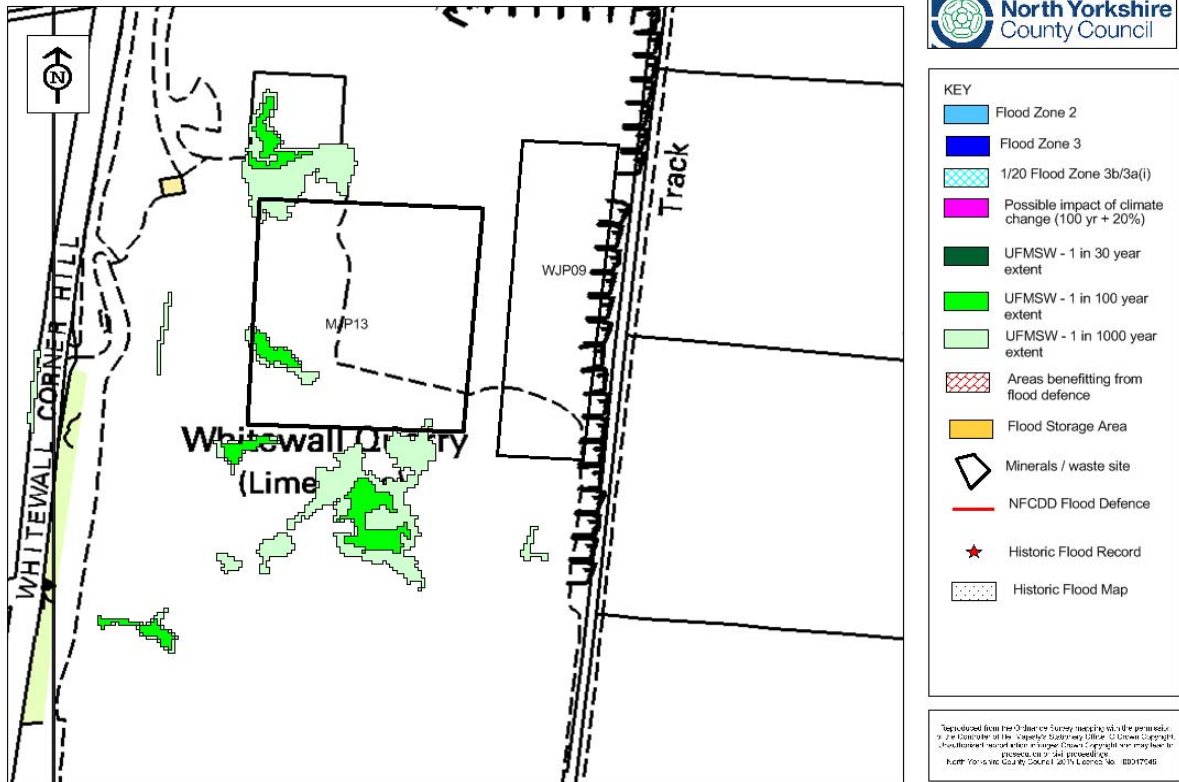
Site Reference: MJP13 Whitewall Quarry, near Norton (recycling)	
Site Information	Expansion to area used for recycling of construction, demolition and soil waste for secondary aggregates within existing quarry void. Estimated date of commencement is prior to 2023 and proposed life of site is until 2023 (which is the permitted lifespan of the existing quarry). Possible restoration is to the approved scheme for the existing quarry, which is undulating grassland with tree and shrub planting.
Proposed Land Use	Expansion to area used for recycling of construction, demolition and soil waste for secondary aggregates within existing quarry void.
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>Site is in Flood Zone 1. A small amount (around 5% of the site) is affected by low (1/1000yr) to medium (1/100yr) surface water flood risk.</p> <p>According to the Environment Agency's 'Areas Susceptible to Groundwater Flooding' (ASTGWF) map the site lies in a square in which less than 25% of the area is susceptible to 'clearwater' groundwater flooding. .</p> <p>A 2007 supporting statement for an extension to the quarry in which this site is located notes that the water table was recorded at 25 metres AOD while the extension site was significantly higher than the water table (at 43m AOD)²⁵. It is assumed the quarry floor at this location is at a similar elevation. Therefore it is unlikely that groundwater flooding would be a significant issue.</p>
Area of site	2.25ha.
Relevant Local SFRA	North east Yorkshire SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable
Climate change	Not applicable as the life of site would not extend into the period when climate change must be taken into account for surface water flooding.
Sequential Test result	Pass
Exception Test Needed	No
Is there an alternative site?	<p>There are no other submitted construction recycling sites within 10km.</p> <p>One potential site in Ryedale was considered suitable for processing of recyclables (RYE3) through the evidence base²⁶. That site is at a significantly higher risk of flooding being in Flood Zone 3.</p>

²⁵ W. Clifford Watts Limited, 2007. Proposal for Extension to Whitewall Quarry [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=5092>]

²⁶ City of York Council, North York Moors National Park and North Yorkshire County Council, 2015. Identification of potential locations for waste management facilities [URL: [http://www.northyorks.gov.uk/media/32597/Identification-of-potential-locations-for-waste-management-facilities-Jul-2015/pdf/Identification_of_potential_locations_for_waste_management_facilities_\(Jul_2015\).pdf](http://www.northyorks.gov.uk/media/32597/Identification-of-potential-locations-for-waste-management-facilities-Jul-2015/pdf/Identification_of_potential_locations_for_waste_management_facilities_(Jul_2015).pdf)]

Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk

A site specific flood risk assessment should consider any potential risk from surface water flooding and seek to manage any runoff utilising SUDS where appropriate, ensuring that flood risk is not increased at any receiving waterbody.



Site Reference: WJP09 Whitewall Quarry Materials Recycling Facility, near Norton	
Site Information	Materials Recycling Facility to sort / treat household waste and including composting. Estimated date of commencement is prior to 2023 with the proposed life of site until 2030. Proposed restoration is to the approved scheme for the existing quarry, which is undulating grassland with tree and shrub planting.
Proposed Land Use	Materials Recycling Facility
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>Site is in Flood Zone 1. Surface water flooding does not affect this site.</p> <p>According to the Environment Agency's 'Areas Susceptible to Groundwater Flooding' (ASTGWF) map the site lies in a square in which less than 25% of the area is susceptible to 'clearwater' groundwater flooding. .</p> <p>A 2007 supporting statement for an extension to the quarry in which this site is located notes that the water table was recorded at 25 metres AOD while the extension site was significantly higher than the water table (at 43m AOD) . It is assumed the quarry floor at this location is at a similar elevation. Therefore it is unlikely that groundwater flooding would be a significant issue.</p>
Area of site	0.87ha
Relevant Local SFRA	North east Yorkshire SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	Not applicable
Climate change	Not applicable.
Sequential Test result	Pass
Exception Test Needed	No
Is there an alternative site?	<p>There are no other submitted Materials Recycling Facilities within 10km.</p> <p>One potential site in Ryedale was considered suitable for processing of recyclables (RYE3) through the evidence base²⁷. That site is at a significantly higher risk of flooding being in Flood Zone 3.</p>
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment should consider any potential risk from surface water flooding and seek to manage any runoff utilising SUDS where appropriate, ensuring that flood risk is not increased at any receiving waterbody.

²⁷ City of York Council, North York Moors National Park and North Yorkshire County Council, 2015. Identification of potential locations for waste management facilities [URL: [http://www.northyorks.gov.uk/media/32597/Identification-of-potential-locations-for-waste-management-facilities-Jul-2015/pdf/Identification_of_potential_locations_for_waste_management_facilities_\(Jul_2015\).pdf](http://www.northyorks.gov.uk/media/32597/Identification-of-potential-locations-for-waste-management-facilities-Jul-2015/pdf/Identification_of_potential_locations_for_waste_management_facilities_(Jul_2015).pdf)]



KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCCD Flood Defence
- Historic Flood Record
- Historic Flood Map

Reproduced from the O-Data for County, North Yorkshire, prepared by the Council for the purpose of the Flood Risk Assessment. Copyright © North Yorkshire County Council. All rights reserved.

DRAFT

7. York Sites

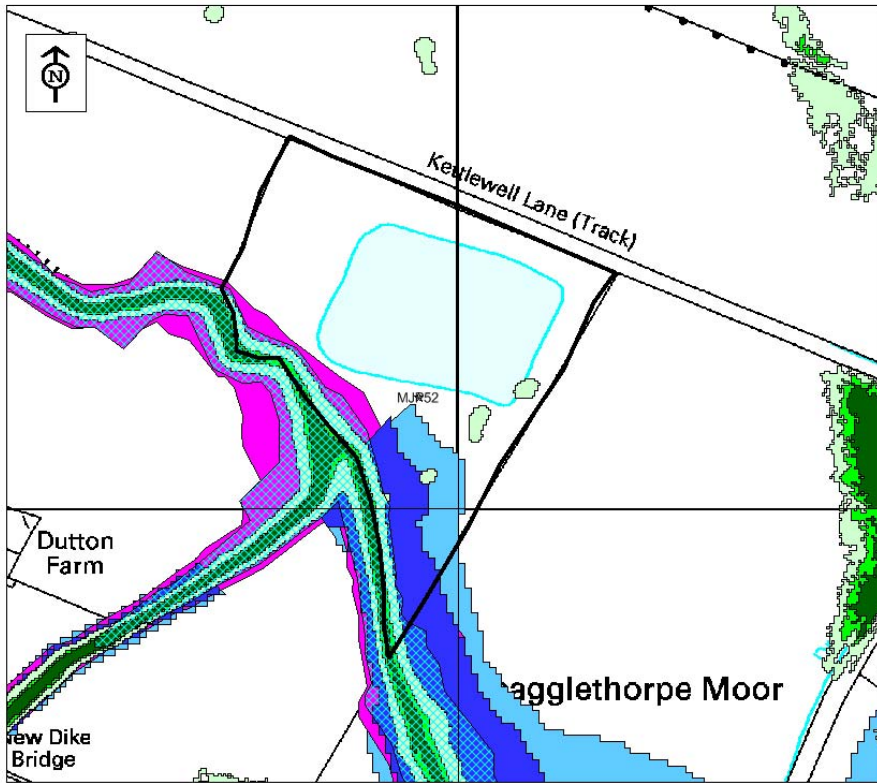
Key to Sequential Test Results		
Pass	Pass subject to further consideration of the site's contribution to the supply of minerals.	Site is not suitable or would require an Exception Test demonstrated through a Level 2 SFRA to proceed.

Site Reference: MJP52 Field SE5356 9513, to north of Duttons Farm, Upper Poppleton	
Site Information	Extraction of clay as proposed extension to a former quarry. Estimated date of commencement is 2017 with a proposed lifespan of 5 to 10 years. Restoration to forestry or agriculture following WJP05.
Proposed Land Use	Extraction of clay
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>South eastern part of the site lies in Flood Zone 3 and Flood Zone 2, though 1 in 20 flood risk continues along the watercourse (Foss Dike) that runs along the southern boundary. About 85 to 90 per cent of the site lies in Flood Zone 1.</p> <p>Surface water flooding also follows the watercourse along the boundary with most of the high surface water flood risk outside of the site boundary, leaving mainly medium (1/100) and low (1/1000) surface water flood risk in a narrow band along the boundary. Additional patches of low risk surface water flooding are spread along the eastern side of the site. No more than 10% of the site is affected by surface water flooding (low to high risk), though a lake lies in the centre of the site.</p> <p>In terms of groundwater flooding, the site lies in a km square in which up to 25% of land may be susceptible to 'clearwater' flooding.</p> <p>As a clay site the site is likely to extract below the perched water table, though groundwater flow on clay sites in clearwater areas is likely to be negligible²⁸ though basal heave may be an issue depending on the depth of extraction. Therefore groundwater flooding is unlikely to cause any significant problems though should still be investigated. Perched water tables are an inherent property</p>

²⁸ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/290396/sp2-173-tr-2-e-e.pdf

	of clay extraction.
Area of site	6.28 ha
Relevant Local SFRA	York
Local Functional Floodplain or 1 in 20/25 flood risk	<p>York's SFRA defines functional floodplain as:</p> <ul style="list-style-type: none"> • Land which would flood with annual probability of 1 in 20 (5%) or greater in any year. • -Land which provides a function of flood conveyance (i.e. free flow) or flood storage, either through natural processes or by design (e.g. washlands and flood storage areas) • Land where the flow of flood water is not prevented by flood defences or by permanent buildings or other solid barriers during times of flood²⁹ <p>While this area is not shown on the York SFRA strategic map as functional floodplain no defences on the National Flood and Coastal Defence database are noted, and no obstructions are observed in this area so the area shown as being at a 1 in 20 flood risk should be considered as potential functional floodplain and further investigated.</p>
Climate change	Climate change is shown to affect fluvial flood risk after 2025. This site would, at most, operate until 2027 so the impact of climate change would be at the end of the site's life (if it operates for 10 years). The area marked as affected by climate change on the map below should therefore be considered from 2025 onwards.
Sequential Test result	Pass
Exception Test Needed	No
Is there an alternative site?	No alternative clay extraction sites have been proposed within 10km.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	<p>A site specific flood risk assessment should consider how surface water flooding will be managed across the site utilising SUDS where possible and groundwater flooding should be further investigated. It should also establish whether the southern boundary of the site is part of the functional floodplain and if so that area should be avoided with a suitable standoff.</p> <p>Drainage of the site (including any drainage from the lake) must not increase flood risk on the receiving waterbody. Climate change impacts towards the end of the period of operation should be considered further.</p>

²⁹ City of York, 2013. Strategic Flood Risk Assessment Revision 2 [URL: https://www.york.gov.uk/downloads/file/6411/2013_strategic_flood_risk_assessmentpdf]



KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- Historic Flood Record
- Historic Flood Map

Reproduced from the O-Blue Survey, mapping, as the permission of the Controller of the Copyright Licensing Agency, Ltd. All rights reserved. Copyright © 2017 North Yorkshire County Council. All rights reserved. 03017046

DRAFT

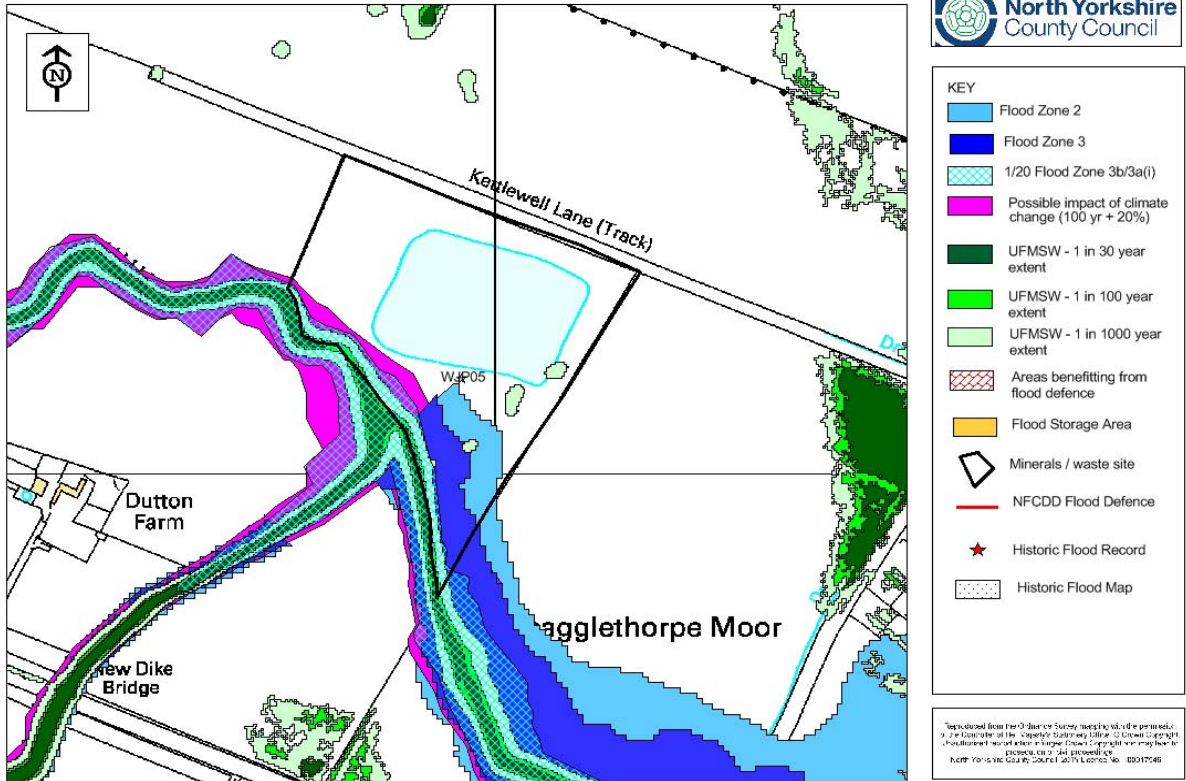
Site Reference: WJP05 Field to north of Duttons Farm, Upper Poppleton	
Site Information	This site is for landfill and recycling of waste from the construction industry. Estimated date of commencement is prior to 2022 and the proposed life of the site is from 2022 to 2027.
Proposed Land Use	Landfill and recycling of waste from construction industry
NPPF Vulnerability Classification	More vulnerable
Overview of flooding	<p>South eastern part of the site lies in Flood Zone 3 and Flood Zone 2, though 1 in 20 flood risk continues along the watercourse (Foss Dike) that runs along the southern boundary. About 85 to 90 per cent of the site lies in Flood Zone 1.</p> <p>Surface water flooding also follows the watercourse along the boundary with most of the high surface water flood risk outside of the site boundary, leaving mainly medium (1/100) and low (1/1000) surface water flood risk in a narrow band along the boundary. Additional patches of low risk surface water flooding are spread along the eastern side of the site. No more than 10% of the site is affected by surface water flooding (low to high risk), though a lake lies in the centre of the site.</p> <p>In terms of groundwater flooding, the site lies in a km square in which up to 25% of land may be susceptible to clearwater flooding.</p> <p>As a landfill site on a former clay extraction site groundwater flow is likely to be negligible, though basal heave may be an issue depending on the depth of prior extraction. Therefore groundwater flooding is considered unlikely to cause any significant problems, though should still be investigated.</p>
Area of site	6.28 ha
Relevant Local SFRA	York
Local Functional Floodplain or 1 in 20/25 flood risk	<p>York's SFRA defines functional floodplain as:</p> <ul style="list-style-type: none"> • Land which would flood with annual probability of 1 in 20 (5%) or greater in any year. • -Land which provides a function of flood conveyance (i.e. free flow) or flood storage, either through natural processes or by design (e.g. washlands and flood storage areas) • Land where the flow of flood water is not prevented by flood defences or by permanent buildings or other solid barriers during times of flood³⁰ <p>While this area is not shown on the York SFRA strategic map as functional floodplain no defences on the National Flood and Coastal Defence database are noted, and no obstructions are observed in this area so the area shown as</p>

³⁰ City of York, 2013.

	being at a 1 in 20 flood risk should be considered as potential functional floodplain and further investigated.
Climate change	<p>Climate change is shown to affect fluvial flood risk after 2025. This site would, at most, operate until 2027 so the impact of climate change would be at the end of the site's life. The area marked as affected by climate change on the map below should therefore be considered from 2025 onwards.</p> <p>Climate change impacts should also be considered in the positioning of any landfill site as the landfill will endure long beyond the end date of this site.</p>
Sequential Test result	Pass
Exception Test Needed	No
Is there an alternative site?	<p>The only other landfill and recycling site proposal within 10km is included in site WJP11. However, WJP11 is a proposal for retention of a site rather than creation of a new facility so would not necessarily add to overall capacity. It is also at similar level of flood risk with the same watercourse as is present at WJP05 site running directly through WJP11. The Joint Plan evidence base identified 7 potential additional waste sites in York (YOR1, YOR2, YOR4, YOR5, YOR6, YOR7 and YOR10)³¹. YOR1, 2, 5, 6, 7 and 10 were considered suitable for processing of recyclables though none of these sites were considered for their potential to also support landfill. While the group of sites at YOR5, YOR6 and YOR10 may have some capacity to include landfill, and have a lower flood risk, the location of those sites close to housing would likely lead to unacceptable amenity impacts if a landfill site were to be placed there.</p>
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	<p>As a landfill site this location will also need to be considered for its effects on the water environment via the environmental permitting process. However, a Flood Risk Assessment should consider how surface water flooding and drainage will be managed across the site (utilising SUDS where appropriate where water is not considered foul). Groundwater flooding should be further investigated. The FRA should also establish whether the southern boundary of the site is part of the functional floodplain and if so that area should be avoided with a suitable standoff as landfill and recycling would not be considered appropriate at those locations.</p> <p>Drainage of the site (including any drainage from the lake) must not increase flood risk on the receiving waterbody.</p>

³¹ City of York Council, North York Moors National Park and North Yorkshire County Council, 2015. Identification of potential locations for waste management facilities [URL: [http://www.northyorks.gov.uk/media/32597/Identification-of-potential-locations-for-waste-management-facilities-Jul-2015/pdf/Identification_of_potential_locations_for_waste_management_facilities_\(Jul_2015\).pdf](http://www.northyorks.gov.uk/media/32597/Identification-of-potential-locations-for-waste-management-facilities-Jul-2015/pdf/Identification_of_potential_locations_for_waste_management_facilities_(Jul_2015).pdf)]

Climate change impacts should also be considered in the positioning of any landfill site as the landfill will endure long beyond the end date of this site.



DRAFT

Site Reference: WJP11: Harewood Whin, Rufforth	
Site Information	This site is for retention of waste facilities beyond 2017. The estimated start date of the site is 2017 and the proposed life of the site is 15 to 20 years. Restoration plan is under review.
Proposed Land Use	Retention of the following facilities beyond 2017 <ul style="list-style-type: none"> • landfill, • open windrow composting, • recycling (including treatment bulking and transfer) and liquid waste treatment • Energy from Waste (Biomass and Landfill Gas Utilization) • kerbside recycling and waste transfer operation <p>And construction of new materials recycling facility and waste transfer station</p>
NPPF Vulnerability Classification	Most uses are 'less vulnerable' but landfill is more vulnerable
Overview of flooding	<p>Flood Zone 3 flows through the centre of this site following the Foss and this is fringed by Flood Zone 2. Most of Flood Zone 3 is also modelled as being at 1 in 20 flood risk.</p> <p>Surface water flooding also overlays the area of fluvial flood risk and also affects patches of the wider site (roughly 10% is affected). Surface water flood risk ranges from low (1/1000yr) to medium (1/100yr) risk.</p> <p>The site lies across 4 kilometre squares identified on the Environment Agency's 'Areas Susceptible to Groundwater Flooding' map, 3 of which are susceptible to 'clearwater' groundwater flooding (with one square affected across less than 25 % of its area, 2 squares affected across 25 to 50% of their areas, and one square which holds no data). A 2012 Flood Risk Assessment for part of southern area of the site reported that "groundwater flooding is not considered to pose a risk due to the groundwater levels underlying the site and the negligibly permeable geology"³².</p>
Area of site	103 ha
Relevant Local SFRA	York
Local Functional Floodplain or 1 in 20/25 flood risk	<p>York's SFRA defines functional floodplain as:</p> <ul style="list-style-type: none"> • Land which would flood with annual probability of 1 in 20 (5%) or greater in any year. • -Land which provides a function of flood conveyance (i.e. free flow) or flood storage, either through natural processes or by design (e.g. washlands and flood

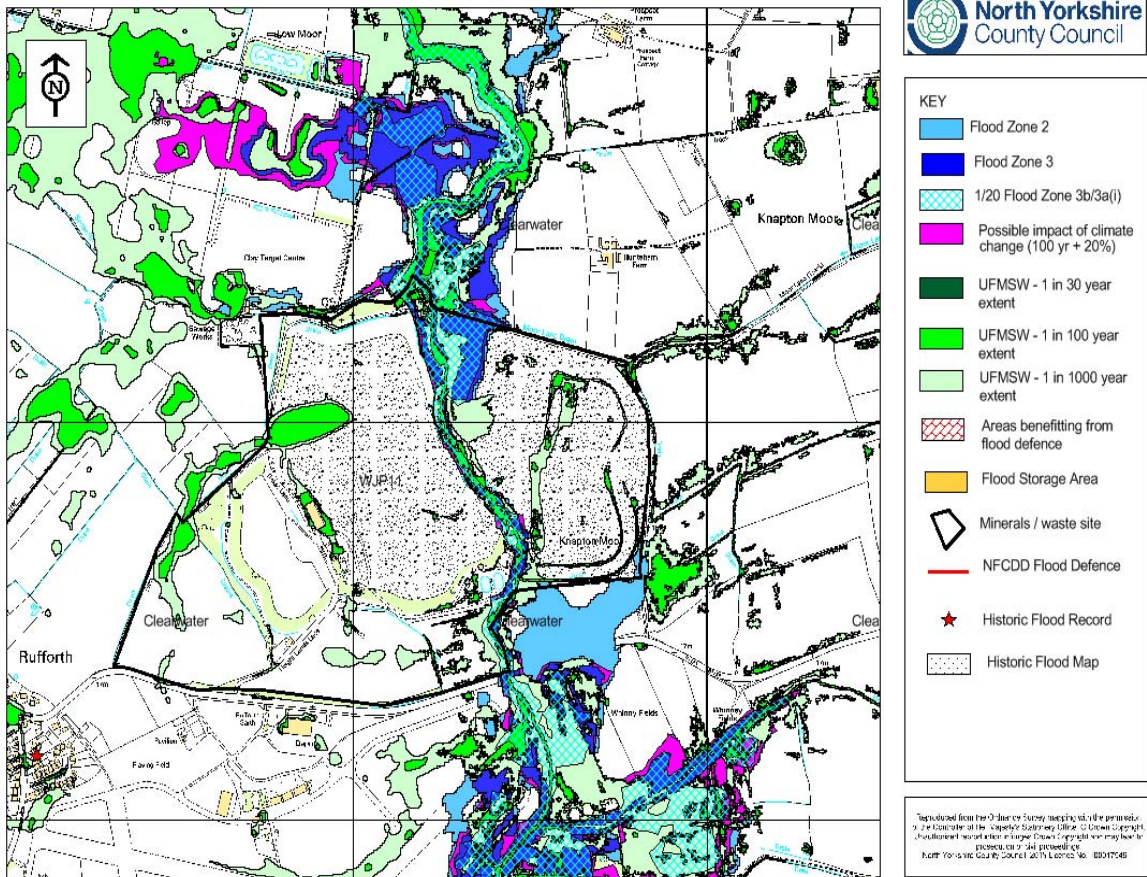
³² Golder Associates, 2012. Harewood Whin Materials Recovery Facility and Transfer. ES Chapter ES6 Flood Risk [URL: https://planningaccess.york.gov.uk/online-applications/files/2DAEB4C058944A49EEB0A39C3D40613A/pdf/13_00041_FULM-FLOOD_RISK-1376390.pdf]

	<p>storage areas)</p> <ul style="list-style-type: none"> Land where the flow of flood water is not prevented by flood defences or by permanent buildings or other solid barriers during times of flood³³ <p>While this area is not shown on the York SFRA strategic map as functional floodplain no defences on the National Flood and Coastal Defence database are noted, and no obstructions are observed in this area, so the narrow area shown as being at a 1 in 20 flood risk should be considered as potential functional floodplain and further investigated.</p>
Climate change	Climate change is shown on the map below as very slightly increasing the area of Flood Zone 3 after 2025.
Sequential Test result	Pass
Exception Test Needed	No
Is there an alternative site?	<p>The only other landfill and recycling site proposal within 10km is included in site WJP05. However, WJP05 is at a similar level of flood risk and this site also includes the retention of other facilities (which would likely be uneconomic to move). The Joint Plan evidence base identified 7 additional potential waste sites in York (YOR1, YOR2, YOR4, YOR5, YOR6, YOR7 and YOR10)³⁴. YOR1, 2, 5, 6, 7 and 10 were considered suitable for processing of recyclables though none of these sites were considered for their potential to also support landfill. While the group of sites at YOR5, YOR6 and YOR10 may have some capacity to include landfill, and have a lower flood risk, the location of those sites close to housing would likely lead to unacceptable amenity impacts if a landfill site were to be placed there.</p> <p>Similarly other uses were considered by this study, such as waste transfer and small scale thermal treatment (that might be suitable for biomass energy from waste). While YOR1, 2, 5, 6, 7 and 10 might be suitable for these uses, this site would provide a recycled materials annual tonnage of 345,000 tonnes, which is more than treble that of the individual sites identified in the Joint Plan evidence base. While it may be possible to divide this site into component parts to fit with the overall capacity of these alternative sites, this would likely be an endeavour that would entail significant risk for a site that it is at a relatively low risk of flooding if the small area of Flood Zone 3 is avoided.</p>
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	<p>A Flood Risk Assessment should consider how surface water flooding and drainage will be managed across the site without increasing flooding elsewhere (utilising SUDS where appropriate where water is not considered foul). Groundwater flooding should be further investigated. The FRA should also establish whether the area marked as</p>

³³ City of York, 2013.

³⁴ City of York Council, North York Moors National Park and North Yorkshire County Council, 2015

being at a 1 in 20 flood risk is part of the functional floodplain and if so that area should continue to be avoided with a suitable standoff as waste management uses would not be considered appropriate at those locations. Climate change should also be considered as affecting the extent of Flood Zone 3.



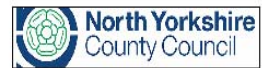
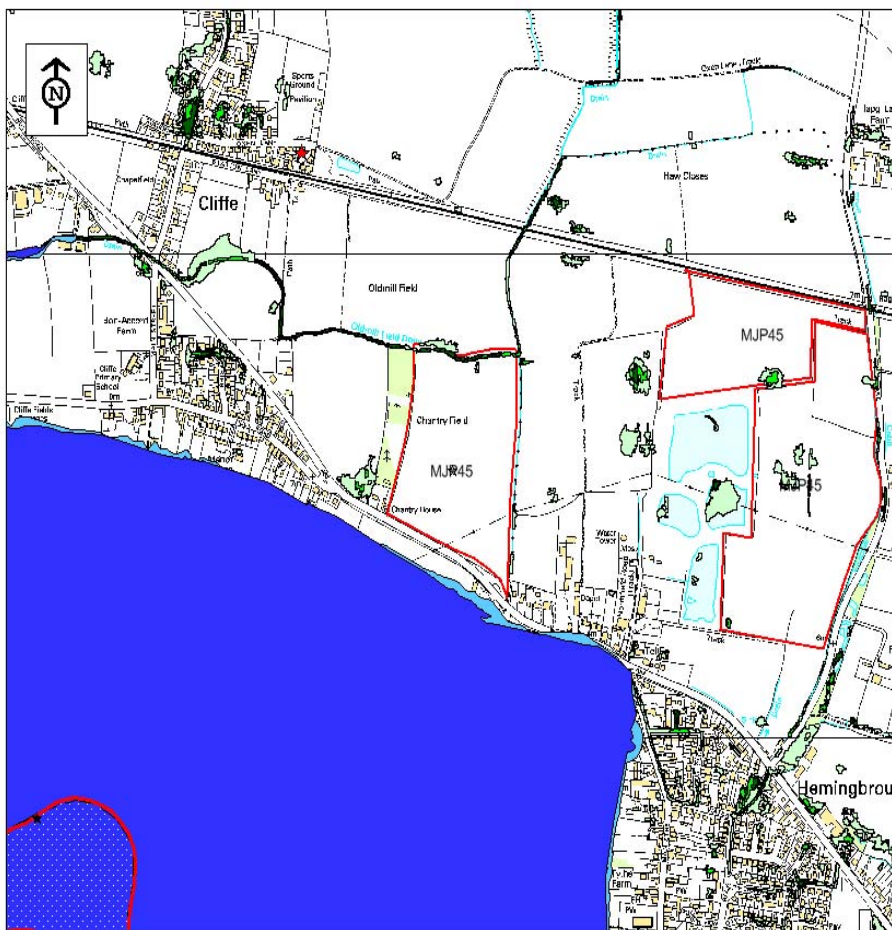
8. Selby Sites

Key to Sequential Test Results		
Pass	Pass subject to further consideration of the site's contribution to the supply of minerals.	Site is not suitable or would require an Exception Test demonstrated through a Level 2 SFRA to proceed.

Site Reference: MJP45: Land to the north of Hemingbrough	
Site Information	Proposed extension to existing quarry. Possible restoration to a range of wetland habitats. Life of site will be 9 to 12 years.
Proposed Land Use	Extraction of clay.
NPPF Vulnerability Classification	Less vulnerable.
Overview of flooding	<p>Site is in Flood Zone 1. There are small areas of surface water flooding across the 3 blocks (mostly low risk / very small high risk). Overall surface water flooding constitutes less than 5% or area and would inevitably change distribution as levels change. No historic flooding.</p> <p>Strategic groundwater flooding maps show that the western part of the site is in a 1 km square where 25% to 50% of the area has conditions that might support 'clearwater' groundwater flooding. This means the site is in an area where groundwater flooding happens in a minority of locations mainly from consolidated aquifers (rather than superficial deposits like clay).</p> <p>As a clay site the site is likely to extract below the perched water table (though groundwater flow on clay sites in clearwater areas is likely to be negligible)³⁵. Therefore groundwater flooding is unlikely to cause any significant problems. Perched water tables are an inherent property of clay extraction.</p> <p>No other forms of flooding are noted.</p>
Area of site	35.12 ha
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	Site is not in functional floodplain and lies behind an area shown as benefitting from flood defences.
Climate change	Only surface water flooding affects this site. As the SFRA

³⁵ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/290396/sp2-173-tr-2-e-e.pdf

	methodology recommends taking climate change into account for surface water flooding only after 2055 climate change is not likely to affect flooding at this site.
Sequential Test result	The location of this site in Flood Zone 1 and the relatively low risk presented by other flood sources means that it is at a very low risk of flooding. Pass
Exception Test Needed	No
Is there an alternative site?	Not applicable
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	<p>A suitable scheme will be required to drain or store water from the site that does not increase flooding on any receiving water body.</p> <p>A site specific flood risk assessment will be required. If a hydrological assessment reveals specific characteristics such as a risk of an underlying aquifer being breached or causing basal heave this should be taken into account.</p>



KEY

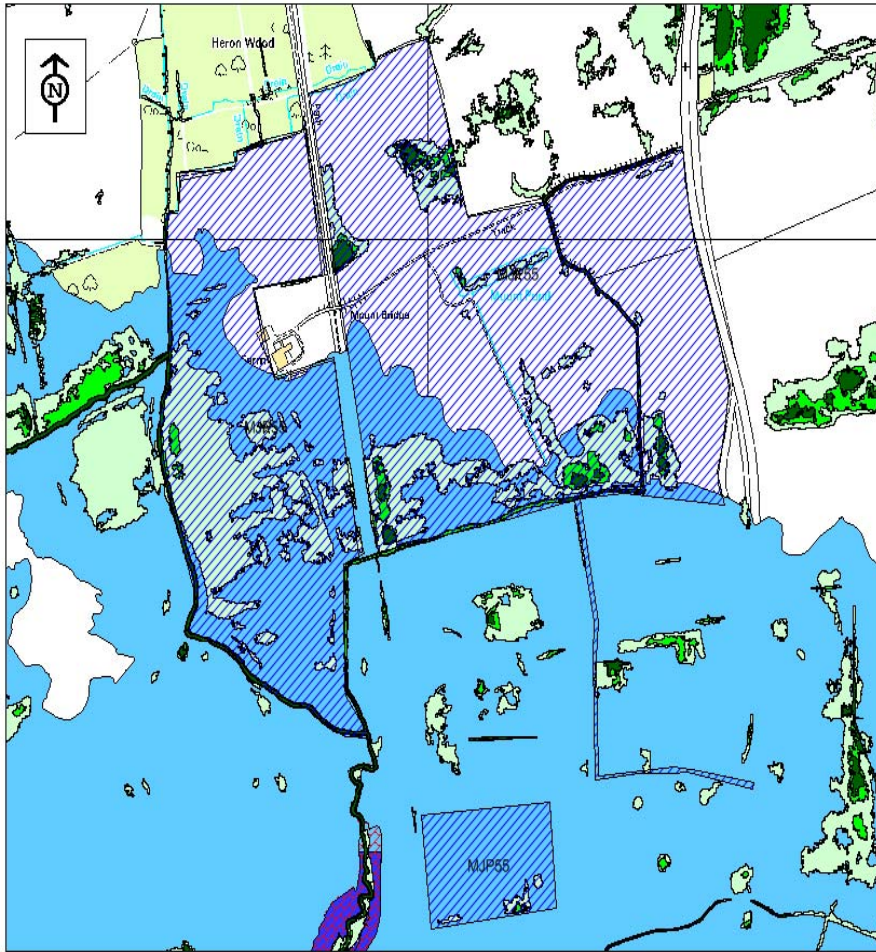
- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 year + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- ★ Historic Flood Record
- Historic Flood Map

Reproduced from the 0-Base to Survey Mapping with the permission of the Controller of the Aerial Photographs Office of Crown Copyright. Additional content added in blue. Crown Copyright may be used in projects on 2-D and 3-D projections. North Yorkshire Council, 2014 Licence No. 00017545











Site Reference: MJP55 Land adjacent to former Escrick Brickworks	
Site Information	Proposed extraction adjacent to a former quarry now operating as a landfill and recycling facility. Restoration to agriculture at or close to original ground levels. Proposed life of site: 25 years extraction upon commencement with 20 years for completion of landfill (WJP06) based on infilling commencing 2 years after extraction commences (likely to be in about 2025).
Proposed Land Use	Extraction of clay
NPPF Vulnerability Classification	Less vulnerable.
Overview of flooding	<p>About 35% of this site (the south-west part and southern block) lies in Flood Zone 2. In addition, about 20% of the site (mainly in the south) is vulnerable to surface water flooding, with small pockets of medium (1 in 100) and higher (1 in 30) risk categories (less than 5%). Surface water flooding would inevitably change distribution as levels change. There are no historic flood records.</p> <p>The southern part of this site lies within a series of three 1 km squares where more than 75% of their area has conditions which support 'clearwater' flooding. Although this is a higher risk area, flooding occurs mainly from consolidated aquifers (rather than superficial deposits like clay). The northern part of the site lies within 2 km squares where the proportion of the area which may support 'clearwater' flooding is less than 25%.</p> <p>As a clay site the site is likely to extract below the perched water table (though groundwater flow on clay sites in clearwater areas is likely to be negligible)³⁶. Therefore groundwater flooding is unlikely to cause any significant problems. Perched water tables are an inherent characteristic of clay deposits.</p> <p>No other forms of flooding are noted.</p>
Area of site	59 ha
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	N/a
Climate change	Flood Zone 2 affects this site. As the SFRA methodology recommends taking climate change into account for fluvial flooding only after 2025 only the landfill phase of this operation (i.e. WJP06) is likely to be affected. As this site is for extraction that would be likely to end in 2025 climate change is unlikely to affect this potential allocation.

³⁶ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/290396/sp2-173-tr-2-e-e.pdf

	Surface water flooding affects this site. As the SFRA methodology recommends taking climate change into account for surface water flooding only after 2055 climate change is not likely to affect surface flooding at this site.
Sequential Test result	The lack of suitable alternative sites coupled with the relatively low fluvial flood risk and manageable surface water flood risk suggests that this site should pass.
Exception Test Needed	No
Is there an alternative site?	<p>This is a large clay extraction site and there are no other proposed clay extraction sites within 10km (and no other sites in the Plan area on this scale). It is also an extension to a site which has the benefit of permission for mineral extraction, so benefits from extant access as well as established routes to market (rather than a new site that may introduce new issues to an area).</p> <p>The site would help maintain supply of clay to existing manufacturing facilities in line with national policy requirements.</p>
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	<p>A suitable scheme will be required to drain or store water from the site that does not increase flooding on any receiving water body. A SUDS scheme could be included to manage drainage.</p> <p>A site specific flood risk assessment will be required which should include consideration of groundwater flooding. If such an assessment reveals specific characteristics such as a risk of an underlying aquifer being breached or causing basal heave this should be taken into account.</p> <p>An emergency plan should be prepared in case of a flood event as this site is in Flood Zone 2.</p> <p>It should be noted that this site is being identified as a preferred area within which a site could be developed – any proposals should consider flood risk sequentially within the site.</p>



KEY

	Flood Zone 2
	Flood Zone 3
	1/20 Flood Zone 3b/3a(i)
	Possible impact of climate change (100 yr + 20%)
	UFMSW - 1 in 30 year extent
	UFMSW - 1 in 100 year extent
	UFMSW - 1 in 1000 year extent
	Areas benefiting from flood defence
	Flood Storage Area
	Minerals / waste site
	NFCDD Flood Defence
	Historic Flood Record
	Historic Flood Map

Reproduced from the 0-100m contour map, with the permission of the Controller of the Copyright, Design and Patents Office. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without the prior written permission of North Yorkshire County Council. 2019 Licence No. 00017546

Site Reference: MJP28 Barnsdale Bar	
Site Information	Proposed extension to existing quarry. Low level restoration to agriculture similar to adjacent existing quarry. Commencement in 2015 for north areas, start date for north west area dependent on extraction of north area (4-5 years), 6-8 years for north-west area).
Proposed Land Use	Extraction of Magnesian limestone.
NPPF Vulnerability Classification	Less vulnerable.
Overview of flooding	<p>Site is in Flood Zone 1. There are no areas of surface water flooding across the 2 blocks. Overall surface water flooding would inevitably change distribution as levels change. No historic flooding.</p> <p>This site lies across three km squares where less than 25% of the area has conditions that might support 'clearwater' groundwater flooding. This means the site is in an area where groundwater flooding happens in a minority of locations mainly from consolidated aquifers.</p> <p>A recent planning application at the site suggests that the site will be maintained approximately 2 metres above the maximum recorded groundwater level and would receive 'little or no groundwater inflow from the bedrock and the thin superficial cover'³⁷. The Environment Agency was satisfied with this assessment³⁸.</p> <p>No other forms of flooding are noted.</p>
Area of site	9.3 ha.5 ha (north) + 9.3 ha (north-west): total 12.8ha
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	N/a
Climate change	N/a
Sequential Test result	The location of this site in Flood Zone 1 and the low risk presented by other flood sources means that it is at a low risk of flooding. Pass.
Exception Test Needed	No
Is there an alternative site?	Extending this site to other areas adjacent to the original site would only increase the overall risk. Other Magnesian limestone sites within 10 km are at a broadly similar level of risk, with MJP29 in Flood Zone 1, and around 1% of that site at high risk of surface water flooding
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A suitable scheme will be required to drain or store water from the site that does not increase flooding on any receiving water body.

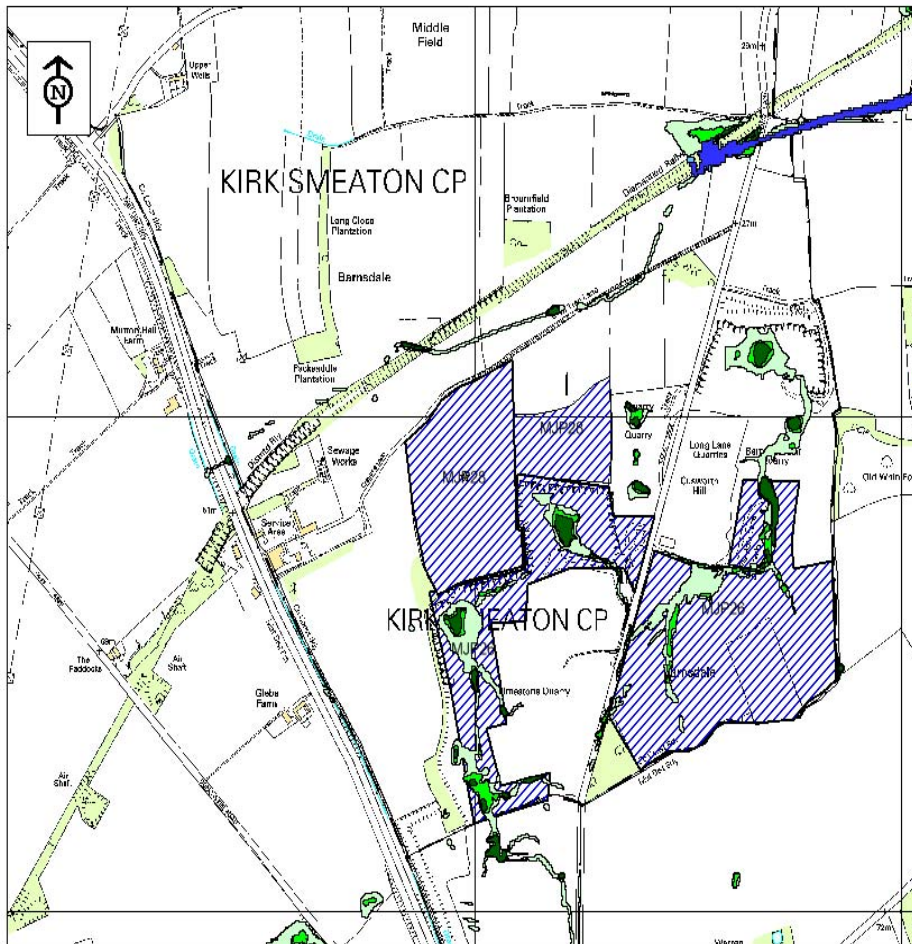
³⁷ DAB Geotechnics / FCC Environment. 2014. Proposed Extension of Barnsdale Bar Quarry: Hydrological and Hydrogeological Assessment [URL:

<https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=9532>]

³⁸ Environment Agency, letter dated 24 March 2015 [URL:

<https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=9532>]

A site specific flood risk assessment will be required. Where a hydrological assessment reveals specific characteristics such as a risk of an underlying aquifer being breached this should be considered in the flood risk assessment.



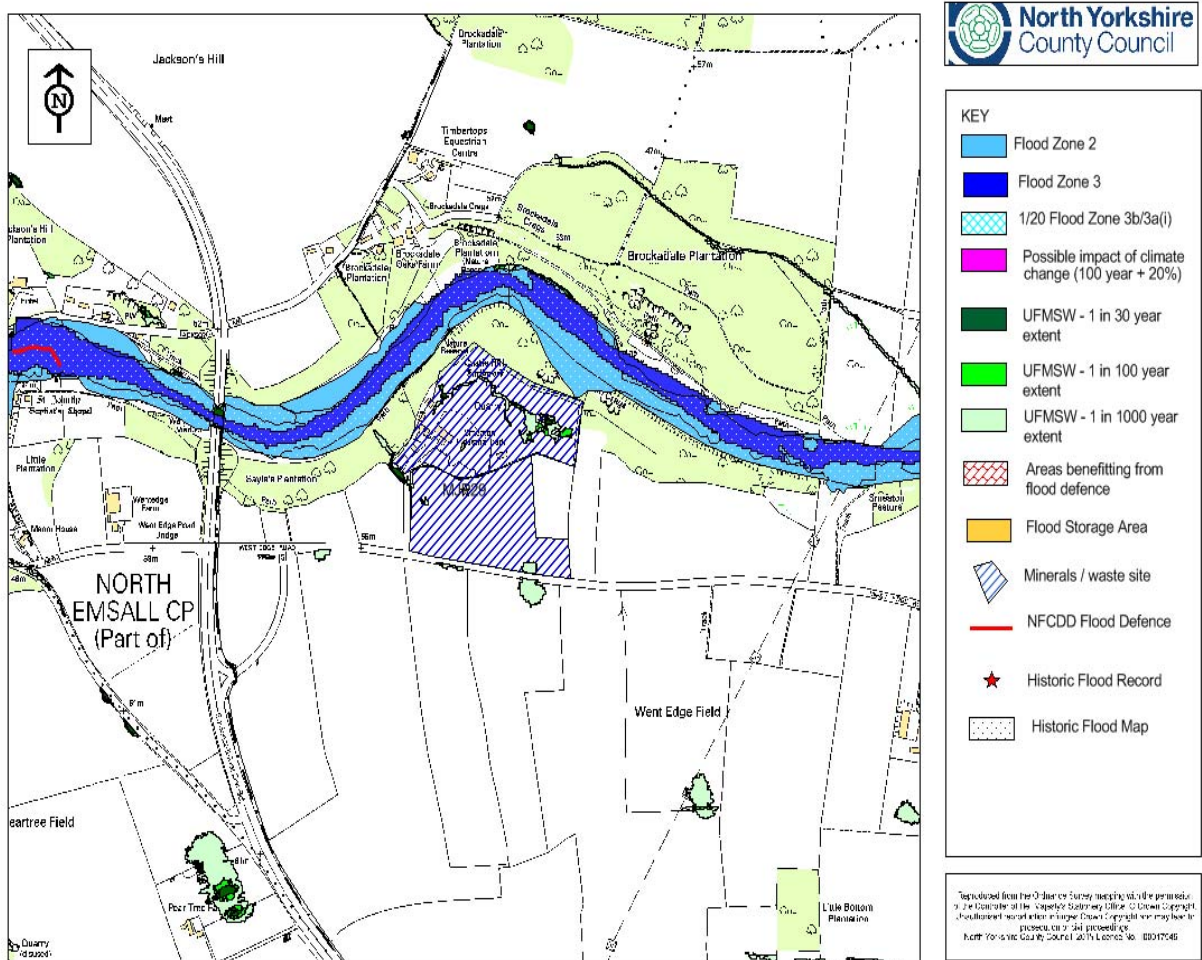
- KEY**
- Flood Zone 2
 - Flood Zone 3
 - 1/20 Flood Zone 3b/3a(i)
 - Possible impact of climate change (100 year + 20%)
 - UFMSW - 1 in 30 year extent
 - UFMSW - 1 in 100 year extent
 - UFMSW - 1 in 1000 year extent
 - Areas benefiting from flood defence
 - Flood Storage Area
 - Minerals / waste site
 - NCFDD Flood Defence
 - Historic Flood Record
 - Historic Flood Map

Reproduced from the Ordnance Survey mapping with the permission of the Controller of Her Majesty's Stationery Office. © Crown Copyright. Positional accuracy in larger scales. Copyright may be held by the Ordnance Survey. Licence No. 100017545

Site Reference: MJP29 Went Edge Quarry, Kirk Smeaton	
Site Information	Proposed extension to existing quarry. Possible restoration. Industrial estate relocated into base of quarry (subject to obtaining planning permission). Proposed life of site is 15 years.
Proposed Land Use	Extraction of Magnesian limestone
NPPF Vulnerability Classification	Less vulnerable.
Overview of flooding	<p>Site is in Flood Zone 1. A small area of Flood Zone 2 lies just outside the site boundary. There are small areas of surface water flooding across the site (less than 10%, with less than 1% at high (1 in 30 year) risk of flooding. Overall surface water flooding would inevitably change distribution as levels change. No historic flooding.</p> <p>The northern part of this site lies across two km squares where less than 25% of the area has conditions that might support 'clearwater' groundwater flooding. This means the site is in an area where groundwater flooding happens in a minority of locations mainly from consolidated aquifers.</p> <p>A recent planning application at the site has shown that "<i>The site and the limestone beds are above the groundwater table by at least 12 metres and when the floor is worked to 20 metres AOD it is still 6 metres above the water table measured at its highest level of 14 metres AOD</i>"³⁹. This means that there is unlikely to be an issue with groundwater flooding. No other forms of flooding are noted.</p>
Area of site	5.6 ha
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	N/a
Climate change	As this assessment assumes that Flood Zone 2 could become Flood Zone 3 after 2025 it is possible that Flood Zone 3 could be within a few metres of the site after 2025. One could assume that this would mean that Flood Zone 2 would also extend. However, the land is sloping with a reasonably steep gradient in this area so the risk that fluvial flooding could affect this site in the future is remote, and considered to be less than the risk associated with Flood Zone 2.
Sequential Test result	Pass. This site has a low risk of flooding and there are no better alternative sites.
Exception Test Needed	No

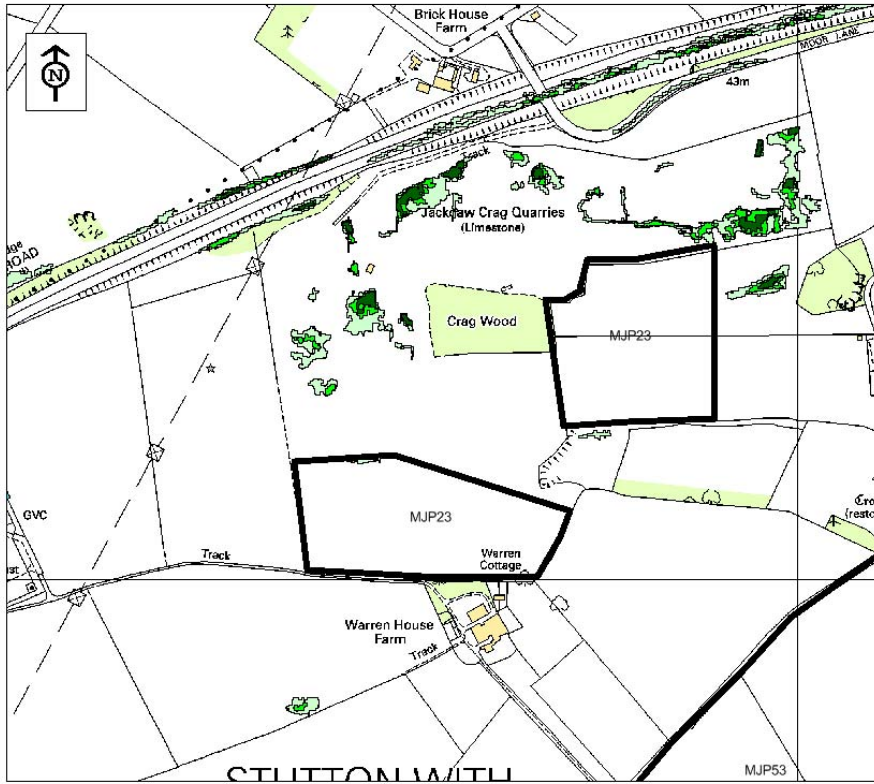
³⁹ Cromwell Mining Consultants, 2014. Went Edge Quarry Environmental Statement [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=9255>]

<p>Is there an alternative site?</p>	<p>Extending the site to other positions around the existing quarry would likely result in an equivalent level of flood risk.</p> <p>1 further Magnesian limestone sites exist within 10km: MJP28. This is at a broadly similar level of risk.</p>
<p>Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk</p>	<p>A suitable scheme will be required to drain or store water from the site that does not increase flooding on any receiving water body.</p> <p>A site specific flood risk assessment will be required. If a hydrological assessment reveals specific characteristics such as a risk of an underlying aquifer being breached this should be taken into account.</p>



Site Reference: MJP23 Jackdaw Crag, Stutton	
Site Information	Proposed extension to existing quarry. Possible restoration: unknown at present but likely to be low level restoration similar to adjacent existing quarry. Proposed life of site is unknown (though south area is 10 years).
Proposed Land Use	Extraction of Magnesian limestone
NPPF Vulnerability Classification	Less vulnerable.
Overview of flooding	<p>Site is in Flood Zone 1. There is only one very small area of 1/1000 year surface water flooding across the 2 blocks. Overall surface water flooding would inevitably change distribution as levels change. No historic flooding.</p> <p>This site lies across two km squares where less than 25% of the area has conditions that might support 'clearwater' groundwater flooding. This means the site is in an area where groundwater flooding happens in a minority of locations mainly from consolidated aquifers.</p> <p>A 2009 planning application⁴⁰ at the adjacent part of this site has shown that extraction could breach the underlying aquifer, but that it was possible to keep the finished floor level above the highest groundwater levels beneath the quarry, which would make the risk of flooding insignificant.</p> <p>No other forms of flooding are noted.</p>
Area of site	6.0ha (south) + 6.2ha (east) so total: 12.2ha
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	N/a
Climate change	N/a
Sequential Test result	The location of this site in Flood Zone 1 and the low risk presented by other flood sources means that it is at a very low risk of flooding from surface sources. Pass.
Exception Test Needed	No
Is there an alternative site?	Extending this site to other areas adjacent to the original site would only increase the overall risk. Other Magnesian limestone sites within 10km (MJP53, MJP58, MJP31) are at a broadly similar level of flood risk.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	<p>A suitable scheme will be required to drain or store water from the site that does not increase flooding on any receiving water body.</p> <p>A site specific flood risk assessment will be required. If a hydrological assessment reveals specific characteristics such as a risk of an underlying aquifer being breached this should be taken into account.</p>

⁴⁰ Darrington Quarries Ltd, 2009. Southern extension to Jackdaw Crag Quarry: Planning Supporting Statement



KEY

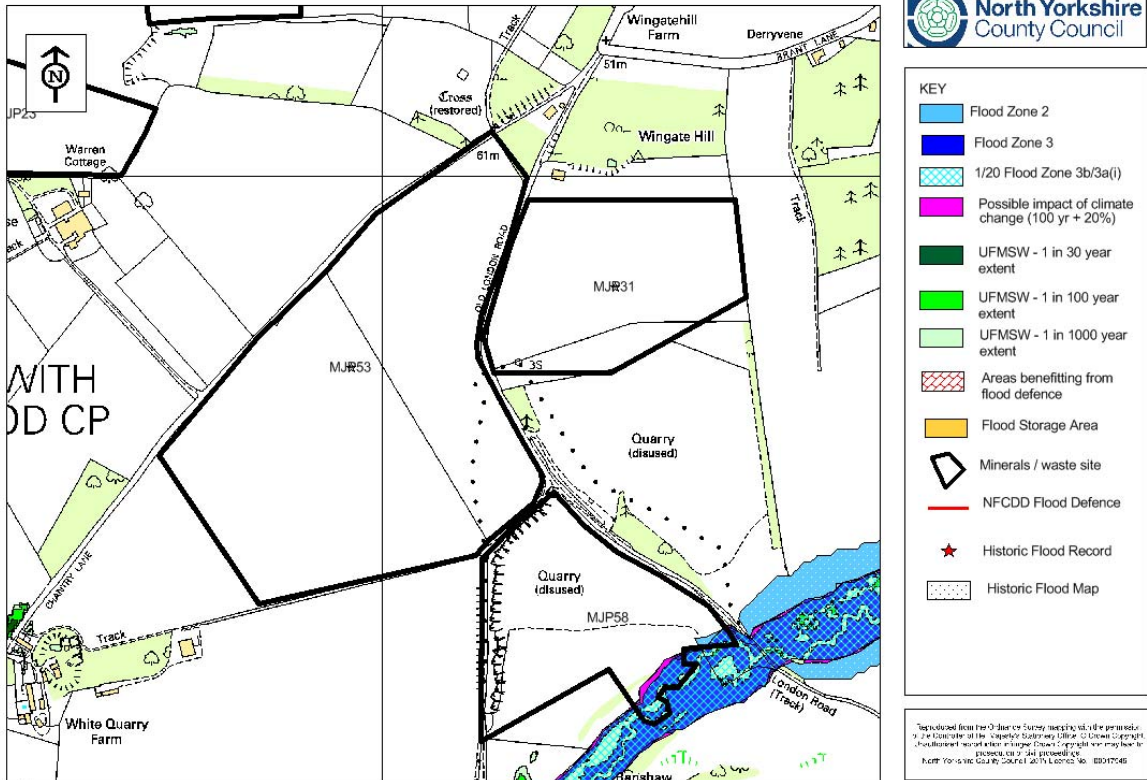
- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- Historic Flood Record
- Historic Flood Map

Reproduced from the 2015 Survey, which is the basis of the present map. It is published on the North Yorkshire Council's website. Copyright © North Yorkshire Council 2015. All rights reserved. North Yorkshire Council 2015. Licence No. 00017046

Site Reference: MJP31 Old London Road, Stutton (recycling)	
Site Information	Proposed new limestone extraction site as an extension to a former quarry and import of construction and excavation waste for use in forming restoration landform. The stone will be removed to 15.2 metres AOD from a surface level of 57 metres AOD. Proposed life of site is 11 years from 2017, but infilling starts in 2019. Restoration to pasture and woodland in a 'bowl' shape.
Proposed Land Use	Extraction of Magnesian limestone
NPPF Vulnerability Classification	A mixture of less vulnerable and more vulnerable ⁴¹ uses.
Overview of flooding	<p>Site is in Flood Zone 1. No surface water or fluvial flooding affects this site. No historic flood events are noted.</p> <p>This site lies within a km square where less than 25% of the area has conditions that might support 'clearwater' and 'superficial deposit' groundwater flooding. This means the site is in an area where groundwater flooding happens in a minority of locations from both consolidated aquifers and drift deposits such as clay or floodplain deposits such as sand and gravel.</p> <p>In terms of groundwater flooding there is no historical data available at this site, though given other sites close by are thought to be close to the aquifer this could be a risk. However, limestone quarries where groundwater flooding does occur generally routinely manage that flooding through dewatering, so there would be little risk to workers. However, any receiving water body (if water is not recharged to the aquifer) could have an increased flood risk so measures may be needed to avoid this risk.</p>
Area of site	9 ha
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	N/a
Climate change	Climate change would not affect flooding at this site.
Sequential Test result	The location of this site in Flood Zone 1 and the low risk presented by other flood sources means that it is at a very low risk of flooding from surface sources. Pass.
Exception Test Needed	N/a
Is there an alternative site?	There are 3 Magnesian limestone sites within 10km (MJP23, MJP58 and MJP53). All of these sites are at a broadly similar level of flood risk.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	<p>A suitable scheme will be required to drain or store water from the site that does not increase flooding on any receiving water body. SUDS should be considered where appropriate.</p> <p>A site specific flood risk assessment will be required. If a hydrological assessment reveals specific characteristics</p>

⁴¹ Importation of material to restore the site is considered equivalent to landfill

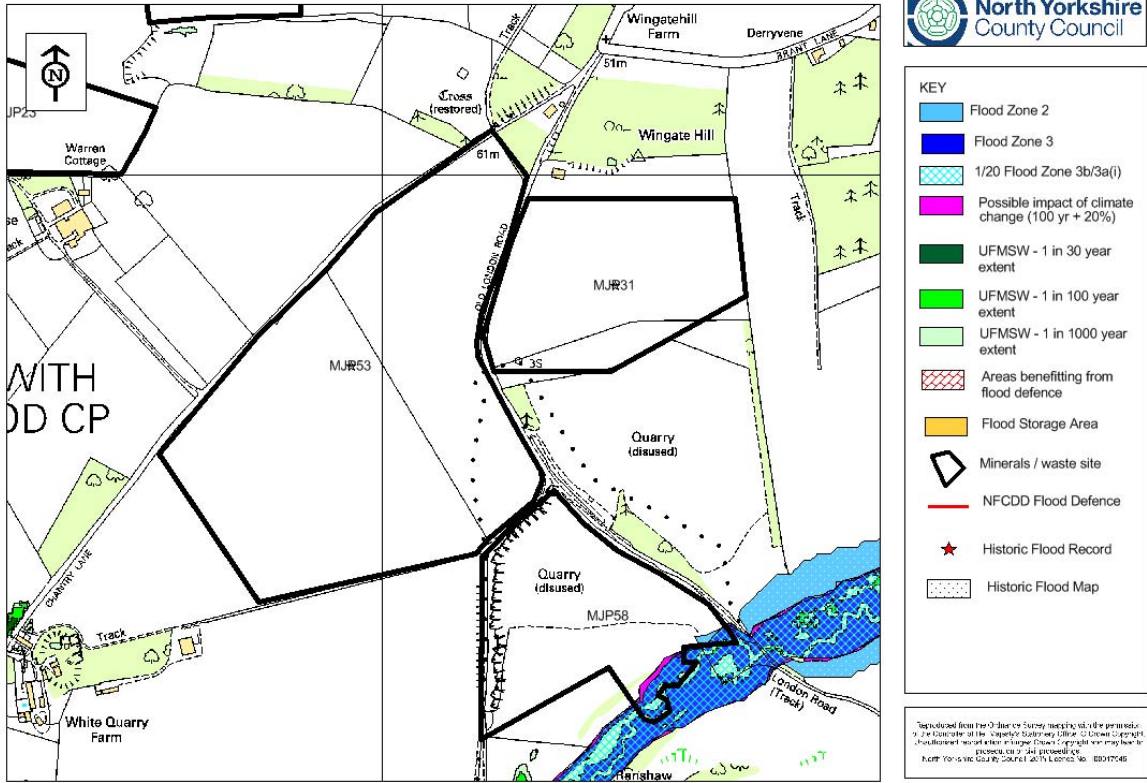
such as a risk of an underlying aquifer being breached this should be taken into account.



Site Reference: MJP53 Land to the North of Old London Road Quarry, Stutton	
Site Information	Proposed new quarry to north-west of former quarry which will involve extraction plus importation of construction waste for restoration purposes. Restoration: No detailed design yet, but restoration would be to a bowl shape with pasture in the base of the bowl, and with the sloping sides formed from imported material (which would be restored to grassland and woodland). Proposed life of site is 20 years for extraction phase.
Proposed Land Use	Extraction of Magnesian limestone and import of construction and excavation waste for use in forming proposed restoration landform.
NPPF Vulnerability Classification	A mixture of less vulnerable and more vulnerable ⁴² uses
Overview of flooding	<p>No surface water or fluvial flooding affects this site. No historic records of flooding.</p> <p>The eastern half of this site lies within a km square where less than 25% of the area has conditions that might support 'clearwater' and 'superficial deposit' groundwater flooding. This means the site is in an area where groundwater flooding happens in a minority of locations from both consolidated aquifers and drift deposits such as clay or floodplain deposits such as sand and gravel.</p> <p>In terms of groundwater flooding there is no historical data available at this site, though given other sites close by are thought to be close to the aquifer this could be a risk. However, limestone quarries where groundwater flooding does occur generally routinely manage that flooding through dewatering, so there would be little risk to workers. However, any receiving water body (if water is not recharged to the aquifer) could have an increased flood risk so measures may be needed to avoid this risk.</p>
Area of site	18 ha
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	N/a
Climate change	Climate change would not affect flooding at this site.
Sequential Test result	The location of this site in Flood Zone 1 and the low risk presented by other surface flood sources means that it is at a very low risk of flooding from surface sources. Pass.
Exception Test Needed	N/a
Is there an alternative site?	There are 3 Magnesian limestone sites within 10km (MJP31, MJP58 and MJP23). All of these sites are at a broadly similar level of flood risk.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	<p>A suitable scheme will be required to drain or store water from the site that does not increase flooding on any receiving water body. SUDS should be considered where appropriate.</p> <p>A site specific flood risk assessment will be required. If a</p>

⁴² Importation of material to restore the site is considered equivalent to landfill

hydrological assessment reveals specific characteristics such as a risk of an underlying aquifer being breached or this should be taken into account.

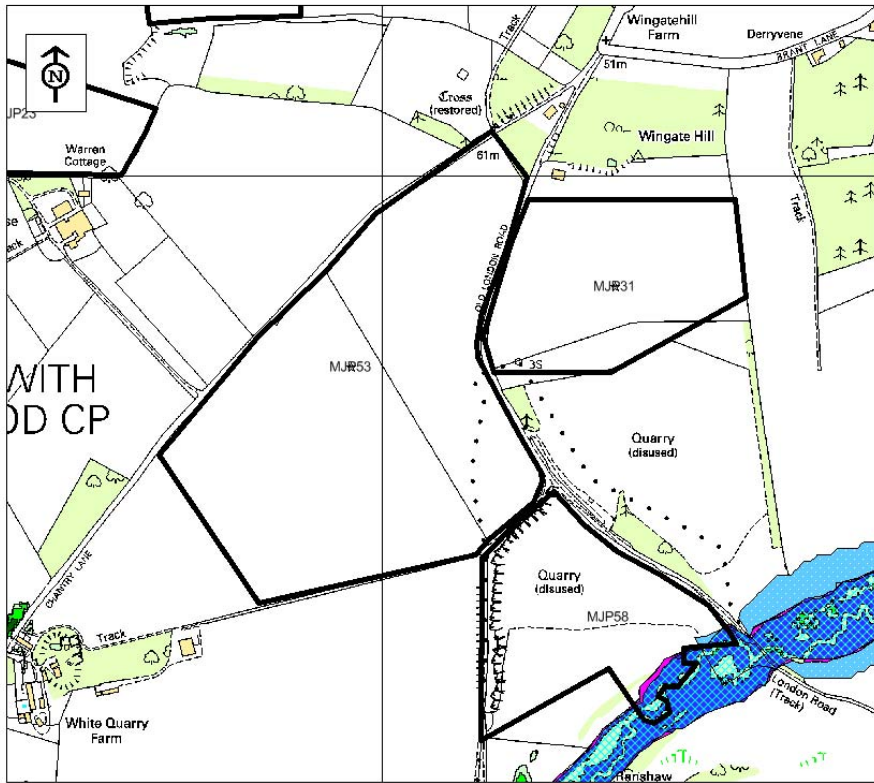


Site Reference: MJP58 Old London Road, Stutton (recycling)	
Site Information	Site is former quarry from which further limestone would be extracted and the area would be used for secondary aggregate recycling and restored using imported materials. Site to north-east proposed for extraction (MJP31) by same submitter. Restoration: site to be restored to pasture and woodland using imported materials (300,000 tonnes) by grading into slopes to meet the original ground levels on the west, north and east sides of the site. Proposed life of site – until 2022
Proposed Land Use	Extraction of Magnesian limestone, secondary aggregate recycling, storage of mineral fines and partial infilling with imported mineral fines material.
NPPF Vulnerability Classification	A mixture of less vulnerable and more vulnerable ⁴³ uses.
Overview of flooding	<p>A small part of the southern part of this site lies within Flood Zone 3 and, being at a 1 in 20 flood risk, is also functional floodplain (3b). This same area is broadly coincidental with areas of historic flooding identified on the Environment Agency's Historic Flood Map. If the quarried area were to overlap with this area a potential risk is that flood water could flow into the site.</p> <p>This site lies within a km square where less than 25% of the area has conditions that might support 'clearwater' and 'superficial deposit' groundwater flooding. This means the site is in an area where groundwater flooding happens in a minority of locations from both consolidated aquifers and drift deposits such as clay or floodplain deposits such as sand and gravel.</p> <p>In terms of groundwater flooding there is no historical data available at this site, though given other sites close by are thought to be close to the aquifer this could be a risk. However, limestone quarries where groundwater flooding does occur generally routinely manage that flooding through dewatering, so there would be little risk to workers. However, any receiving water body (if water is not recharged to the aquifer) could have an increased flood risk so measures may be needed to avoid this risk.</p>
Area of site	3 ha
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	A small part of the southern part of this site lies within an area of 1 in 20 flood risk that is also shown in Selby District Council's Level 1 SFRA as functional floodplain (3b) ⁴⁴
Climate change	As this site is has a proposed end date of 2022 climate change related flooding will not significantly increase present

⁴³ Importation of material to restore the site is considered equivalent to landfill

⁴⁴ Selby District Council. Selby Strategic Flood Risk Assessment: District Flood Map [URL: http://www.selby.gov.uk/sites/default/files/Documents/081125_Map_District_Wide_Risk_SFRA.pdf]

	levels of flood risk at the site.
Sequential Test result	Pass (if the area of Flood Zone 3 is avoided, or else pursue MJP31/53 or 23 ahead of this site).
Exception Test Needed	If the quarry excavation or machinery, vehicles, equipment, buildings or fuel stores are to be located in the area identified as Flood Zone 3b an exception test will be required. If this area is avoided then this site can proceed without an exception test.
Is there an alternative site?	There are 3 Magnesian limestone sites within 10km (MJP31, MJP53 and MJP23). Although this site has an area within Flood Zone 3 / potential 3b, this area constitutes only about 5% of the area of the site and could be avoided. Discounting the area of potential Flood Zone 3b shows that potential alternative sites have a broadly similar level of flood risk.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	<p>A suitable scheme will be required to drain or store water from the site that does not increase flooding on any receiving water body.</p> <p>A site specific flood risk assessment will be required. If a hydrological assessment reveals specific characteristics such as a risk of an underlying aquifer being breached this should be taken into account. This assessment should also establish an appropriate standoff between the quarry excavation and the area of flood zone 3a / potential 3b. This is particularly relevant as the use of imported material to restore the site is considered to be in the same category of vulnerability as landfill (which is not allowed in functional floodplain)</p> <p>Machinery, vehicles, equipment, buildings, or fuel stores should not be located in the area identified as potential Flood Zone 3b plus an appropriate standoff unless this site can pass an exception test.</p> <p>There may be some potential to utilise the land in Flood Zone 3 / 3a as a small area of flood storage.</p> <p><u>All sites in functional flood plain must: remain operational and safe for users in times of flood; result in no net loss of floodplain storage; not impede water flows and not increase flood risk elsewhere.</u></p>



KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- ★ Historic Flood Record
- Historic Flood Map

Reproduced from the Ofsted Survey, subject to the permission of the Controller of the Copyright Material. © Crown Copyright. Downloaded from the National Archives website. Copyright reserved. North Yorkshire County Council 2019. L00102.00. 03017046

Site Reference: WJP04 Old London Road Quarry, Stutton	
Site Information	<p>Current use is two former quarries. Various proposed uses:</p> <ul style="list-style-type: none"> • Extraction of Magnesian limestone if site MJP31 developed; • Temporary storage of mineral fines if sites MJP31 and MJP53 developed; and <p>Recycling of waste from construction industry and landfill in WJP04 (to east and west of Old London Road) areas irrespective of development of sites MJP31 and MJP53.</p> <p>Proposed life of site:</p> <ul style="list-style-type: none"> • If MJP31 and MJP53 areas are not allocated and developed for mineral extraction: 2022 for WJP04 (west) and 2024 for WJP04 (east) • If MJP31 and MJP53 are allocated and developed for minerals extraction, then: 2022 for WJP04 (west) and 2046 for WJP04 (east)
Proposed Land Use	Extraction of Magnesian limestone, temporary storage of mineral fines, and recycling of construction industry waste and landfill
NPPF Vulnerability Classification	Extraction of minerals, storage of fines and recycling is 'less vulnerable'. Landfill would be 'more vulnerable'.
Overview of flooding	<p>No surface water flooding affects this site. Functional floodplain (3b) and Flood Zone 3a runs along the site's southern boundary. Flood Zone 2 affects a small area (circa 5%) of the southern part of the eastern site. Most of the site is in Flood Zone 1. Historic flooding is co-incident with Flood Zone 2.</p> <p>This site lies within a km square where less than 25% of the area has conditions that might support 'clearwater' and 'superficial deposit' groundwater flooding. This means the site is in an area where groundwater flooding happens in a minority of locations from both consolidated aquifers and drift deposits such as clay or floodplain deposits such as sand and gravel.</p> <p>In terms of groundwater flooding there is no historical data available at this site, though given other sites close by are thought to be close to the aquifer this could be a risk. A Flood Risk Assessment will need to establish the groundwater flooding risk.</p>
Area of site	14.8 ha
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	Functional floodplain as defined by 1/20 flood risk (potential 3b in this SFRA) comes very close to the site boundary. Selby SFRA also shows functional floodplain bordering the site with what appears to be a very slight / negligible (less than 0.5%) overlap with boundary).
Climate change	If MJP31 and MJP53 areas are not allocated and developed for mineral extraction then the latest this site would operate would be until 2024. Flood risk would not increase due to climate change during this period.

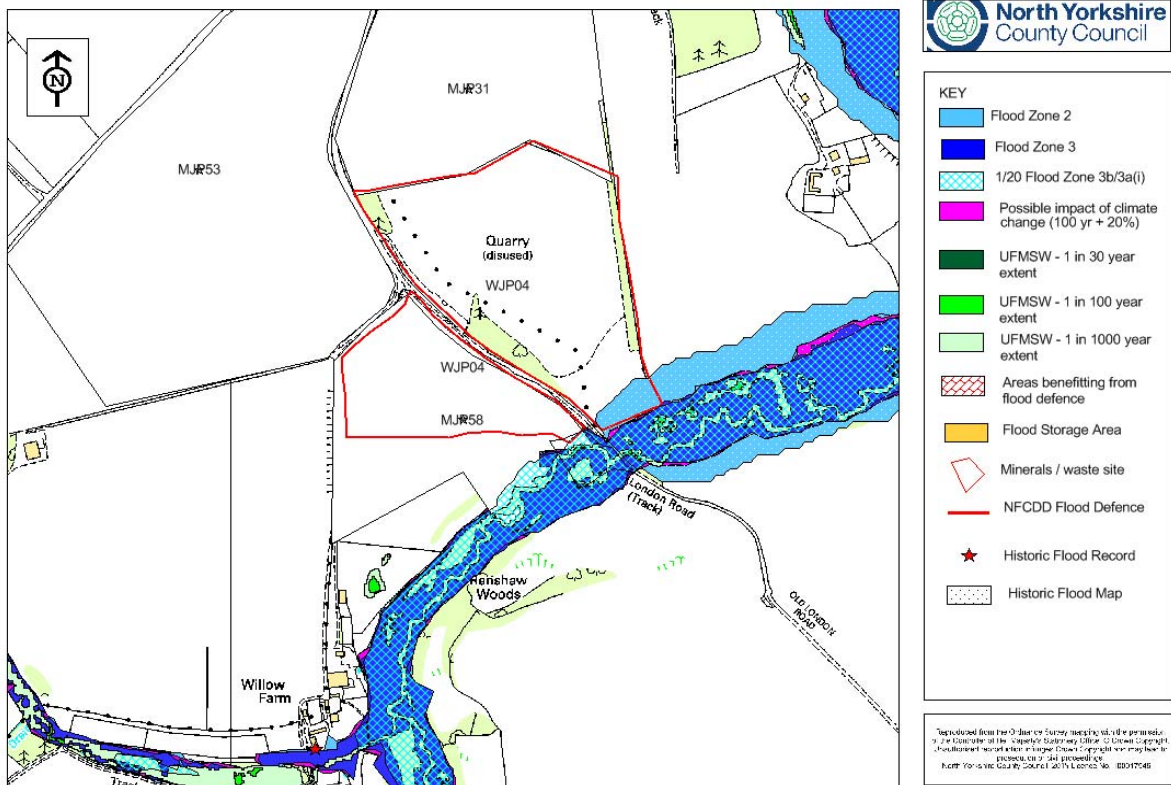
	<p>If MJP31 and MJP53 are allocated and developed for minerals extraction then the eastern part of the site would operate until 2046. From 2025 to 2046 the area of this site currently shown as Flood Zone 2 should be considered as Flood Zone 3.</p>
Sequential Test result	<p>Landfill would not be suitable in the area identified as Flood potential Flood Zone 3b (unless a detailed Flood Risk Assessment could demonstrate that the area is not functional floodplain) and a suitable area of standoff should be determined. Exception testing would also be required if the area currently identified as Zone 2 includes development that would endure beyond 2025.</p> <p>However, the area of 3a/3b is only confined to a very small / negligible part of the site (i.e. the boundary). If an appropriate standoff were applied landfill (from a flood risk perspective) could be suitable in the wider site, 95% of which is in Flood Zone 1.</p> <p>There are no suitable alternative sites with a lower level of flood risk.</p> <p>Groundwater flood risk will need to be established at this site.</p>
Exception Test Needed	<p>An exception test would be needed only if landfill extends into Flood Zone 3b, or recycling development extends into Flood Zone 3b (see 'sequential test result' above).</p>
Is there an alternative site?	<p>There are 3 Magnesian limestone sites within 10km (MJP31, MJP53 and MJP23) all with a similar level of flood risk. Although this site has an area within Flood Zone 3 / potential 3b this area constitutes a negligible part of the area and could be avoided.</p> <p>In terms of waste sites, there are none within 10km. However, some potential additional sites have also been identified as part of the evidence gathering of the plan⁴⁵. Of those suitable for recycling / landfill only SEL12 lies within 10km, which has been identified for 'processing of recyclables'. However, most of that site lies in Flood Zone 2 (which would represent a higher flood risk than the Flood Zone 1 that covers 95% of this site).</p>
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	<p>A suitable scheme will be required to drain or store clean water from the site that does not increase flooding on any receiving water body. Foul water (if applicable) will need to be managed via an environmental permit. Opportunities to integrate SUDS should be explored.</p>

⁴⁵ These sites were identified in North Yorkshire County Council, North York Moors National Park and City of York Council, 2015. Identification of potential locations for waste management facilities [URL: [http://www.northyorks.gov.uk/media/32597/Identification-of-potential-locations-for-waste-management-facilities-Jul-2015/pdf/Identification_of_potential_locations_for_waste_management_facilities_\(Jul_2015\).pdf](http://www.northyorks.gov.uk/media/32597/Identification-of-potential-locations-for-waste-management-facilities-Jul-2015/pdf/Identification_of_potential_locations_for_waste_management_facilities_(Jul_2015).pdf)]

The area of Flood Zone 2 should not be landfilled without an exception test being passed, while the area of Flood Zone 3a / potential 3b should be avoided for landfill and a suitable standoff applied (supported by a flood risk assessment). Recycling operations should not be pursued in Flood Zone 3b (and an area of standoff).

Groundwater flood risk will need to be established at this site through a site specific flood risk assessment.

All sites in functional flood plain must: remain operational and safe for users in times of flood; result in no net loss of floodplain storage; not impede water flows and not increase flood risk elsewhere.

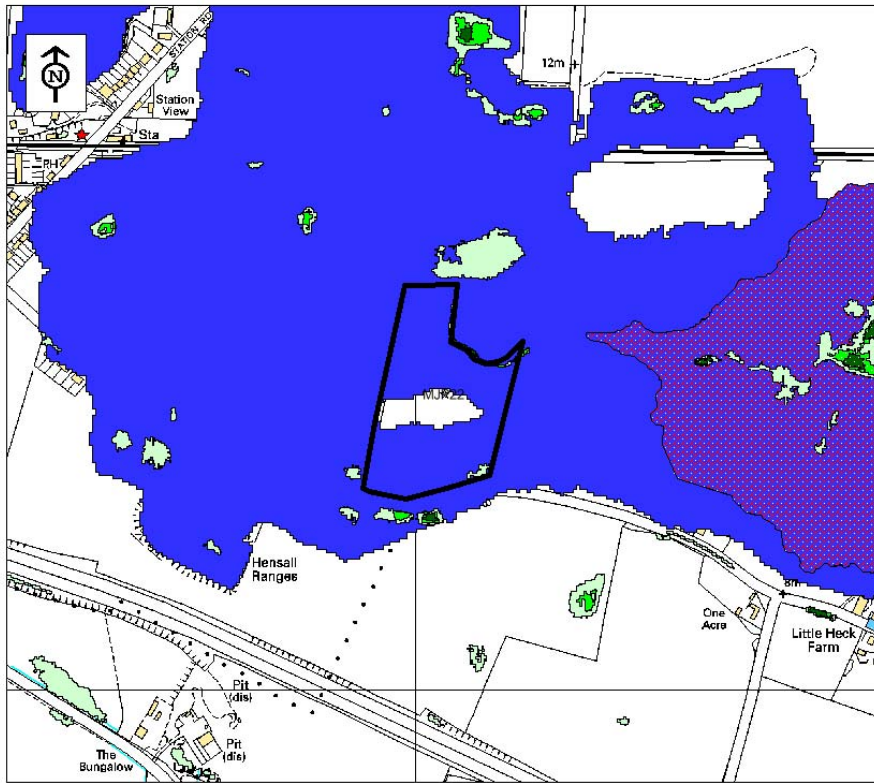


Site Reference: MJP22 Hensall Quarry	
Site Information	Proposed extension to existing quarry. Possible restoration is low level agriculture similar to scheme for adjacent existing quarry. Proposed life: 16 years plus restoration, commencing in 2025.
Proposed Land Use	Extraction of Sand
NPPF Vulnerability Classification	Water compatible
Overview of flooding	<p>Approximately 85% of this site lies in Flood Zone 3 according to the Flood Map. However, the area also lies behind an area identified as benefitting from flood defences to the east (though the standard of protection of these defences is not known) and flooding may be possible from the north. This does however suggest that the Flood Zone 3 risk is at the lower end of the scale of risk, given that connected Flood Zone 3 closer to the river benefits from flood defences.</p> <p>Two small areas of surface water flooding also affect the site. One is confined to a drain in the north east corner and includes an area of high risk. Another is in the south-east corner. Together they affect around 5% of the site. No historic flooding is noted.</p> <p>This site lies across two km squares where less than 25% of the area has conditions that might support 'clearwater' groundwater flooding. This means the site is in an area where groundwater flooding happens in a minority of locations mainly from consolidated aquifers (rather than superficial deposits like sand).</p> <p>According to the 2012 planning statement for a neighbouring part of this site groundwater levels are around -1m AOD. For that part of the site at least, where extraction is to -0.5 AOD <i>"although flooding from a rising groundwater table is a possibility at the site, it is considered unlikely because of a small seasonal variation in groundwater levels of around 0.2m and a long term decline in groundwater levels probably caused by groundwater extraction"</i>⁴⁶. It is assumed that a similar level of risk could also be present at this site, though this is dependent on the levels of extraction, and the underlying water table, which should be further investigated.</p>
Area of site	4.3 ha
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	Most of the site is identified as functional floodplain (3b) in the Selby SFRA. However, 1 in 20 year flood data is not available for this area.

⁴⁶ Darrington Quarries Ltd, 2012. Hensall Sand Quarry, Planning application for the importation of compost, mixing of compost and sand, stockpiling and exportation of soil material at Hensall Sand Quarry: Planning Statement (August 2012) [URL:

<https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=8600>]

Climate change	Site is currently in Flood Zone 3 and it is likely that it will remain as Flood Zone 3 after 2025 (though depth / risk of flooding could further increase).
Sequential Test result	Sand and gravel extraction is water compatible development. MJP44 and MJP54 should be considered ahead of this site in terms of priority, subject to other planning constraints.
Exception Test Needed	No
Is there an alternative site?	This site is an extension to an existing quarry. Much of the land around the quarry is likely to be at a similar level of flood risk or is constrained by other development. The only additional sand sites within 10 km are MJP44 and MJP54 which both have a lower level of flood risk and would be preferable to this site in terms of flood risk. However, the Plan identifies that more resources of building sand are needed and the site is required to help meet this need. No further alternative sites have been identified.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	<p>A suitable scheme will be required to drain or store clean water from the site that does not increase flooding on any receiving water body. Opportunities to integrate SUDS should be explored.</p> <p>Groundwater flood risk will need to be established at this site through a site specific flood risk assessment.</p> <p>A site specific flood risk assessment should also include a flood evacuation plan due to the presence of Flood Zone 3.</p> <p><u>All sites in functional flood plain must: remain operational and safe for users in times of flood; result in no net loss of floodplain storage; not impede water flows and not increase flood risk elsewhere.</u></p>



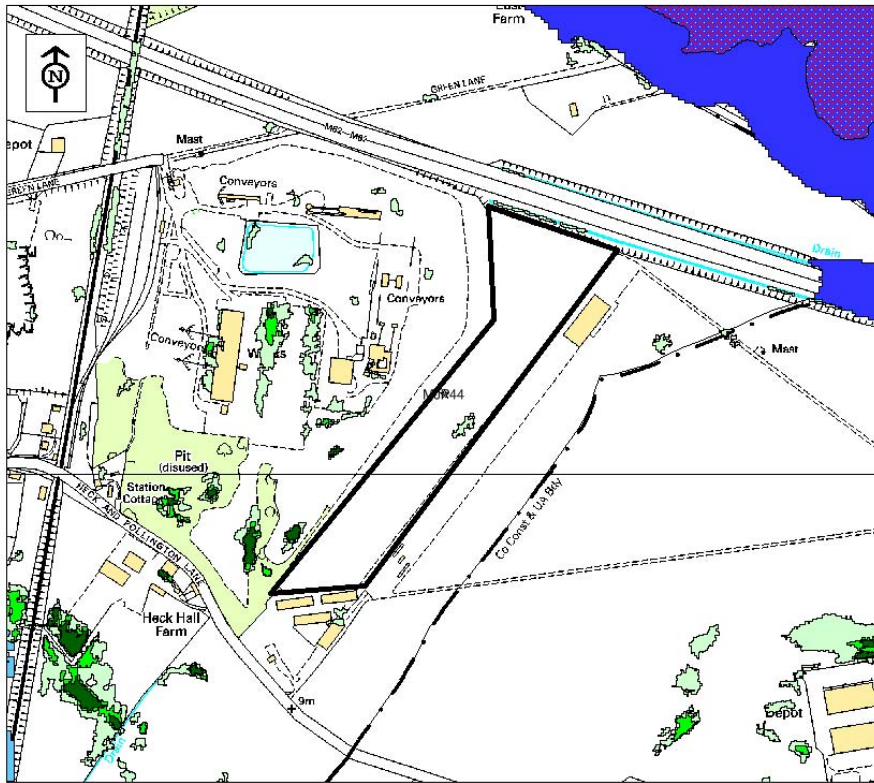
KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- Historic Flood Record
- Historic Flood Map

Reproduced from the Ofsted Survey, subject to the permission of the Controller of the Copyright Material Office. © Crown Copyright. All rights reserved. No part of this publication may be reproduced without the prior written permission of the Controller of the Copyright Material Office. North Yorkshire County Council, 2019. Licence No. 10017046

Site Reference: MJP44 Land between Plasmor Block making plant, Great Heck and Pollington Airfield	
Site Information	Proposed new extraction site adjacent to a former quarry. Possible restoration to low level agriculture.
Proposed Land Use	Extraction of building sand. Proposed life of site: Commence within 5 years and 22 year life.
NPPF Vulnerability Classification	Water compatible
Overview of flooding	<p>Only a very small area is affected by surface water flooding (>2%) and only at a 1 in 1000 year return rate. No fluvial flooding affects the site (site is in Flood Zone 1). No historic flooding is noted.</p> <p>This site lies across two km squares where less than 25% of the area has conditions that might support 'clearwater' groundwater flooding. This means the site is in an area where groundwater flooding happens in a minority of locations mainly from consolidated aquifers (rather than superficial deposits like sand).</p> <p>The planning application for a biomass processing plant at the site immediately to the west of this one stated that 'The Environment Agency advised that the aquifer level in this area is -12.0m AOD (20m below ground level)'. Additionally, boreholes to 13m in that application were dry⁴⁷. This is unlikely to present a significant issue for a water compatible development, even if it were to go below the water table.</p>
Area of site	8.16 ha
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	N/a
Climate change	Unlikely to significantly affect this site.
Sequential Test result	Pass. Site is in Flood Zone 1 and other forms of flood risk are insignificant.
Exception Test Needed	No
Is there an alternative site?	As this site has a very low level of flood risk seeking alternative sites would be unreasonable. In any case, this site has the lowest flood risk when compared to the only other two sand sites within 10km (MJP54 and MJP22).
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment will be required. Opportunities to integrate SUDS should be explored.

⁴⁷ Ethical Partnership, 2009. Planning application for the extension of the biomass and wood fuel processing plant, Pollington Airfield, Selby: Supporting Statement.



KEY

	Flood Zone 2
	Flood Zone 3
	1/20 Flood Zone 3b/3a(i)
	Possible impact of climate change (100 yr + 20%)
	UFMSW - 1 in 30 year extent
	UFMSW - 1 in 100 year extent
	UFMSW - 1 in 1000 year extent
	Areas benefiting from flood defence
	Flood Storage Area
	Minerals / waste site
	NFCDD Flood Defence
	Historic Flood Record
	Historic Flood Map

Reproduced from the Ofwat (ex-Survey) map, subject to the permission of the Controller of the Copyright Material Office of the United Kingdom Intellectual Property Office. Copyright reserved by the Controller of the Copyright Material Office. North Yorkshire County Council 2019. License No. 10017046

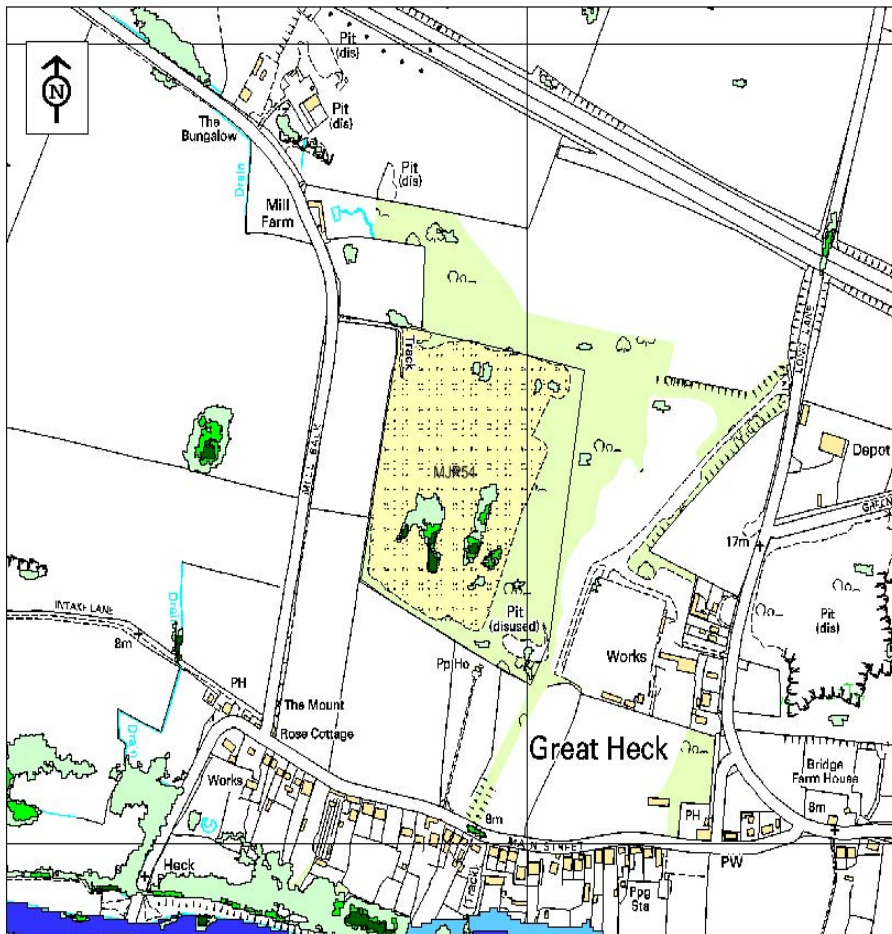
Site Reference: MJP54: Mill Balk Quarry, Great Heck	
Site Information	Proposed extension to depth of extraction within existing quarry. Current quarry approved restoration scheme is short rotation coppice in base of quarry and grassed perimeter slopes (but currently being reviewed as a water-based restoration may be necessary given the current site circumstances). Proposed life of site: currently the quarry is permitted to 2042 but life of this site likely to be shorter (commencement would be prior to 2030).
Proposed Land Use	Extraction of sand
NPPF Vulnerability Classification	Water compatible.
Overview of flooding	<p>This site is in Flood Zone 1. About 10% of site is prone to surface water flooding. Of this <5% is medium (1/100) risk or greater. Surface water distribution is likely to change during extraction. No historic flooding is noted.</p> <p>This site lies across two km squares where less than 25% of the area has conditions that might support 'clearwater' groundwater flooding. This means the site is in an area where groundwater flooding happens in a minority of locations mainly from consolidated aquifers (rather than superficial deposits like sand).</p> <p>A recent request for a scoping opinion NY/2013/0262/SCO at the same site has investigated groundwater levels at the site and found them to be at between – 3m and – 4m AOD. However, that same case highlighted that these levels were unusually high and thought to be the result of a local cessation in groundwater pumping⁴⁸. The deepening of this quarry may potentially (depending on depth planned) dip below this level. However extraction of sand is a water compatible use.</p>
Area of site	10.3 ha
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	N/a
Climate change	As this site would last until 2030, any additional risk from climate change impacts on surface water flooding is thought not to be significant.
Sequential Test result	Pass. However, MJP44 should be considered alongside MJP54 subject to other planning constraints. However, the Plan identifies that more resources of building sand are needed and the site is required to help meet this need. No further alternative sites have been identified.
Exception Test Needed	N/a
Is there an alternative site?	MJP54 and MJP22 are both within 10 km. This site is preferable to MJP22 in terms of flood risk, but is slightly more vulnerable than MJP44 due to the surface water flood risk.

⁴⁸ MJCA, 2013. Letter to North Yorkshire County Council, dated 8 November 2013 [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=8972>]

Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk

A suitable scheme will be required to drain or store clean water from the site that does not increase flooding on any receiving water body. Opportunities to integrate SUDS should be explored.

Groundwater flood risk will need to be established at this site through a site specific flood risk assessment.



KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- Historic Flood Record
- Historic Flood Map

Reproduced from the Ordnance Survey map of the area, reproduced by permission of the Ordnance Survey, under the terms of the Ordnance Survey Licence. All rights reserved. Copyright © Ordnance Survey. All rights reserved. Ordnance Survey Licence No. 100017545.

Site Reference: MJP09 Barlby Road, Selby	
Site Information	Current lifespan of facility tied to life of adjacent asphalt plant but no set end-date (possibly 30 years). No restoration proposed
Proposed Land Use	Retention of rail and road freight distribution facility including handling
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>This site is entirely within Flood Zone 3 due to fluvial and tidal flood risk. However, the flood zones do not acknowledge the presence and influence of flood defences and the River Ouse Modelled Flood Outline indicates the area is defended to at least a 1 in 25 year standard of protection. This site is entirely contained within an area benefitting from flood defences.</p> <p>Surface water flooding also affects the site in patches of low to high risk spread throughout the site (but covering less than 10% of its area). About 5% of the site is at high risk of surface water flooding. No historic flooding is noted.</p> <p>No local groundwater flooding data is available. According to the Environment Agency 'areas susceptible to surface water flooding' map most of this site lies in 2 km squares where more than 75% of the area has conditions that might support 'clearwater' groundwater flooding. This means the site is in an area where groundwater flooding happens in a relatively high proportion of locations mainly from consolidated aquifers (rather than superficial deposits like sand), subject to local conditions. A small portion of the southern part of this site lies in an area of 25 – 50% vulnerability to clearwater flooding, and another small area of 50 to 75% vulnerability to clearwater flooding.</p>
Area of site	25 ha
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	Site is in area defined as Flood zone 3, but not defined as functional floodplain (3b) in the Selby SFRA. The site does not show up as possible functional floodplain based on 1 in 20 flood modelling and would be excluded in any case due to the presence of a flood defence.
Climate change	<p>This site is already almost entirely in Flood Zone 3. Flood events may after 2025 be deeper and more frequent as sea level rise and increased fluvial flood risk begins to take effect. The standard of protection associated with the flood defence is not known (though is clearly at an appropriate level to establish the area behind the flood defence as an 'area benefitting from flood defences'.</p> <p>After 2055 areas of medium risk (1/100 yr) of surface water flooding may become high risk (1/30 yr) and low risk areas may become medium risk.</p>
Sequential Test result	Pass. Although flooding would be a significant problem in

	<p>this area, the site lies adjacent to a flood defence that at least protects the site from present day fluvial / tidal flood risk, though groundwater flooding may still occur. In addition, there are no reasonable alternatives to this existing site.</p>
Exception Test Needed	No
Is there an alternative site?	<p>This site is an existing rail freight terminal that will be safeguarded through the plan. The nearest alternative rail freight terminal that would deal with aggregate minerals is at Great Heck (Plasmor / Tarmac)⁴⁹ around 11 km south and on different lines. This is not seen as a realistic alternative proposition as minerals transport to a more distant terminal would be less economic and the site does not contain the infrastructure needed to replace the uses at the Barlby Road site. It is also desirable from a sustainability perspective to transport minerals by rail.</p>
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	<p>A site specific flood risk assessment will be required should any planning applications come forward at this site. This should address the issues of draining surface water without causing additional flood risk (SUDS may well be desirable). It should also establish the standard of protection of the adjacent flood defence, calculate the specific risk from tidal and fluvial flooding taking account of climate change and include an emergency plan for the site in case of defence overtopping by tidal or fluvial flooding.</p> <p>Groundwater flooding may also be a risk at this site. This should be investigated and suitably mitigated through design of buildings etc.</p> <p><u>All sites in functional flood plain must: remain operational and safe for users in times of flood; result in no net loss of floodplain storage; not impede water flows and not increase flood risk elsewhere.</u></p>

⁴⁹ Yorkshire and Humber Aggregates Working Party, 2009. Annual Report [URL: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6309/1916910.pdf]



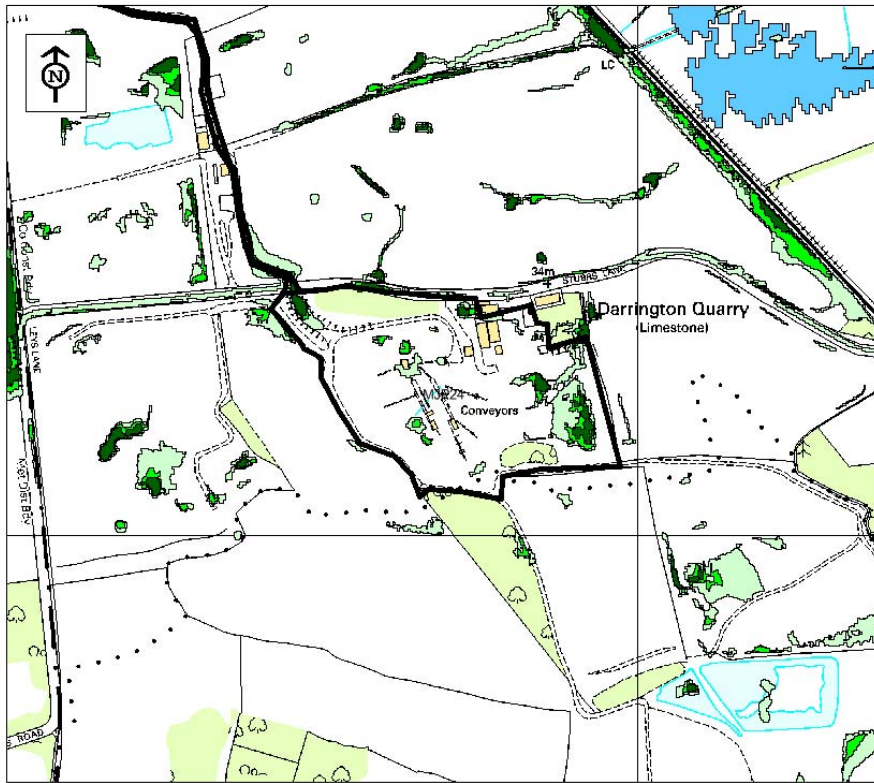
KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- Historic Flood Record
- Historic Flood Map

Reproduced from the Ofsted Survey, mapping, as a condition of the licence of the copyright holder, North Yorkshire County Council. All rights reserved.

Site Reference: MJP24 Darrington Quarry processing plant site and haul road	
Site Information	Proposal is for use of a plant site in NYCC area for processing of Magnesian limestone extracted in Wakefield Council area. Possible restoration: Unknown at present. Extraction in Wakefield area currently permitted until 2028
Proposed Land Use	Retention of plant site and haul road for processing of Magnesian limestone
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>Site is in Flood Zone 1. About 10% of this site is prone to surface water flooding, medium and high risk surface water flooding covers less than 5% of the site. This form of flood risk is spread across the site, though affects the access road in particular.</p> <p>The vast majority of this site lies across one km square where less than 25% of the area has conditions that might support 'clearwater' groundwater flooding. This means the site is in an area where groundwater flooding happens in a minority of locations mainly from consolidated aquifers. A tiny proportion of the access road falls between two km squares with the same groundwater flood susceptibility as the main area of the site.</p> <p>Groundwater levels at the adjacent Darrington East quarry site were considered to be below the proposed base of the restored quarry (13m AOD) in an application submitted in 2003⁵⁰ though no other local data is available through the North Yorkshire planning website.</p>
Area of site	10.4 ha
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	N/a
Climate change	Not applicable as site is vulnerable to surface water flooding which does not increase its risk value until after 2055.
Sequential Test result	Pass – this site is linked to an existing quarry and in Flood Zone 1.
Exception Test Needed	No
Is there an alternative site?	This site is to retain a plant that is tied to an existing quarry. It would be unreasonable to disassociate the plant site from the linked quarry, and to move it elsewhere in the immediate vicinity of the site would only result in an equivalent level of flood risk.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment will be required. This should address the issues of draining surface water without causing additional flood risk (SUDS should be investigated).

⁵⁰ North Yorkshire County Council Planning and Regulatory Affairs Committee. 2003. Proposed northern extension to mineral working and revisions to existing working and restoration proposals as Darrington Quarry, Criddling Stubbs.



KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- ★ Historic Flood Record
- Historic Flood Map

Reproduced from the Ofwat Licence Survey, subject to the permission of the Controller of the Copyright Material Office. © Crown Copyright. Conditioned as to use. Ordnance Survey Licence No. 100017546. North Yorkshire County Council 2019. License No. 10017546

Site Reference: MJP27 Darrington Quarry (recycling)	
Site Information	Proposal for inert waste facility would be on the same site as MJP24. Proposed life of site: At least 2028. Restoration unknown.
Proposed Land Use	Recycling of inert waste
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>Site is in Flood Zone 1. About 10% of this site is prone to surface water flooding. Medium and high risk surface water flooding covers less than 5% of the site. This form of flood risk is spread across the site, though affects the access road in particular.</p> <p>The vast majority of this site lies across one km square where less than 25% of the area has conditions that might support 'clearwater' groundwater flooding. This means the site is in an area where groundwater flooding happens in a minority of locations mainly from consolidated aquifers. A tiny proportion of the access road falls between two km squares with the same groundwater flood susceptibility as the main area of the site.</p> <p>Groundwater levels at the adjacent Darrington East quarry site were considered to be below the proposed base of the restored quarry (13m AOD) in an application submitted in 2003⁵¹ though no other local data is available through the planning record.</p>
Area of site	10.4 ha
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	N/a
Climate change	Not applicable as site is vulnerable to surface water flooding which does not increase its risk value until after 2055.
Sequential Test result	This site is in Flood Zone 1 and other forms of flooding are relatively small scale and manageable. There are no reasonable alternative sites.
Exception Test Needed	No
Is there an alternative site?	Within 10km the only other allocation proposing to recycle inert waste is WJP10. This is at a broadly similar level of flood risk. Of the sites identified in the Plan's evidence base ⁵² , all are over 10km away so are likely to serve different markets to an extent.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment will be required. This should address the issues of draining clean surface water without causing additional flood risk (SUDS should be

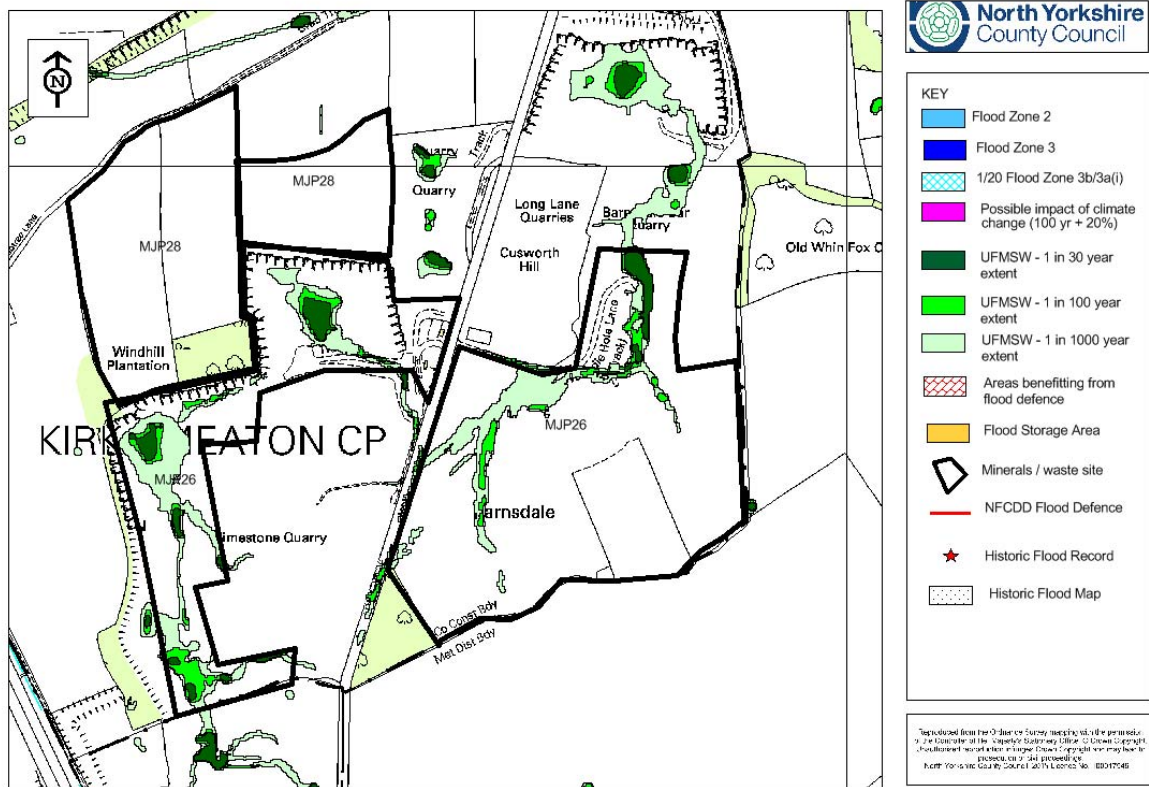
⁵¹ ibid

⁵² These sites were identified in North Yorkshire County Council, North York Moors National Park and City of York Council, 2015. Identification of potential locations for waste management facilities [URL: [http://www.northyorks.gov.uk/media/32597/Identification-of-potential-locations-for-waste-management-facilities-Jul-2015/pdf/Identification_of_potential_locations_for_waste_management_facilities_\(Jul_2015\).pdf](http://www.northyorks.gov.uk/media/32597/Identification-of-potential-locations-for-waste-management-facilities-Jul-2015/pdf/Identification_of_potential_locations_for_waste_management_facilities_(Jul_2015).pdf)]

Site Reference: MJP26 Barnsdale Bar, near Kirk Smeaton (recycling)	
Site Information	Proposal to recycle inert waste on a site where the current uses include a quarry, former landfill site and an inert recycling facility. Possible restoration: unknown at present. The operator is seeking flexibility to locate the recycling facility within the site in order that it is close to areas undergoing restoration at the time. Proposed life of site is throughout plan period.
Proposed Land Use	Recycling of inert waste to produce secondary aggregate.
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>Site is in Flood Zone 1. Western part of site is prone to surface water flooding though only around 10 to 15 per cent of this is medium risk or higher. A much smaller proportion of the eastern site suffers from any level of surface water flood risk with less than 5% at medium to high risk of surface water flooding. Changing quarry contours may mean that the positioning of surface water flooding varies considerably from the Environment Agency maps. No historic flooding is noted.</p> <p>This site lies across two km squares where less than 25% of the area has conditions that might support 'clearwater' groundwater flooding. This means the site is in an area where groundwater flooding happens in a minority of locations mainly from consolidated aquifers.</p> <p>According to a recent hydrological assessment for an adjacent part of the quarry, mineral workings in the past have been maintained approximately 2 m above the maximum recorded groundwater levels. However there is a north east gradient, with the highest levels being recorded at the north east of this site (though in this site at least groundwater has remained unaffected by quarrying)⁵³.</p>
Area of site	45.6 ha
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	N/a
Climate change	It is unclear if this operation would operate beyond the plan period. In terms of the plan period, the surface water flooding which may occur would not be significantly affected by climate change.
Sequential Test result	Pass. Although there may be some surface water flood risk, the site is 'less vulnerable' and there are no reasonable alternative sites.
Exception Test Needed	No
Is there an alternative site?	This site submission is for permission to move a recycling

⁵³ FCC Environment, 2014. Proposed Extension of Barnsdale Bar Quarry: Hydrological and Hydrogeological Assessment [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=9532>]

	<p>plant around the quarry site close to areas being restored. As this is at least in part for the purpose of facilitating restoration it would be unreasonable to perform this operation at a different site.</p>
<p>Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk</p>	<p>A site specific flood risk assessment will be required. This should address the issues of draining clean surface water without causing additional flood risk.</p>

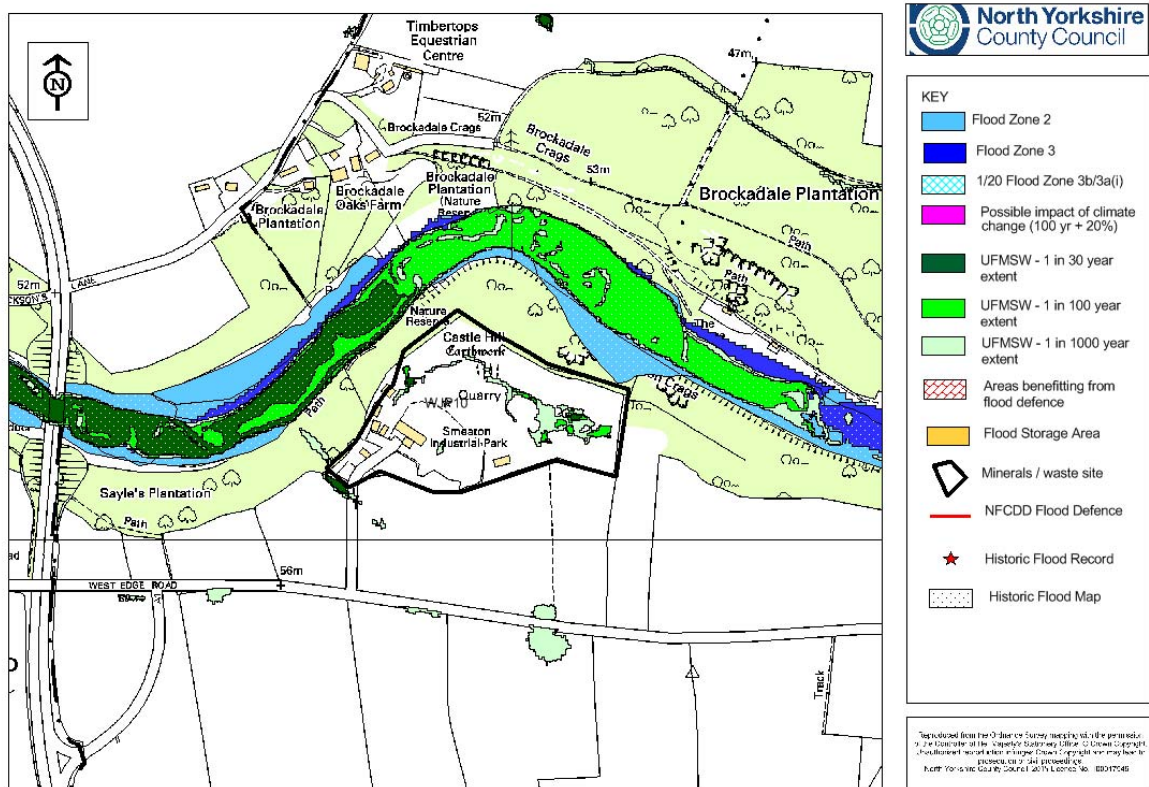


Site Reference: WJP10 Went Edge Quarry recycling, near Kirk Smeaton	
Site Information	<p>This proposed recycling plant is part of existing quarry.</p> <p>Restoration: A long-term restoration showing relocation of the industrial estate (which would require planning permission) to quarry floor with remainder of quarry floor to be restored to limestone grassland / trees. Proposed life of site is permanent.</p>
Proposed Land Use	Recycling of construction and demolition waste for secondary aggregate
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>This site is in Flood Zone 1. It is affected by small patches of surface water flooding across the site (mostly low risk, very small area of high risk).</p> <p>This site lies across two km squares where less than 25% of the area has conditions that might support 'clearwater' groundwater flooding. This means the site is in an area where groundwater flooding happens in a minority of locations mainly from consolidated aquifers.</p> <p>A 2006 Committee Report for a planning application for extraction at this site referred to the Environment Agency's confirmation that the water table was significantly below the base of the site⁵⁴. More recently, according to a recent 2014 planning application for another part of the quarry immediately adjacent to the south, the quarry floor, at 20m AOD, is still 6 metres above the water table measured at its highest point (14m AOD)⁵⁵.</p>
Area of site	Not specified
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	No
Climate change	Assuming the industrial estate will still be in place in 2055 surface water flooding may increase under climate change, with low risk flooding assumed to be medium risk, and medium risk flooding assumed to be high risk.
Sequential Test result	This site is in Flood Zone 1 and at very low risk of surface water flooding. Site MJP27 has been considered as a potential alternative and found to be at a broadly similar level of flood risk. Pass.
Exception Test Needed	No
Is there an alternative site?	Site MJP27 has been considered as a potential alternative

⁵⁴ North Yorkshire County Council, 2006. Planning and Regulatory Affairs Committee 29 August 2006: Proposed extraction of limestone from areas 1 and 2 to stabilise the quarry face at Went Edge Quarry, Kirk Smeaton by Meakin Properties.

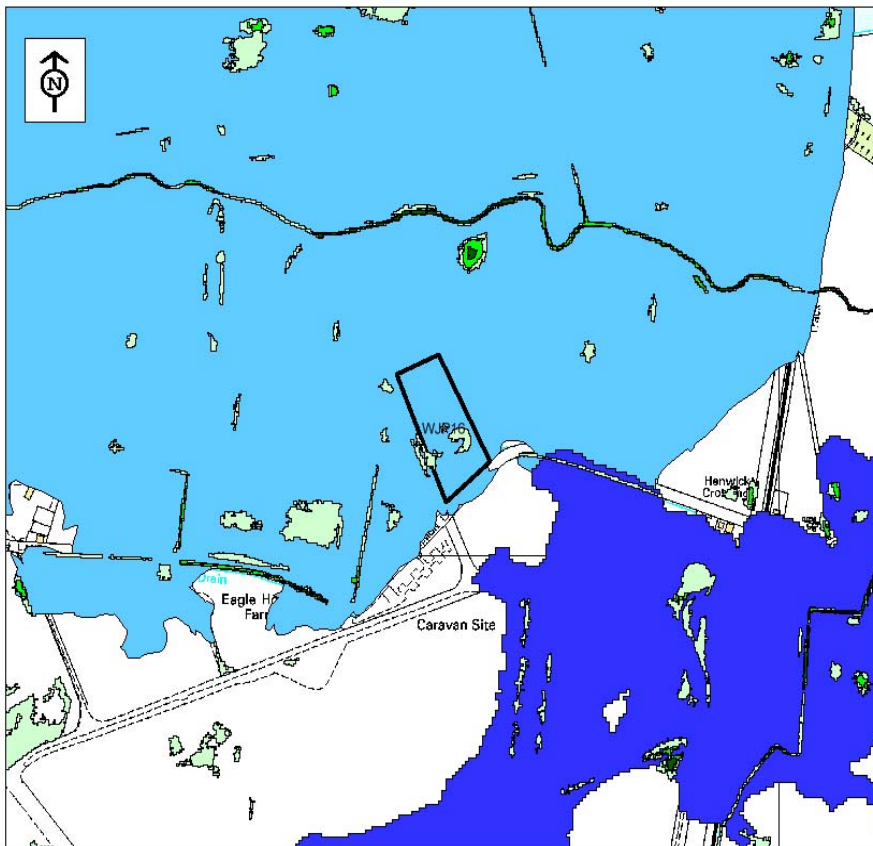
⁵⁵ Cromwell Mining Consultants. 2014. Environmental Statement. Went Edge Area 4 [URL: <https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=9255>]

	<p>and found to be at a broadly similar level of flood risk. Of the sites identified in the Plan's evidence base⁵⁶, all are over 10km away so are likely to serve different markets to an extent.</p> <p>There are no other proposals to place an industrial estate in a quarry within 10km.</p>
<p>Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk</p>	<p>A site specific flood risk assessment will be required. This should address the issues of draining clean surface water without causing additional flood risk. SUDS could be used for draining / storing clean (non-foul) water. SUDS would integrate well with the wider restoration to biodiversity.</p>













⁵⁶ See in North Yorkshire County Council, North York Moors National Park and City of York Council, 2015.

Site Reference: WJP16: Common Lane Burn	
Site Information	This transfer facility is on a former airfield and is adjacent to an existing waste recycling operation. It has a proposed life of 15 to 20 years.
Proposed Land Use	Bulking and transfer of municipal and commercial waste.
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<p>Around 90 per cent of this site is in Flood Zone 2. The remainder of the site is in Flood Zone 1. There are also very small patches of surface water flooding (mostly low risk, negligible medium risk). No historic flood risk is noted.</p> <p>This site lies in one km square where less than 25% of the area has conditions that might support 'clearwater' groundwater flooding. This means the site is in an area where groundwater flooding happens in a minority of locations mainly from consolidated aquifers.</p>
Area of site	1.42 ha
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	N/a
Climate change	No climate change modelling is available, however, the SFRA methodology assumes that after 2025 Flood Zone 2 should be considered as Flood Zone 3. However, given that this site is at the outer edge of Flood Zone 2 this is thought to be very precautionary (so further work will be need to establish flood risk under climate change through a site specific FRA).
Sequential Test result	Pass. Although this site is in Flood Zone 2, it is less vulnerable and there are no alternative sites.
Exception Test Needed	No
Is there an alternative site?	A need for a transfer station to serve the Selby area has been identified in the Plan. No further transfer stations have been submitted within 10km.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment will be required. This should address the issues of draining clean surface water without causing additional flood risk. SUDS could be used for draining / storing clean (non-foul) water.



KEY

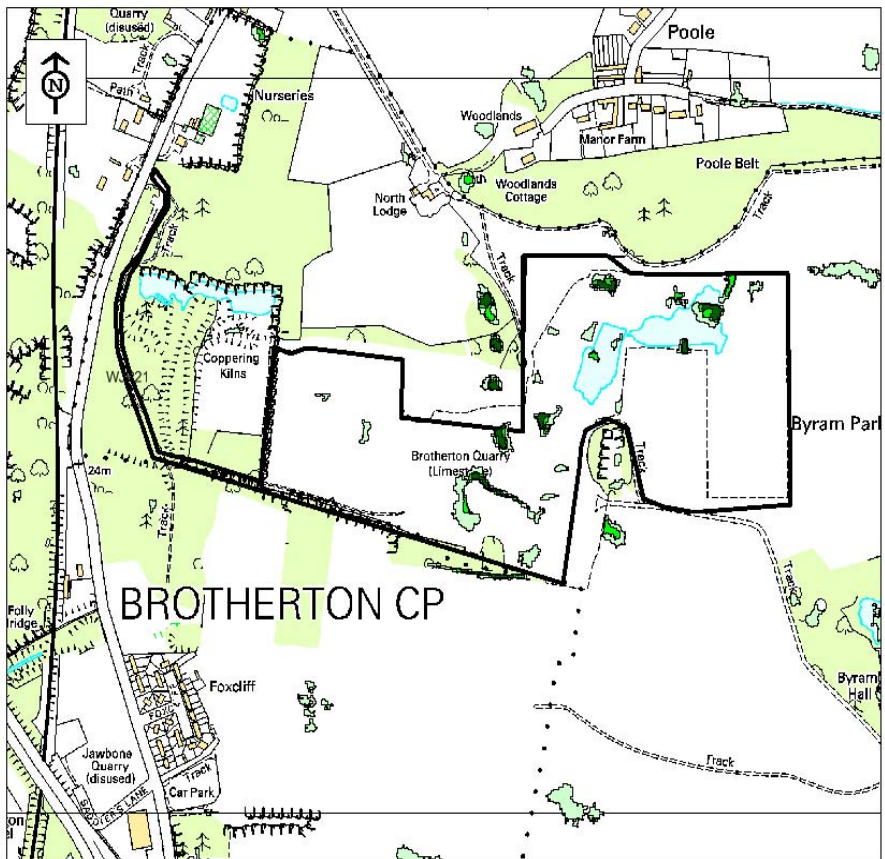
	Flood Zone 2
	Flood Zone 3
	1/20 Flood Zone 3b/3a(i)
	Possible impact of climate change (100 yr + 20%)
	UFMSW - 1 in 30 year extent
	UFMSW - 1 in 100 year extent
	UFMSW - 1 in 1000 year extent
	Areas benefiting from flood defence
	Flood Storage Area
	Minerals / waste site
	NFCCD Flood Defence
	Historic Flood Record
	Historic Flood Map

Topographic data from the Ordnance Survey mapping is used in accordance with the Ordnance Survey Licence. All other copyright information is the property of the North Yorkshire County Council. All other copyright information is the property of the North Yorkshire County Council. All other copyright information is the property of the North Yorkshire County Council. All other copyright information is the property of the North Yorkshire County Council.

Site Reference: WJP06 Land adjacent to former Escrick brickworks, Escrick	
Site Information	This site is proposed as new landfill for restoration following proposed extraction of clay (MJP55). Possible restoration: Agriculture at original ground levels. Proposed life of site is 21.5 years.
Proposed Land Use	Landfill of inert waste for restoration of proposed clay extraction site
NPPF Vulnerability Classification	More vulnerable
Overview of flooding	<p>About a third of this site lies in Flood Zone 2, while smaller areas (around 10%) are prone to mainly low risk surface water flooding (less than 2% high probability). The rest of this site lies in Flood Zone 1. There are no historic flooding records.</p> <p>The southern part of this site lies within a series of three 1 km squares where more than 75% of their area has conditions which support 'clearwater' flooding. Although this is a higher risk area, flooding occurs mainly from consolidated aquifers (rather than superficial deposits like clay). The northern part of the site lies within 2 km squares where the proportion of the area which may support 'clear water' flooding is less than 25%.</p> <p>As a former clay site in a clear water flooding area the site's vulnerability to groundwater flow is likely to be negligible⁵⁷. Therefore groundwater flooding is unlikely to cause any significant problems.</p>
Area of site	59 ha
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	N/a
Climate change	<p>No 1 in 20 modelling is available, however, the SFRA methodology assumes that after 2025 Flood Zone 2 should be considered as Flood Zone 3 in areas where there is no 1 in 20 modelling data.</p> <p>However, present day Flood Zone 3 in the vicinity of the site is shown as being contained within an area benefiting from a flood defence with a design standard of 1 in 25 year flooding. Given that the Flood Zones in this area are at the upper reaches of the potentially flooded area and away from the main river climate change effects on Flood Risk at this site seem unlikely during the lifetime of the site.</p> <p>Surface water flooding would also be more severe under climate change, but this is unlikely to affect this site as in this SFRA methodology its effect would be seen after 2055.</p>
Sequential Test result	Assuming that climate change has no medium term impact

⁵⁷ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/290396/sp2-173-tr-2-e-e.pdf

Site Reference: WJP21 Brotherton Quarry, Burton Salmon	
Site Information	This proposal would extend the area of proposed import of materials for restoration to include the western part of the Brotherton Quarry site. Potential need for circa 400,000 tonnes of inert material in total to restore the site. Restoration to agriculture. Proposed life of site is unknown at present.
Proposed Land Use	Import of inert waste for restoration purposes
NPPF Vulnerability Classification	More vulnerable
Overview of flooding	<p>Site is in Flood Zone 1. A few small patches of high risk surface water flooding affect less than 2% of the site. Slightly larger areas of medium and low risk surface water flooding are also found. In total surface water flooding affects around 5% of the site. There are no historic flooding record for this site.</p> <p>More than half of the site lies in one km square where less than 25% of the area has conditions that might support 'clearwater' groundwater flooding. This means the site is in an area where groundwater flooding happens in a minority of locations mainly from consolidated aquifers.</p>
Area of site	20.5 ha
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	N/a
Climate change	Should this site last beyond 2055 medium (1/100yr) risk surface water flooding should be considered high risk, and low risk should be considered medium risk.
Sequential Test result	Pass. There are no reasonable alternatives to this site as it is proposed for the purpose of restoring an extant site. It lies in an area of relatively low flood risk from all types of flooding.
Exception Test Needed	N/a
Is there an alternative site?	As the filling of this site is required for restoration purposes it would be unreasonable to seek an alternative site elsewhere.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment will be required. This should address the issues of draining clean surface water without causing additional flood risk. Foul water will need to be dealt with via an environmental permit.

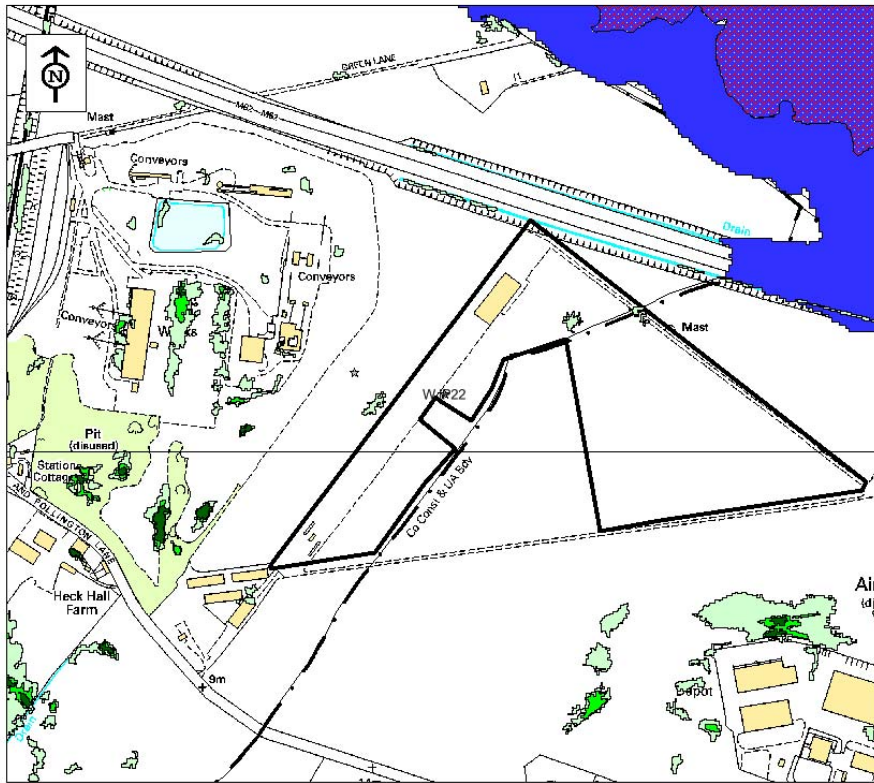


KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCCD Flood Defence
- Historic Flood Record
- Historic Flood Map

Reproduced from the © Bluewin Survey, keeping all the provisions of the licence with the exception of the following: Copyright. Fundamental records which are in the public domain may be reproduced in any form without charge. North Yorkshire County Council 2017. Licence No. 00017246

Site Reference: WJP22 Land on former Pollington Airfield	
Site Information	This site currently includes a processing plant to create wood biomass fuel (current), a processing plant to create waste wood pellets and a current biomass energy plant (with permission, but yet to be built). This proposal crosses the county boundary. Planning proposal may also include installation of solar panels with a capacity of approximately 5MW. Propose life of site is until approximately 2040.
Proposed Land Use	-Import of wood for wood pellet production -Modification to biomass plant permission (reduction to throughput and output) -Additional infrastructure associated with wood processing
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	Site is in Flood Zone 1. 2 very small areas of low risk (1/1000yr) surface water flooding affects this site (circa 1% of site). The northern part of this site lies in one km square where less than 25% of the area has conditions that might support 'clearwater' groundwater flooding. This means the site is in an area where groundwater flooding happens in a minority of locations mainly from consolidated aquifers. The site will mostly consist of surface development, so groundwater flooding shouldn't be a significant issue.
Area of site	27.83
Relevant Local SFRA	Selby
Local Functional Floodplain or 1 in 20/25 flood risk	N/a
Climate change	N/a
Sequential Test result	Pass
Exception Test Needed	No
Is there an alternative site?	Site is in Flood Zone 1 and surface water flooding is negligible. There are no alternative wood biomass plants within 10 km in the Plan Area.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment will be required. This should address the issues of draining clean surface water without causing additional flood risk. Foul water will need to be dealt with via an environmental permit.



KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- ★ Historic Flood Record
- Historic Flood Map

Reproduced from the Office for Survey, Mapping and the provision of the County of the Capital Survey Office. © Crown Copyright. All rights reserved. No part of this publication may be reproduced without the prior written permission of the Controller of Her Majesty's Stationery Office. ISBN 978-0-11-810705-6

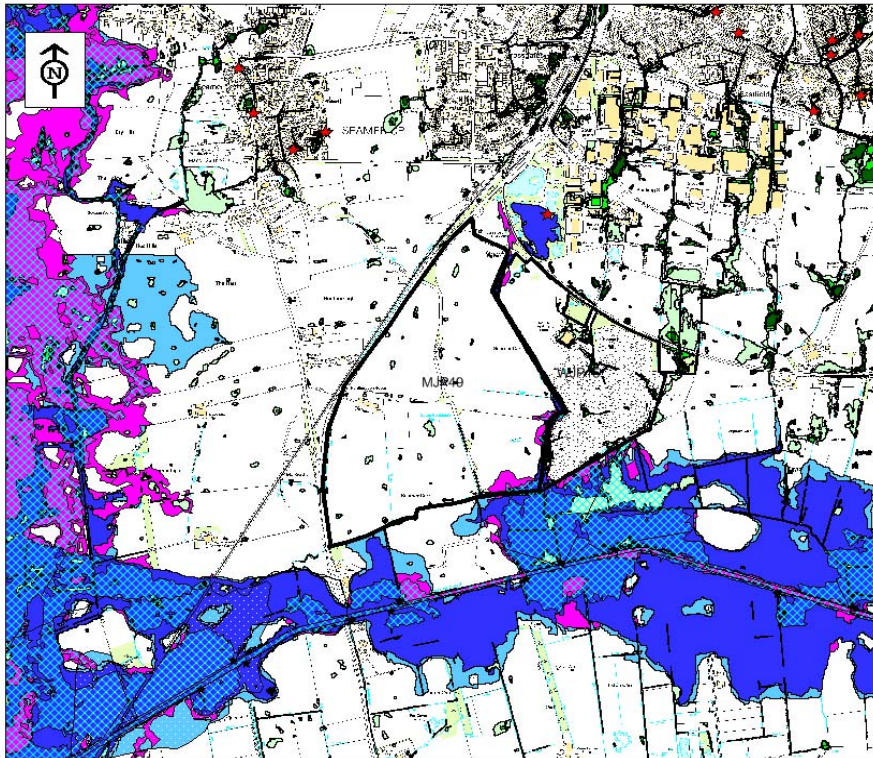
9. Scarborough Sites

Key to Sequential Test Results		
Pass	Pass subject to further consideration of the site's contribution to the supply of minerals.	Site is not suitable or would require an Exception Test demonstrated through a Level 2 SFRA to proceed.

Site Reference: MJP49 Metes Lane, Seamer	
Site Information	Extraction of sand and gravel from a new extraction site. Estimated start date: 2018. Proposed life of site: 20-25 years. Restoration to some form of agriculture.
Proposed Land Use	Extraction of sand and gravel
NPPF Vulnerability Classification	Water compatible
Overview of flooding	<p>Mainly Flood Zone 1. Very small area (<2%) Flood Zone 3 is present in the south east corner. This area broadly coincides with a modelled area of 1 in 20 fluvial flood risk. A very small area of Flood Zone 2 borders the area of Flood Zone 3.</p> <p>Mostly low risk surface water flooding exists in small patches across the site (though of course its distribution would change during extraction) covering <2% of the area and never rising above medium (1/100) risk.</p> <p>The site lies across 7 different kilometre squares in the Environment Agency's 'Areas Susceptible to Groundwater Flooding' map. Four of these squares show that conditions that support superficial deposit flooding can be found in those squares (susceptibility rates vary from less than 25% to 75% or more of the area of each square) while one square (north eastern part of the site) shows that 'clearwater' and superficial deposit flooding may be supported. 2 squares hold no data.</p>
Area of site	107.8 ha
Relevant Local SFRA	North East Yorkshire SFRA
Local Functional Floodplain or 1 in 20/25 flood risk	The North East Yorkshire SFRA defines functional floodplain as "all areas within Flood Zone 3 which are located outside of currently developed sites and are not defended to a proven standard of protection of at least 5%. This includes all floodplain areas behind agricultural flood banks". This would mean the area of the map currently shown as Flood Zone 3 should be considered as functional floodplain, with the area of 1 in 20 modelled fluvial flood risk also considered

	as potential functional floodplain.
Climate change	After 2025 the small area labelled as 'possible impact of climate change' (on the map below) that borders the area of Flood Zone 3 should be considered as Flood Zone 3. The site will not remain operational for long enough for surface water flooding to be affected by climate change (at least under the methodology presented in this SFRA).
Sequential Test result	Pass. This site is water compatible.
Exception Test Needed	No.
Is there an alternative site?	There are no alternative proposed sand and gravel sites within the 10km area of search around this site.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment should further investigate the risk of groundwater flooding and should consider the potential for managing surface water through the use of SUDS. The management of drainage at the site must not increase drainage elsewhere. If the area of functional floodplain is extracted adequate then the flood risk assessment must consider that <u>all sites in functional flood plain must: remain operational and safe for users in times of flood; result in no net loss of floodplain storage; not impede water flows and not increase flood risk elsewhere.</u>

	<p>rising to high (1/30) risk.</p> <p>Site lies across 2 different kilometre squares in the Environment Agency's 'Areas Susceptible to Groundwater Flooding' map. The northern part is susceptible to clearwater and superficial deposits (50 to 75% of square is susceptible) flooding. The southern part is subject to superficial deposits flooding (<25% of square is susceptible).</p>
Area of site	35.12 ha
Relevant Local SFRA	North East Yorkshire SFRA.
Local Functional Floodplain or 1 in 20/25 flood risk	The North East Yorkshire SFRA defines functional floodplain as "all areas within Flood Zone 3 which are located outside of currently developed sites and are not defended to a proven standard of protection of at least 5%. This includes all floodplain areas behind agricultural flood banks". This would mean the area of the map currently shown as Flood Zone 3 should be considered as functional floodplain, with the area of 1 in 20 modelled fluvial flood risk (that affects a tiny corner of the site) also considered as potential functional floodplain.
Climate change	After 2025 the small area labelled as 'possible impact of climate change' (on the map below) that borders the area of Flood Zone 3 should be considered as Flood Zone 3. The site will not remain operational for long enough for surface water flooding to be affected by climate change (at least under the methodology presented in this SFRA).
Sequential Test result	Pass
Exception Test Needed	No
Is there an alternative site?	The evidence base to the Joint Plan has identified 2 potential alternative waste management locations in Scarborough (SCAR 17 and SCAR25). SCAR 17 has a broadly similar level of flood risk (if the southwest corner of WJP15 is not considered) but is a much smaller site in a location distant from the A64 (important for transfer) while SCAR 25 can also be discounted as an alternative for the same reasons, notwithstanding the fact that this is a retained site (so moving the location of the site may incur considerable risk that the range of facilities at the site could not be replaced).
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	Waste management facilities should not be located in the areas of functional floodplain / potential functional floodplain unless the site specific flood risk assessment can demonstrate that they are not in the functional floodplain. A site specific flood risk assessment should further investigate the risk of groundwater flooding and should consider the potential for managing surface water through the use of SUDS. The management of drainage at the site must not increase drainage elsewhere.



KEY

- Flood Zone 2
- Flood Zone 3
- 1/20 Flood Zone 3b/3a(i)
- Possible impact of climate change (100 yr + 20%)
- UFMSW - 1 in 30 year extent
- UFMSW - 1 in 100 year extent
- UFMSW - 1 in 1000 year extent
- Areas benefiting from flood defence
- Flood Storage Area
- Minerals / waste site
- NFCDD Flood Defence
- Historic Flood Record
- Historic Flood Map

Reproduced from the 0.5m scale Survey map by 1:10,000 scale, as prepared by the Ordnance Survey, under the Ordnance Survey Act 2003. Copyright Ordnance Survey. All rights reserved. Ordnance Survey is a registered trademark of Ordnance Survey. North Yorkshire County Council 2017. Licence No. 03017046

Contact us

Minerals and Waste Joint Plan Team Planning Services, North Yorkshire County Council, County Hall, Northallerton, North Yorkshire, DL7 8AH

Tel: **01609 780780**

Email: **mwjointplan@northyorks.gov.uk**