Minerals and Waste Joint Plan

Sustainability Appraisal
Strategic Flood Risk Assessment
Volume I - Data Review Document
Volume II - Sequential Test Results

October 2016

Strategic Flood Risk Assessment (Level 1)

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

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

Contents

1. Introduction

Flooding is a regular occurrence in the United Kingdom and across 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 (NPPF) 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 SFRA 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 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 determine where flood risk is and what the associated level of that risk is. The SFRA is then used to inform the Sequential Test and a sequential approach to the allocation of development. The Sequential Test and sequential approach 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 Test[2].

This means that a SFRA 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 SFRA process.

However, the Environment Agency (EA) 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 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.

It should be noted that the district / unitary authority level SFRAs will be superseded when any new versions of these documents are published.

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

- Comments were raised about a new SFRA covering the whole Joint Plan as it would introduce multiple sources of data which may be confusing or contradictory and would be inefficient as it may duplicate work already done. The Agency felt that as minerals and waste sites are not particularly sensitive to flooding the existing district tier SFRAs should be used as the starting point, and that the current SFRA should address gaps;
- 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 paragraph 100 and 102 of the NPPF the Inspector suggested that all allocations which must be subject to the Exception Test 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 SFRAs consider fluvial flooding though consideration of other forms of flooding is variable;
- Applicability of Sustainable Drainage Systems (SuDS) – some assessments vary in their approach to this.

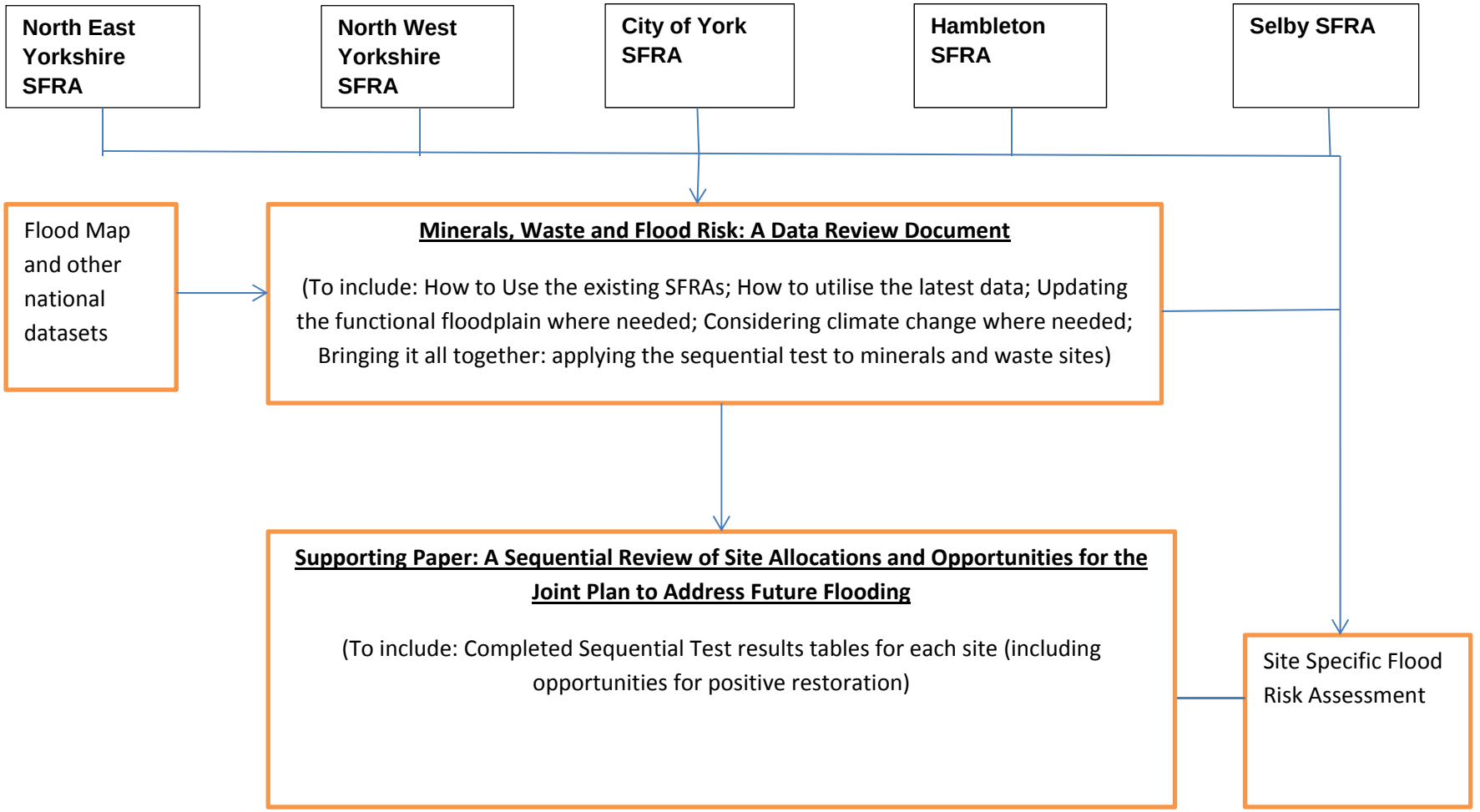
Any divergence from current guidance on SFRA is inevitable, given that many SFRAs pre-date the NPPF and the latest EA mapping.

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 SFRAs.

2.2.1 Aligning the SFRA Approach with Environment Agency Suggestions

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

Figure 1: The Structure of this SFRA



This new structure for the SFRA attempts to bring together the results of existing local SFRAs 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 SFRAs by enabling the utilisation of up to date data and, where necessary, providing a methodological bridge between some of the older SFRAs 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 SFRAs

As stated above, this SFRA 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 SFRAs to inform District level planning (including employment and housing sites). Similarly the City of York has its own SFRA, and the North York Moors National Park is covered by district / local authority level SFRAs covering its area.

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

The following sections are correct at the time of writing this SFRA, however, we understand that Craven, Harrogate and Hambleton have recently commissioned new SFRA work to inform their Local Plans. As this SFRA is informed by the District SFRAs we will further review this SFRA and evidence data when the District SFRAs are updated.

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 theses urban centres'.

In addition to mapping Flood Zones 2 and 3a, the study maps the functional floodplain (Flood Zone 3b) using flood outlines for the 1:25 (4%) or greater chance of happening each year provided by the Environment Agency (excluding developed and defended areas). In addition an extension to the functional floodplain 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 EAs comment in general is that: *"Where available, the 1:20 (5%) modelled level should be used to delineate functional floodplain. The 1:25 (4%) modelled level is used to infer the location of functional floodplain when the 1:20 (5%) modelled level is not available. A further site specific flood risk assessment will then be required if a site affected by the 1:25 (4%) modelled level is to be brought forward to determine the actual level of risk."*
The SFRA includes strategic maps of selected areas for the following types of flood risk:

- PPS25 Flood Zones;
- 1 in 100 (1%) event flood depths;
- 1 in 100 (1%) event flood hazards;
- Climate change sensitivity;
- Flood risk management;
- Refined surface water flooding;
- Historical Flooding.

The North West Yorkshire SFRA also proposes seven 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 North East Yorkshire Strategic Flood Risk Assessment

The North East Yorkshire SFRA 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. It should be noted that the Critical Drainage Areas cited in the North East Yorkshire SFRA are not formally Critical Drainage Areas for the purposes set out in the NPPF or the Development Management Procedure Order.

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 are currently updating their SFRA. In particular, the EA would urge caution about the use of their existing functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding.

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/transporteconom_/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 (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 SFRAs as well as their common elements.

Table 1: Review of local level SFRAs

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	2011/NPPF	2006 / PPG25. 2009 update reviewed some key settlements in relation to a newer iteration of the flood map.	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.	Yes – 2, 3, 3b (functional floodplain) / Rapid Inundation Zones	Flood Zones 2 and 3. Flood Zone 3 is defined as being made up of 3 types of land, including functional floodplain and undeveloped areas.	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].	Analysis done for settlements using local topography.	Uses river modelling studies with a +20% adjustment for climate change from rivers. Climate change also considered for 1 in 200 (0.5%) surface water risk.	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.

[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'.

Areas at risk of other sources of flooding, such as surface water or reservoirs.	Yes, but do not use contemporary definitions (areas susceptible to surface water flooding, groundwater flooding, sewer flooding).	Sophisticated approach. Consider both surface water and sewer flooding by using bespoke JFLOW modelling.	Groundwater and overland flow recommended for FRA.	Flooding on ordinary watercourses / sewers noted based on historical data. Useful consideration of high water tables for groundwater flood risk.	Rely on historic flooding and sewer flooding records, though FRAs are 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.

[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 2 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 Type	Key Causes
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 '*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'*.[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 Type	Key Causes
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 for Planning is produced and regularly updated by the EA. It combines detailed local data with information from a national model of England and Wales. The Flood Map for Planning shows the following:

"*Flooding from rivers or sea without defences - the natural floodplain 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 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".[8]

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 for Planning 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".

[8] Environment Agency, 2016, Flood Map for Planning *http://apps.environment-agency.gov.uk/wiyby/37837.aspx*

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 UNDERTAKING THE SEQUENTIAL TEST.

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 initial 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 (checked for fluvial flooding)	MapInfo file	North Yorkshire County Council LFRMS
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 EA 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 each 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."[9]

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

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

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

Low – the chance of flooding in each 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

In our assessment data was provided to us at 3 levels: 1 in 30 (3.3%) risk, 1 in 100 (1%) risk and 1 in 1000 (0.1%) 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).

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

Table 4: 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. [10]

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

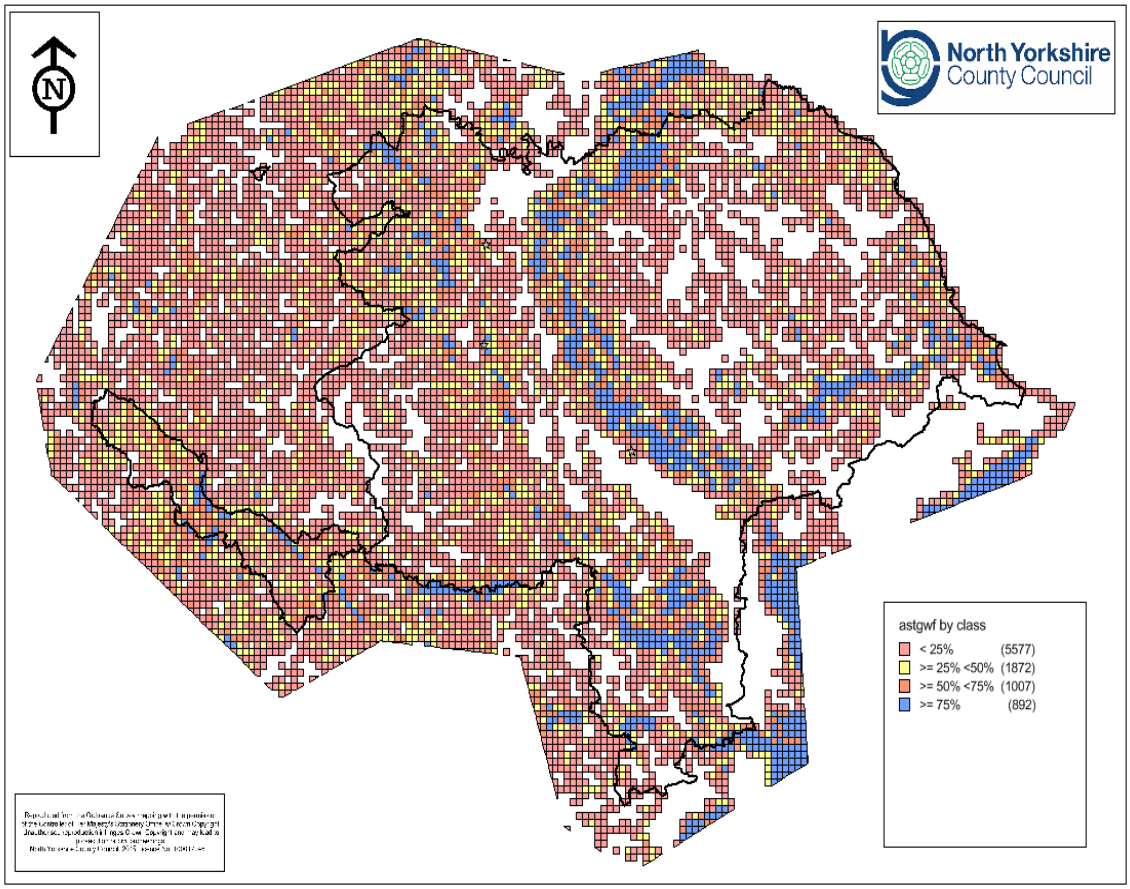
[10] Sunderland City Council, 2010. Strategic Flood Risk Assessment 2010: Volume 1 Guidance

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. 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.

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 clearwater[11] flooding and small areas which are prone to flooding because they lie on superficial permeable deposits[12]. 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 possible[13].

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 1925[14]. 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 2008[15]. 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).

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

[12] 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]

[13] 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]

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

[15] 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 (also referred to as Flood Zone 3b) comprises land where water has to flow or be stored in times of flood. According to the Guidance:

"This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency."."[16]

The definition of Flood Zone 3b above explains that local planning authorities should identify areas of functional floodplain in their SFRAs in discussion with the EA and the lead local flood authority. 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, either naturally or as part of a flood storage area, should provide a starting point for consideration and discussions to identify the functional floodplain.

A functional floodplain is a very important planning tool in making space for flood waters when flooding occurs. Generally, development should be directed away from these areas using the EA's catchment flood management plans, shoreline management plans and local flood risk management strategies produced by lead local flood authorities.

The area identified as functional floodplain should take into account the effects of defences and other flood risk management infrastructure. Areas which would naturally flood, but which are prevented from doing so by existing defences and infrastructure or solid buildings, will not normally be identified as functional floodplain. If an area is intended to flood, e.g. an upstream flood storage area designed to protect communities further downstream, then this should be safeguarded from development and identified as functional floodplain, even though it might not flood very often.

Across the plan area local level SFRAs take a very varied approach to mapping the functional floodplain. 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 (4%) flood risk modelling.

Table 7 summarises the different approaches taken by local level SFRAs.

[16] Department for Community Local Government, 2015.

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 functional floodplain.	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 (5%) flood risk data which would allow a methodology consistent with current planning practice to be developed.

We have therefore taken the following tiered approach:

1. In areas where functional floodplain has been defined in a local SFRA we have utilised the mapped data or definition in that SFRA to define functional floodplain. The mapped data in some areas takes a very precautionary nature and therefore has been applied with this in mind.

2. In areas where 1 in 20 (5%) flood risk data is available to the authors of this report this is used as the basis for defining the functional floodplain. We have also referred to this as initial functional floodplain in our strategic review of minerals and waste sites. However, a more detailed mapping exercise would be required to fully delineate functional floodplain in such areas to remove small scale features that are not functional, in line with the definition presented in this SFRA.

While 1 in 20 (5%) data can provide the starting point for functional floodplain, further data can be applied to add or remove areas from the functional floodplain to make it more accurate. The definition of functional floodplain and its' allocation only refers to fluvial flooding. However, other sources and forms of flooding also need to be considered, with an appropriate weight applied to them based on the level of risk inferred. Table 8 shows the data that we have collected to help define the functional floodplain.

Table 8: Data used to help 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 (5%) flood where available)	Environment Agency	1 in 20 (5%) risk
Modelled Outline (1 in 25 (4%) flood where available)	Environment Agency	1 in 25 (4%) 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

*Historic records of flooding are not necessarily an indication of functional floodplain. However, the frequency of historic flooding should be used to help delineate the functional floodplain.

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

Functional Floodplain = IF three or more historic flood records[17] 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 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 the 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 the functional floodplain in our sequential testing of minerals and waste sites in this SFRA, where the Exception Test is needed it may be necessary to consider the need to extend the scope of the SFRA to a Level 2 in accordance with the NPPF.

[17] 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).

Specific flood risk assessment for sites that are 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'[18], 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 functional floodplain areas should be considered further and confirmed as functional floodplain in site specific Flood Risk Assessments.

In some cases the functional floodplain area overlaps existing developed areas. While these are excluded from the definition of Flood Zone 3b, they can be described at a site level as flood zone 3a(i). Flood Zone 3a(i) can be defined as developed land within Flood Zone 3b where water would flow or be stored in times of flooding if not already constrained by development or infrastructure. Identification of 3a(i) allows the council to assess risk within Flood Zone 3a in more detail showing areas where existing development or infrastructure is likely to be restricting flood flows and water storage that would otherwise be within the functional floodplain. Should any potential development sites in Flood Zone 3a(i) become available for new or further development (e.g. brownfield sites) then both the risk at the sites and their role in managing flood risk in the surrounding area should be carefully considered in line with Local Plan policies. Flood Zone 3a(i) includes the areas of land that would be in Flood Zone 3b if not already developed and should therefore be used as an indicator of flood risk, from a modelled 1 in 20 (5%) / 25 (4%) event, to existing developed sites.

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.

[18] Maintained and functional defences are listed within the NFCDD database

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 locations"[19].

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.

[19] 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 undertaken a qualitative approach based on assessment of application of EA climate change guidance to Flood Zones 2 (1:1000 (0.1%)) and 3 (1:100 (1%)) and 1:20 (5%) event outlines provided by the EA. The EA guidance (published in February 2016) on climate change for the Plan Area is for the Humber River Basin Management Plan (RBMP) area, in which the Plan Area lies.

Table 10: Environment Agency climate change guidance for the Humber RBMP

River basin district	Allowance category	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Humber	Upper end	20%	30%	50%
	Higher central	15%	20%	30%
	Central	10%	15%	20%

The EA have supplied the Joint Plan Authorities with a broad scale modelled outline of the 1 in 20 (5%), 1 in 100 (1%) and 1 in 1000 (0.1%) flood events that have been qualitatively assessed with consideration to the above climate change guidance for up to 2115. The qualitative assessment considered the present day Flood Zone for each site and the potential for that site to change Flood Zone based on climate change and local influences such as topography and proximity to subsequent Flood Zone extents. This data takes into account tidal as well as river flooding (however, coastal flooding is not considered based on advice from the EA due to the fact that sites will predominantly not be placed at coastal locations).

The appropriate allowance for climate change will depend on the vulnerability and predicted lifetime of the development being considered. EA guidance on use of appropriate allowance is provided in Table 11.

Table 11: Environment Agency guidance on use of climate change allowances

In flood zone 2

- essential infrastructure – use the higher central and upper end to assess a range of allowances
- highly vulnerable – use the higher central and upper end to assess a range of allowances
- more vulnerable – use the central and higher central to assess a range of allowances
- less vulnerable – use the central allowance
- water compatible – use none of the allowances

In flood zone 3a

- essential infrastructure – use the upper end allowance
- highly vulnerable – development should not be permitted
- more vulnerable – use the higher central and upper end to assess a range of allowances
- less vulnerable – use the central and higher central to assess a range of allowances
- water compatible – use the central allowance

In flood zone 3b

- essential infrastructure – use the upper end allowance
- highly vulnerable – development should not be permitted
- more vulnerable – development should not be permitted
- less vulnerable – development should not be permitted
- water compatible – use the central allowance

If (exceptionally) development is considered appropriate when not in accordance with flood zone vulnerability categories, then it would be appropriate to use the upper end allowance.

5.2 Climate Change Effects on Surface Water

Local level SFRAs give very limited consideration to the effects of climate change on surface water[20]. 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 EA 'climate change allowances for planners' guidance to support the NPPF[21] gives an indication of the possible effects of climate change, stating that recommended national precautionary sensitivity ranges for peak rainfall intensity will rise by:

- Between +5% to 10% between 2015 and 2039;
- Between +10% to 20% between 2040 and 2069;
- Between +20% to 40% between 2070 and 2115.

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

[21] Environment Agency (2016) Climate Change Allowances for Planners - Guidance to support the National Planning Policy Framework. Available at: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.

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 (3.3%) (high risk), >1 in 100 (1%) (medium risk) and 100 to >1000 (0.1%) (low risk) level up to 2039 should be taken to occur at the stated rate;

-Flooding at a >1 in 100 to >1 in 1000 (0.1%) level (low risk) should be considered to occur at a >1 in 100 (1%) (medium risk) rate and >1 in 100 (1%) (medium risk) should be considered as being >1 in 30 (3.3%) (high risk) level after 2039.

As with flood risk from rivers and the sea, the appropriate allowance for climate change will be applied depending on the predicted lifetime of the development being considered. For flood risk assessments and strategic flood risk assessments the EA advise that both the central and upper end allowances should be assessed to understand the range of impact.

Table 12: Environment Agency guidance on peak rainfall intensity allowances

Applies across all of England	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Upper end	10%	20%	40%
Central	5%	10%	20%

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

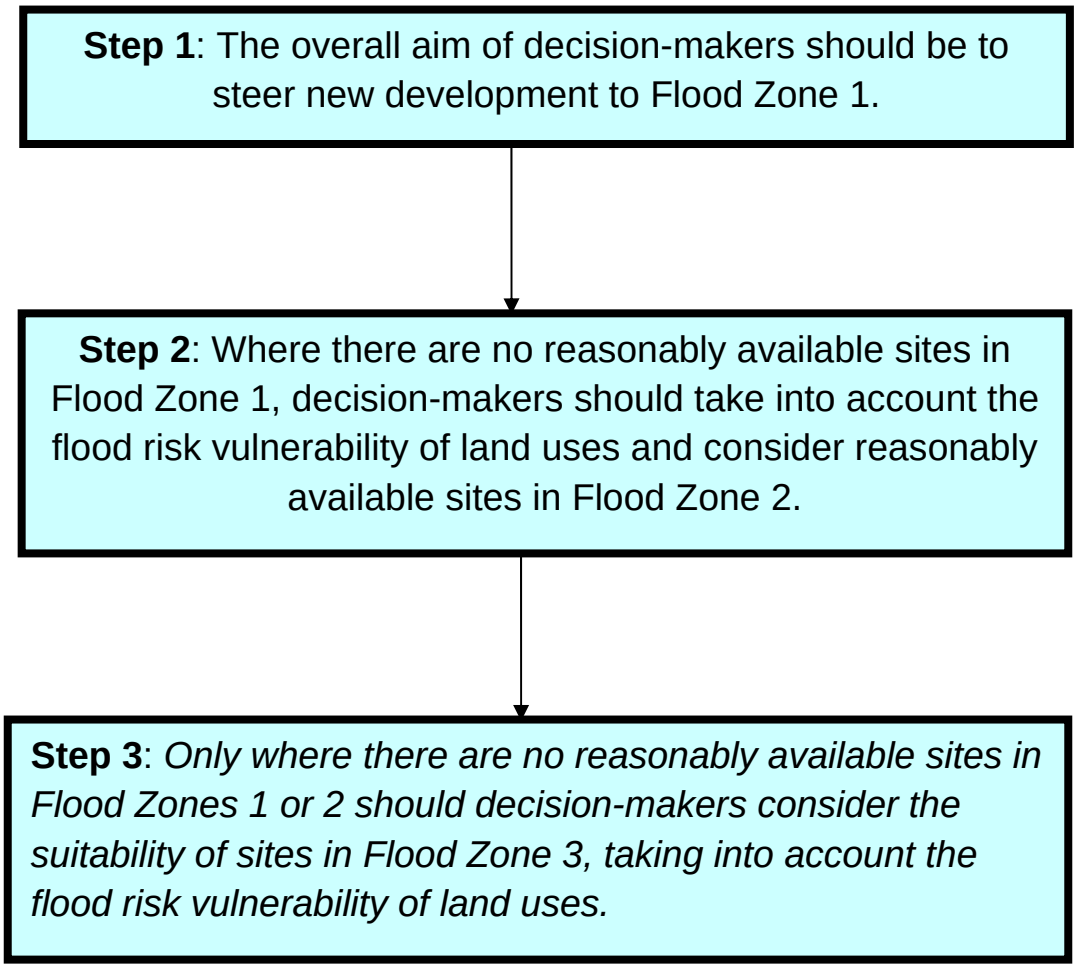
6.1 What is the Sequential Test?

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"[22].

This is summarised by Figure 2 below.

Figure 2: The Sequential Approach



[22] 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 11 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 13 to show land use vulnerability to consider the other sources of flooding considered in this SFRA and local SFRAs.

Table 13: The Flood Risk Vulnerability of Land Uses

Flood risk vulnerability classification	Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Types of development [23]	-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.	-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	-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').	-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.	-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

[23] 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); -Water treatment works that do not need to remain operational during times of flood; -Sewage treatment works (if adequate measures to control pollution and manage sewage during flooding events are in place).
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	✓	Exception test required	✓	✓
Zone 3a	Exception test required	✓	×	Exception test required	✓
Zone 3b: Functional Floodplain	Exception test required	✓*	×	×	×
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[24]	✓	✓
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.

[24] 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 site[25]

As stated previously, the National Planning Policy Framework states that Local Plans should take account of climate change in the longer term[26]. 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 14 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.

[25] 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]

[26] Paragraph 99 of the NPPF

Table 14: 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 will not be significantly affected by other sources of flooding or the impacts of climate change?[27]	Allocation or site can proceed	Progress to Step 2
2. Is the site located in Flood Zone 1 in an area that will be 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 other 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 13).	Progress to step 3
3. Is the site located in Flood Zone 2 in an area that will not 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 other 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 13).	Progress to Step 4

[27] 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.

4. Is the site located in Flood Zone 2 in an area that will be 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 13). Undertake exception test fluvial or other 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 13).	Progress to Step 5
5. Is the site located in Flood Zone 3 in an area that will not be significantly affected by other sources of flooding or the impacts of climate change?	Establish whether the development type is suitable for Flood Zone 3 having considered the flood risk vulnerability of land uses (Table 13). Undertake exception test fluvial or other 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 13).	Progress to Step 6
6. Is the site located in Flood Zone 3 in an area that will be affected by other forms of flooding / climate change?	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 13). Undertake exception test fluvial or other 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 13).	Progress to Step 7

7. Can the site be located in Flood Zone 3b?	Establish whether the development type is suitable for Flood Zone 3b and other forms of flooding having considered the flood risk vulnerability of land uses (Table 13). Undertake exception test if site is defined as ‘essential infrastructure’ in flood risk vulnerability of land uses table (Table 13).	No further options are available. Allocation should be rejected.

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 FRA.

Table 15 shows low (and very low where applicable[28]), 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 FRA and also during Exception Testing.

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

Table 15: 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 each year is greater than 3.3% (1 in 30)	The chance of flooding in each 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 14 (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).

[28] 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 14 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.

EA standing advice[29] 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 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 and a range of other planning and environmental constraints are taken into consideration. The search for reasonably available sites through the sequential test is therefore more constrained 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 each site by mineral type and waste facility category as summarised below. The sand and gravel sites has been further sub divided based on provision to specific market areas in line with the strategic approach in the draft Plan.

Table 16: Categories used in the Mineral and Waste Sites Sequential Testing process

Site Type (M or W)	Type Category
M	Sand and gravel (South)
M	Sand and gravel (North)
M	Magnesian limestone
M	Jurassic limestone
M	Sand / Silica sand
M	Building stone
M	Clay
M	Distribution / Processing
M	Recycling of inert waste
W	Energy from waste and waste transfer
W	Household Waste Recycling Centre
W	Landfill
W	Recycling

[29] 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 SFRA 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 16, and can also be found on the North Yorkshire County Council website at:

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

Table 16: 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 17: 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.

Appendix 1: Sustainable Drainage and Water Management

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*"[30].

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 appropriate[31].

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.

[30] CIRIA, 2011. SUDS Management Train. [URL: http://www.ciria.org.uk/suds/suds_management_train.htm] (accessed 21/10/11)
[31] 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 gravel[32]. 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 soil[33].

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.

[32] Environment Agency, undated Sustainable Drainage Systems: An Introduction [URL: http://publications.environment-agency.gov.uk/PDF/GEHO0308BNSS-E-E.pdf]
[33] Environment Agency, undated. Sustainable Drainage Systems: A guide for developers [URL: http://publications.environment-agency.gov.uk/PDF/GEHO0308BNST-E-E.pdf]

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 areas, organic / mulch areas, soil, woody and herbaceous plants and a sand bed for drainage[34].

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 phase[35].

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).

A SuDS Approving Body (SAB) was to be established and was to be North Yorkshire County Council (NYCC) in its capacity as Lead Local Flood Authority (LLFA), this was a requirement of Schedule 3 of the Flood and Water Management Act 2010 and was to happen to ensure SuDS were implemented. However, government decided to abandon Schedule 3 so SABs were never created. Instead, the government implemented SuDS by amending the National Planning Policy Framework (NPPF) by means of House of Commons Written Statement HCWS161 and produced some new planning legislation, The Town and Country Planning (Development Management Procedure) (England) Order 2015. All of this resulted in the responsibility for SuDS being moved from the LLFA to the Local Planning Authority (LPA). As such NYCC in its capacity as LLFA provides technical advice on major planning applications as a statutory consultee.

[34] CIRIA, 2015. The SUDS Manual, CIRIA, London
[35] CIRIA, 2015. The SUDS Manual, CIRIA, London

The Town and Country Planning (Development Management Procedure) (England) Order 2015 Section 2 sets out the major development on which the LLFA is a statutory consultee:

- The winning and working of minerals or the use of land for mineral-working deposits
- Waste development
- The provision of dwellinghouses where - (i) the number of dwellinghouses to be provided is 10 or more; or (ii) the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (i)
- The provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more
- 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 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, 2015) gives extensive information on the selection and design on different SuDS elements;

- 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.

Other Opportunities for Minerals and Waste Sites to Manage Flood Risk

Woodlands and agricultural farming practices: Planting woodlands can slow down flow (such as the Forestry Commission's woodlands for water scheme) and also changing agricultural farming practices such as ploughing horizontally along the land gradient rather than vertically can also slow flow and prevent silt run off[36].

Designing out flood risk: There are a range of other approaches to 'designing out' flood risk on a site and the National Planning Practice Guidance includes advice on making development safe from flood risk, creating flood resistant and flood resilient development and developing flood evacuation plans.

Floodplain compensatory storage: There may also be a need to provide compensatory storage if development is in flood zone 3 or 3a as paragraph 100 of the National Planning Policy Framework states:

> *"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".*

This means that not only must appropriate management measures be put in place to make a site safe, the flood reduction role that land had played prior to development taking place must be effectively substituted for or enhanced. Even though the individual risk of increased flooding may be small, the cumulative risk of several separate developments may be significant, so each must seek to offset that risk.

Table 18: Types of Flood Plain Compensatory Storage

Direct or 'level for level' storage methods	These re-grade the land to replace lost storage volume.
Indirect methods	These rely on water entering an area for storage of water for later slow release. They can be remote from the floodplain or include solutions such as tanks. They are generally seen as a last resort because of their potential complexity.

[36] Farming for cleaner water and healthier soil (NE230); Farming and climate change (NE308) and http://www.forestry.gov.uk/pdf/FRMG004_Woodland4Water.pdf/$FILE/FRMG004_Woodland4Water.pdf

Strategic Flood Risk Assessment (Level 1)

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

SEQUENTIAL TEST RESULTS FOR SUBMITTED SITES

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

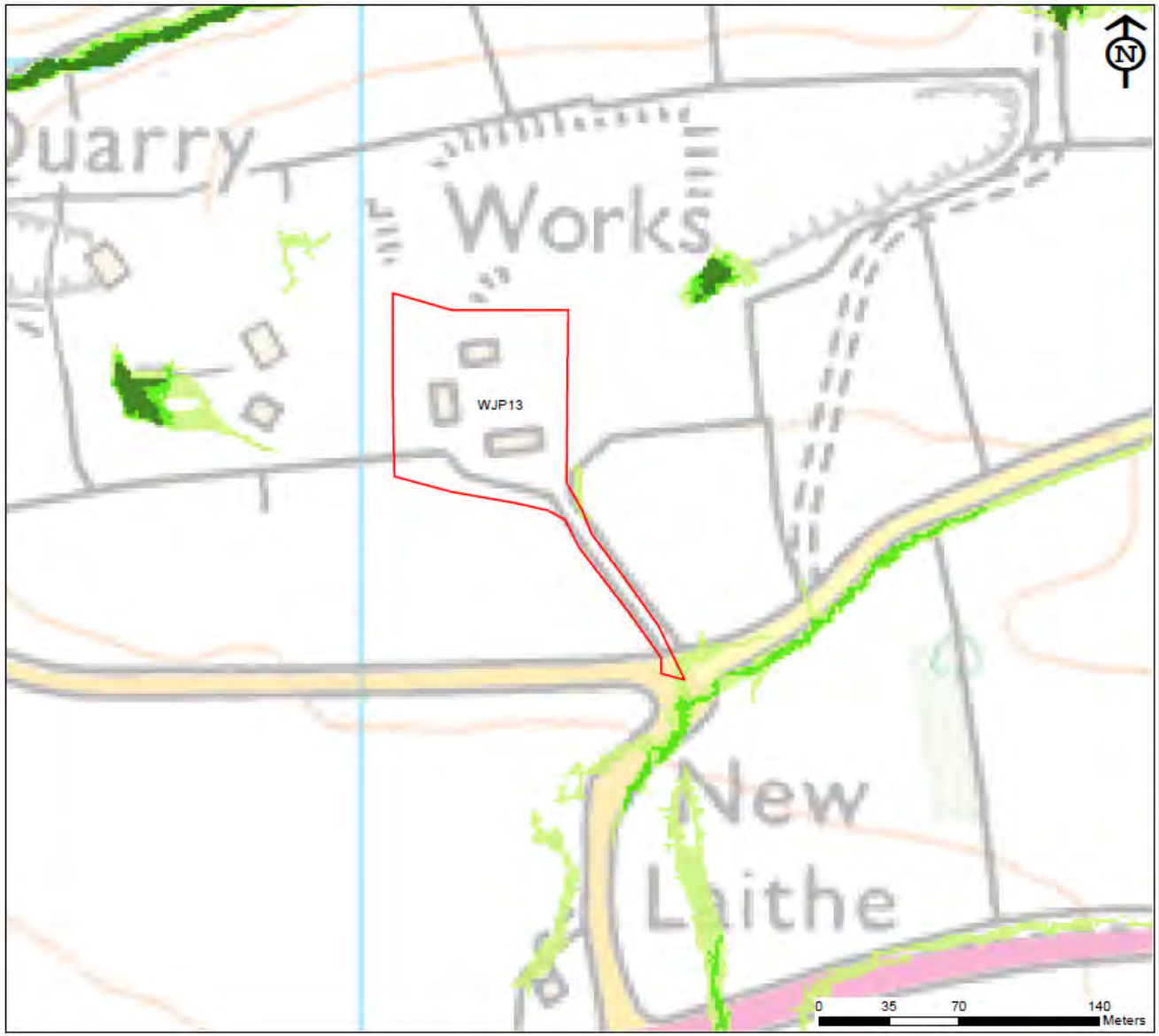
Contents

1. Craven Sites

Key to Sequential Test Results		
Pass	**Pass subject to further consideration of the site's contribution to the supply of minerals or waste facilities.**	**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	Planning permission C5/34/2013/14104 currently limits the higher vehicle numbers and hours of operation until February 2019 after which it would default back to the terms of planning permission C5/34/2011/12077. Proposed access: Existing entrance at the Four Lane Ends junction of Low Lane (C399 road from Embsay) with the U2313 (unclassified road to Halton East village) thence via Low Lane south to the A59. Current use: Waste transfer station Site area: 0.85ha Waste annual tonnage import: 40,000 Estimated date of commencement: 2019 Proposed Life of Site: 20 years plus
Proposed Land Use	Retention of waste transfer station for household and some commercial waste with higher vehicle numbers and hours of operation.
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	This site is 100% in Flood Zone 1. <5% of the site is at low risk (1:1000 (0.1%)) of surface water flooding. Site is in a 1km square identified as susceptible to Clearwater and superficial deposit flooding across <25% of the 1km square. However, no additional risk factors are noted and this development is above ground so is likely to be at a lower risk.
Relevant Local SFRA	North West Yorkshire

1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. In the North West Yorkshire SFRA functional floodplain is defined as undeveloped areas in Flood Zone 3, maps were not available for review at the time of writing. The North West Yorkshire SFRA is in the process of being revised therefore we consider the 1:20 (5%) extent in this location should be considered 'initial' functional floodplain.
Climate change	Climate change to river flood risk is unlikely to affect the site in the latter part of the plan period. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass
Exception Test Needed	No
Is an alternative site available which could help meet requirements for this waste facility, subject to other tests of suitability?	Yes, WJP01, WJP02, WJP03 and WJP25. WJP01 is at slightly lower risk from surface water flooding with WJP25 being at a similar level of risk. WJP03 is at a slightly higher level of risk from surface water flooding and is also within Flood Zone 2 to a minor extent. WJP02 is within Flood Zones 2 and 3. Therefore this site should be considered alongside WJP25 but after WJP01 and before WJP03 and WJP02.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment is not required as this site is in Flood Zone 1 and is less than 1ha. Surface water runoff from this site should be managed using SuDS where appropriate.



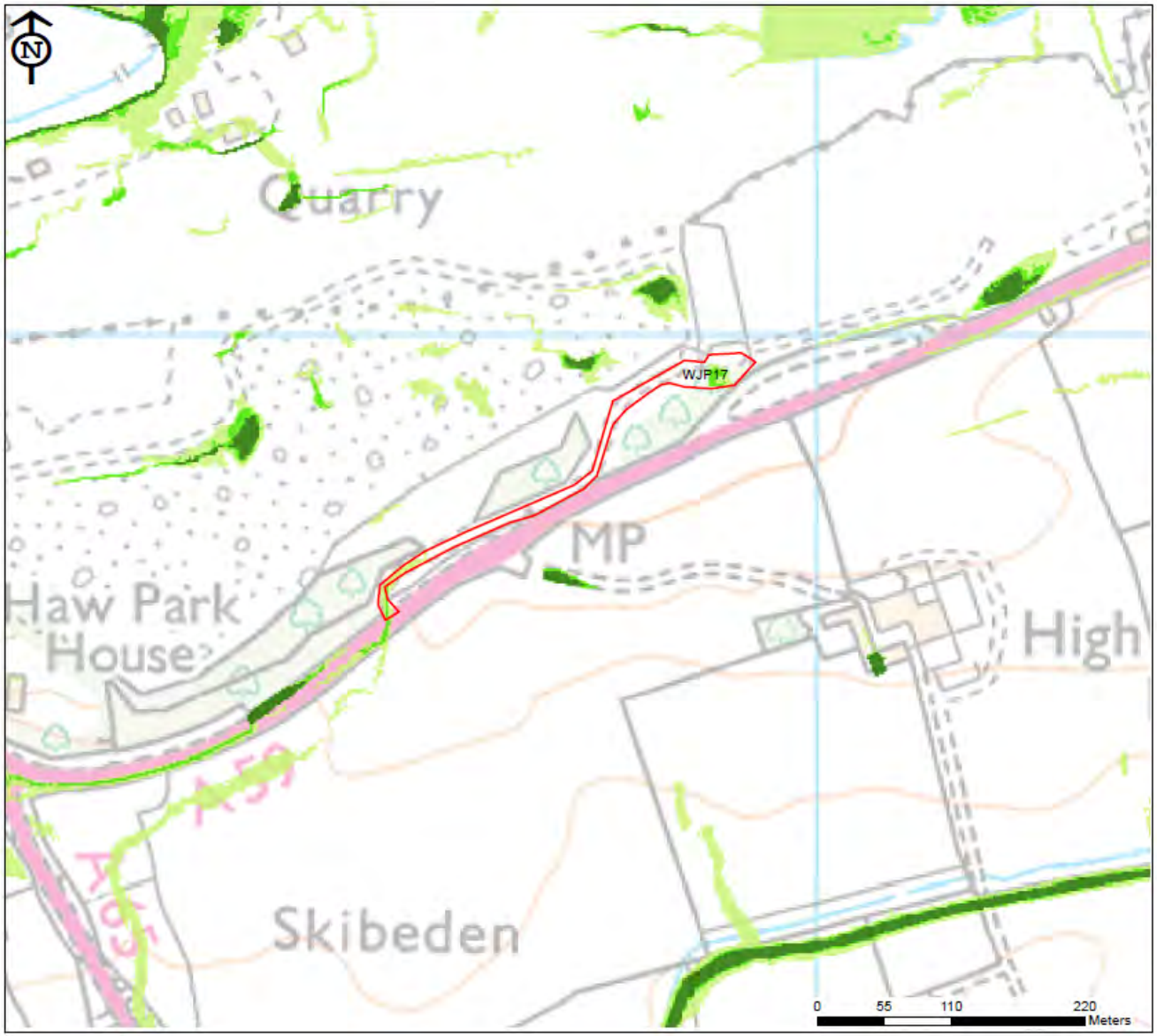
North Yorkshire County Council

Key

- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

Site Reference: WJP17 Skibeden, near Skipton	
Site Information	Landfill site is closed and undergoing restoration. Proposed access: Existing access at Skibeden HWRC onto A59 (approximately 330m east of junction between A59 and A65). Current use: Household Waste Recycling Centre for waste transfer of household and some commercial waste. Site area: 0.39ha Waste annual tonnage import: 5,000 Estimated date of commencement: 2015 Proposed Life of Site: Unknown at present
Proposed Land Use	Retention of Household Waste Recycling Centre (HWRC) for waste transfer of household and some commercial waste.
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	This site is 100% in Flood Zone 1. About 5% of the site is subject to medium risk (1:100 (1%)) surface water flooding. Low risk (1:1000 (0.1%)) affects a further 10% of the site. Site is in a 1km square identified as susceptible to Clearwater and superficial deposit flooding across >25% to <50% of the km square. No additional risk factors are noted. Proposals are above ground so risk is likely to be lower.
Relevant Local SFRA	North West Yorkshire
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. In the North West Yorkshire SFRA functional floodplain is defined as undeveloped areas in Flood Zone 3, maps were not available for review at the time of writing. The North West Yorkshire SFRA is in the process of being revised therefore we consider the 1:20 (5%) extent in this location should be considered 'initial' functional floodplain.
Climate change	Climate change to river flood risk is unlikely to affect the site in the latter part of the plan period. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass
Exception Test Needed	No
Is an alternative site available which could help meet requirements for this waste facility, subject to other tests of suitability?	No. No other HWRC site has been identified as suitable for SFRA assessment and this site is located in Flood Zone 1.

Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment is not required as this site is in Flood Zone 1 and is less than 1ha. Surface water runoff from this site should be managed using SuDS where appropriate.



North Yorkshire County Council

Key

- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

2. Hambleton Sites

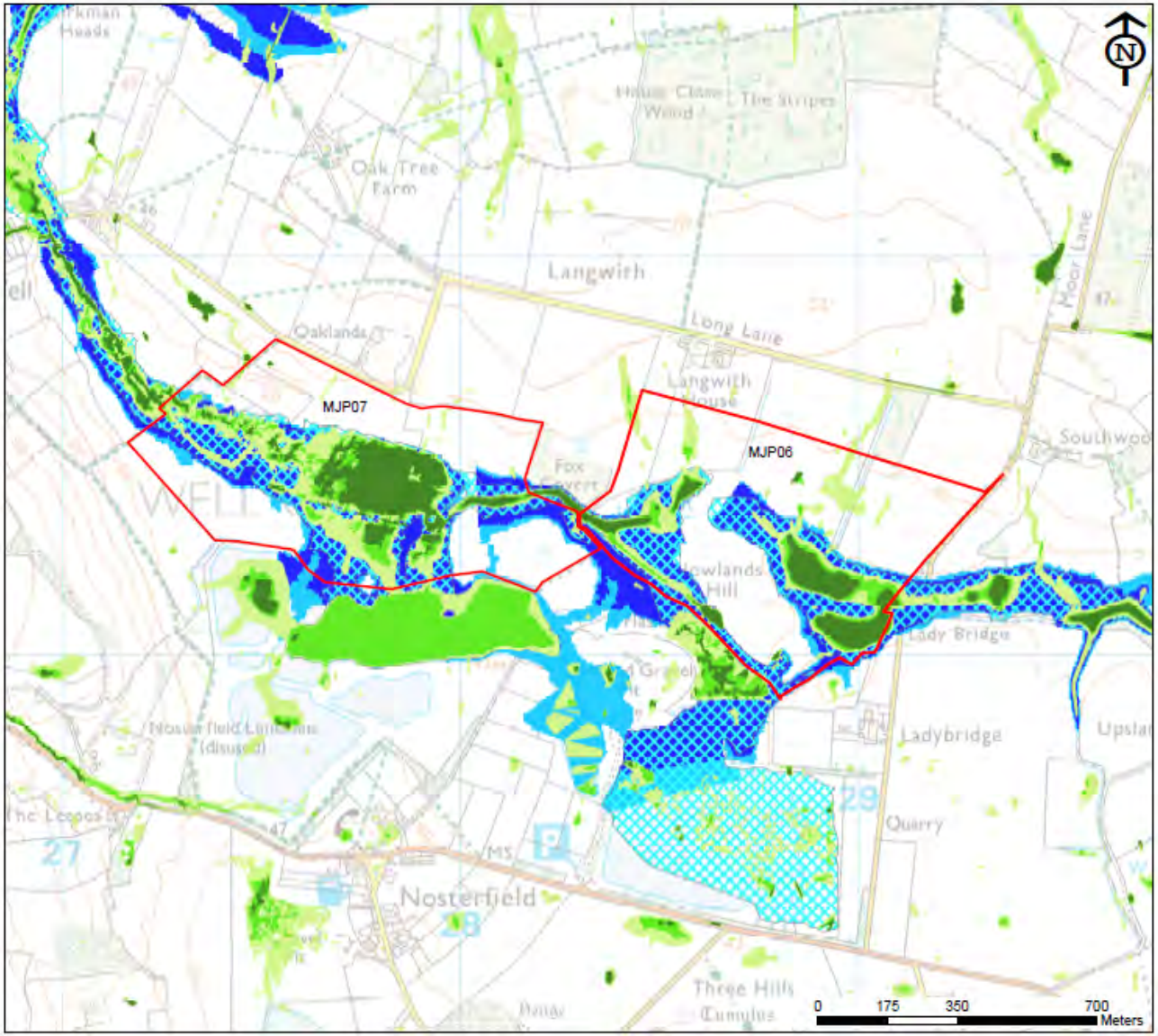
Key to Sequential Test Results		
Pass	**Pass subject to further consideration of the site's contribution to the supply of minerals or waste facilities.**	**Site is not suitable or would require an Exception Test demonstrated through a Level 2 SFRA to proceed.**

Site Reference: MJP06 Langwith Hall Farm, east of Well	
Site Information	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 until 31 January 2018 was granted planning permission in February 2016. Proposed access: No direct access to public highway proposed from MJP06 site, rather material would be taken direct to the existing processing Nosterfield Quarry plant site by an internal route and would then use the existing Nosterfield Quarry access on to B6267 (approximately 500m east of Nosterfield village). Current use: Agriculture Site area: 43.1ha Minerals Estimated Reserve: 2,300,000 tonnes Annual output of 500,000 tonnes Estimated date of commencement: 2016 Proposed Life of Site: Four to five years
Proposed Land Use	Extraction of sand and gravel as a proposed extension to existing quarry.
NPPF Vulnerability Classification	Water compatible

Overview of flooding	About 25% of this site is in Flood Zones 2 and 3. About 15% - 20% of the site is subject to surface water flooding, much of which is at high risk (1:30 (3.33%)) of 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. Strategic groundwater flooding maps show that most of the site lies in a 1km square where >25% to <50% of the km square 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 >75% of the km square has conditions that might support superficial deposits flooding. 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 39mAOD (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.
Relevant Local SFRA	Hambleton
1:20 (5%) flood event or Local SFRA Functional Floodplain	The 1:20 (5%) event extent mapping for this SFRA shows about 25% this site is affected by this level of 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, maps were not available for review at the time of writing. Hambleton has recently developed a draft revised definition of functional floodplain and, consistent with that revised definition, we consider the 1:20 (5%) extent in this location should be considered 'initial' functional floodplain.
Climate change	Climate change is likely to extend the area of Flood Zones 2 and 3, with Flood Zone 3 increasing to the extent of Flood Zone 2. The extent of the 1:20 (5%) event is also likely to increase. 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. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass
Exception Test Needed	No. This site is water compatible.
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, sites MJP07 and MJP14. MJP07 is at slightly higher risk from flooding and MJP14 is at significantly higher risk from flooding. Therefore this site should be considered alongside but before MJP07 and is preferable to MJP14.

[1] 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]

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. All sites in functional floodplain 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.



North Yorkshire County Council

Key

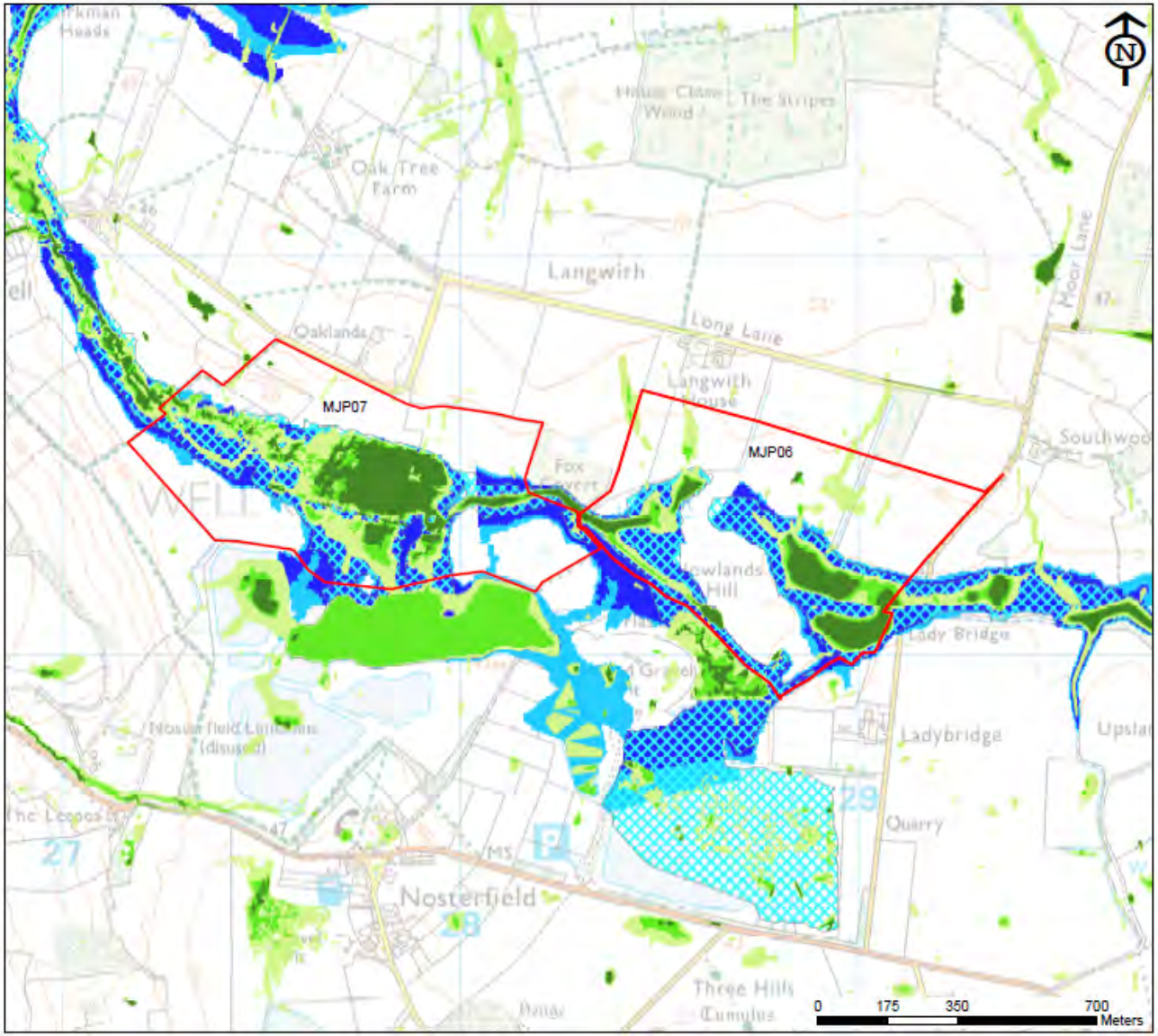
- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

Site Reference: MJP07 Oaklands, near Well	
Site Information	Proposal includes diversion of the Ings Goit stream and extraction would be by suction dredger with material to be pumped by pipeline to the existing conveyor system for transport to the existing processing plant. Proposed access: No direct access to public highway from MJP07 site, rather material would be taken to the existing processing plant site in Nosterfield Quarry by an internal route and would then leave using the existing Nosterfield Quarry access onto B6267 (approximately 500m east of Nosterfield village). Current use: Agriculture Site area: 44.6ha Minerals Estimated Reserve: 3,602,720 tonnes (submitter information). Proposed reduction to tonnage to a provisional estimate of 1,500,000 tonnes. Annual output of 500,000 tonnes Estimated date of commencement: 2020-21 (to follow MJP06) Proposed Life of Site: Six years
Proposed Land Use	Extraction of sand and gravel as proposed extension to existing quarry.
NPPF Vulnerability Classification	Water compatible

Overview of flooding	About 50% of this site, the central and southern area, is in Flood Zones 2 and 3. About 40% of the site is subject to surface water flooding with approximately 30% at high risk (1:30 (3.33%)) of flooding and 10% at medium risk (1:100 (1%)) or low risk (1:1000 (0.1%)). 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. Strategic groundwater flooding maps show that most of the site lies in a 1km square where <25% of the km square 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 km square has conditions that might support superficial deposits groundwater flooding. A recent application for a site (MJP06) 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 39mAOD (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.
Relevant Local SFRA	Hambleton
1:20 (5%) flood event or Local SFRA Functional Floodplain	The 1:20 (5%) event extent mapping for this SFRA shows about 40% of this site is at 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, maps were not available for review at the time of writing. Hambleton has recently developed a draft revised definition of functional floodplain and, consistent with that revised definition, we consider the 1:20 (5%) extent in this location should be considered 'initial' functional floodplain.
Climate change	Climate change is likely to extend the area of Flood Zones 2 and 3, with Flood Zone 3 increasing to the extent of Flood Zone 2. The extent of the 1:20 (5%) event is also likely to increase. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass
Exception Test Needed	No. This site is water compatible.

[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 an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP06 and MJP14. MJP06 is at slightly lower risk from flooding, however MJP14 is at higher risk from flooding. Therefore this site should be considered alongside but after MJP06 and is preferable to 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. All sites in functional floodplain 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.



North Yorkshire County Council

Key

- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

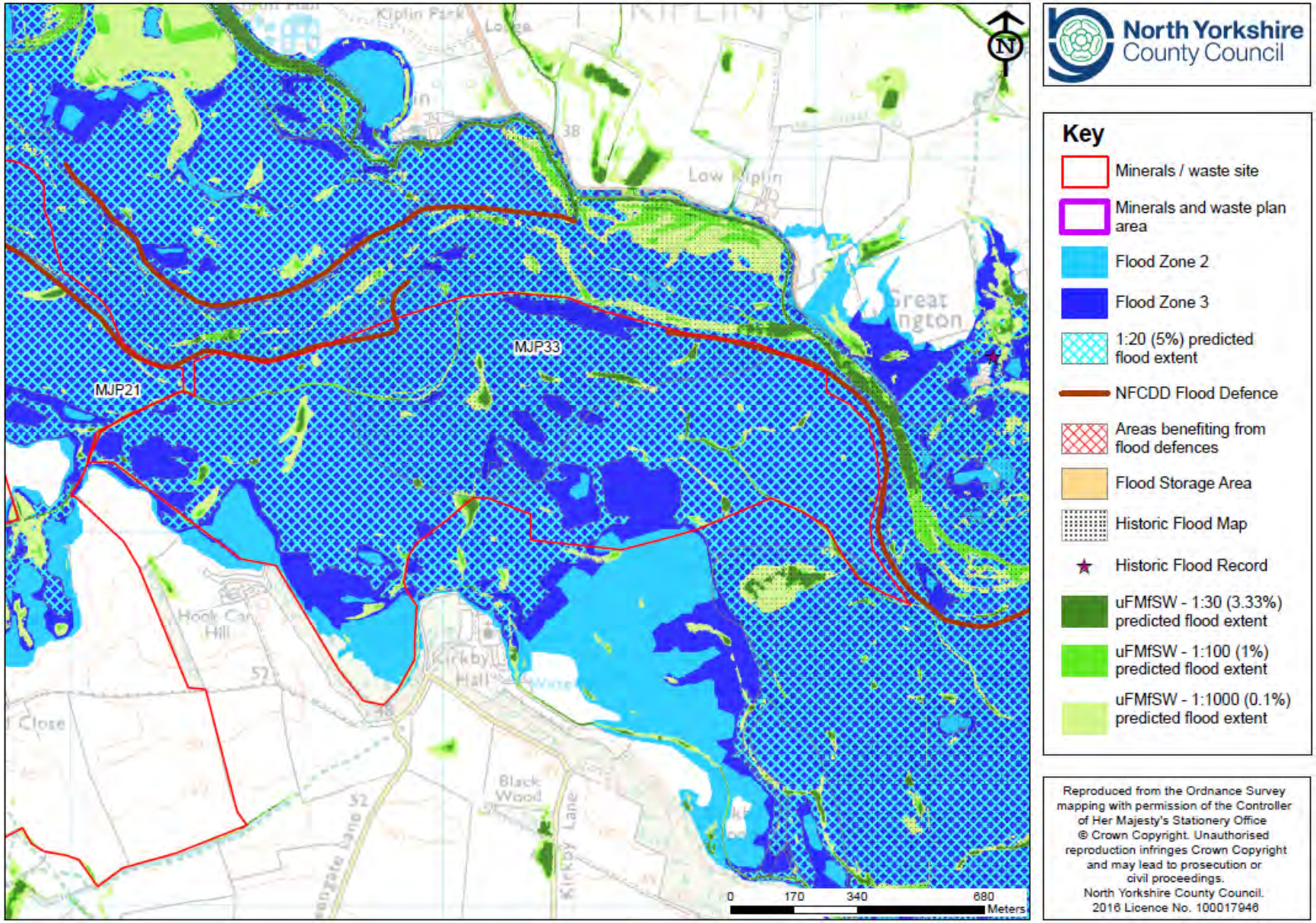
Site Reference: MJP33 Home Farm, Kirkby Fleetham	
Site Information	Proposed access: The site is allocated on the basis that access to the highway for heavy goods vehicles will be obtained via the Killerby site allocation MJP21 and associated access point to the local access road west of site MJP21. Current use: Agriculture and woodland Site area: 114.7ha Minerals Estimated Reserve: 3,500,000 tonnes Annual output of 300,000 tonnes Estimated date of commencement: Anticipated to be about 2019 Proposed Life of Site: 12 years
Proposed Land Use	Extraction of sand and gravel from a new extraction site.
NPPF Vulnerability Classification	Water compatible

Overview of flooding	This site is almost entirely within Flood Zone 3 (approximately 90%). The remainder of the site outside of Flood Zone 3 (about 10%) is either Flood Zone 2 (<10%) or Flood Zone 1 (<5%). Flood defences along the north western boundary of the site may offer some protection (though the standard of protection is not known). Surface water flooding affects small areas (<10%) of the site, with low risk (1:1000 (0.1%)) to high risk (1:30 (3.33%)) areas of ponding distributed across the site. 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. This site lies across six 1km squares of differing groundwater vulnerability according to the Environment Agency's 'Areas Susceptible to Groundwater Flooding' map. The north west of the site lies in area where >50% to <75% of the km square has conditions that could support superficial deposits flooding. The south west lies in an area where >25% to <50% of the km square has conditions that could support superficial deposits groundwater flooding. The north east and south east site lies in an area where <25% of the km square has conditions that might support Clearwater flooding. A nearby site (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. 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 37.3mAOD in the west to 31.5mAOD in the east. This represents an easterly hydraulic gradient of 1 in 341"[4]. 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.
Relevant Local SFRA	Hambleton

[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]

[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]

1:20 (5%) flood event or Local SFRA Functional Floodplain	The 1:20 (5%) event extent mapping for this SFRA shows about 85% of this site is at 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, maps were not available for review at the time of writing. Hambleton has recently developed a draft revised definition of functional floodplain and, consistent with that revised definition, we consider the 1:20 (5%) extent in this location should be considered 'initial' functional floodplain.
Climate change	The remainder of the site outside of Flood Zone 3 (about 10%) is either Flood Zone 2, that with climate change is likely to become Flood Zone 3, or Flood Zone 1, that with climate change is likely to become Flood Zone 2, for the 2020's. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass. This is water compatible development, however, MJP43, followed by MJP17 and MJP21 should be considered before this site from a flood risk point of view.
Exception Test Needed	No. This site is water compatible.
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP17, MJP21 and MJP43. This site is at the highest flood risk compared to MJP43, MJP17 and MJP21. Therefore MJP43, MJP17 and MJP21 are preferable to this site.
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. All sites in functional floodplain 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.



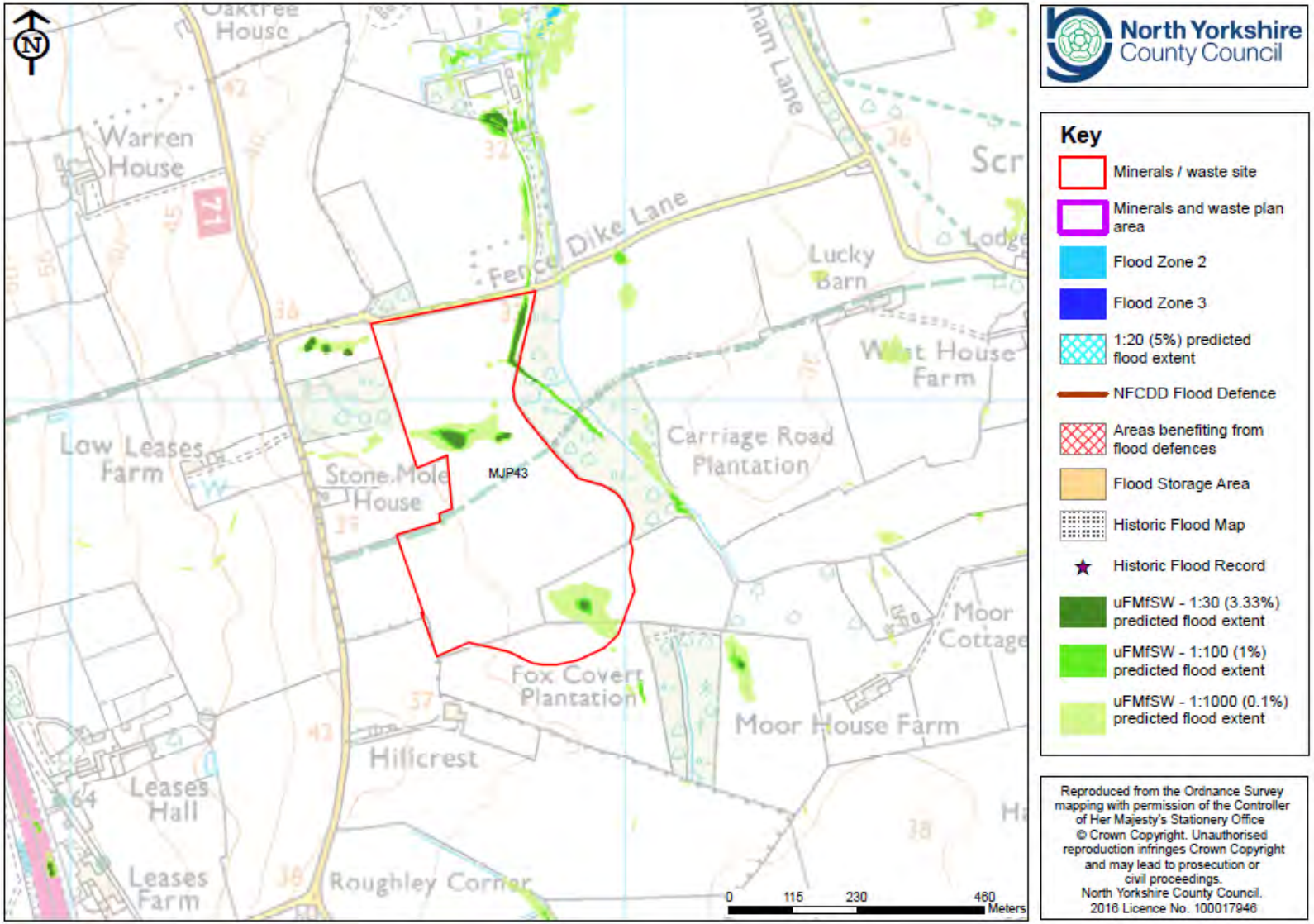
North Yorkshire County Council

Key

- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

Site Reference: MJP43 Land to west of Scruton	
Site Information	Working would involve mobile plant rather than a fixed plant site. Proposed access: Via a new haul road from the site to a new entrance onto Low Street approximately mid-way between Stone Mole and Hillcrest and to the site. Vehicles would then transport the mineral south along Low Street to join the new Bedale-Asikew-Leeming Bar bypass approximately 850 metres south of the site access Current use: Agriculture Site area: 18.1ha Minerals Estimated Reserve: 850,000 – 900,000 tonnes Annual output of 75,000 (first year) rising to 90,000 tonnes Estimated date of commencement: 2018 Proposed Life of Site: 11 – 12 years
Proposed Land Use	Extraction of sand and gravel from a new extraction site.
NPPF Vulnerability Classification	Water compatible
Overview of flooding	This site is 100% in Flood Zone 1. Surface water flooding low risk (1:1000 (0.1%)) to high risk (1:30 (3.33%)) affects about 10% of the site. Ditches and small streams on the site are the focal point for much of the surface water 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. The site lies across three 1km squares on the Environment Agency's 'Areas Susceptible to Groundwater Flooding Map', all of which have details of levels susceptibility to groundwater flooding and are susceptible to Clearwater flooding (<25%).
Relevant Local SFRA	Hambleton
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. 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, maps were not available for review at the time of writing. Hambleton has recently developed a draft revised definition of functional floodplain and, consistent with that revised definition, we consider the 1:20 (5%) extent in this location should be considered 'initial' functional floodplain.

Climate change	Climate change to river flood risk is unlikely to affect the site in the latter part of the plan period. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass
Exception Test Needed	No. This site is water compatible.
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP17, MJP21 and MJP33. MJP17 is at slightly higher risk for river flooding and surface water flooding. Sites MJP21 and MJP33 are at significantly higher risk of river flooding, with MJP33 being at higher risk than MJP21. This site should be considered before MJP17 and is preferable to both MJP21 and MJP33.
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.


Oaktree House
Warren House
Fence Dike Lane
Lucky Barn
West House Farm
Low Leases Farm
Stone Mole House
MJP43
Carriage Road Plantation
Fox Covert Plantation
Moor Cottage
Moor House Farm
Hillcrest
Leases Hall
Leases Farm
Roughley Corner
0 115 230 460 Meters
North Yorkshire County Council
Key
Minerals / waste site
Minerals and waste plan area
Flood Zone 2
Flood Zone 3
1:20 (5%) predicted flood extent
NFCDD Flood Defence
Areas benefiting from flood defences
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uFMfSW - 1:30 (3.33%) predicted flood extent
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uFMfSW - 1:1000 (0.1%) predicted flood extent
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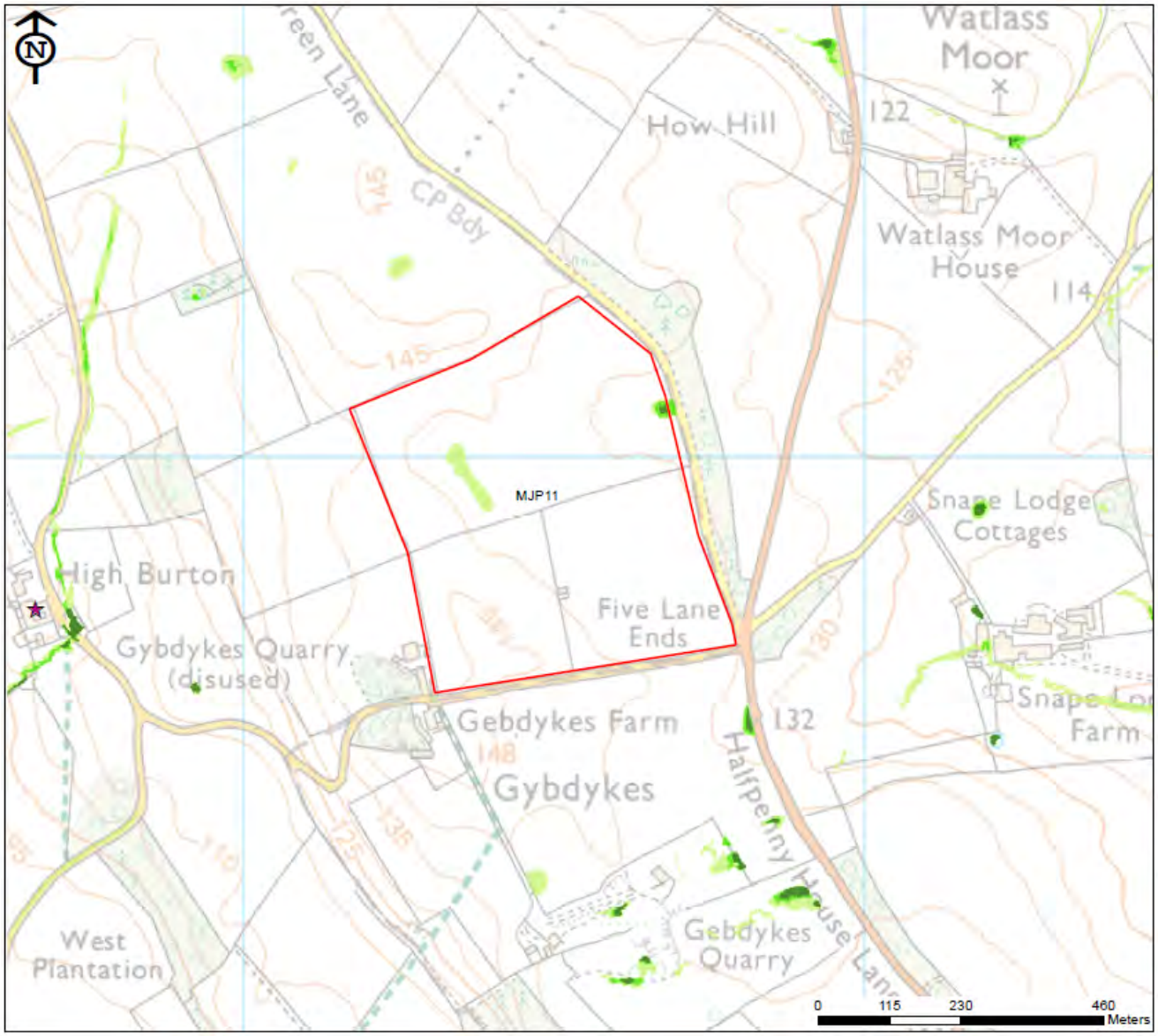
3. Hambleton / Harrogate and Hambleton / Richmondshire Sites

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

Site Reference: MJP11 Gebdykes Quarry, near Masham	
Site Information	Existing quarry site restoration is to agriculture and woodland. The proposed strip of land to the North of the existing quarry will retain the existing screening, the area proposed goes from the boundary of the existing extraction to the boundary of the existing screening. Landscaping will follow along the lines of the existing permission, with low level agricultural restoration. Proposed access: Existing Gebdykes Quarry access onto the B6268 approximately 250m south of the Five Lane Ends junction. The means of, and location of, the crossing from MJP11 northern area into the existing Gebdykes quarry to be confirmed; but may be a conveyor beneath the C133 lane (between Five Lane Ends and High Burton) at a point to the east of Gebdykes Farm. Current use: Agriculture Site area: 27.1ha (25.8ha north of C133 and 1.3ha between existing quarry extraction area and C133 roadside landscape planting). Minerals Estimated Reserve: 3,800,000 tonnes (3,400,000 (to north of C133 road); 400,000 (between existing quarry extraction area and C133 roadside landscape planting)). Annual output of 235,000 tonnes Estimated date of commencement: 2022 - 2025 Proposed Life of Site: 15 years
Proposed Land Use	Extraction of Magnesian limestone as proposed extension to existing quarry.
NPPF Vulnerability Classification	Less vulnerable

Overview of flooding	This site is 100% in Flood Zone 1. Surface water flooding low risk (1:1000 (0.1%)) to high risk (1:30 (3.33%)) affects a very small area (<5%). 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. 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 site[5].
Relevant Local SFRA	North West Yorkshire
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. In the North West Yorkshire SFRA functional floodplain is defined as undeveloped areas in Flood Zone 3, maps were not available for review at the time of writing. The North West Yorkshire SFRA is in the process of being revised therefore we consider the 1:20 (5%) extent in this location should be considered 'initial' functional floodplain.
Climate change	Climate change to river flood risk is unlikely to affect the site in the latter part of the plan period. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass
Exception Test Needed	No
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP10, MJP23, MJP28 and MJP29. This site is at slightly higher risk from surface water flooding than MJP23, MJP28 and MJP29 but at lower risk than MJP10. All the alternative sites are located in Flood Zone 1. Therefore this site should be considered after MJP28, MJP23 and MJP29 but in preference to MJP10.
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.

[5] 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]



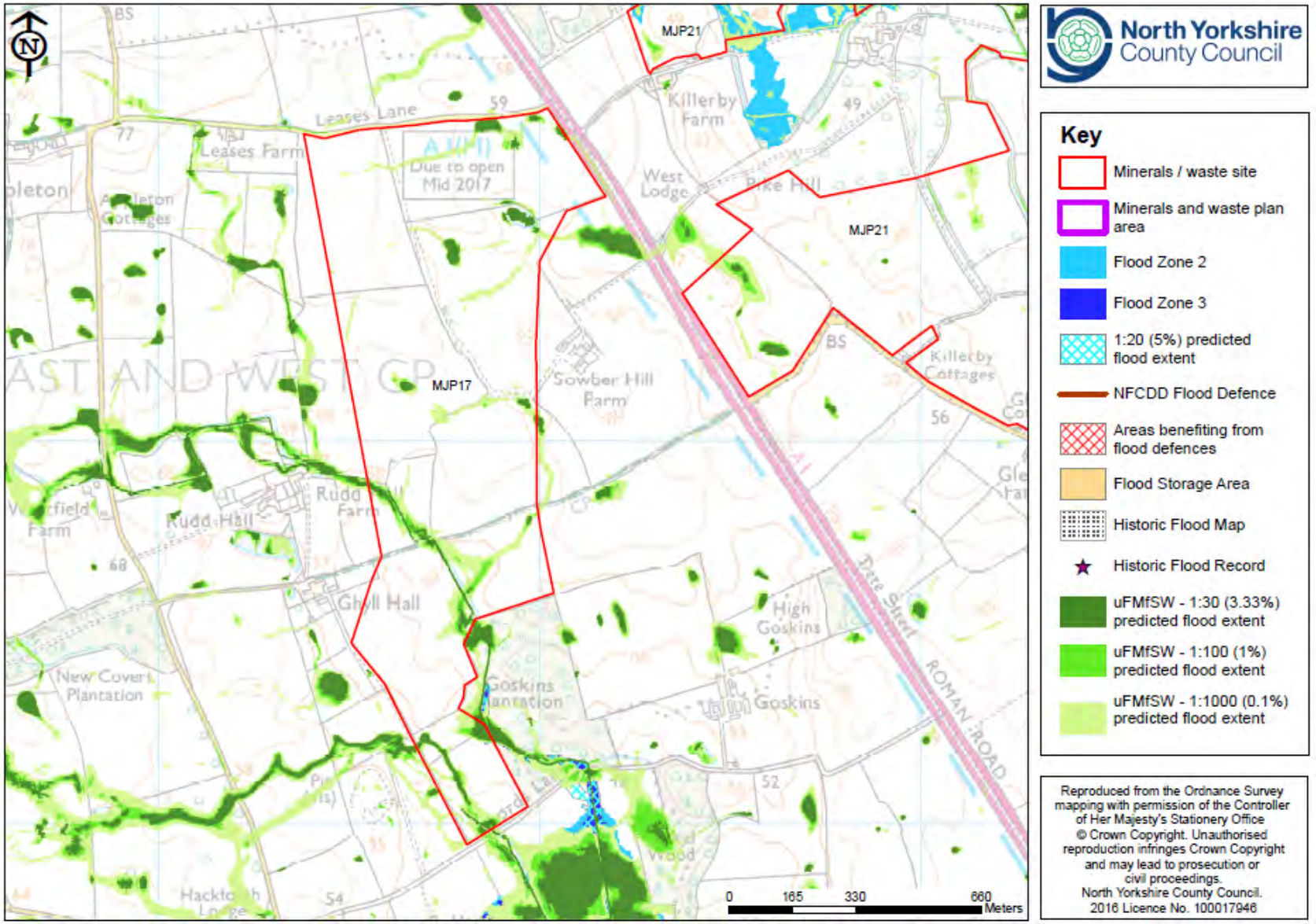
North Yorkshire County Council

Key

- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

Site Reference: MJP17 Land to the south of Catterick	
Site Information	Proposed access: Not known yet but will take account of the new mid-Catterick A1(M) roundabout in order to access the strategic road network and potentially use Lords Lane to access the Local Access Road. Current use: Agriculture Site area: 81.52ha Minerals Estimated Reserve: 3,000,000 tonnes (submitter information) Annual output of 150,000 – 250,000 tonnes estimated Estimated date of commencement: Unknown at present, likely to be in the later part of the join Plan period. Proposed Life of Site: Unknown at present
Proposed Land Use	Extraction of sand and gravel from a new extraction site.
NPPF Vulnerability Classification	Water compatible
Overview of flooding	<5% of the site is within Flood Zones 2 and 3. Surface water flooding low risk (1:1000 (0.1%)) to high risk (1:30 (3.33%)) affects about 10% of the site. Ditches and small streams on the site are the focal point for much of the surface water 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. The site lies across five 1km squares on the Environment Agency's 'Areas Susceptible to Groundwater Flooding Map', four of which have details of levels susceptibility to groundwater flooding and one of which has no data. The 1km square at the extreme south of this site is susceptible to superficial deposits flooding (>25% to <50% of the 1km square is susceptible), while the other 1km squares are subject to Clearwater and superficial deposits flooding >25 to <50% in the centre and <25% in the north-east), apart from a 1km square along the central eastern edge of the site which is susceptible to Clearwater flooding (<25%).
Relevant Local SFRA	Hambleton and North West Yorkshire

1:20 (5%) flood event or Local SFRA Functional Floodplain	<5% of this site is at risk from the 1:20 (5%) flood event. 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, maps were not available for review at the time of writing. Hambleton has recently developed a draft revised definition of functional floodplain and, consistent with that revised definition, we consider the 1:20 (5%) extent in this location should be considered 'initial' functional floodplain. In the North West Yorkshire SFRA functional floodplain is defined as undeveloped areas in Flood Zone 3, maps were not available for review at the time of writing. The North West Yorkshire SFRA is in the process of being revised therefore we consider the 1:20 (5%) extent in this location should be considered 'initial' functional floodplain.
Climate change	The extent of Flood Zone 3 is likely to increase to that of Flood Zone 2, while Flood Zone 2 may encroach the site further. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass. This site should be considered after MJP43 but is preferable to both MJP21 and MJP33.
Exception Test Needed	No. This site is water compatible.
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP21, MJP33 and MJP43. MJP43 is at a slightly lower level of risk for river flooding and surface water flooding. Sites MJP21 and MJP33 are at higher risk of river flooding, with MJP33 being at higher risk than MJP21. This site should be considered after MJP43 but is preferable to both MJP21 and MJP33.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment should further consider climate change impact to the river flood risk, 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. All sites in functional floodplain 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.



North Yorkshire County Council

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- Minerals / waste site
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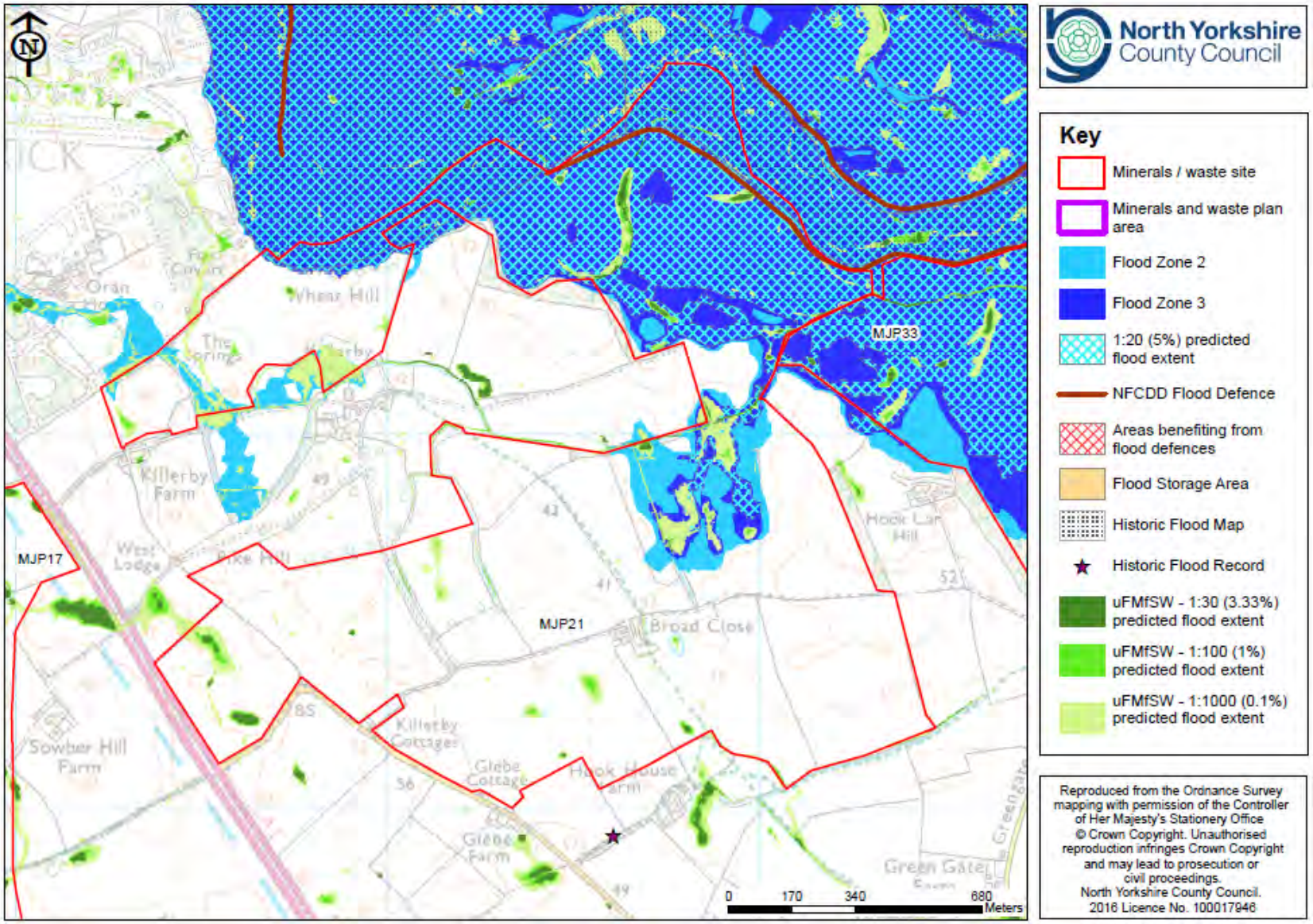
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

Site Reference: MJP21 Land at Killerby	
Site Information	Application (NY/2010/0356/ENV) is currently awaiting determination. Proposed access: Access to be as in the latest details for application NY/2010/0356/ENV, at the bend at north end of Low Street (C114), with vehicles to go west along Low Street onto the new Local Access Road next to the upgraded A1(M). Current use: Agriculture and woodland Site area: 213ha, of which 122ha is proposed for extraction Minerals Estimated Reserve: 11,370,000 tonnes Annual output of 650,000 tonnes Estimated date of commencement: 2020 - 2021 Proposed Life of Site: Extraction would occur for an initial period of two years, after which the remaining permitted reserves at Ellerton Quarry would be extracted (five to six years), then the remainder of the Killerby reserves would be extracted during a period of 14 years.
Proposed Land Use	Extraction of sand and gravel from a new extraction site.
NPPF Vulnerability Classification	Water compatible

Overview of flooding	About 35% of this site is in Flood Zones 2 and 3. 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 defences[6]. Surface water flooding low risk (1:1000 (0.1%)) to high risk (1:30 (3.33%)) affects about 5% of the site. 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. In terms of groundwater flooding site lies across six 1km squares on the 'Areas Susceptible to Groundwater Flooding Map' all of which are areas that support superficial deposits flooding (at varying rates from <25% of a km square to >50% to <75% of a km square), apart from the south west corner which supports Clearwater and superficial deposits flooding (across <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 risk[7].
Relevant Local SFRA	Hambleton and North West Yorkshire

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

1:20 (5%) flood event or Local SFRA Functional Floodplain	Much of the area in Flood Zone 3 is also considered to be at a 1:20 (5%) flood risk. However, the presence of a flood defence would mean that although the area could still flood in a 1:20 (5%) 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 1m 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. 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, maps were not available for review at the time of writing. Hambleton has recently developed a draft revised definition of functional floodplain and, consistent with that revised definition, we consider the 1:20 (5%) extent in this location should be considered 'initial' functional floodplain. In the North West Yorkshire SFRA functional floodplain is defined as undeveloped areas in Flood Zone 3, maps were not available for review at the time of writing. The North West Yorkshire SFRA is in the process of being revised therefore we consider the 1:20 (5%) extent in this location should be considered 'initial' functional floodplain.
Climate change	As this site would be active beyond 2025, river flooding may increase in significance beyond 2025. This would increase the area of Flood Zone 3 into areas that are shown as Flood Zone 2 and would also increase the extent of Flood Zone 2. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass. This is water compatible development, however, MJP43 and MJP17 should be considered before this site but it is preferable to MJP33 from a flood risk point of view.
Exception Test Needed	No. This site is water compatible.
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP17, MJP33 and MJP43. MJP43 and MJP17 are at lower risk than this site. MJP33 is at higher risk. Therefore this site should be considered after MJP43 and MJP17 but is preferable to MJP33.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A flood risk assessment has already been carried out for this site.


N
MJP17
MJP21
MJP33
Killerby Farm
Wheat Hill
Broad Close
Sowber Hill Farm
Killerby Cottages
Glebe Cottage
Hook House Farm
Glebe Farm
Green Gate
Hook Car Hill
0 170 340 680 Meters
North Yorkshire County Council
Key
Minerals / waste site
Minerals and waste plan area
Flood Zone 2
Flood Zone 3
1:20 (5%) predicted flood extent
NFCDD Flood Defence
Areas benefiting from flood defences
Flood Storage Area
Historic Flood Map
Historic Flood Record
uFMfSW - 1:30 (3.33%) predicted flood extent
uFMfSW - 1:100 (1%) predicted flood extent
uFMfSW - 1:1000 (0.1%) predicted flood extent
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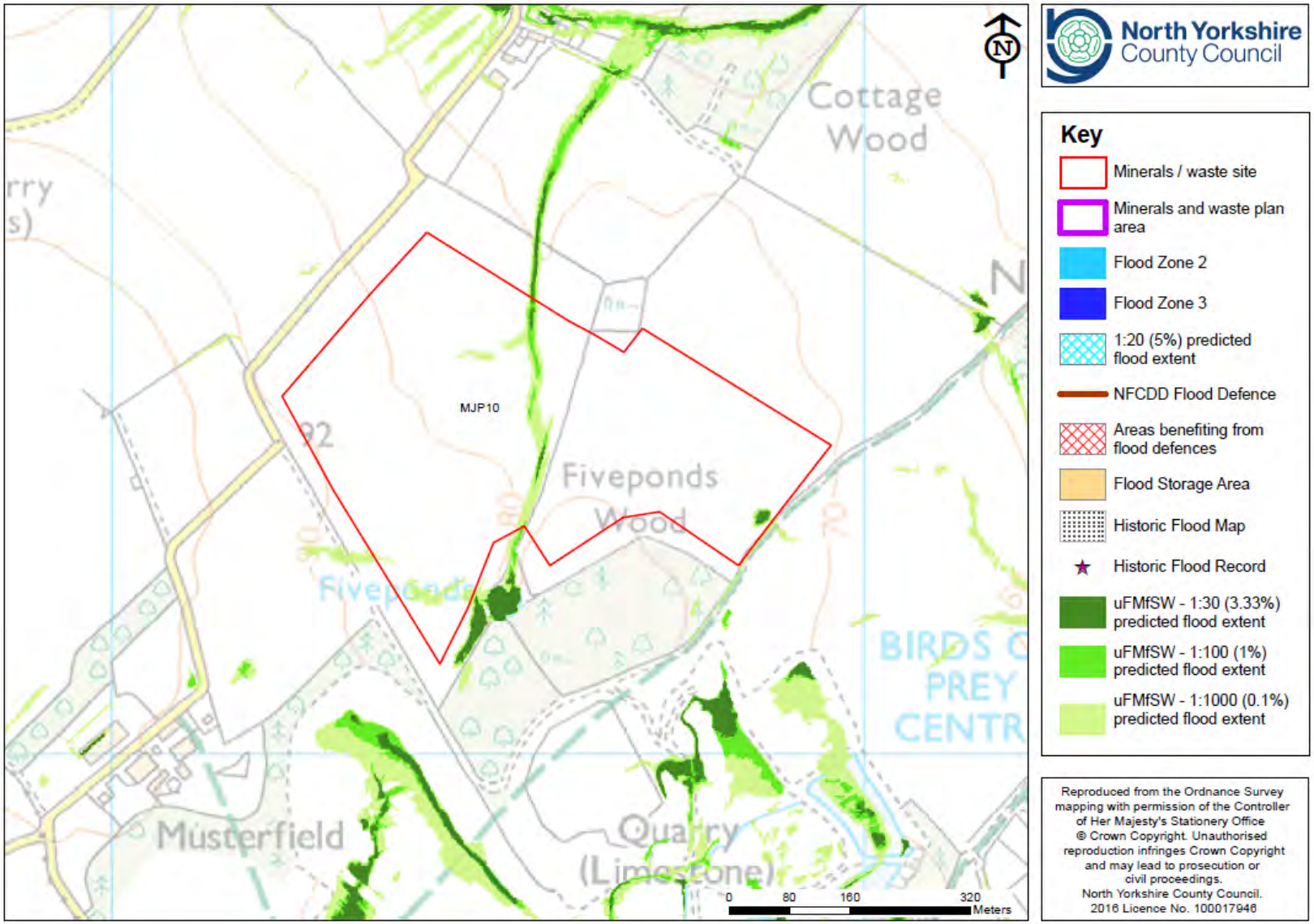
4. Harrogate Sites

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

Site Reference: MJP10 Potgate Quarry, North Stainley	
Site Information	Planning permission was granted on 30 January 2015 for the extraction of limestone from an area of land west of the site at Musterfield (NY/2012/0319/ENV). Proposed access: Access to be into the western field of MJP10 from Potgate Quarry through the Musterfield extension (see below) with mineral to be processed at the existing quarry plant site. Material would then leave the site via the existing access along Water Lane (bridleway) onto the A6108 approximately 100m south of North Stainley. There would be no direct access to MJP10 from the public highway. Current use: Agriculture Site area: 36.5ha of which working area would be 19.4ha Minerals Estimated Reserve: 3,700,000 tonnes Annual output of 235,000 tonnes Estimated date of commencement: 2021 Proposed Life of Site: 16 years
Proposed Land Use	Extraction of Magnesian limestone as proposed extension to existing quarry.
NPPF Vulnerability Classification	Less vulnerable

Overview of flooding	This site is in Flood Zone 1. About 5% of this is site in areas subject to surface water flooding (low risk (1:1000 (0.1%)) to high risk (1:30 (3.33%)). The overall percentage of the site area at risk is low but there is a clear surface water flow path across the site which requires mentioning and would need consideration in any proposals. Most of the site lies in a 1km square where <25% of the km square is susceptible to Clearwater groundwater flooding. The eastern part of the site is in a km square where groundwater flooding susceptibility information is not available. 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"[8] A borehole on this site was dry to 12.19m below ground level so much depends on the depth of extraction.
Relevant Local SFRA	North West Yorkshire
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. In the North West Yorkshire SFRA functional floodplain is defined as undeveloped areas in Flood Zone 3, maps were not available for review at the time of writing. The North West Yorkshire SFRA is in the process of being revised therefore we consider the 1:20 (5%) extent in this location should be considered 'initial' functional floodplain.
Climate change	Climate change would not affect the site in the latter part of the plan period. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass
Exception Test Needed	No
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP11, MJP23, MJP28 and MJP29. This site is at higher risk from surface water flooding than MJP11, MJP23, MJP28 and MJP29. All the alternative sites are located in Flood Zone 1. Therefore this site should be considered after MJP28, MJP23, MJP29 and MJP11.
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.

[8] 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]



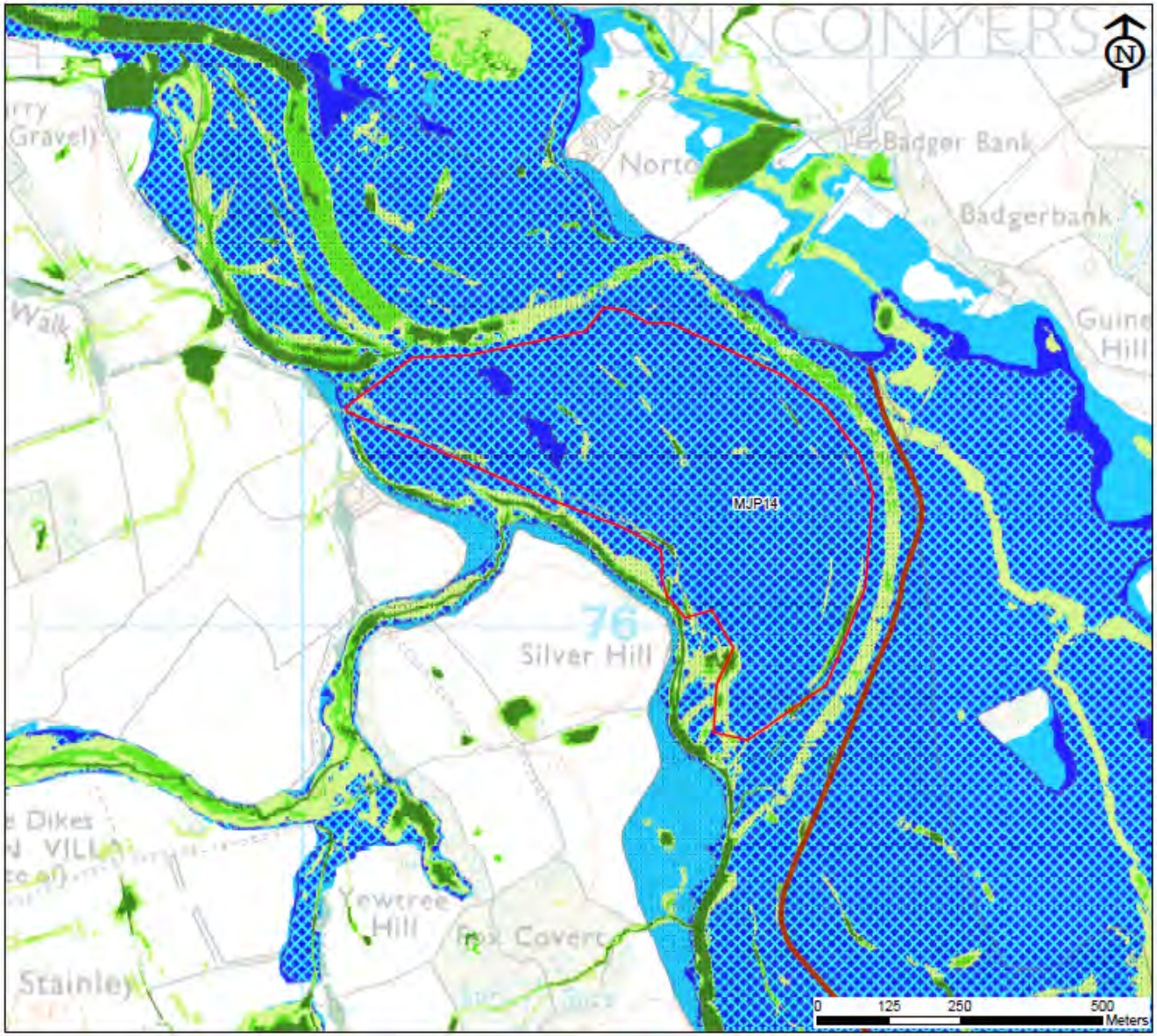
Site Reference: MJP14 Land in vicinity of Ripon Quarry, North Stainley	
Site Information	Pennycroft and Thorneyfields is subject to an application (NY/2011/0429/ENV) which is awaiting determination. Proposed access: Existing Ripon Quarry access onto A6108 (approximately 460m south of North Stainley) with the mineral to be moved from the area to the existing plant site on the south-west side of the River Ure without passage on the highway. Current use: Agriculture Site area: 30.22ha (Pennycroft and Thorneyfields) Minerals Estimated Reserve: 3,500 tonnes Annual output of 250,000 tonnes Estimated date of commencement: 2015 - 2016 Proposed Life of Site: 15 years
Proposed Land Use	Extraction of sand and gravel as proposed extension to existing quarry.
NPPF Vulnerability Classification	Water compatible
Overview of flooding	100% of the site is in Flood Zones 2 and 3. It is also identified as being at historic flood risk. About 5% of the site is also subject to surface water flooding, which includes small areas at high risk (1:30 (3.33%)) of 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. The site lies across two 1km squares in the Environment Agency's Areas Susceptible to Groundwater Flooding maps, with the southern part of the site is in a km square that is >50 to <75% at risk of superficial deposits flooding. According to the planning application for this site *"in order to 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 8.6m below ground level"*[9].
Relevant Local SFRA	North West Yorkshire

[9] 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]

1:20 (5%) flood event or Local SFRA Functional Floodplain	The 1:20 (5%) event extent mapping for this SFRA shows that 100% of this site is at 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 1:20 (5%) risk the site should be regarded as potentially being in functional floodplain in line with the North West SFRA.
Climate change	The site is currently 100% at risk from the 1:20 (5%) event and Flood Zones 2 and 3, as such climate change is likely to increase the depth of flooding over the site compared to present day for these event scenarios. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass. This is water compatible development, however, MJP06 and MJP07 should be considered before this site from a flood risk point of view.
Exception Test Needed	No. This site is water compatible.
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability	Yes, MJP06 and MJP07. Both MJP06 and MJP07 are at lower risk from flooding than this site. Therefore MJP06 and MJP07 are preferable to this site[10].
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[11].

[10] 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.

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



North Yorkshire County Council

Key

- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

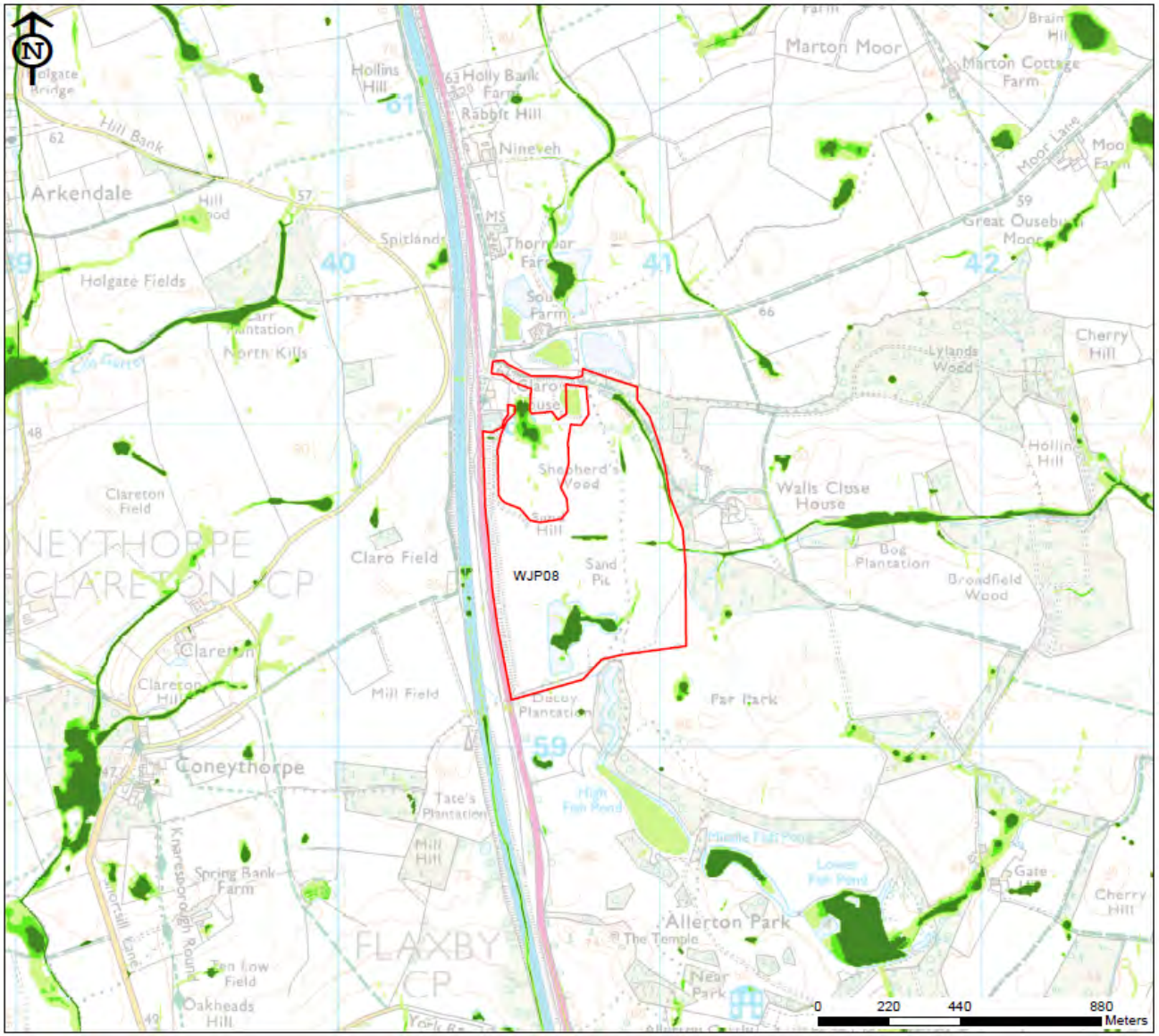
Site Reference: WJP08 Allerton Park, near Knaresborough	
Site Information	Site currently has planning permission until 2018 for landfill. There would be built infrastructure to support the extension to the landfill operations and the recycling operation. The Allerton Waste Recovery Park facility adjacent to the site is currently under construction. Proposed access: Existing at Allerton Park Landfill site onto the A168, approximately 3km north of junction 47 of the A1(M). Current use: Landfill and associated landfill gas utilisation plant Site area: 29ha Waste annual tonnage import: 60,000 (based on current inputs). Current permit allows 365,000 tonnes. Estimated date of commencement: Continuation from 2018 Proposed Life of Site: Until 2033
Proposed Land Use	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).
NPPF Vulnerability Classification	Landfill is more vulnerable, other uses are less vulnerable

Overview of flooding	This site is 100% in Flood Zone 1. About 5% - 10% of the site is subject to low risk (1:1000 (0.1%)) to high risk (1:30 (3.33%)) surface water flooding. Most of this site is in two 1km squares which the Environment Agency's Areas Susceptible to Groundwater Flooding indicates have a <25% vulnerability to Clearwater flooding. The remainder of the site (along the eastern boundary) is not mapped. 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 flooding[12]. 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 small[13]. However, as this development is unlikely to extend the depths of any features risks are considered to be low, but should still be investigated.
Relevant Local SFRA	North West Yorkshire
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. In the North West Yorkshire SFRA functional floodplain is defined as undeveloped areas in Flood Zone 3, maps were not available for review at the time of writing. The North West Yorkshire SFRA is in the process of being revised therefore we consider the 1:20 (5%) extent in this location should be considered 'initial' functional floodplain.
Climate change	Climate change to river flood risk is unlikely to affect the site in the latter part of the plan period. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively. A changed site profile will have affected where water gathers.
Sequential Test result	Pass
Exception Test Needed	No

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

[13] 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}

Is an alternative site available which could help meet requirements for this waste facility, subject to other tests of suitability?	Yes, WJP05, WJP06, WJP11, WJP15, WJP16, WJP18 and WJP19. This site is at similar risk from surface water flooding with WJP19, both of which are located in Flood Zone 1. WJP05, WJP06, WJP11, WJP15, WJP16 and WJP18 are all at higher risk from river flooding than this site. Therefore this site should be considered alongside WJP19 and in preference to and WJP05, WJP06, WJP11, WJP15, WJP16 and WJP18.
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 be used to sustainably manage surface water runoff.



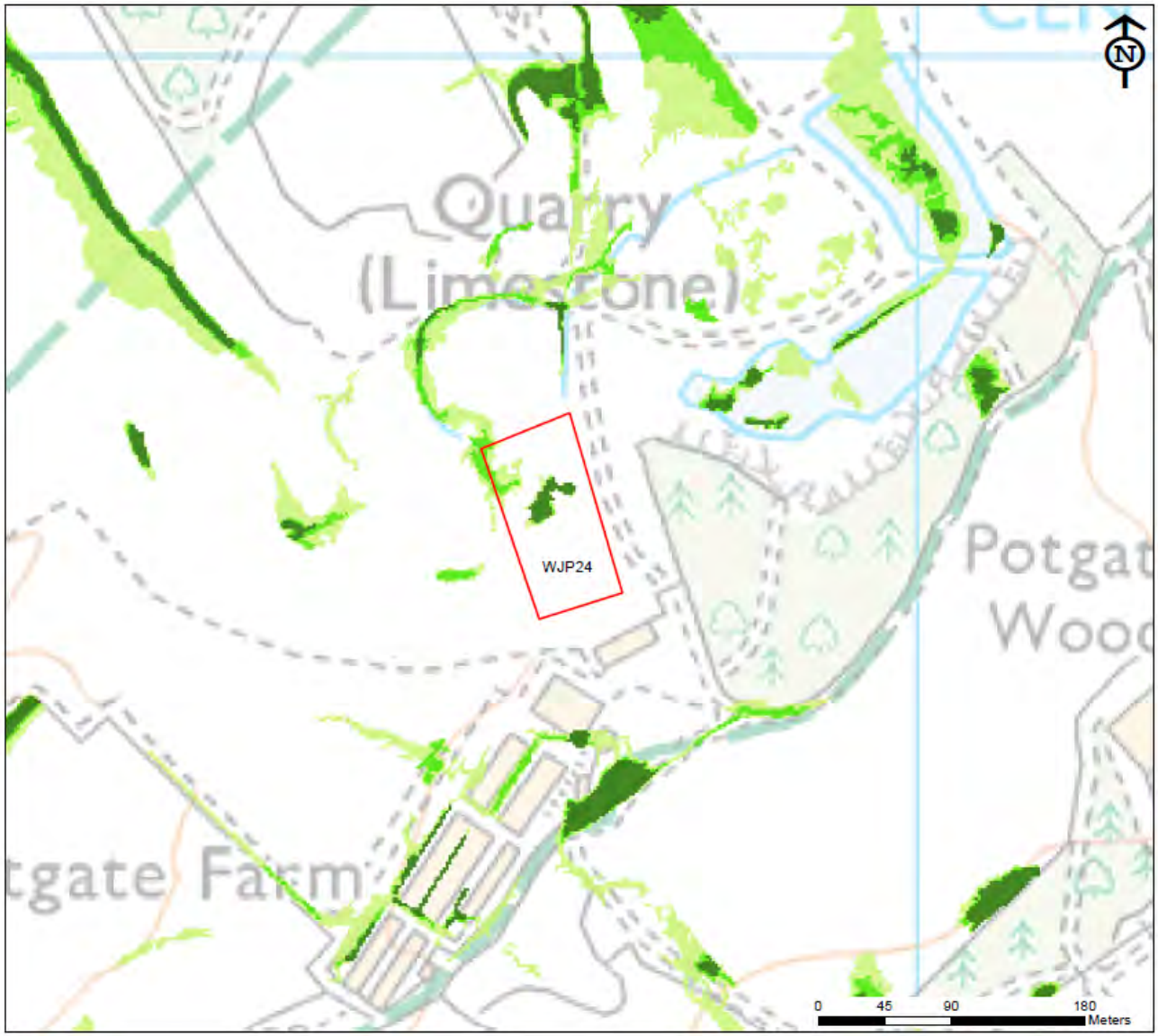
North Yorkshire County Council

Key

- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

Site Reference: WJP24 Potgate (former plant site), North Stainley	
Site Information	The facility would operate in conjunction with Potgate Quarry to extend the life of the Quarry. Note: Site Submission WJP23 for a similar proposal on adjacent land has been withdrawn. Proposed access: Existing Potgate Quarry access via Water Lane (bridleway) onto A6108 approximately 100m south of North Stainley village. Current use: Redundant crushing and screening plant. Site area: 0.75ha Waste annual tonnage import: 30,000 Estimated date of commencement: January 2018 Proposed Life of Site: Tied to Potgate Quarry permission which is 1st June 2022 (if MJP10 is not developed)
Proposed Land Use	Recycling of inert construction and demolition waste for secondary aggregates.
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	This site is 100% in Flood Zone 1. About 10% of the site is subject to medium risk (1:100 (1%)) to high risk (1:30 (3.33%)) surface water flooding. Low risk (1:1000 (0.1%)) surface water flooding affects a further 10% of the site. The site is in two 1km squares identified as <25% of the km square being susceptible to Clearwater groundwater flooding.
Relevant Local SFRA	North West Yorkshire
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. In the North West Yorkshire SFRA functional floodplain is defined as undeveloped areas in Flood Zone 3, maps were not available for review at the time of writing. The North West Yorkshire SFRA is in the process of being revised therefore we consider the 1:20 (5%) extent in this location should be considered 'initial' functional floodplain.
Climate change	Climate change to river flood risk is unlikely to affect the site in the latter part of the plan period. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass
Exception Test Needed	No

Is an alternative site available which could help meet requirements for this waste facility, subject to other tests of suitability?	Yes, WJP10, WJP21 and WJP22. WJP10, WJP21 and WJP22 have similar levels of flood risk from surface water. WJP10 is within close proximity to Flood Zone 2 and WJP22 is within Flood Zones 2 and 3 to a minor extent. Therefore this site should be considered alongside WJP21 and WJP10 and is preferable to WJP22.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment is not required as this site is in Flood Zone 1 and is less than 1ha. Surface water runoff from this site should be managed using SuDS where appropriate.



North Yorkshire County Council

Key

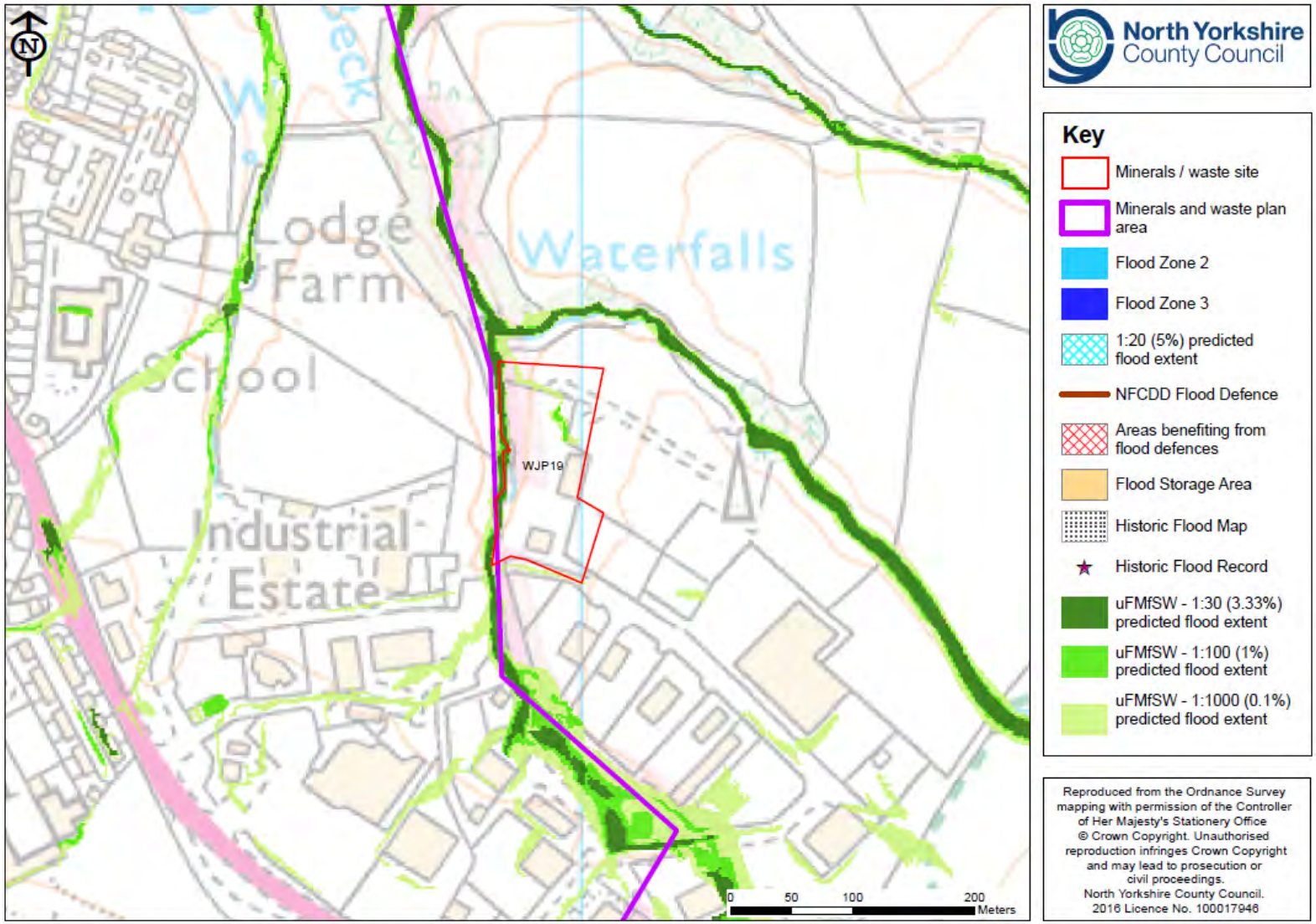
- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

5. North York Moors National Park

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

Site Reference: WJP19 Fairfield Road, Whitby	
Site Information	Proposed access: Existing onto Fairfield Way (unclassified U98) to A171. Current use: Partly existing recycling and transfer of municipal and commercial waste facility and partly grassland. Site area: 1.25ha Waste annual tonnage import: 51,700 Estimated date of commencement: Unknown at present Proposed Life of Site: Unknown at present
Proposed Land Use	Proposed extension to area and changes to existing facility for recycling and transfer of municipal and commercial waste.
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	This site is 100% in Flood Zone 1. About 5% of the site is subject to low risk (1:1000 (0.1%)) to high risk (1:30 (3.33%)) surface water flooding. Low risk and medium risk (1:100 (1%)) areas are to the north of the site while high risk flood risk areas are along the western site boundary. Site is in 2 1km square identified as susceptible to superficial deposit flooding across <25% of the km square to the west and >50% - <75% of the km square to the east. Proposals are above ground so risk is likely to be less significant.
Relevant Local SFRA	North East Yorkshire
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. 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".

Climate change	Climate change to river flood risk is unlikely to affect the site in the latter part of the plan period. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively. A changed site profile will have affected where water gathers.
Sequential Test result	Pass
Exception Test Needed	No
Is an alternative site available which could help meet requirements for this waste facility, subject to other tests of suitability?	Yes, WJP05, WJP06, WJP08, WJP11, WJP15, WJP16 and WJP18. This site is at similar risk from surface water flooding with WJP08, both of which are located in Flood Zone 1. WJP05, WJP06, WJP11, WJP15, WJP16 and WJP18 are all at higher risk from river flooding than this site. Therefore this site should be considered alongside WJP08 and in preference to and WJP05, WJP06, WJP11, WJP15, WJP16 and WJP18.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment would be required as although this site is in Flood Zone 1 it is greater than 1ha. Surface water runoff from this site should be managed using SuDS where appropriate.


Lodge Farm
School
Waterfalls
Industrial Estate
WJP19
0 50 100 200
Meters
North Yorkshire County Council
Key
Minerals / waste site
Minerals and waste plan area
Flood Zone 2
Flood Zone 3
1:20 (5%) predicted flood extent
NFCDD Flood Defence
Areas benefiting from flood defences
Flood Storage Area
Historic Flood Map
Historic Flood Record
uFMfSW - 1:30 (3.33%) predicted flood extent
uFMfSW - 1:100 (1%) predicted flood extent
uFMfSW - 1:1000 (0.1%) predicted flood extent
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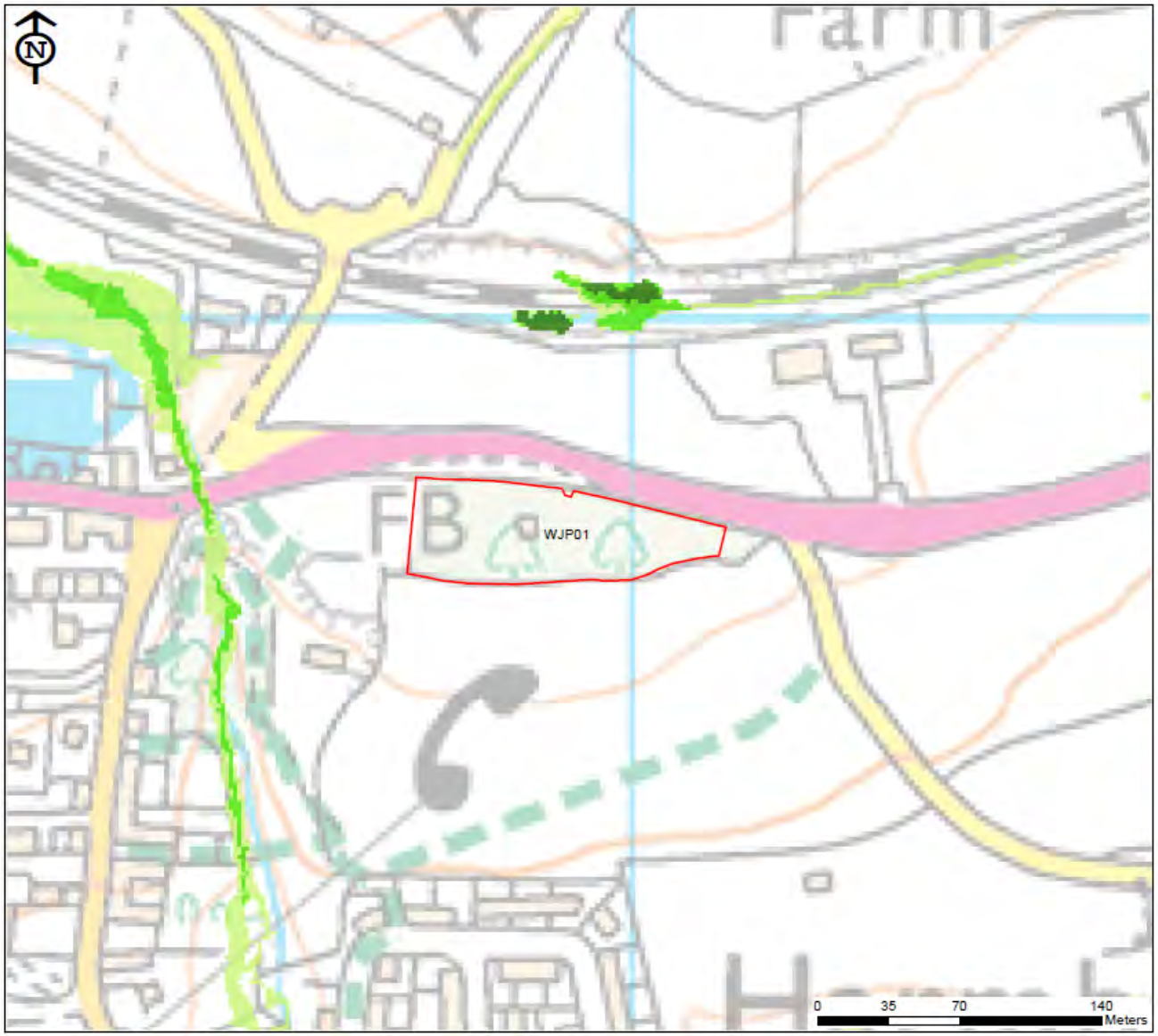
6. Richmondshire Sites

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

Site Reference: WJP01 Hillcrest, Harmby	
Site Information	There is no end-date specified by existing planning conditions for the existing scrap yard facility. WJP01 proposal likely to include a new waste transfer building at east end of site and an office facility near the site entrance. Proposed access: Existing access onto A684 at Harmby, approximately 205m east of the junction with the C42 road to Spennithorne. Current use: Scrap Yard including end of life vehicle dismantling Site area: 0.64ha Waste annual tonnage import: 10,000 – 15,000 Estimated date of commencement: 2017 Proposed Life of Site: Permanent
Proposed Land Use	Waste Transfer Station (including recycling) for commercial and industrial waste including construction and demolition waste.
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	This site is 100% in Flood Zone 1. This site is not at risk from surface water flooding. The site lies across two 1km 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.
Relevant Local SFRA	North West Yorkshire

1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. In the North West Yorkshire SFRA functional floodplain is defined as undeveloped areas in Flood Zone 3, maps were not available for review at the time of writing. The North West Yorkshire SFRA is in the process of being revised therefore we consider the 1:20 (5%) extent in this location should be considered 'initial' functional floodplain.
Climate change	Climate change to river flood risk is unlikely to affect the site in the latter part of the plan period. Climate change effects on surface water flooding may impact the site in the latter plan period, however, the level of risk is likely to be low.
Sequential Test result	Pass
Exception Test Needed	No
Is an alternative site available which could help meet requirements for this waste facility, subject to other tests of suitability?	Yes, WJP02, WJP03, WJP13 and WJP25. This site is at slightly lower risk from surface water flooding than WJP13 and WJP25. WJP03 is at a slightly higher level of risk from surface water flooding and is also within Flood Zone 2 to a minor extent. WJP02 is in Flood Zones 2 and 3. Therefore this site should be considered alongside but before WJP13 and WJP25 and in preference WJP03 and WJP02.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment is not required as this site is in Flood Zone 1 and is less than 1ha. Surface water runoff from this site should be managed using SuDS where appropriate.



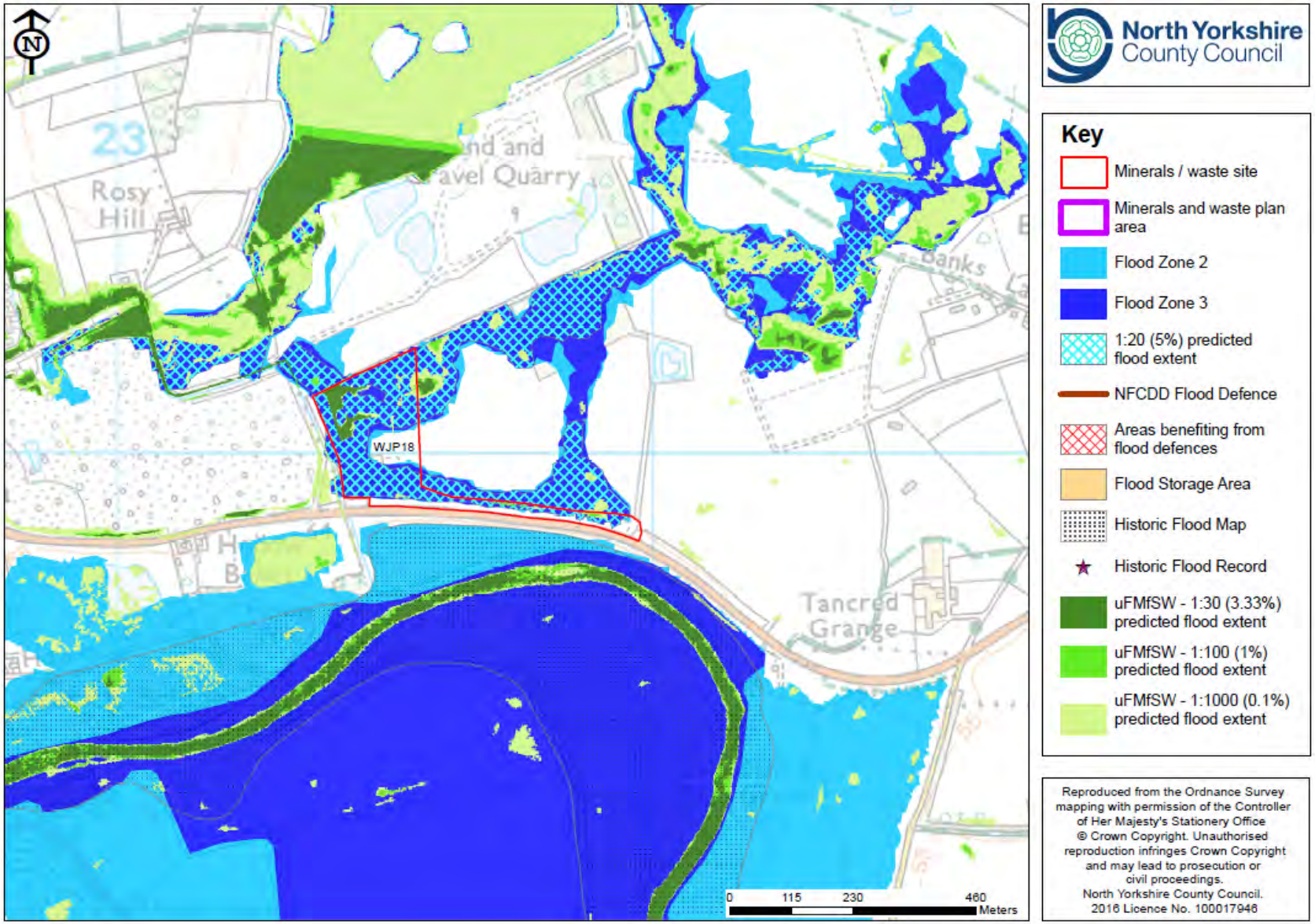
North Yorkshire County Council

Key

- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

Site Reference: WJP18: Tancred, near Scorton	
Site Information	Compost to be used in restoration to agriculture of the landfill site near Tancred Grange. Operation of the transfer station/ recycling facility and composting area is currently permitted until March 2025 with restoration to agriculture. Proposed access: Existing access at Tancred facility onto B6271 approximately 1400m west of Scorton village. Current use: Waste transfer, recycling and open windrow composting. Site area: 1.98ha – Recycling and composting facility Waste annual tonnage import: • 26,999 - Composting • 100,999 - Municipal and commercial recycling-bulking and transfer (All above estimates for 2020) Estimated date of commencement: 2025 Proposed Life of Site: 2031 - 2035
Proposed Land Use	Proposed retention of recycling (including treatment, bulking and transfer) and open windrow composting facilities beyond 2025.
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	About 85% of the site is Flood Zones 2 and 3. Medium risk (1:100 (1%)) to high risk (1:30 (3.33%)) surface water flooding affects about 10% of the site. Site lies across two 1km squares of differing susceptibility to groundwater flooding. The northern part of the site is in a 1km square, >50% to <75% of which is vulnerable to superficial deposits groundwater flooding and southern part of the site, including the site access, is in an area where >75% of the area is susceptible 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).
Relevant Local SFRA	North West Yorkshire

1:20 (5%) flood event or Local SFRA Functional Floodplain	The 1:20 (5%) event extent mapping for this SFRA shows that about 80% of this site is at flood risk. In the North West Yorkshire SFRA functional floodplain is defined as undeveloped areas in Flood Zone 3, maps were not available for review at the time of writing. The North West Yorkshire SFRA is in the process of being revised therefore we consider the 1:20 (5%) extent in this location should be considered 'initial' functional floodplain.
Climate change	Climate change is likely to increase the 1:20 (5%) predicted flood event extent within the site. Areas of Flood Zone 3 are likely to increase into areas that are shown as Flood Zone 2 and Flood Zone 2 is likely to increase in extent into the site. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	**Site is not suitable**. Less vulnerable land uses are not permitted at sites within functional floodplain. Sites WJP08 and WJP19 should be considered before this site followed by WJP16, WJP06. WJP15, WJP11 and WJP05 are at similar levels of risk but to a lesser extent. Therefore all of the alternative sites are preferable to this site.
Exception Test Needed	No, however, less vulnerable land uses are not permitted at sites within functional floodplain.
Is an alternative site available which could help meet requirements for this waste facility, subject to other tests of suitability?	Yes, WJP05, WJP06, WJP08, WJP11, WJP15, WJP16 and WJP19. WJP08 and WJP19 are in Flood Zone 1 and WJP16 is in Flood Zone 2. WJP06 is in Flood Zone 3 but benefits from existing defences. WJP15, WJP11 and WJP05 are at similar levels of risk but to a lesser extent. Therefore all of the alternative sites are preferable to this site.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	The flood risk assessment should establish whether the area marked as being at a 1:20 (5%) 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 the 1:20 (5%) event and of Flood Zones 2 and 3. A flood risk assessment should consider how surface water flooding and drainage will be managed across the site without increasing flooding elsewhere utilising SuDS. Groundwater flooding should be further investigated. All sites in functional floodplain 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.


N
23
Rosy Hill
WJP18
Tancred Grange
0
115
230
460
Meters
North Yorkshire County Council
Key
Minerals / waste site
Minerals and waste plan area
Flood Zone 2
Flood Zone 3
1:20 (5%) predicted flood extent
NFCDD Flood Defence
Areas benefiting from flood defences
Flood Storage Area
Historic Flood Map
Historic Flood Record
uFMfSW - 1:30 (3.33%) predicted flood extent
uFMfSW - 1:100 (1%) predicted flood extent
uFMfSW - 1:1000 (0.1%) predicted flood extent
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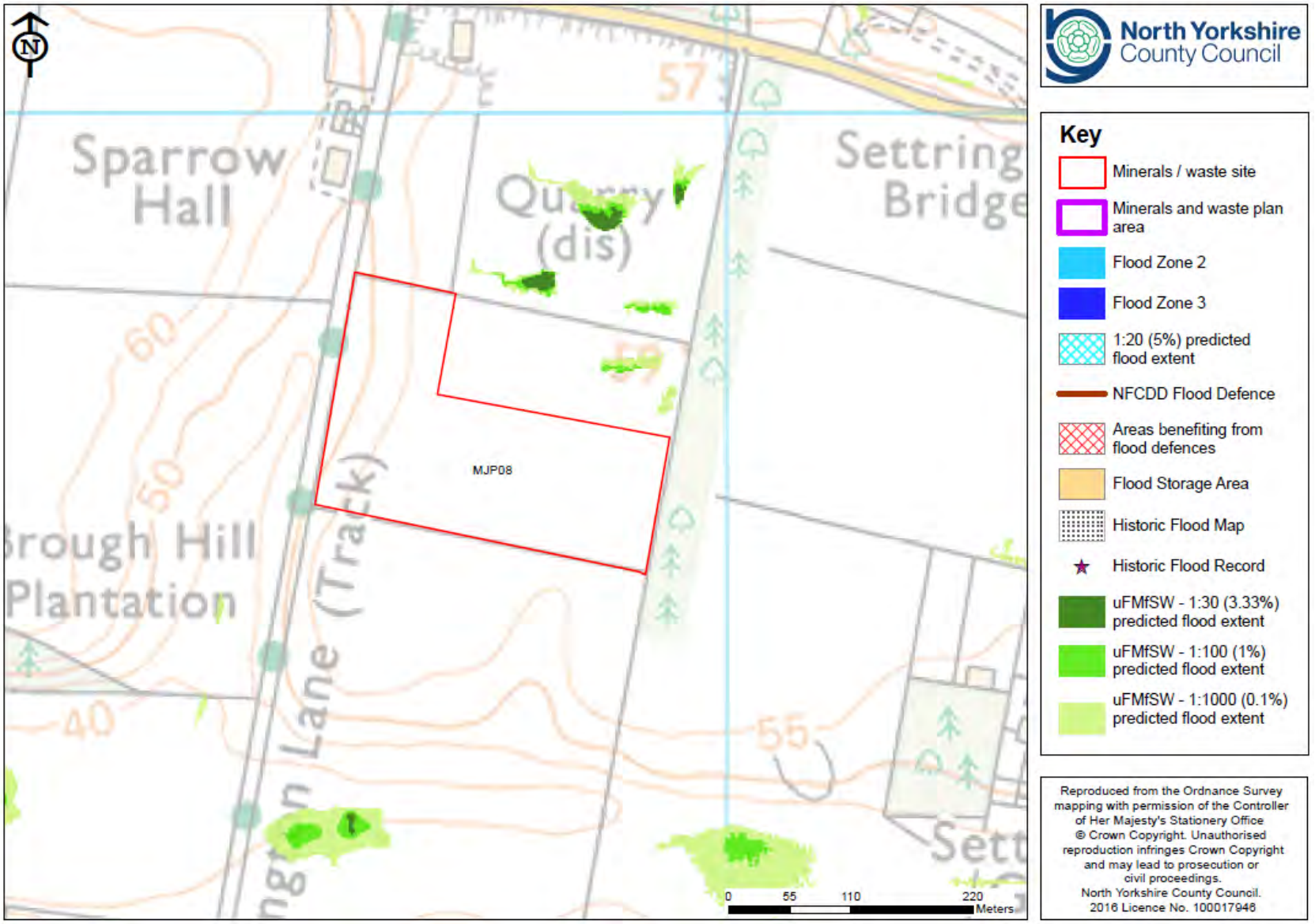
7. Ryedale Sites

Key to Sequential Test Results		
Pass	**Pass subject to further consideration of the site's contribution to the supply of minerals or waste facilities.**	**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 would be a minimum of 100m from Langton Lane, consistent with the existing quarry operation. The submitter advises that unless for local delivery HGVs are routed via C350 to Settrington (Back Lane C349 & Chapel Road C349) to Forkers Lane/Bull Piece Lane (C349) to Scagglethorpe thence to the A64; or along Grimston Lane to B1248 southwards; or along the C350 to B1248 via Norton to A64 (Brambling Fields junction). Proposed access: There would be no direct access from MJP08 site to the public highway. The site would be worked direct from within the existing Settrington Quarry and stone would leave using the existing quarry access onto the C350 road (between Settrington and B1248 from Norton) approximately 75m east of Langton Lane (U8022 unclassified road). Current use: Agriculture Site area: 5.6ha Minerals Estimated Reserve: 1,700,000 tonnes Annual output of 80,000 – 120,000 tonnes Estimated date of commencement: 2018 Proposed Life of Site: 20 – 25 years
Proposed Land Use	Extraction of Jurassic limestone as proposed extension to existing quarry and importation of soils for use in restoration.
NPPF Vulnerability Classification	Less vulnerable

Overview of flooding	This site is 100% in Flood Zone 1. This site is not at risk from surface water flooding. According to the Environment Agency's 'Areas Susceptible to Groundwater Flooding' map site is in a 1km square in which <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 25mAOD which was above the water table[14].
Relevant Local SFRA	North East Yorkshire
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. 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".
Climate change	Climate change to river flood risk is unlikely to affect the site in the latter part of the plan period. Climate change effects on surface water flooding may impact the site in the latter plan period, however, the level of risk is likely to be low.
Sequential Test result	Pass
Exception Test Needed	No
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	No. No other Jurassic limestone site has been identified as suitable for SFRA assessment and this site is located in Flood Zone 1.
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.

[14] 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]


Sparrow Hall
Quarry (dis)
Settring Bridge
MJP08
Brough Hill Plantation
Lane (Track)
57
60
59
50
40
55
0 55 110 220
Meters
North Yorkshire County Council
Key
Minerals / waste site
Minerals and waste plan area
Flood Zone 2
Flood Zone 3
1:20 (5%) predicted flood extent
NFCDD Flood Defence
Areas benefiting from flood defences
Flood Storage Area
Historic Flood Map
Historic Flood Record
uFMfSW - 1:30 (3.33%) predicted flood extent
uFMfSW - 1:100 (1%) predicted flood extent
uFMfSW - 1:1000 (0.1%) predicted flood extent
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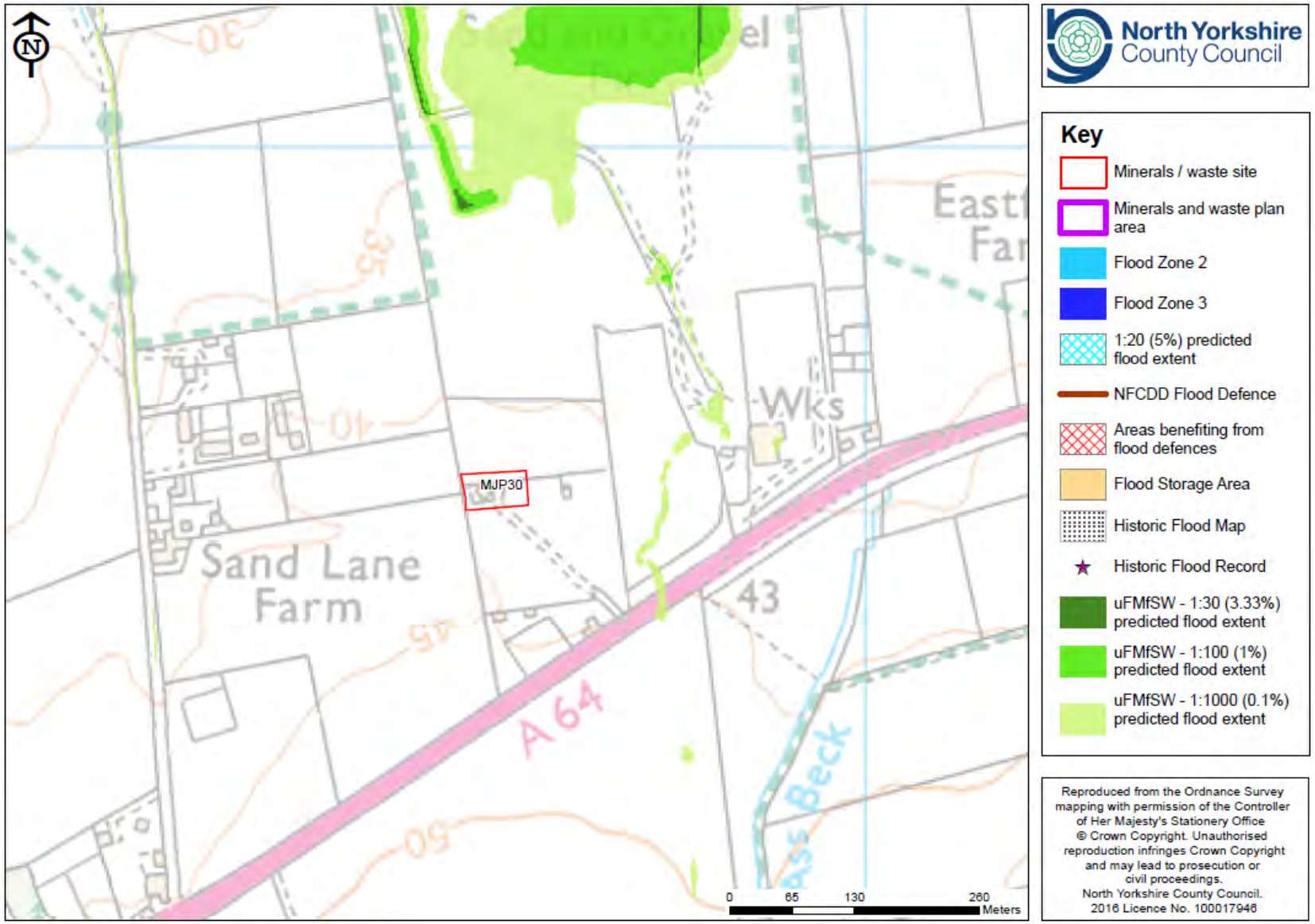
Site Reference: MJP30 West Heslerton Quarry	
Site Information	Planning permission to replace the bungalow may be sought in the future. Proposed access: There would be no direct access to the MJP30 site; rather the mineral would be taken direct into the existing West Heslerton Quarry without transport on the public highway. Material would then leave via the existing Quarry access onto A64 approximately 490m east of West Heslerton village. Current use: Bungalow and associated land Site area: 0.29ha Minerals Estimated Reserve: 30,000 – 50,000 tonnes Annual output of 35,000 tonnes Estimated date of commencement: 2019 Proposed Life of Site: One year
Proposed Land Use	Extraction of sand as proposed extension to existing quarry
NPPF Vulnerability Classification	Water compatible
Overview of flooding	This site is 100% in Flood Zone 1. This site is not at risk from surface water flooding. In terms of groundwater flooding according to the Environment Agency's Areas Susceptible to Groundwater Flooding map the site is in a 1km square where >75% of the area has conditions that could support superficial deposits groundwater flooding. A previous application at the existing quarry adjacent to this site stated that *"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 metres below the 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*"[15]. Groundwater, however, is considered to be an inherent issue with many sand quarries.
Relevant Local SFRA	North East Yorkshire

[15] 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]

1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. 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”.
Climate change	Climate change to river flood risk is unlikely to affect the site in the latter part of the plan period. Climate change effects on surface water flooding may impact the site in the latter plan period, however, the level of risk is likely to be low.
Sequential Test result	Pass
Exception Test Needed	No. This site is water compatible.
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP22, MJP44 and MJP54. This site is at slightly lower risk from surface water flooding than MJP44 and MJP54, both of which are also in Flood Zone 1. MJP22 is at significantly higher flood risk from rivers. Therefore this site should be considered before but alongside MJP44 and MJP54 and in preference to MJP22.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment is not required as this site is in Flood Zone 1 and is less than 1ha. However, proposals 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 highly fluctuating groundwater levels in this area the proposals should consider this in the safe site operation plan.


North Yorkshire County Council
Key
Minerals / waste site
Minerals and waste plan area
Flood Zone 2
Flood Zone 3
1:20 (5%) predicted flood extent
NFCDD Flood Defence
Areas benefiting from flood defences
Flood Storage Area
Historic Flood Map
Historic Flood Record
uFMfSW - 1:30 (3.33%) predicted flood extent
uFMfSW - 1:100 (1%) predicted flood extent
uFMfSW - 1:1000 (0.1%) predicted flood extent
MJP30
Sand Lane Farm
A64
Wks
43
Ass Beck
0 65 130 260 Meters
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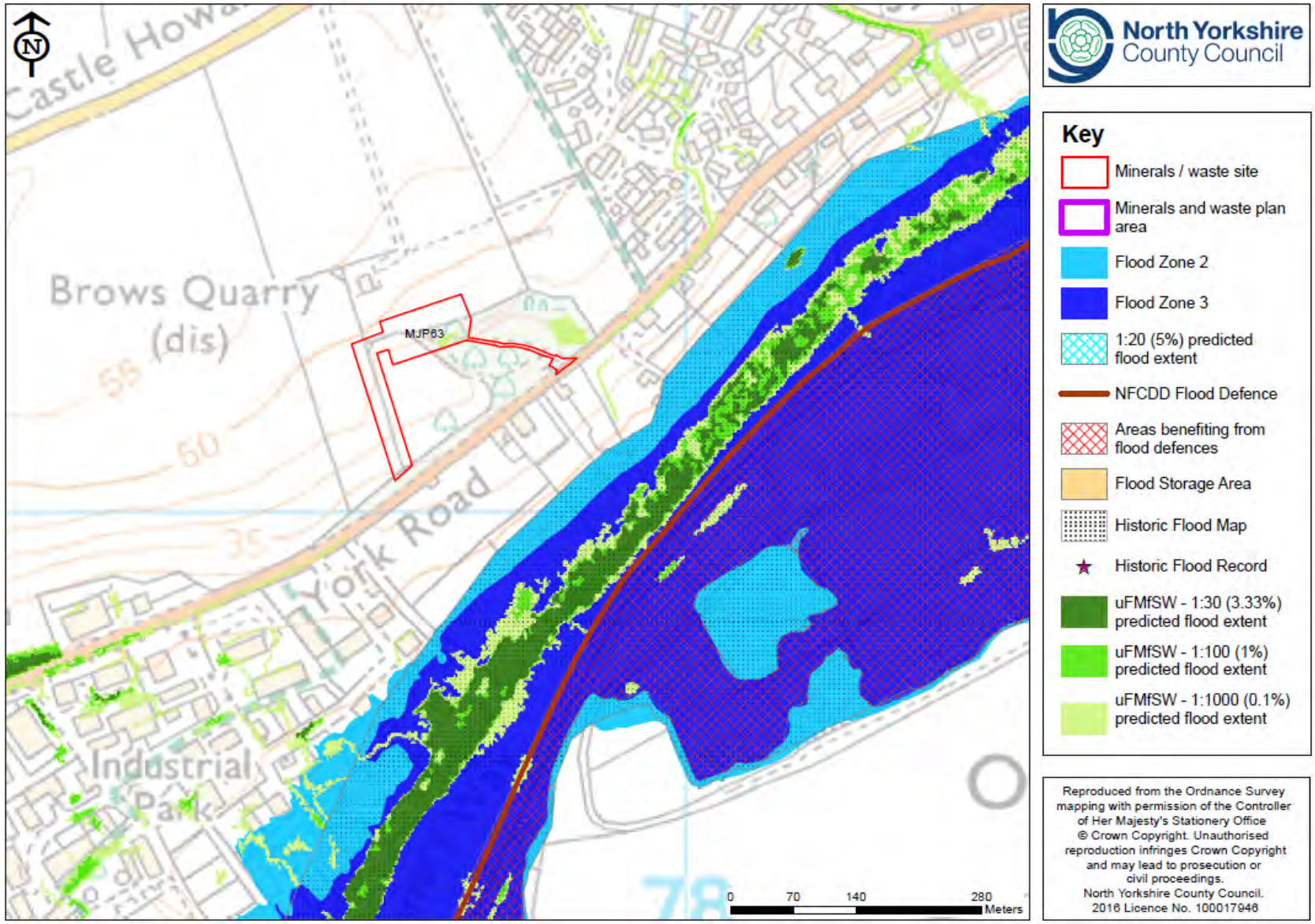
Site Reference: MJP63 Brows Quarry, Malton	
Site Information	Planning permission for the extraction of building stone at Brows Quarry (NY/2007/0293/FUL) was granted in 2009, but the permission was not implemented within the specified timescale so has lapsed. No drilling or blasting proposed. About 50% of the stone quarried will be unsuitable for use as building stone due to quality so the operation would involve the extraction of about 1,500 tonnes per year to achieve the output, but the surplus material would remain on site in order to form the sloping sides of the restored site. Proposed access: Main site access would be onto B1248 approximately 220m south-west of Rockingham Close, Malton. However, there would be a temporary access approximately 280 metres to the west of the proposed main site entrance to enable the delivery of the excavator and the formation of the main site entrance from within the site. Current use: Part disused quarry containing woodland and part agriculture Site area: 0.48ha Minerals Estimated Reserve: 37,500 tonnes Annual output of approximately 750 tonnes Estimated date of commencement: 2017 Proposed Life of Site: 25 years
Proposed Land Use	Extraction of building stone from part of a former quarry and a proposed extension to the quarry.
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	This site is 100% in Flood Zone 1. <5% of the site is at low risk (1:1000 (0.1%)) of surface water flooding. In terms of groundwater flooding, according to the Environment Agency's Areas Susceptible to Groundwater Flooding map the site is in a 1km square where <25% of the area has conditions that could support 'superficial deposits' groundwater flooding. A previous planning application on part of the site did not raise any groundwater flooding concerns[16].
Relevant Local SFRA	North East Yorkshire

[16] 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]

1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. 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”.
Climate change	Climate change to river flood risk is unlikely to affect the site in the latter part of the plan period. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass
Exception Test Needed	No
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	No. No other building stone site has been identified as suitable for SFRA assessment and this site is located in Flood Zone 1.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment is not required as this site is in Flood Zone 1 and is less than 1ha. Surface water runoff from this site should be managed using SuDS where appropriate.


Castle How
Brows Quarry
(dis)
MJP83
York Road
Industrial
Park
78
0
70
140
280
Meters
North Yorkshire
County Council
Key
Minerals / waste site
Minerals and waste plan area
Flood Zone 2
Flood Zone 3
1:20 (5%) predicted flood extent
NFCDD Flood Defence
Areas benefiting from flood defences
Flood Storage Area
Historic Flood Map
Historic Flood Record
uFMfSW - 1:30 (3.33%) predicted flood extent
uFMfSW - 1:100 (1%) predicted flood extent
uFMfSW - 1:1000 (0.1%) predicted flood extent
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8. York Sites

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

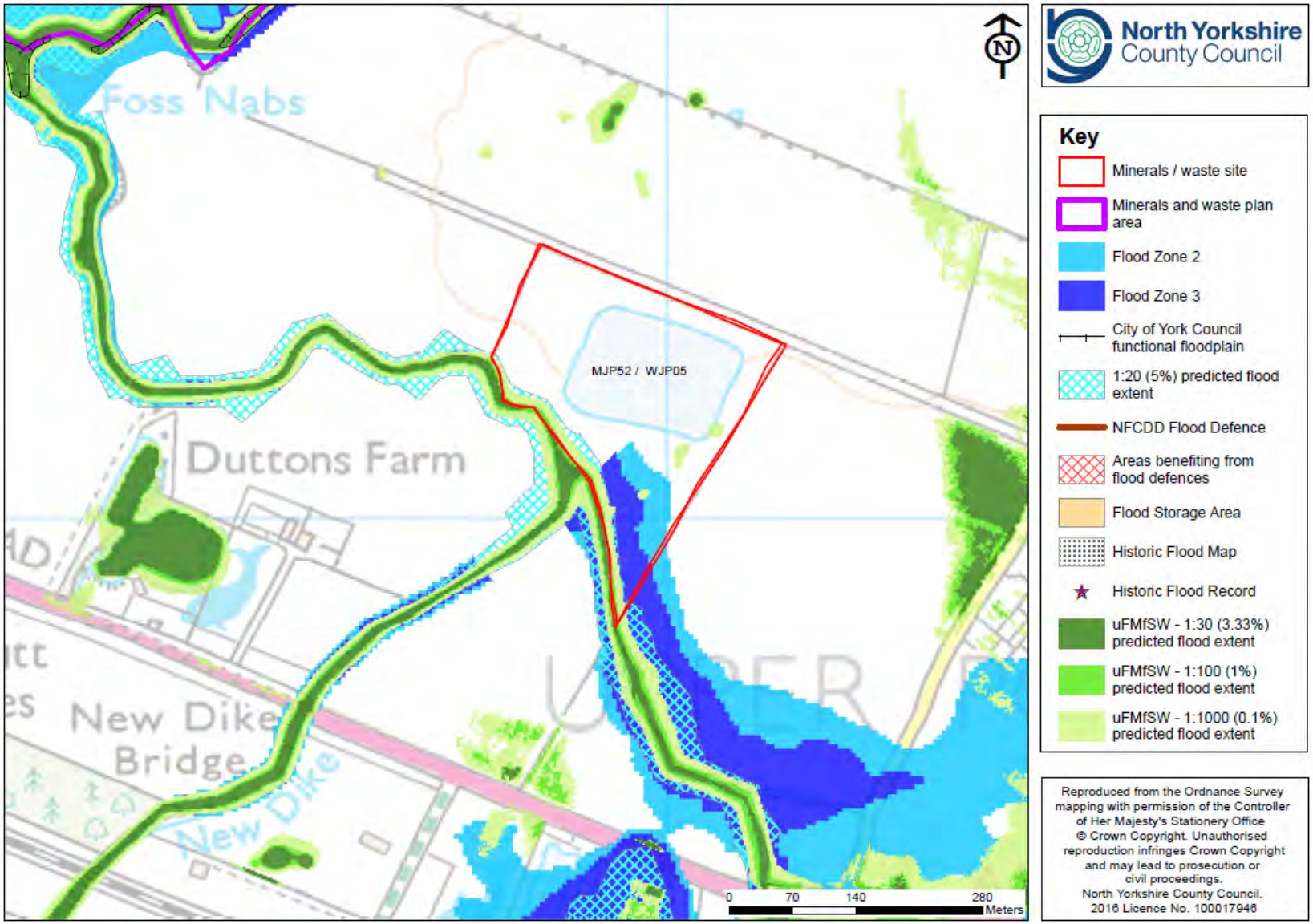
Site Reference: MJP52 Field SE5356 9513, to north of Duttons Farm, Upper Poppleton	
Site Information	Site is also the WJP05 which would follow on from the clay extraction as the means to achieve restoration on the site. There is no existing approved restoration plan for the site. Proposed access: Existing access via Kettlewell Lane onto Newlands Lane then onto the A59. Current use: Agriculture and a lake in the former clay working Site area: 6.28ha Minerals Estimated Reserve: 200,000 tonnes Annual output of 40,000 tonnes estimated Estimated date of commencement: 2017 Proposed Life of Site: 5 to 10 years
Proposed Land Use	Extraction of clay as a proposed extension to former quarry.
NPPF Vulnerability Classification	Less vulnerable

Overview of flooding	About 15% of the site to the south lies in Flood Zones 2 and 3. About 85% of the site lies in Flood Zone 1. Surface water flooding also follows the watercourse along the boundary with most of the high risk area being outside of the site boundary, leaving mainly medium risk (1:100 (1%)) and low risk (1:1000 (0.1%)) surface water flood risk in a narrow band along the boundary. Additional patches of low risk surface water flooding are to the eastern side of the site. No more than 10% of the site is affected by surface water flooding (low to high risk (1:30 (3.33%)), though a lake lies in the centre of the site. In terms of groundwater flooding, the site lies in a 1km square in which <25% of land may be susceptible to Clearwater flooding. 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[17] 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 of clay extraction.
Relevant Local SFRA	York
1:20 (5%) flood event or Local SFRA Functional Floodplain	The 1:20 (5%) predicted flood event extent following along the watercourse (Foss Dike) runs along the south western boundary. The 1:20 (5%) event extent mapping for this SFRA shows that about 5% of this site is at flood risk. York's SFRA defines functional floodplain as: • Land which would flood with annual probability of 1:20 (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 flood[18]. 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 1:20 (5%) flood risk should be considered as initial functional floodplain and further investigated.

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

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

Climate change	Climate change is likely to increase the 1:20 (5%) predicted flood event extent within the site. Areas of Flood Zone 3 are likely to increase into areas that are shown as Flood Zone 2 and Flood Zone 2 is likely to increase in extent into the site. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	**Site is not suitable**. Less vulnerable land uses are not permitted at sites within functional floodplain. Sites MJP45 and MJP55 should be considered before this site.
Actions to pass the Sequential Test	In order for this site to pass, subject to further consideration of the site's contribution to the supply of minerals or waste facilities, the redline boundary for any proposal needs to be outside of the 1:20 (5%) flood event or Local SFRA Functional Floodplain. If a proposed redline boundary for this site remains within Flood Zone 3 MJP45 and MJP55 would remain preferable to this site as they are located in Flood Zone 1 and Flood Zone 3 (but benefiting from existing defences) respectively.
Exception Test Needed	Yes, however, less vulnerable land uses are not permitted at sites within functional floodplain.
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP45 and MJP55. Both MJP45 and MJP55 are at lower risk than this site. Therefore MJP45 and MJP55 should be considered before this site.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A flood risk assessment will be required for this site. This should consider how surface water flooding and drainage will be managed across the site utilising SuDS. Groundwater flooding should be further investigated. The flood risk assessment should also establish whether the south western 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. 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.


Foss Nabs
MJP52 / WJP05
Duttons Farm
New Dike Bridge
New Dike
0 70 140 280
Meters
North Yorkshire County Council
Key
Minerals / waste site
Minerals and waste plan area
Flood Zone 2
Flood Zone 3
City of York Council functional floodplain
1:20 (5%) predicted flood extent
NFCDD Flood Defence
Areas benefiting from flood defences
Flood Storage Area
Historic Flood Map
Historic Flood Record
uFMfSW - 1:30 (3.33%) predicted flood extent
uFMfSW - 1:100 (1%) predicted flood extent
uFMfSW - 1:1000 (0.1%) predicted flood extent
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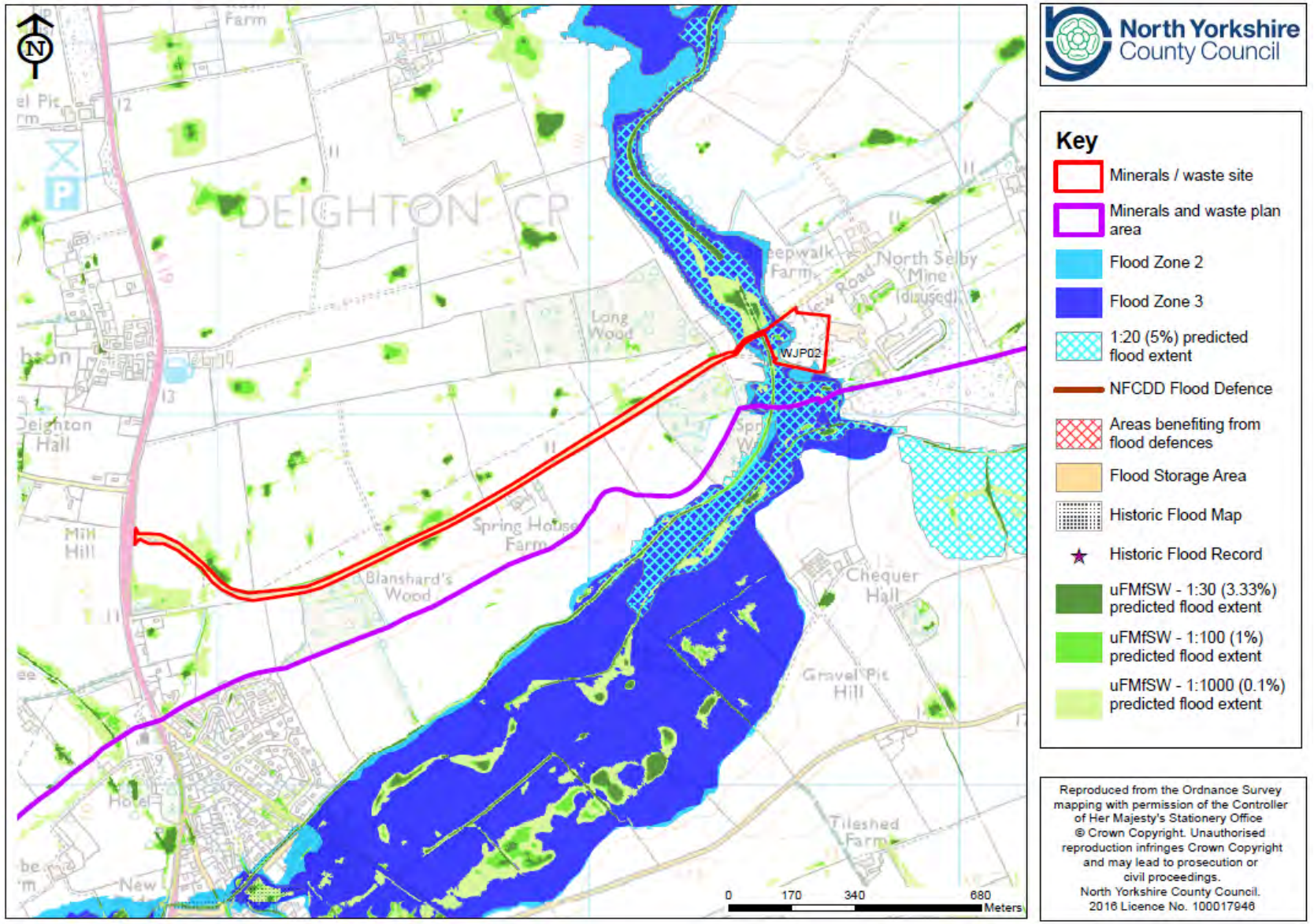
Site Reference: WJP02 Former North Selby Mine Site, Deighton	
Site Information	Planning application (12/03385/FULM) for the development of an anaerobic digestion and horticultural glasshouse project including CHP units was granted planning permission in April 2014 for receipt of source segregated organic LACW, C&I food waste and agricultural waste. No extra capacity is proposed as part of this submission in addition to that already permitted. Proposed access: Existing access from former North Selby mine site onto A19 approximately midway between the villages of Deighton and Escrick. Current use: Former coal mine Site area: 24ha Waste annual tonnage import: 60,000 Estimated date of commencement: By April 2017 (based on requirement for implementation specified in decision notice for planning application 12/03385/FULM). Proposed Life of Site: Permanent
Proposed Land Use	Energy from Waste facility
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	The site is located in both Flood Zones 2 and 3 associated with Halfpenny Dike / Bridge Dike to the western side of the main site. About 35% of the main site area being at risk of flooding. The access road is mainly in Flood Zone 1 apart from the section adjacent to the main site area which is also in Flood Zones 2 and 3. The site is <5% at risk of low risk (1:1000 (0.1%)) to high risk (1:30 (3.33%)) surface water flooding. The high risk areas are associated with the access road rather than the main site area. In terms of groundwater flooding, the site lies in four 1km squares. Three 1km squares where >50% - <75% of land may be susceptible to Clearwater flooding and one 1km square where >25% - <50% of land may be susceptible to Clearwater flooding. The main site area is within the higher risk class with most of the access road being in the lower risk class.
Relevant Local SFRA	York

1:20 (5%) flood event or Local SFRA Functional Floodplain	About 20% of the main site area and the eastern end of the access road is located in the 1:20 (5%) event flood extent. York's SFRA defines functional floodplain as: • Land which would flood with annual probability of 1:20 (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 flood[19]. 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 1:20 (5%) flood risk should be considered as initial functional floodplain and further investigated.
Climate change	Areas of Flood Zone 3 are likely to increase into areas that are shown as Flood Zone 2 and Flood Zone 2 is likely to increase in extent into the site. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass. WJP01, WJP03, WJP13 and WJP25 should be considered before this site.
Exception Test Needed	No
Is an alternative site available which could help meet requirements for this waste facility, subject to other tests of suitability?	Yes, WJP01, WJP03, WJP13 and WJP25. WJP01, WJP13 and WJP25 are all in Flood Zone 1 and at lower risk from surface water flooding than this site. WJP03 is in Flood Zone 2 to a minor extent and is at a similar level of risk from surface water flooding. All the alternative sites are at lower risk of flooding than this site, therefore this site should be considered after the alternatives.

[19] City of York, 2013.

Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment will be required which should confirm the impact of climate change on river flooding at this site. The flood risk assessment should also address the issues of draining surface water using SuDS and without causing additional flood risk. Groundwater flooding should be further investigated. All sites in functional floodplain 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.


North Yorkshire County Council
Key
Minerals / waste site
Minerals and waste plan area
Flood Zone 2
Flood Zone 3
1:20 (5%) predicted flood extent
NFCDD Flood Defence
Areas benefiting from flood defences
Flood Storage Area
Historic Flood Map
Historic Flood Record
uFMfSW - 1:30 (3.33%) predicted flood extent
uFMfSW - 1:100 (1%) predicted flood extent
uFMfSW - 1:1000 (0.1%) predicted flood extent
WJP02
DEIGHTON CP
Deighton Hall
Mill Hill
Spring House Farm
Blanshard's Wood
Chequer Hall
Gravel Pit Hill
Tileshed Farm
North Selby Mine (disused)
Long Wood
0 170 340 680 Meters
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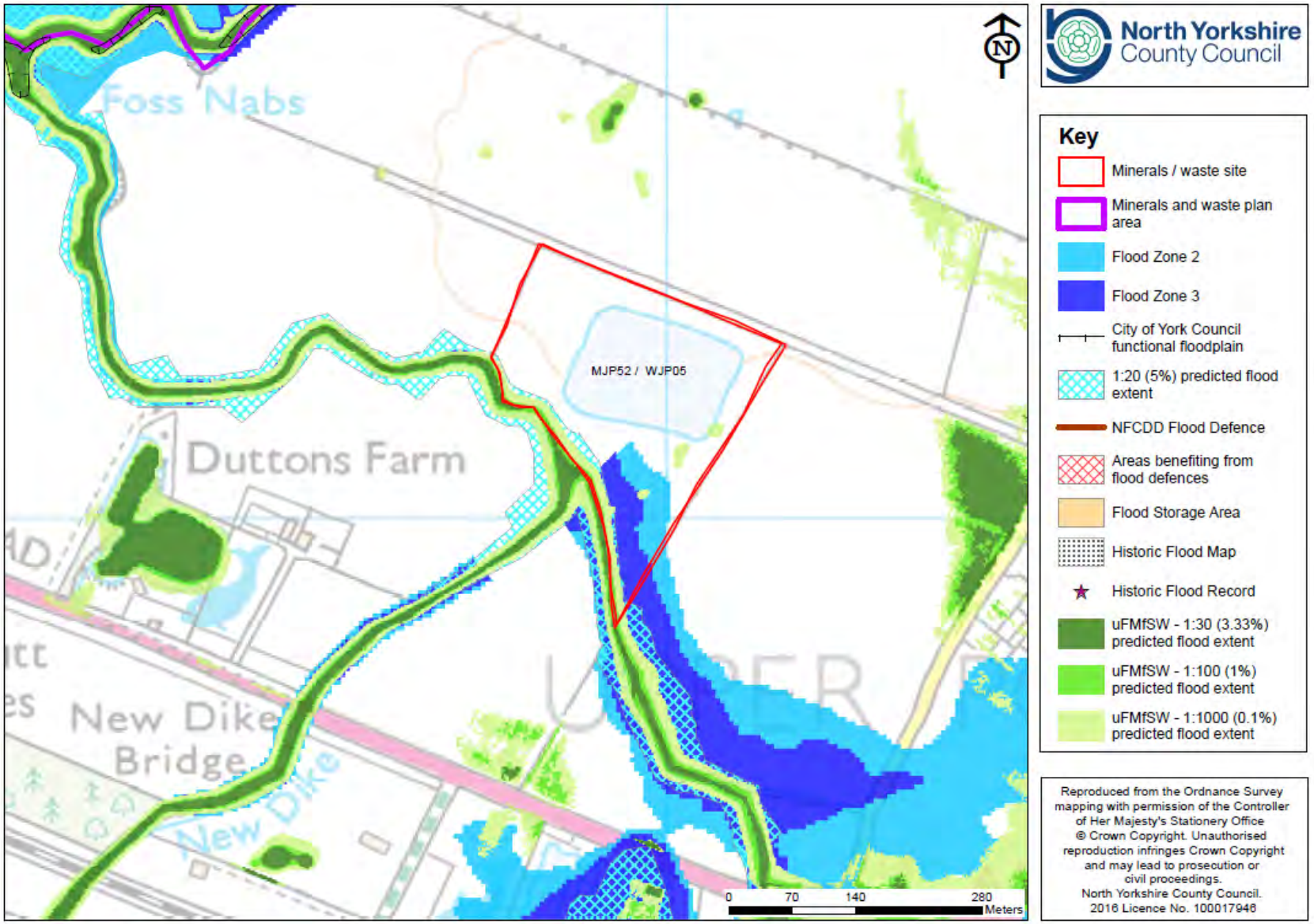
Site Reference: WJP05 Field to north of Duttons Farm, Upper Poppleton	
Site Information	Site is also the MJP52 site area and the proposal would follow on from the extraction as the means to achieve the restoration on the site. Proposed access: Existing access via Kettlewell Lane onto Newlands Lane then onto A59. Current use: Agriculture and a lake in the former clay working. Site area: 6.28ha Waste annual tonnage import: 40,000 Estimated date of commencement: Prior to 2022 Proposed Life of Site: 2022 - 2027
Proposed Land Use	Landfill and recycling of inert waste from construction industry.
NPPF Vulnerability Classification	Landfill is more vulnerable, other uses are less vulnerable
Overview of flooding	About 15% of the site to the south lies in Flood Zones 2 and 3. About 85% of the site lies in Flood Zone 1. Surface water flooding also follows the watercourse along the boundary with most of the high risk area being outside of the site boundary, leaving mainly medium risk (1:100 (1%)) and low risk (1:1000 (0.1%)) surface water flood risk in a narrow band along the boundary. Additional patches of low risk surface water flooding are to the eastern side of the site. No more than 10% of the site is affected by surface water flooding (low to high risk (1:30 (3.33%)), though a lake lies in the centre of the site. In terms of groundwater flooding, the site lies in a 1km square in which <25% of land may be susceptible to Clearwater flooding. 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.
Relevant Local SFRA	York

1:20 (5%) flood event or Local SFRA Functional Floodplain	The 1:20 (5%) predicted flood event extent following along the watercourse (Foss Dike) runs along the south western boundary. The 1:20 (5%) event extent mapping for this SFRA shows that about 5% of this site is at flood risk. York's SFRA defines functional floodplain as: • Land which would flood with annual probability of 1:20 (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 flood[20]. 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 1:20 (5%) flood risk should be considered as initial functional floodplain and further investigated.
Climate change	Climate change is likely to increase the 1:20 (5%) predicted flood event extent within the site. Areas of Flood Zone 3 are likely to increase into areas that are shown as Flood Zone 2 and Flood Zone 2 is likely to increase in extent into the site. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	**Site is not suitable**. More vulnerable and less vulnerable land uses are not permitted at sites within functional floodplain. Sites WJP08, WJP19, WJP16 and WJP06 should be considered before this site followed by WJP15 and WJP11. However, this site is preferable to WJP18.
Actions to pass the Sequential Test	In order for this site to pass, subject to further consideration of the site's contribution to the supply of minerals or waste facilities**,** the redline boundary for any proposal needs to be outside of Flood Zone 3 and the 1:20 (5%) flood event or Local SFRA Functional Floodplain. If a proposed redline boundary for this site remains within Flood Zone 2 WJP08 and WJP19 would remain preferable to this site as they are located in Flood Zone 1. WJP11 (with revised boundary), WJP15 (with revised boundary) and WJP16 should be considered before this site. This site would be preferable to WJP06 and WJP18.
Exception Test Needed	Yes, however, more vulnerable and less vulnerable land uses are not permitted at sites within functional floodplain.

[20] City of York, 2013.

Is an alternative site available which could help meet requirements for this waste facility, subject to other tests of suitability?	Yes, WJP06, WJP08, WJP11, WJP15, WJP16, WJP18 and WJP19. WJP08 and WJP19 are in Flood Zone 1 and WJP16 is in Flood Zone 2. WJP06 is in Flood Zone 3 but benefits from existing defences. These site should be considered before this site. WJP15 and WJP11 are at a similar level of risk but to a lesser extent whereas WJP18 is at a similar level of risk but to a greater extent. WJP15 and WJP11 should be considered before this site, however, this site is preferable to WJP18.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A flood risk assessment will be required for this site. This should consider how surface water flooding and drainage will be managed across the site utilising SuDS. Groundwater flooding should be further investigated. The flood risk assessment should also establish whether the south western 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. Drainage of the site (including any drainage from the lake) must not increase flood risk on the receiving waterbody. 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.


Foss Nabs
MJP52 / WJP05
Duttons Farm
New Dike Bridge
New Dike
0 70 140 280
Meters
North Yorkshire County Council
Key
Minerals / waste site
Minerals and waste plan area
Flood Zone 2
Flood Zone 3
City of York Council functional floodplain
1:20 (5%) predicted flood extent
NFCDD Flood Defence
Areas benefiting from flood defences
Flood Storage Area
Historic Flood Map
Historic Flood Record
uFMfSW - 1:30 (3.33%) predicted flood extent
uFMfSW - 1:100 (1%) predicted flood extent
uFMfSW - 1:1000 (0.1%) predicted flood extent
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North Yorkshire County Council.
2016 Licence No. 100017946

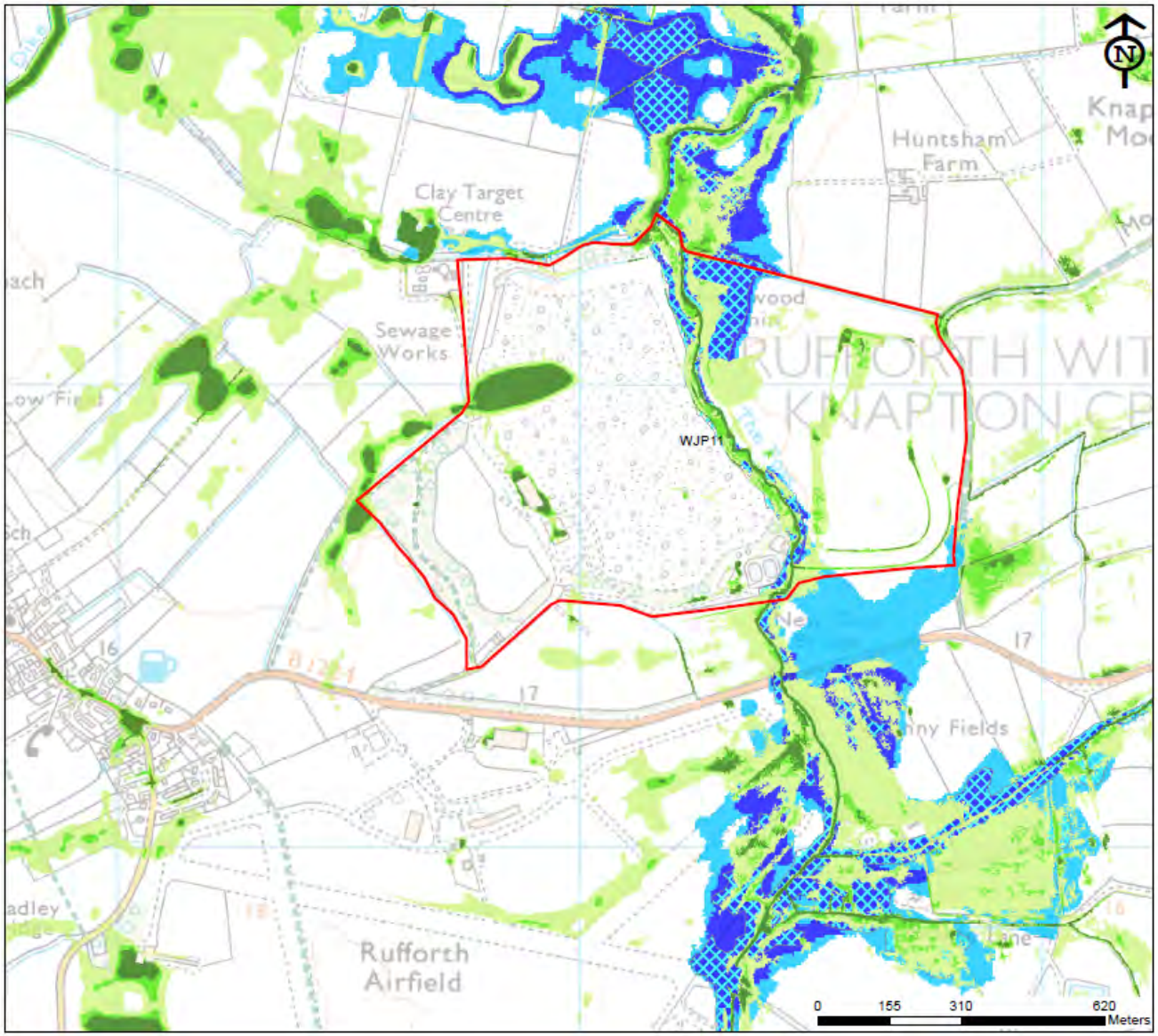
Site Reference: WJP11: Harewood Whin, Rufforth	
Site Information	The application for the construction of a Materials Recycling Facility and Waste Transfer Station (13/00041/FULM) has recently been withdrawn. Proposed access: Existing access on Height Lands Lane onto the B1224, approximately 460m east of Rufforth. Current use: Waste facility for landfill, open windrow composting, recycling (including treatment bulking and transfer) and liquid waste treatment. Site area: 82ha Waste annual tonnage import: • Landfill: 30,000 • Composting: 60,000 • C&I Recycling: 150,000 • Liquid Waste Treatment: 25,000 • MRF: 50,000 • Transfer: 60,000 (All above estimates for 2020) Estimated date of commencement: Continuation from 2017 Proposed Life of Site: 15 - 20 years
Proposed Land Use	Retention of the following facilities beyond 2017 • 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 And construction of new materials recycling facility and waste transfer station.
NPPF Vulnerability Classification	Landfill is more vulnerable, other uses are less vulnerable

Overview of flooding	Much of the site is in Flood Zone 1, however, Flood Zone 3 flows through the centre of this site following the Foss and this is fringed by Flood Zone 2. Surface water flooding also overlays the area of river flood risk and also affects patches of the wider site (roughly 10% is affected). Surface water flood risk ranges from low risk (1:1000 (0.1%)) to medium risk (1:100 (1%)). The site lies across four 1km squares identified on the Environment Agency's 'Areas Susceptible to Groundwater Flooding' map, three of which are susceptible to Clearwater groundwater flooding (with one 1km square affected across <25% of its area, two 1km squares affected across >25% to <50% of their areas, and one 1km 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"[21].
Relevant Local SFRA	York
1:20 (5%) flood event or Local SFRA Functional Floodplain	The 1:20 (5%) event extent mapping for this SFRA shows that about 5% of this site is at flood risk. York's SFRA defines functional floodplain as: • Land which would flood with annual probability of 1:20 (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 flood[22]. 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 1:20 (5%) flood risk should be considered as initial functional floodplain and further investigated.

[21] 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]

[22] City of York, 2013.

Climate change	Climate change is likely to increase the 1:20 (5%) predicted flood event extent within the site. Areas of Flood Zone 3 are likely to increase into areas that are shown as Flood Zone 2 and Flood Zone 2 is likely to increase in extent into the site. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	**Site is not suitable**. More vulnerable and less vulnerable land uses are not permitted at sites within functional floodplain. Sites WJP08, WJP19, WJP16 and WJP06 should be considered before this site. This site should be considered alongside but after WJP15 and is preferable to WJP05 and WJP18.
Actions to pass the Sequential Test	In order for this site to pass, subject to further consideration of the site's contribution to the supply of minerals or waste facilities, the redline boundary for any proposal needs to be outside of Flood Zone 3 and the 1:20 (5%) flood event or Local SFRA Functional Floodplain. If a proposed redline boundary for this site remains within Flood Zone 2 WJP08 and WJP19 would remain preferable to this site as they are located in Flood Zone 1. It should be considered alongside but before WJP16 and in preference to WJP05, WJP06, WJP15 and WJP18.
Exception Test Needed	Yes, however, more vulnerable and less vulnerable land uses are not permitted at sites within functional floodplain.
Is an alternative site available which could help meet requirements for this waste facility, subject to other tests of suitability?	Yes, WJP05, WJP06, WJP08, WJP15, WJP16, WJP18 and WJP19. Sites WJP08 and WJP19 are in Flood Zone 1 while WJP16 is in Flood Zone 2. As such these three sites are at lower risk than this site. WJP06 is within Flood Zone 3 but benefits from existing flood defences. WJP15 is at similar flood risk but to a lesser extent than this site while WJP05 and WJP18 are at a similar flood risk but to a greater extent. Therefore WJP08, WJP19, WJP16 and WJP06 should be considered before this site. This site should be considered alongside but after WJP15 and is preferable to WJP05 and WJP18.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	The flood risk assessment should establish whether the area marked as being at a 1:20 (5%) 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 the 1:20 (5%) and of Flood Zones 2 and 3. A flood risk assessment should consider how surface water flooding and drainage will be managed across the site without increasing flooding elsewhere utilising SuDS. Groundwater flooding should be further investigated.



North Yorkshire County Council

Key

- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- City of York Council functional floodplain
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

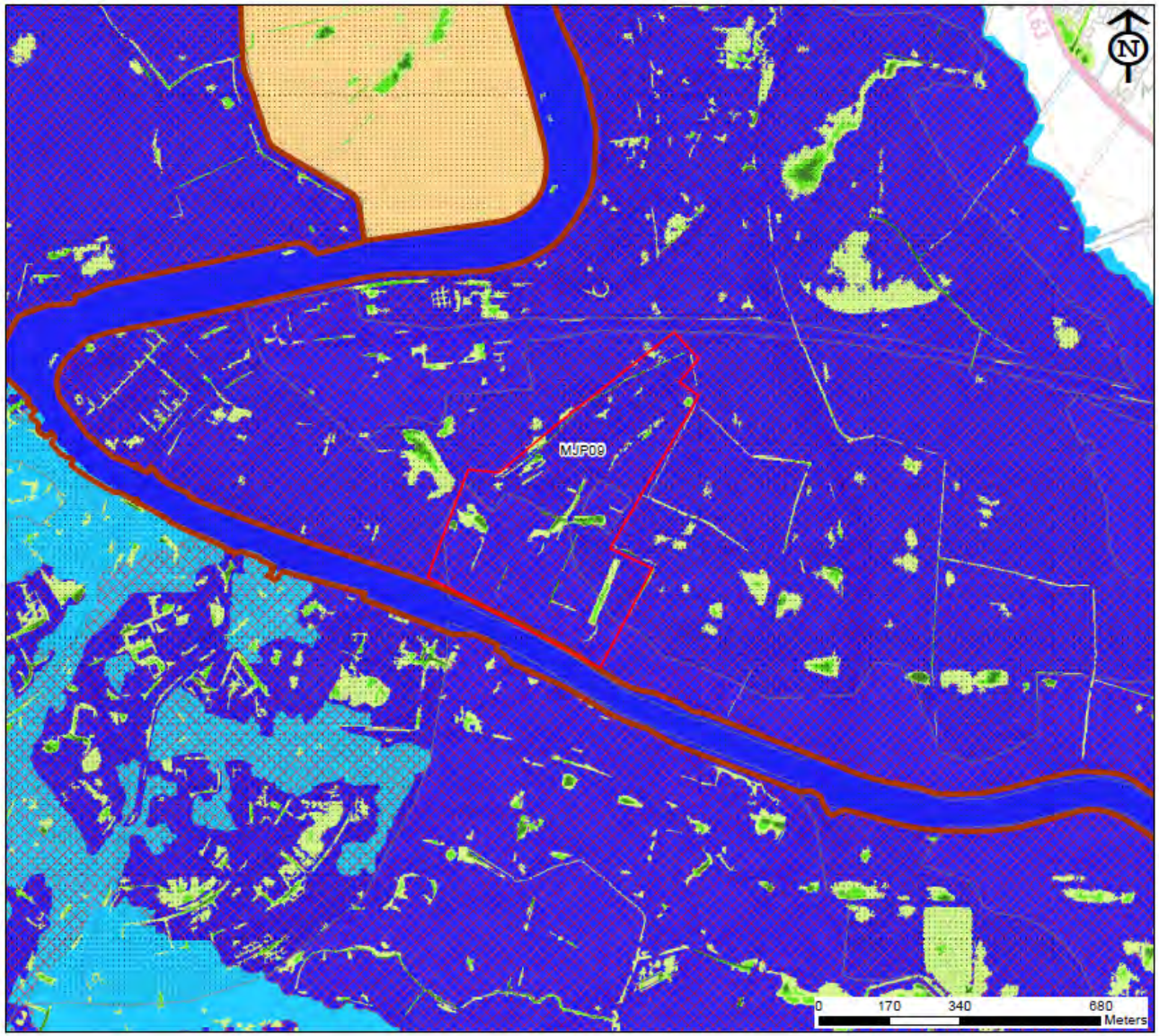
9. Selby Sites

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

Site Reference: MJP09 Barlby Road, Selby	
Site Information	The current lifespan of facility is tied by planning condition to the life of adjacent asphalt plant, but there is no specified end-date for the asphalt plant and further planning permission would only be required in the event of the asphalt plant closing. Proposed access: Existing unnamed road via feed-mill level crossing route to A19 at Barlby. No date yet for an access to be constructed from the junction approximately 470m north of the river Ouse bridge on the A63 Selby Bypass. Current use: Rail and road freight distribution facility, including rail import and handling facility for aggregates Site area: 25ha Minerals Estimated Reserve: N/A Annual output of approximately 170,000 tonnes by road via existing CEMEX operation. None by rail. Estimated date of commencement: Site is already operational Proposed Life of Site: 30 years
Proposed Land Use	Retention of rail import and handling facility for aggregates
NPPF Vulnerability Classification	Less vulnerable

Overview of flooding	This site is entirely within Flood Zone 3 due to river and tidal flood risk. However, the flood zones do not acknowledge the presence and influence of the existing flood defences and the River Ouse Modelled Flood Outline indicates the area is defended to at least a 1:25 (4%) standard of protection. This site is entirely contained within an area benefitting from flood defences. Surface water flooding also affects the site in patches of low risk (1:1000 (0.1%)) to high risk (1:30 (3.33%)) spread throughout the site (but covering less than 10% of its total area). About 5% of the site is at high risk (1:30 (3.33%)) of surface water flooding. 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 two 1km squares where >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.
Relevant Local SFRA	Selby
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. 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 1:20 (5%) flood modelling and would be excluded in any case due to the presence of a flood defence. Flood Zone 3b is defined in the Selby SFRA as Flood Zone 3 when it is undefended and outside of development limits. The EA urge caution about the use of the Selby SFRA functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding. Selby District Council are currently updating their SFRA.
Climate change	This site is already almost entirely in Flood Zone 3. Flood events are likely to be deeper and more frequent as sea level rise and increased river flood risk begins to take effect. The standard of protection associated with the flood defence is indicated in the River Ouse Modelled Flood Outline as being defended to at least a 1:25 (4%) standard of protection; this standard of protection will reduce with climate change. Areas of medium risk (1:100 (1%)) of surface water flooding may become high risk (1:30 (3.33%)) and low risk (1:1000 (0.1%)) areas may become medium risk (1:100 (1%)).

Sequential Test result	Pass. However, MJP24 should be considered before this site.
Exception Test Needed	No
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP24. MJP24 is at lower flood risk than MJP09 and should be considered before this site.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	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 using SuDS and without causing additional flood risk. It should also establish the standard of protection of the adjacent flood defence, calculate the specific risk from tidal and river flooding taking account of climate change and include an emergency plan for the site in case of defence overtopping by tidal or river flooding. Groundwater flooding may also be a risk at this site. This should be investigated and suitably mitigated through design of buildings etc.



North Yorkshire County Council

Key

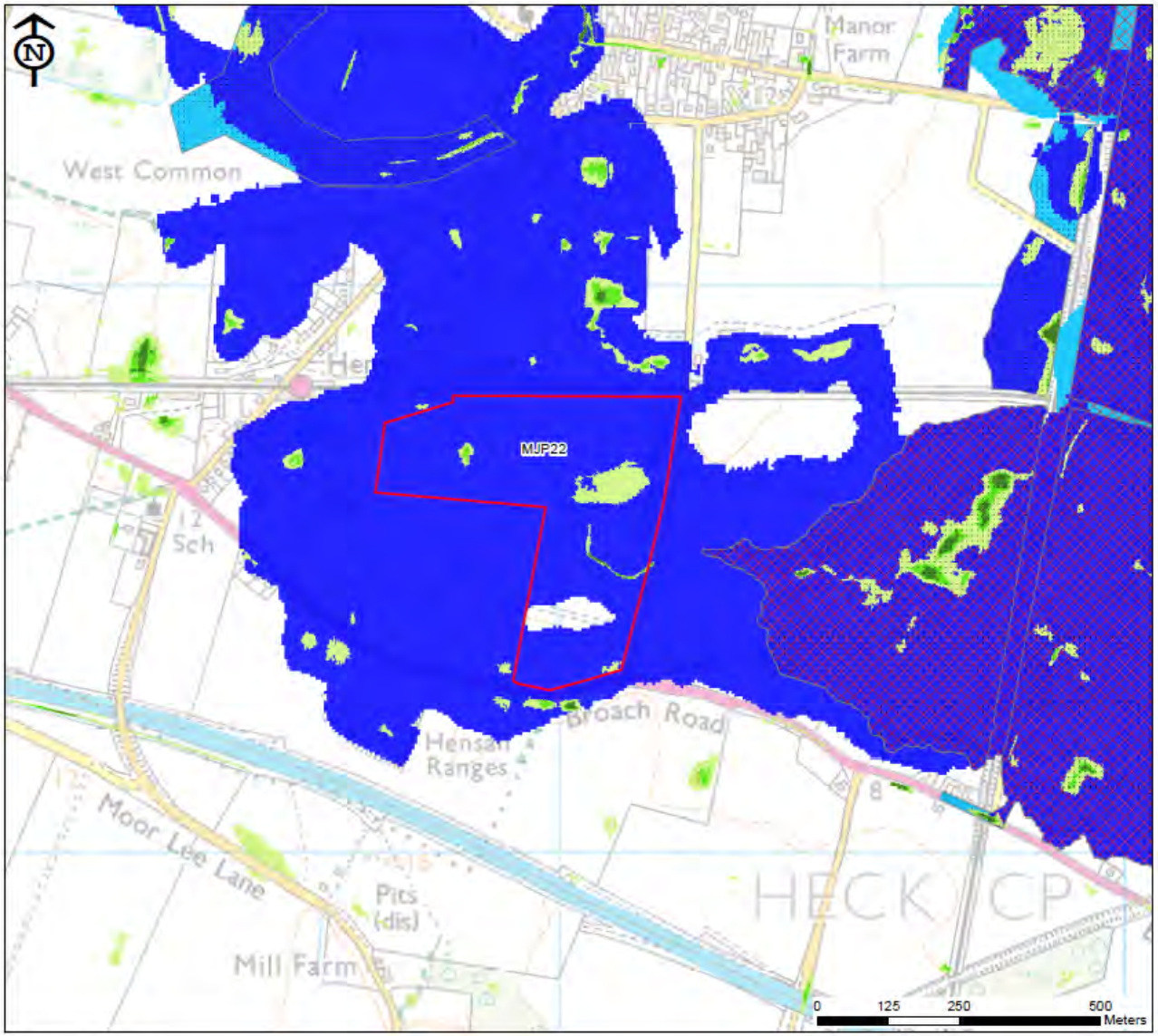
- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

Site Reference: MJP22 Hensall Quarry	
Site Information	Proposed 30m stand-off from railway. Proposed access: Existing Hensall Quarry access onto unclassified New Road (U1077), approximately 75m north of A645 and then south to the junction with the A645. Current use: Agriculture Site area: 14.41ha Minerals Estimated Reserve: 1,545,000 tonnes Annual output of approximately 80,000 – 100,000 tonnes Estimated date of commencement: 2016 - 2017 Proposed Life of Site: 24 years
Proposed Land Use	Extraction of sand as proposed extension to existing quarry.
NPPF Vulnerability Classification	Water compatible
Overview of flooding	About 95% of this site is in Flood Zone 3. There is an area benefiting from existing flood defences to the east of the site, however, the standard of protection of these defences is not known. This site may be at lower risk given that connected Flood Zone 3 closer to the river benefits from flood defences. Four areas of surface water flooding also affect the site, totalling about 5% of the overall site area. The level of risk associated with these is generally low (1:1000 (0.1%)), however two of the areas include small regions of medium risk (1:100 (1%)) and high risk (1:30 (3.33%)) respectively. This site lies across two 1km squares where <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). According to the 2012 planning statement for a neighbouring part of this site groundwater levels are around -1mAOD. For that part of the site at least, where extraction is to -0.5mAOD *"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"*[23]. 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.

[23] 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

Relevant Local SFRA	Selby
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. Most of the site is identified as functional floodplain (3b) in the Selby SFRA. Flood Zone 3b is defined in the Selby SFRA as Flood Zone 3 when it is undefended and outside of development limits. The EA urge caution about the use of the Selby SFRA functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding. Selby District Council are currently updating their SFRA.
Climate change	Site is currently in Flood Zone 3 and it is likely that it will remain as Flood Zone 3 after 2025, however, depth and velocity of moving water is likely to increase. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass. MJP30, MJP44 and MJP54 should be considered before this site in terms of flood risk.
Exception Test Needed	No. This site is water compatible.
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP30, MJP44 and MJP54. This site is at higher risk of flooding than all of the alternative sites, therefore it should only be considered after the alternative sites if more resources of building sand are needed and the site is required to help meet this need.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment is required for this site. A suitable scheme will be required to drain or store surface 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 within the site specific flood risk assessment. The site specific flood risk assessment should also include a flood evacuation plan due to the presence of Flood Zone 3. All sites in functional floodplain 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.

Statement (August 2012) [URL: https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=8600]



North Yorkshire County Council

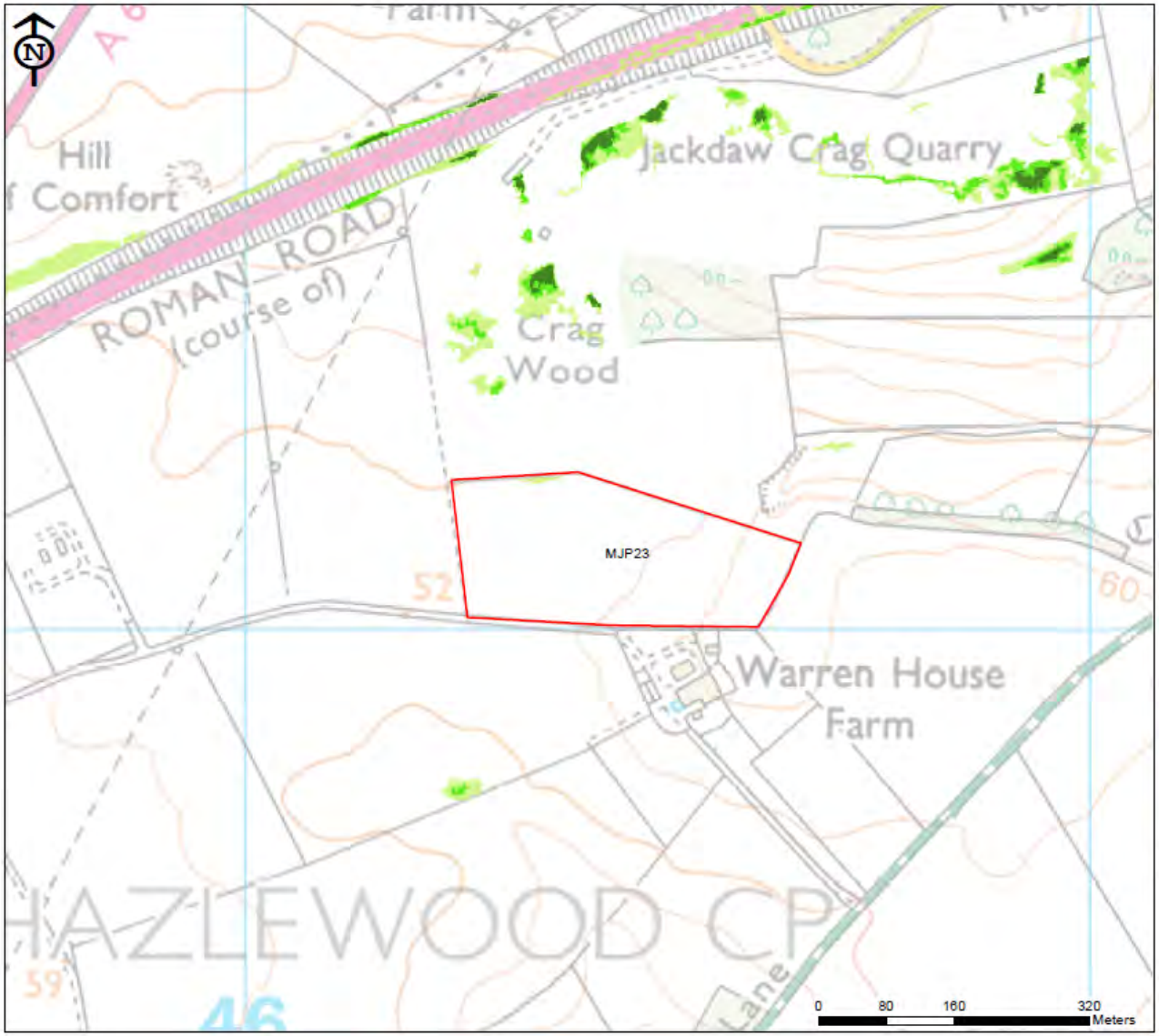
Key

- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

Site Reference: MJP23 Jackdaw Crag, Stutton	
Site Information	A planning application for the area (NY/2009/0523/ENV) is currently awaiting determination. Proposed access: Existing Jackdaw Crag quarry access onto Moor Lane (C305), approximately 35m south of the bridge over A64 which leads to the A659 and the A64. No direct access to proposed area from the public highway. Current use: Agriculture Site area: 6.0ha (south) Minerals Estimated Reserve: 3,000,000 tonnes (submitter information) Annual output of 250,000 – 300,000 tonnes Estimated date of commencement: 2016 - 2017 Proposed Life of Site: 10 years
Proposed Land Use	Extraction of Magnesian limestone as proposed extension to existing quarry.
NPPF Vulnerability Classification	Less vulnerable.
Overview of flooding	This site is 100% in Flood Zone 1. <5% of the site is at low risk (1:1000 (0.1%)) of surface water flooding at the north western site boundary. As such for the present day this site can be considered as not being at risk from surface water flooding. This site lies in a km square where <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 2009 planning application[24] 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.
Relevant Local SFRA	Selby
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. Functional floodplain (Flood Zone 3b) is defined in the Selby SFRA as Flood Zone 3 when it is undefended and outside of development limits. The EA urge caution about the use of the Selby SFRA functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding. Selby District Council are currently updating their SFRA.

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

Climate change	Climate change to river flood risk is unlikely to affect the site in the latter part of the plan period. Climate change effects on surface water flooding are likely to increase the extents of the small area at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass
Exception Test Needed	No
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP10, MJP11, MJP28 and MJP29. This site is at slightly higher risk from surface water flooding than MJP28, at similar risk from surface water flooding than MJP29 and slightly lower risk than MJP11 and more so MJP10. All the alternative sites are located in Flood Zone 1. Therefore this site should be considered after MJP28, alongside MJP29 and before MJP11 and in preference MJP10.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	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. A suitable SuDS scheme will be required to drain or store water from the site that does not increase flooding on any receiving waterbody.



North Yorkshire County Council

Key

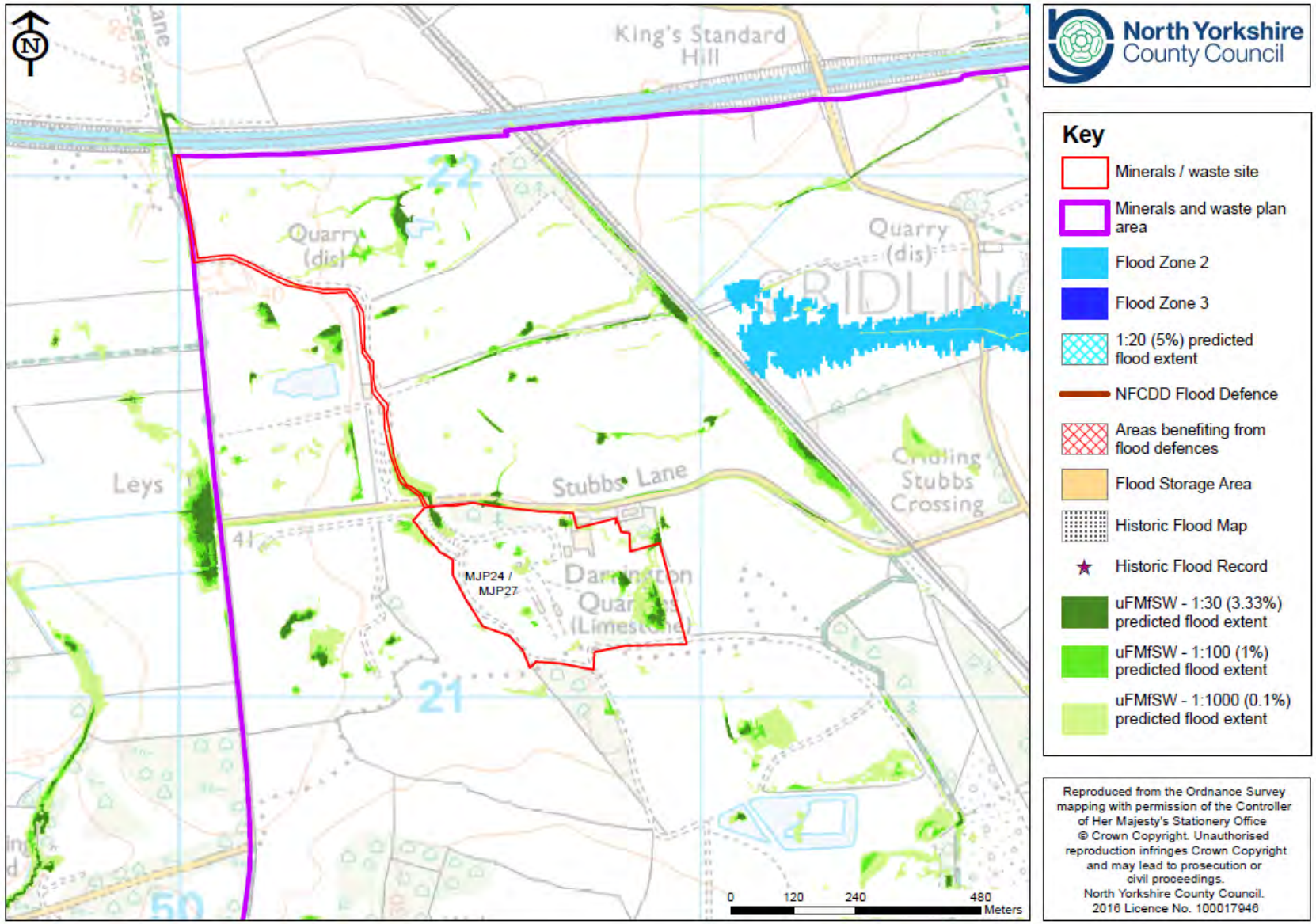
- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

Site Reference: MJP24 Darrington Quarry processing plant site and haul road	
Site Information	An application to retain the plant and haul road at Darrington Quarry (NY/2012/0020/73) is currently awaiting determination. Extraction in Wakefield area currently permitted until 2028. Plant site area is the same location as MJP27 site. Proposed access: Existing Darrington Quarry plant site access onto Stubbs Lane (C335), with the mineral to be brought from the Wakefield quarry site to the north of the M62 via the existing haul road and tunnel under Stubbs Lane. Current use: Quarry plant site and associated haul road Site area: 10.4ha (plant site) Minerals Estimated Reserve: (located in Wakefield Council area) 10,000,000 tonnes (as at 2011) Annual output of 450,000 – 500,000 tonnes extracted from the land in the Wakefield Council area Estimated date of commencement: Site is already operational Proposed Life of Site: 2028
Proposed Land Use	Retention of processing plant site and haul road for processing of Magnesian limestone extracted from the part of Darrington Quarry located in the Wakefield Council area.
NPPF Vulnerability Classification	Less vulnerable

Overview of flooding	This site is 100% in Flood Zone 1. About 10% of this site is prone to surface water flooding. Medium (1:100 (1%)) and high risk (1:30 (3.33%)) 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. As extraction is likely to change the topography of the site where flooding occurs across this site is likely to change as extraction progresses. The vast majority of this site lies in a 1km square where <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 very small proportion of the access road falls between two 1km squares with the same groundwater flood susceptibility as the main area of the site. Groundwater levels at the adjacent Darrington East quarry site were considered to be below the proposed base of the restored quarry (13mAOD) in an application submitted in 2003[25] though no other local data is available through the North Yorkshire planning website.
Relevant Local SFRA	Selby
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. Functional floodplain (Flood Zone 3b) is defined in the Selby SFRA as Flood Zone 3 when it is undefended and outside of development limits. The EA urge caution about the use of the Selby SFRA functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding. Selby District Council are currently updating their SFRA.
Climate change	Climate change to river flood risk is unlikely to affect the site in the latter part of the plan period. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass
Exception Test Needed	No

[25] ibid

Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP09. MJP09 is in Flood Zone 3 but benefits from existing defences, however, it is at higher risk than this site. Therefore this site is preferable to MJP09. 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 clean surface water without causing additional flood risk (SuDS should be investigated).

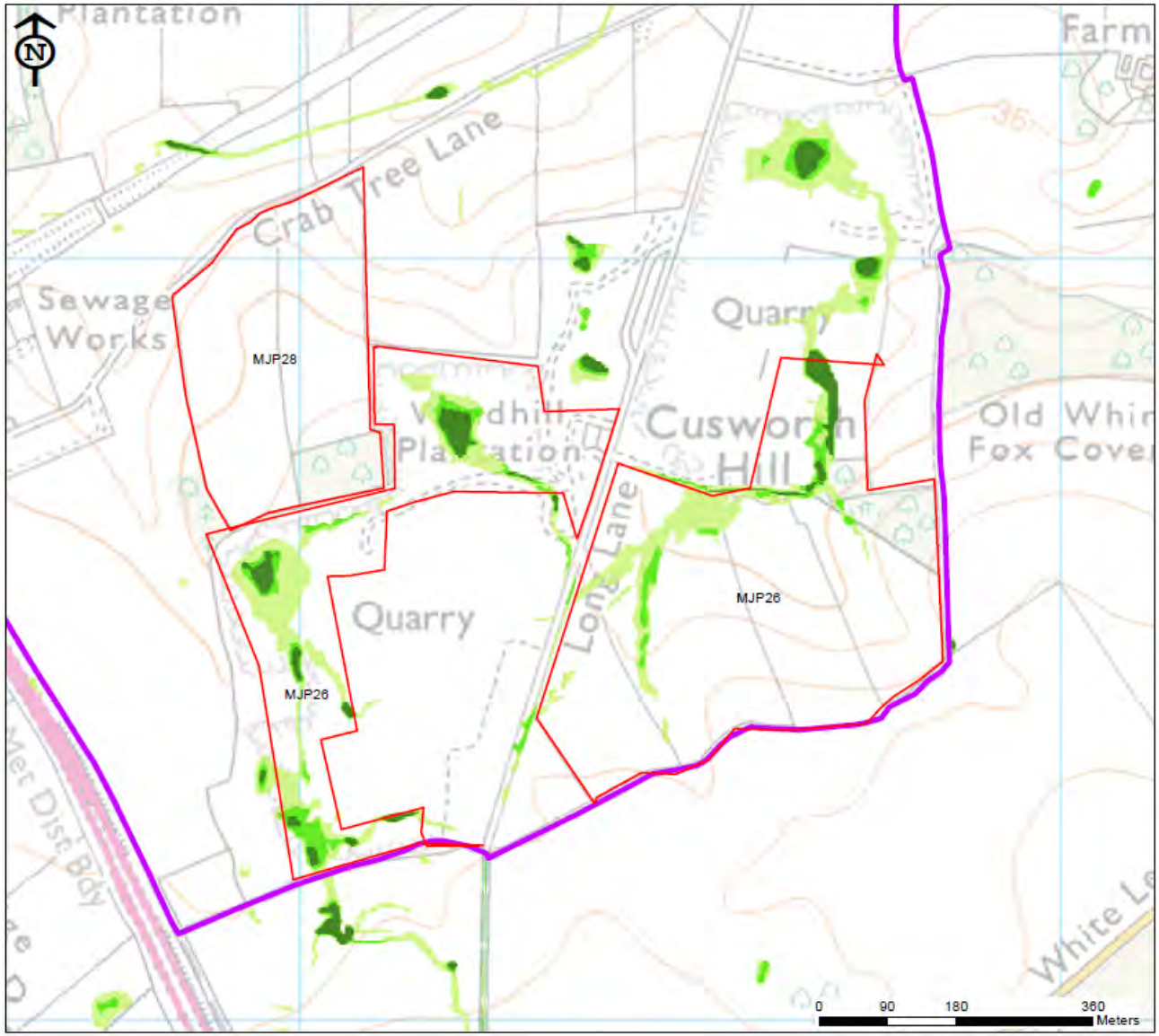


Site Reference: MJP26 Barnsdale Bar, near Kirk Smeaton (recycling)	
Site Information	Operator seeking flexibility to locate the recycling facility within the site in order that it is close to areas undergoing restoration at the time, as current recycling area is limited to only one part of the site. Site lies adjacent to the county boundary with the administrative area of Doncaster Council. Proposed access: Existing Barnsdale Bar Quarry access along Long Lane onto Woodfield Road (approximately 115m east of Barnsdale Bar junction of A1 with A639/A6201). Current use: Quarry, former landfill site and inert aggregate recycling facility Site area: 45.6ha Waste annual tonnage import: 100,000 Recycled materials annual output: 100,000 tonnes (aggregate and soils) Estimated date of commencement: Approximately 2016 - 2020 Proposed Life of Site: Throughout the plan period
Proposed Land Use	Recycling of inert waste to produce secondary aggregate.
NPPF Vulnerability Classification	Less vulnerable

Overview of flooding	This site is 100% in Flood Zone 1. Surface water flooding low risk (1:1000 (0.1%)) to high risk (1:30 (3.33%)) affects about 15% - 20% of the overall site. One third (33%) of the western part of site is prone to surface water flooding and there is a possible flow path through this part of the site that would need to be addressed in any proposals. Around 10% – 15% of the flood risk to this part of the site is medium risk (1:100 (1%)) to high risk. A smaller proportion of the eastern part of the site, about 10% -15%, suffers from any level of surface water flood risk with about 5% at medium risk (1:100 (1%)) to high risk (1:30 (3.33%)) of surface water flooding. As extraction is likely to change the topography of the site where flooding occurs across this site is likely to change as extraction progresses. This site lies across two 1km squares where <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. According to a recent hydrological assessment for an adjacent part of the quarry, mineral workings in the past have been maintained approximately 2m 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)[26].
Relevant Local SFRA	Selby
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. Functional floodplain (Flood Zone 3b) is defined in the Selby SFRA as Flood Zone 3 when it is undefended and outside of development limits. The EA urge caution about the use of the Selby SFRA functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding. Selby District Council are currently updating their SFRA.
Climate change	It is unclear if this operation would operate beyond the plan period. Climate change to river flood risk is unlikely to affect the site in the latter part of the plan period. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass

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

Exception Test Needed	No
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP27. This site is at slightly higher risk from surface water flooding than MJP27 and both sites are in Flood Zone 1. Therefore this site should be considered after MJP27.
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.



North Yorkshire County Council

Key

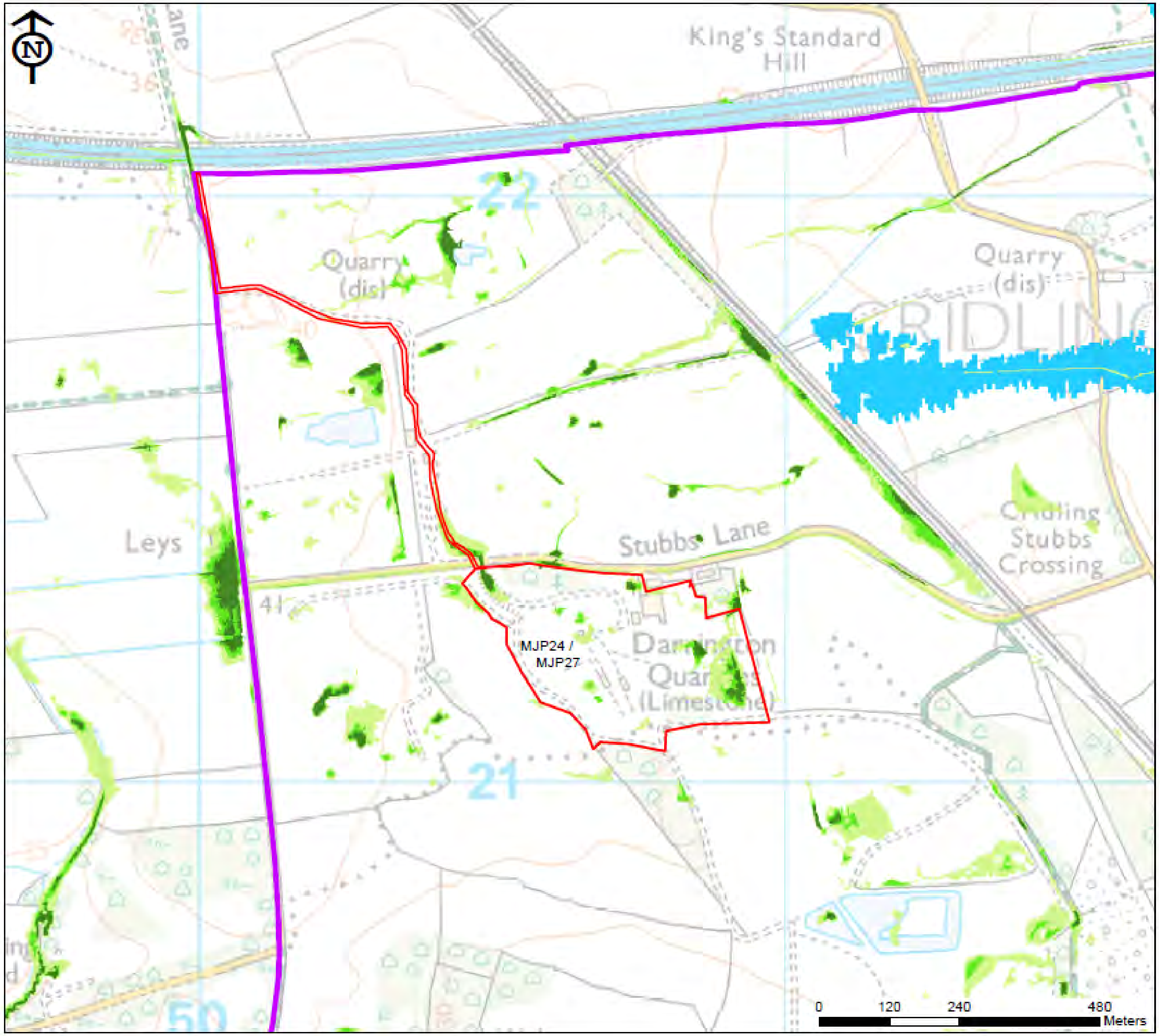
- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

Site Reference: MJP27 Darrington Quarry (recycling)	
Site Information	Proposed access: Existing Darrington Quarry plant site access onto Stubbs Lane (C335). Current use: Quarry processing plant site Site area: 10.4ha Waste annual tonnage import: 100,000 (estimate) Recycled materials annual output: 100,000 tonnes (aggregate and soils) Estimated date of commencement: Unknown at present Proposed Life of Site: 2028
Proposed Land Use	Inert waste recycling facility
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	This site is 100% in Flood Zone 1. About 10% of this site is prone to surface water flooding. Medium risk (1:100 (1%)) and high risk (1:30 (3.33%)) surface water flooding covers <5% of the site. This form of flood risk is spread across the site, though affects the access road in particular. As extraction is likely to change the topography of the site where flooding occurs across this site is likely to change as extraction progresses. The vast majority of this site lies across 1km square where <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 very small proportion of the access road falls between two 1km squares with the same groundwater flood susceptibility as the main area of the site. Groundwater levels at the adjacent Darrington East quarry site were considered to be below the proposed base of the restored quarry (13mAOD) in an application submitted in 2003[27] though no other local data is available through the planning record.
Relevant Local SFRA	Selby
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. Functional floodplain (Flood Zone 3b) is defined in the Selby SFRA as Flood Zone 3 when it is undefended and outside of development limits. The EA urge caution about the use of the Selby SFRA functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding. Selby District Council are currently updating their SFRA.

[27] ibid

Climate change	Climate change to river flood risk is unlikely to affect the site in the latter part of the plan period. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass
Exception Test Needed	No
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP26. This site is at slightly lower risk from surface water flooding than MJP26 and both sites are in Flood Zone 1. Therefore this site should be considered before MJP26.
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 investigated).

North Yorkshire County Council



Key

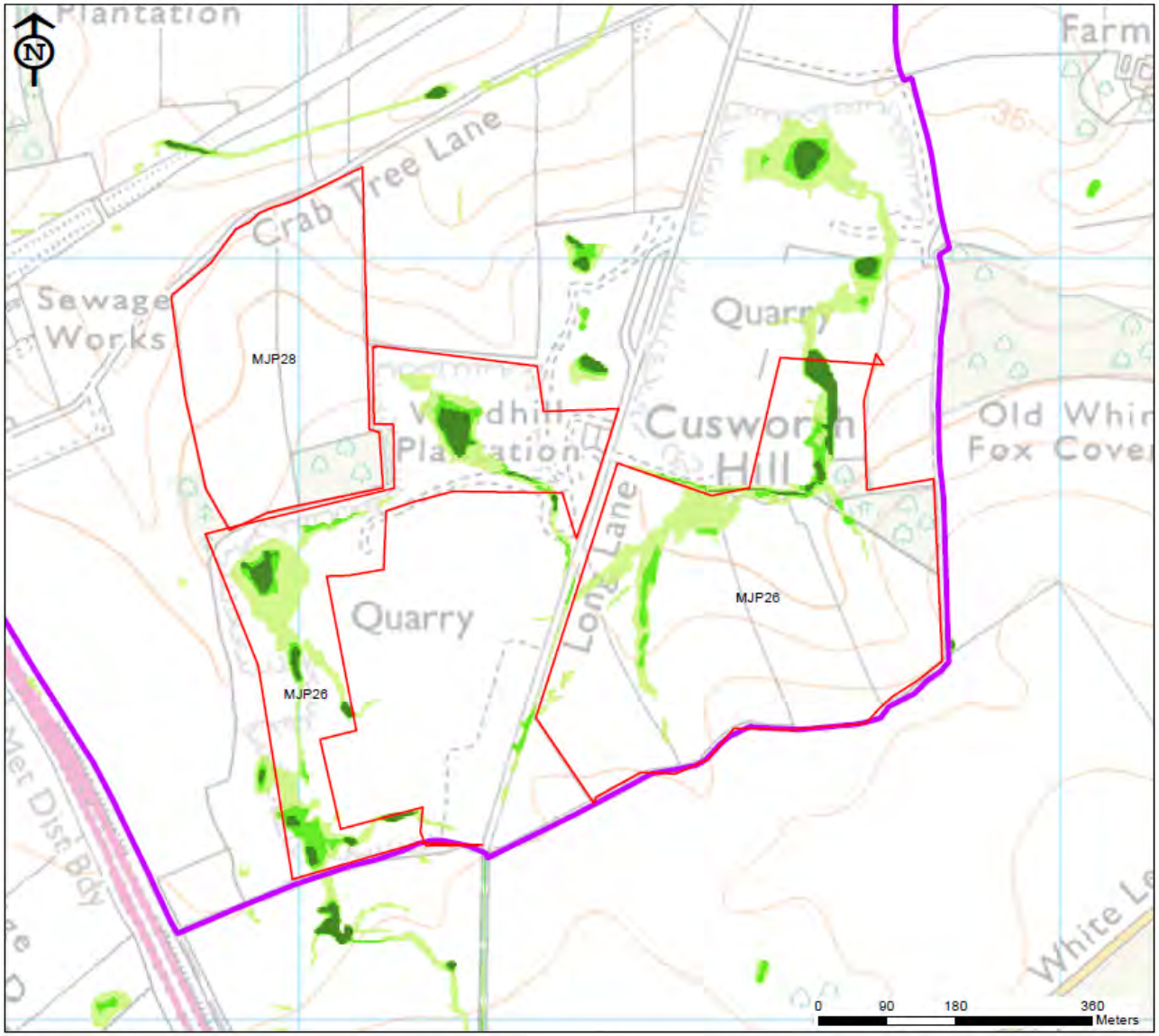
- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

Site Reference: MJP28 Barnsdale Bar Quarry, near Kirk Smeaton	
Site Information	A planning application (NY/2014/0393/ENV) to extract from the MJP28 north area as an extension to the existing quarry was granted planning permission in June 2016. No planning application has yet been submitted for the MJP28 north-west area. Proposed access: No direct access to the public highway from the proposed extraction area, rather access would be from within the existing Barnsdale Bar Quarry and material would then leave using the existing access along Long Lane onto Woodfield Road (approximately 115m east of Barnsdale Bar junction of A1 with A639/A6201). Current use: Agriculture Site area: 9.3ha (north-west) Minerals Estimated Reserve: 1,960,000 tonnes (north-west) Annual output of 175,000 tonnes Estimated date of commencement: 2020 Proposed Life of Site: 6 to 8 years (north-west)
Proposed Land Use	Extraction of Magnesian limestone as proposed extensions to existing quarry.
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	This site is 100% in Flood Zone 1. This site is not at risk from surface water flooding. This site lies across three 1km squares where <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 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'[28]. The Environment Agency was satisfied with this assessment[29].
Relevant Local SFRA	Selby

[28] 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]

[29] Environment Agency, letter dated 24 March 2015 [URL: https://onlineplanningregister.northyorks.gov.uk/register/PlanAppDisp.aspx?recno=9532]

1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. Functional floodplain (Flood Zone 3b) is defined in the Selby SFRA as Flood Zone 3 when it is undefended and outside of development limits. The EA urge caution about the use of the Selby SFRA functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding. Selby District Council are currently updating their SFRA.
Climate change	Climate change to river flood risk is unlikely to affect the site in the latter part of the plan period. Climate change effects on surface water flooding may impact the site in the latter plan period, however, the level of risk is likely to be low.
Sequential Test result	Pass
Exception Test Needed	No
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP10, MJP11, MJP23 and MJP29. This site is at slightly lower risk from surface water flooding than MJP11, MJP23 and MJP29 and more so than MJP10. All the alternative sites are located in Flood Zone 1. Therefore this site should be considered alongside but before MJP11, MJP23 and MJP29 and in preference MJP10.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	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. A suitable SuDS scheme will be required to drain or store water from the site that does not increase flooding on any receiving waterbody.



North Yorkshire County Council

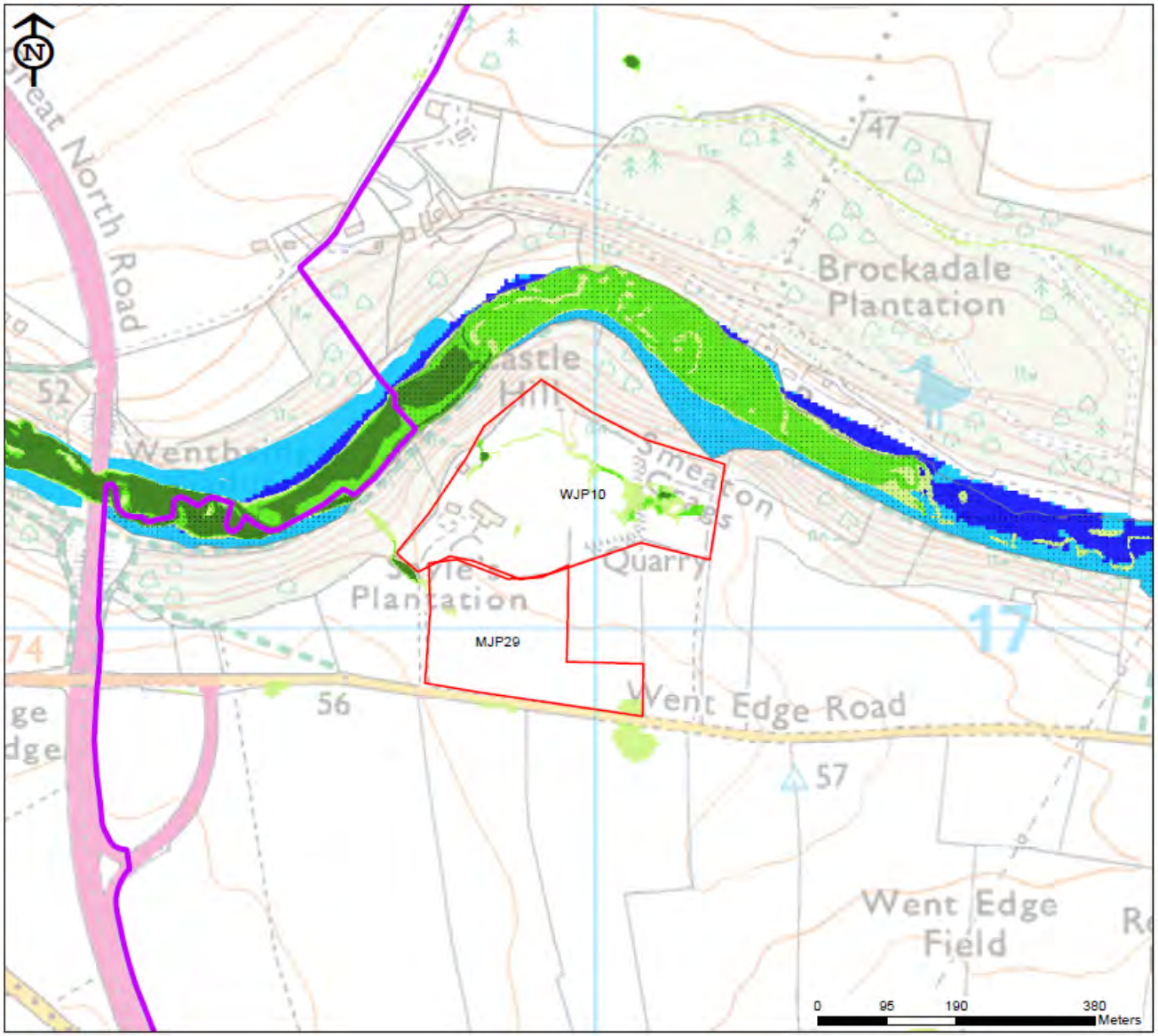
Key

- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

Site Reference: MJP29 Went Edge Quarry, Kirk Smeaton	
Site Information	Existing restoration scheme for quarry is to limestone grassland with blocks of woodland and scrub. Planning application (NY/2014/0113/ENV) to extract 1,610,000 tonnes of limestone from the 1.7 hectares in the north-east part of the MJP29 area as an extension to the existing quarry was granted in September 2015. Proposed access: No direct access to MJP29 site, rather it would be accessed from within the existing Went Edge Quarry and material would leave the quarry via the existing access onto Went Edge Road (C344), approximately 290m east of A1(M) south-bound junction at Wentbridge. Current use: Agriculture Site area: 5.6ha Minerals Estimated Reserve: 1,999,000 tonnes Annual output of 600,000 tonnes Estimated date of commencement: 2017 Proposed Life of Site: 15 years
Proposed Land Use	Extraction of Magnesian limestone as proposed extension to existing quarry.
NPPF Vulnerability Classification	Less vulnerable.
Overview of flooding	This site is 100% in Flood Zone 1. <5% of the site is at low risk (1:1000 (0.1%)) of surface water flooding. The northern part of this site lies a 1km square where <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 recent planning application at the site has shown that "*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*"[30]. This means that there is unlikely to be an issue with groundwater flooding. No other forms of flooding are noted.
Relevant Local SFRA	Selby

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

1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. Functional floodplain (Flood Zone 3b) is defined in the Selby SFRA as Flood Zone 3 when it is undefended and outside of development limits. The EA urge caution about the use of the Selby SFRA functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding. Selby District Council are currently updating their SFRA.
Climate change	Climate change would not affect the site in the latter part of the plan period. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass
Exception Test Needed	No
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP10, MJP11, MJP23 and MJP28. This site is at slightly higher risk from surface water flooding than MJP28, at similar risk from surface water flooding than MJP23 and slightly lower risk than MJP11 and more so MJP10. All the alternative sites are located in Flood Zone 1. Therefore this site should be considered after MJP28, alongside MJP23 and before MJP11 and in preference MJP10.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	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. A suitable SuDS scheme will be required to drain or store water from the site that does not increase flooding on any receiving waterbody.



North Yorkshire County Council

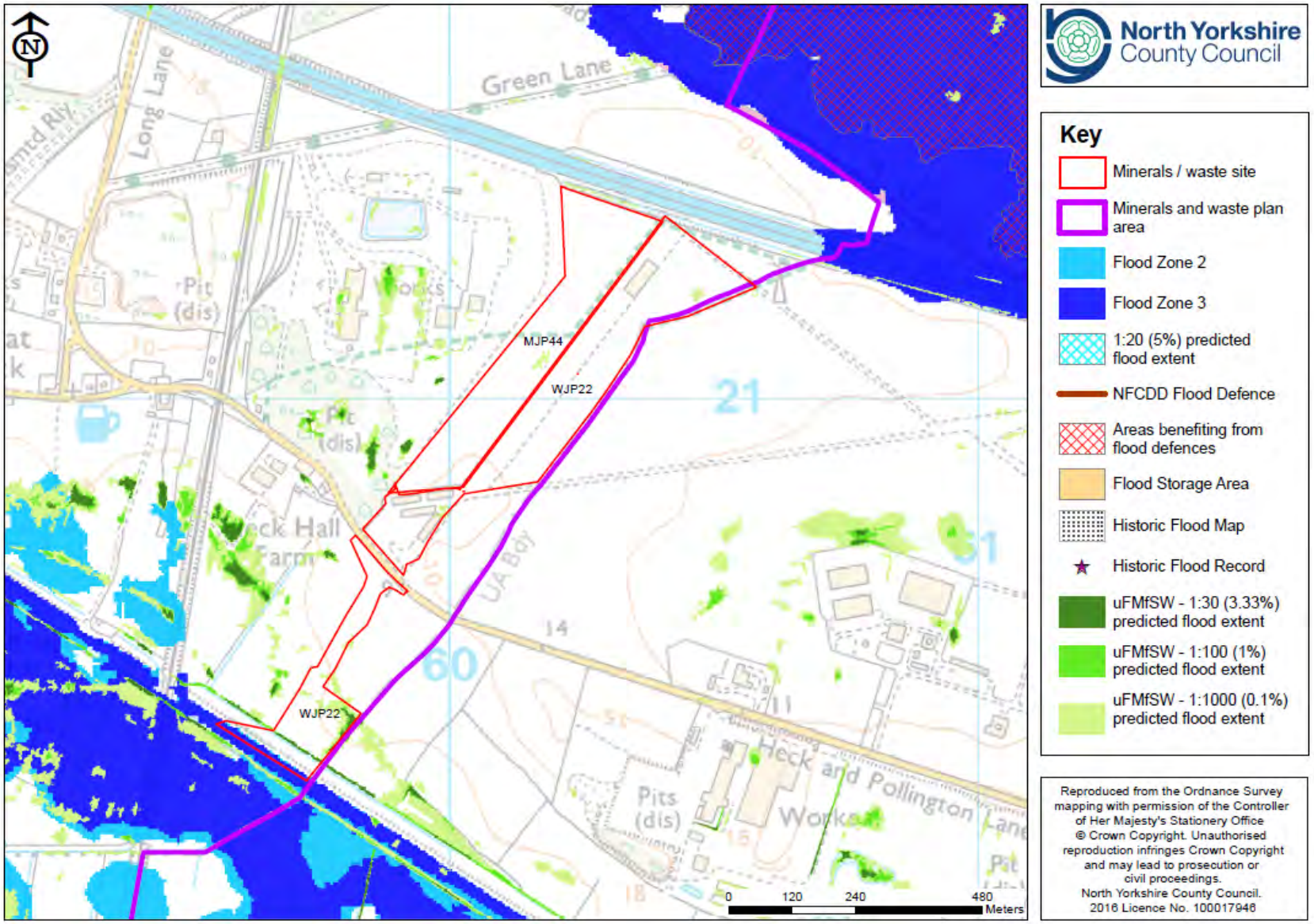
Key

- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

Site Reference: MJP44 Land between Plasmor Block making plant, Great Heck and Pollington Airfield	
Site Information	Manufactured blocks leave the block making plant by road and rail. Proposed access: Access will be direct from the adjacent Plasmor block making plant to the west with sand transported by dump truck or conveyor direct to the plant for use in manufacture of blocks. Manufactured blocks already leave the block making plant by road and rail. Current use: Agriculture Site area: 8.16ha Minerals Estimated Reserve: 900,000 tonnes Annual output of 40,000 tonnes Estimated date of commencement: By 2020 Proposed Life of Site: 22 years
Proposed Land Use	Extraction of sand from proposed new extraction site adjacent to former quarry.
NPPF Vulnerability Classification	Water compatible
Overview of flooding	This site is 100% in Flood Zone 1. Only a very small area (<5%) is affected by low risk (1:1000 (0.1%)) surface water flooding. This site lies across two 1km squares where <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). The planning application for a biomass processing plant adjacent to the site 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 dry[31]. This is unlikely to present a significant issue for a water compatible development, even if it were to go below the water table.
Relevant Local SFRA	Selby

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

1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. Functional floodplain (Flood Zone 3b) is defined in the Selby SFRA as Flood Zone 3 when it is undefended and outside of development limits. The EA urge caution about the use of the Selby SFRA functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding. Selby District Council are currently updating their SFRA.
Climate change	Climate change would not affect the site in the latter part of the plan period. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass
Exception Test Needed	No. This site is water compatible.
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP22, MJP30 and MJP54. MJP30 is at slightly lower surface water flood risk and MJP54 slightly higher, however, both are in Flood Zone 1. MJP22 is at significantly higher risk from river flooding. Therefore this site should be considered alongside but after MJP30 and before MJP54 and in preference to 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.


North Yorkshire County Council
Key
Minerals / waste site
Minerals and waste plan area
Flood Zone 2
Flood Zone 3
1:20 (5%) predicted flood extent
NFCDD Flood Defence
Areas benefiting from flood defences
Flood Storage Area
Historic Flood Map
Historic Flood Record
uFMfSW - 1:30 (3.33%) predicted flood extent
uFMfSW - 1:100 (1%) predicted flood extent
uFMfSW - 1:1000 (0.1%) predicted flood extent
MJP44
WJP22
WJP22
Green Lane
Long Lane
Heck and Pollington Lane
0 120 240 480 Meters
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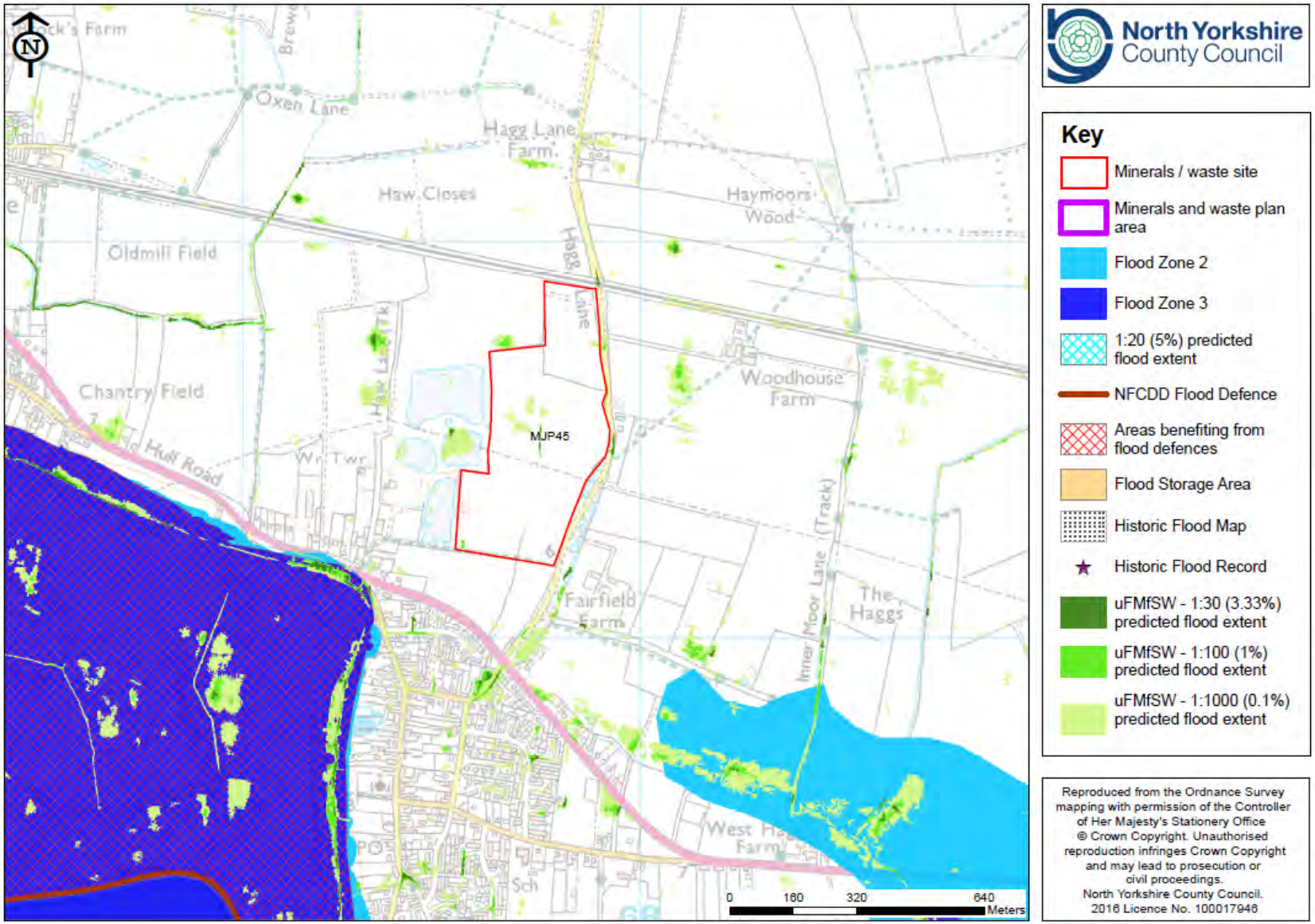
Site Reference: MJP45: Land to the north of Hemingbrough	
Site Information	Planning application NY/2015/0058/ENV was granted in March 2016 (planning permission C8/2015/0280/CPO), so the site area has been reduced to reflect that decision. The company preference is to extract reserves at MJP55 Escrick. However, if the clay within the MJP55 allocation is not available then the MJP45 reserve would be expected to commence within the plan period. Proposed access: Access to be onto A63 to west of Garth House, Hull Road (A63) approximately midway along the southern boundary of the west extension which would be used by HGVs once constructed. Once this new access is constructed the existing Northfield Road access would be used by site staff and visitors only to get to the site offices. Current use: Agriculture Site area: 14.31ha Minerals Estimated Reserve: 500,000 tonnes Annual output of 150,000 – 200,000 tonnes Estimated date of commencement: 2026 - 2035 (based on annual output of 100,000 - 200,000 as per NY/2015/0058/ENV) Proposed Life of Site: 2.5 - 3.5 years
Proposed Land Use	Extraction of clay as proposed extension to existing quarry.
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	This site is 100% in Flood Zone 1. <5% of the site is at risk of surface water flooding. This is mostly low risk (1:1000 (0.1%)) with one small area of high risk (1:30 (3.33%)) in the south west corner of the site. These areas are likely to alter in location as levels change across the site. Strategic groundwater flooding maps show that the site is not within an area at risk from groundwater flooding. 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)[32]. Therefore groundwater flooding is unlikely to cause any significant problems. Perched water tables are an inherent property of clay extraction.
Relevant Local SFRA	Selby

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

1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. The site also lies behind an area shown as benefitting from existing flood defences. Functional floodplain (Flood Zone 3b) is defined in the Selby SFRA as Flood Zone 3 when it is undefended and outside of development limits. The EA urge caution about the use of the Selby SFRA functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding. Selby District Council are currently updating their SFRA.
Climate change	Climate change to river flood risk is unlikely to not affect the site in the latter part of the plan period. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass
Exception Test Needed	No
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP52 and MJP55. This site is at lower flood risk than both MJP52 and MJP55. Therefore this site should be considered before MJP52 and MJP55.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	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. A suitable SuDS scheme will be required to drain or store water from the site that does not increase flooding on any receiving water body.


North Yorkshire County Council
Key
Minerals / waste site
Minerals and waste plan area
Flood Zone 2
Flood Zone 3
1:20 (5%) predicted flood extent
NFCDD Flood Defence
Areas benefiting from flood defences
Flood Storage Area
Historic Flood Map
Historic Flood Record
uFMfSW - 1:30 (3.33%) predicted flood extent
uFMfSW - 1:100 (1%) predicted flood extent
uFMfSW - 1:1000 (0.1%) predicted flood extent
MJP45
Oxen Lane
Hagg Lane Farm
Haw Closes
Haymoors Wood
Oldmill Field
Chantry Field
Hull Road
Woodhouse Farm
Fairfield Farm
The Haggs
Inner Moor Lane (Track)
0 160 320 640 Meters
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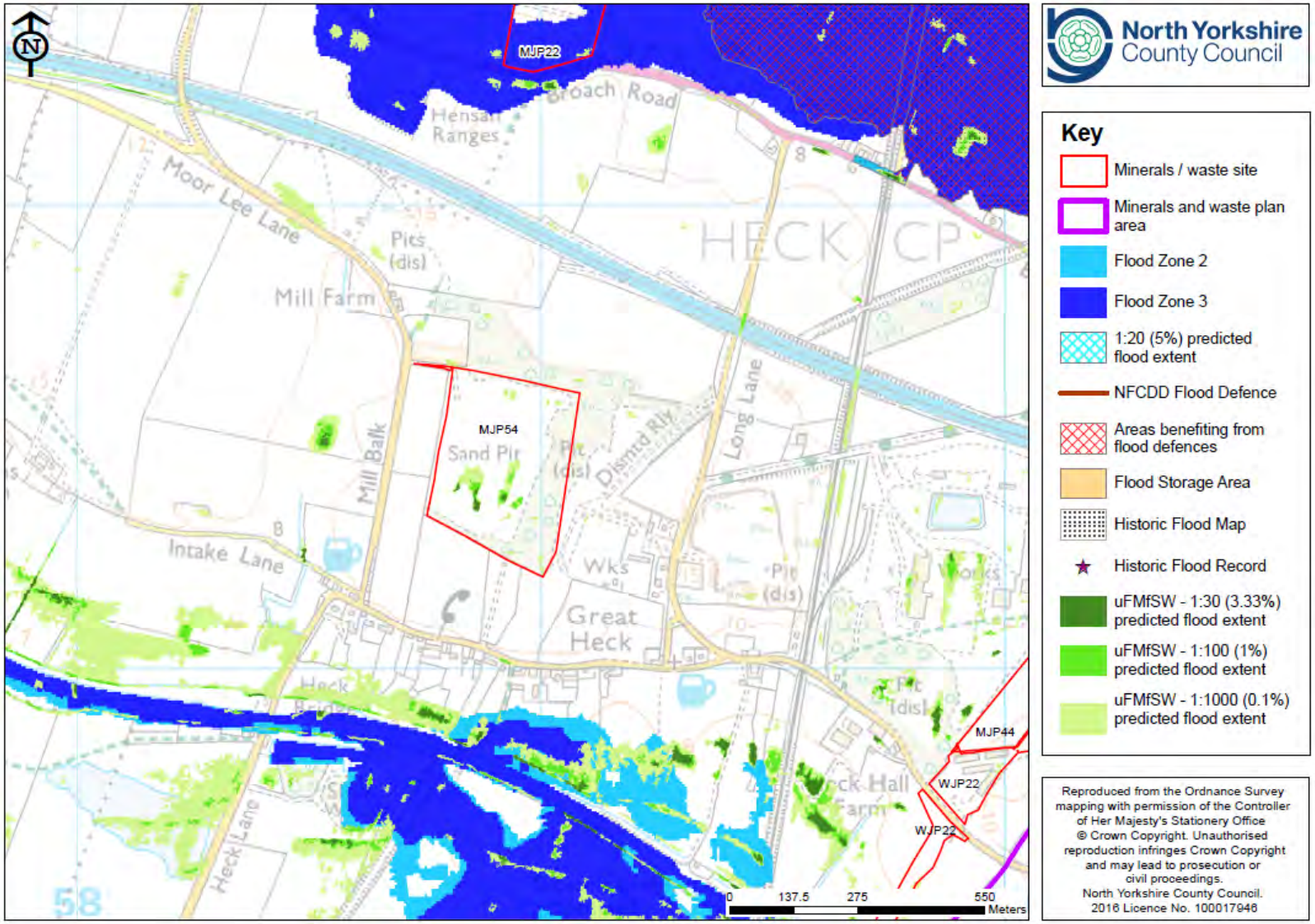
Site Reference: MJP54: Mill Balk Quarry, Great Heck	
Site Information	The existing planning permission is valid until 2042 and there are 220,000 tonnes of already consented reserves remaining at the site which would be worked when the site is re-opened. Proposed access: Existing access at Mill Balk Quarry onto Mill Balk (C339) leading north to A645 at Hensall. Current use: Mothballed sand quarry (since 2008) Site area: 10.3ha Minerals Estimated Reserve: 70,000 tonnes (without current planning permission) Annual output of 50,000 tonnes Estimated date of commencement: Unknown at present, but would be prior to 2030 Proposed Life of Site: Restoration would be prior to end of 2030
Proposed Land Use	Extraction of sand from existing quarry by deepening of part of the site.
NPPF Vulnerability Classification	Water compatible
Overview of flooding	This site is 100% in Flood Zone 1. About 10% of the site is at risk of surface water flooding. Of this <5% is medium risk (1:100 (1%)). Surface water distribution is likely to change during extraction. This site lies across two 1km squares where <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). 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 – 4mAOD. However, that same case highlighted that these levels were unusually high and thought to be the result of a local cessation in groundwater pumping[33]. The deepening of this quarry may potentially (depending on depth planned) dip below this level. However extraction of sand is a water compatible use.
Relevant Local SFRA	Selby

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

1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. Functional floodplain (Flood Zone 3b) is defined in the Selby SFRA as Flood Zone 3 when it is undefended and outside of development limits. The EA urge caution about the use of the Selby SFRA functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding. Selby District Council are currently updating their SFRA.
Climate change	Climate change to river flood risk is unlikely to affect the site in the latter part of the plan period. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass
Exception Test Needed	No. This site is water compatible.
Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP22, MJP30 and MJP44. MJP30 and MJP44 are at slightly lower risk from surface water flooding than this site, however, they are all located in Flood Zone 1. MJP22 is at significantly higher flood risk from rivers. Therefore this site should be considered alongside but after MJP30 and MJP44 but in preference to MJP22.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A suitable scheme will be required to drain or store surface water from the site that does not increase flooding on any receiving water body. Opportunities to integrate SuDS should be explored. A site specific flood risk assessment will be required. Groundwater flood risk will need to be established and clarified at this site within the site specific flood risk assessment.


MJP22
Broach Road
Hensall Ranges
Moor Lee Lane
Pits (dis)
Mill Farm
HECK CP
MJP54
Sand Pit
Mill Balk
Dismtd Rlwy
Long Lane
Intake Lane
Wks
Great Heck
Heck
Heck Lane
MJP44
WJP22
WJP22
58
0
137.5
275
550
Meters
North Yorkshire County Council
Key
Minerals / waste site
Minerals and waste plan area
Flood Zone 2
Flood Zone 3
1:20 (5%) predicted flood extent
NFCDD Flood Defence
Areas benefiting from flood defences
Flood Storage Area
Historic Flood Map
Historic Flood Record
uFMfSW - 1:30 (3.33%) predicted flood extent
uFMfSW - 1:100 (1%) predicted flood extent
uFMfSW - 1:1000 (0.1%) predicted flood extent
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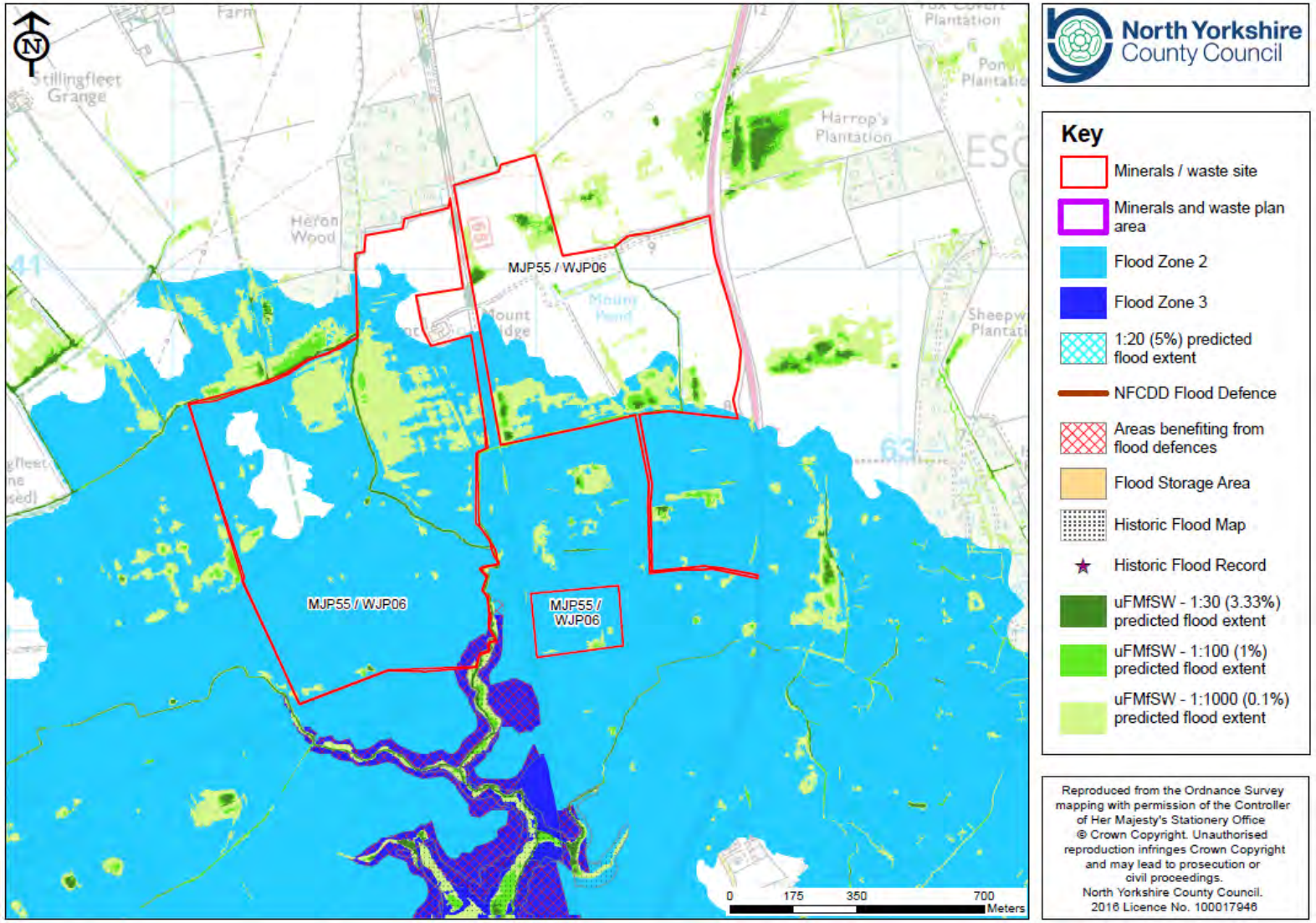
North Yorkshire County Council. 2016 Licence No. 100017946

Site Reference: MJP55 Land adjacent to former Escrick Brickworks	
Site Information	WJP06 proposes landfill of the MJP55 site. MJP55 is proposed to enable continued supply of clay to the existing Heck block manufacturing facility operated by the submitter, once the reserves at Hemingbrough Quarry permitted via planning permission C8/2015/0280/CPO have been extracted. Proposed access: Existing access via the former Escrick Brickworks and U722 unclassified road by Escrick Business Park onto the A19. Current use: Agriculture Site area: 112ha Minerals Estimated Reserve: 7,350,000 tonnes Annual output of 200,000 tonnes Estimated date of commencement: Anticipated to be approximately 2023 Proposed Life of Site: 37 years extraction upon commencement with 31.5 years for completion of landfill (WJP06) based on infilling commencing two years after extraction commences and on development of the whole area.
Proposed Land Use	Extraction of clay as extensions to a former quarry.
NPPF Vulnerability Classification	Less vulnerable (WJP06 proposed landfill land use is more vulnerable)

Overview of flooding	About 60% of this site lies in Flood Zone 2 with about 35% being in Flood Zone 1 and <5% being in Flood Zone 3, but benefiting from existing defences. About 15% of the site is at risk from surface water flooding. This is mainly low risk (1:1000 (0.1%)) with small areas of medium risk (1:100 (1%)) and high risk (1:30 (3.33%)). The southern part of this site lies within a series of three 1km squares where >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 two 1km squares where the proportion of the area which may support 'clear water' flooding is <25%. 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)[34]. Therefore groundwater flooding is unlikely to cause any significant problems. Perched water tables are an inherent characteristic of clay deposits.
Relevant Local SFRA	Selby
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. Functional floodplain (Flood Zone 3b) is defined in the Selby SFRA as Flood Zone 3 when it is undefended and outside of development limits. The EA urge caution about the use of the Selby SFRA functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding. Selby District Council are currently updating their SFRA.
Climate change	Present day Flood Zone 3 in the vicinity of the site is shown as being within an area benefiting from a flood defence with a design standard of 1:25 (4%). The level of protection is expected to reduce with climate change. The depth of flooding associated with Flood Zone 2 is likely to increase with climate change and the site may be at risk from Flood Zone 3 encroaching from the south east of the site. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass. This site should be considered after MJP45 but in preference to MJP52.
Exception Test Needed	No

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

Is an alternative site available which could help meet requirements for this mineral, subject to other tests of suitability?	Yes, MJP45 and MJP52. This site is at higher flood risk than MJP45 but at lower risk than MJP52. Therefore this site should be considered after MJP45 but is preferable to MJP52. The site would help maintain supply of clay to existing manufacturing facilities in line with national policy requirements.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment will be required which should confirm the impact of climate change on river flooding at this site. The flood risk assessment should also address the issues of draining surface water using SuDS, without causing additional flood risk. An emergency plan should be prepared in case of a flood event as this site is in Flood Zones 2 and 3. 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.


N
Stillingfleet Grange
Heron Wood
Harrop's Plantation
MJP55 / WJP06
MJP55 / WJP06
MJP55 / WJP06
0 175 350 700 Meters
North Yorkshire County Council
Key
Minerals / waste site
Minerals and waste plan area
Flood Zone 2
Flood Zone 3
1:20 (5%) predicted flood extent
NFCDD Flood Defence
Areas benefiting from flood defences
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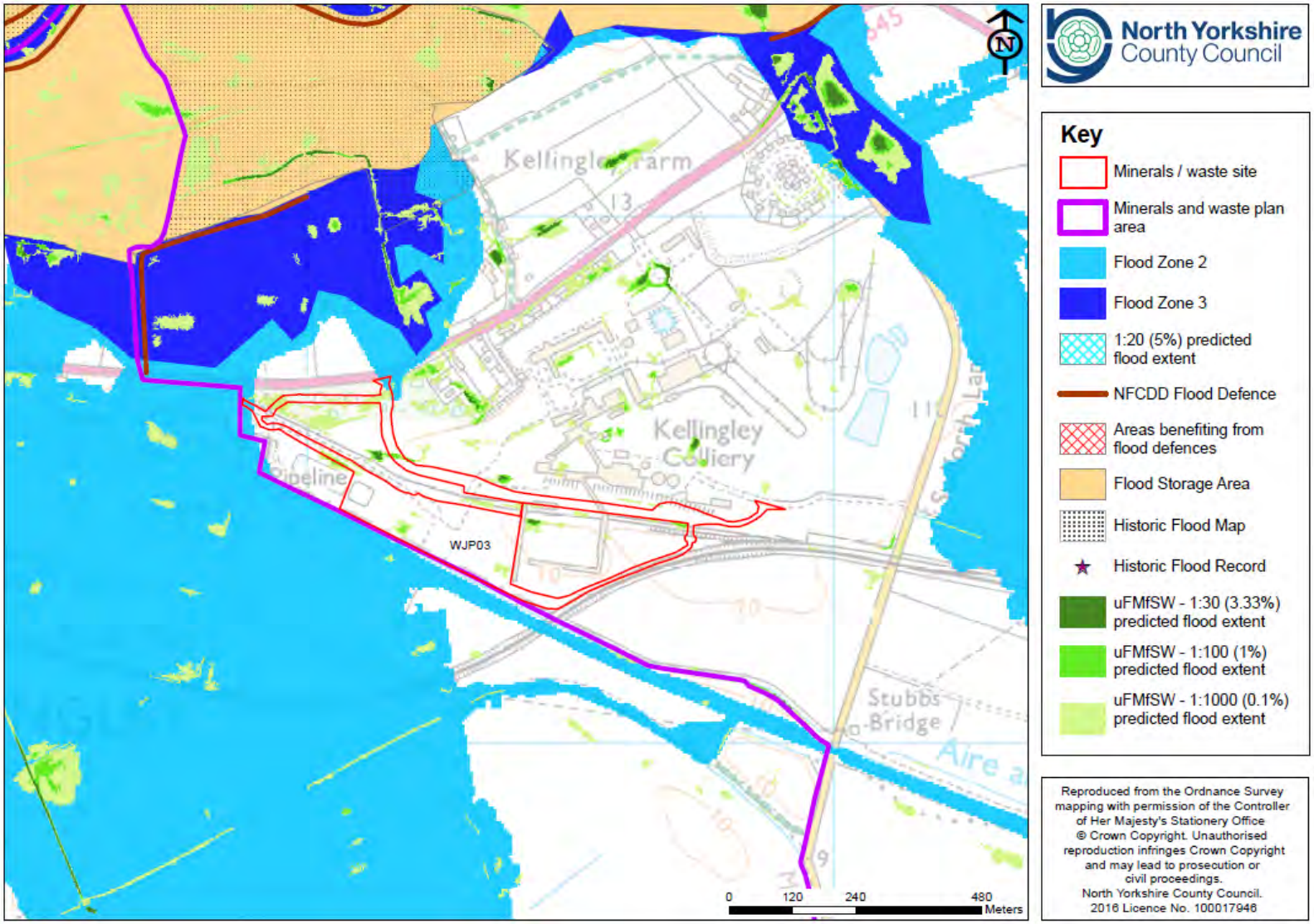
Site Reference: WJP03 Southmoor Energy Centre, former Kellingley Colliery	
Site Information	Planning application (NY/2013/0128/ENV) for this development was granted planning permission (reference C8/2013/0677/CPO) in February 2015. No extra capacity is proposed as part of this submission in addition to that already permitted. Proposed access: New access onto A645 Weeland Road in accordance with decision notice for planning application NY/2013/0128/ENV. Current use: Former coal mine Site area: 12.9ha Waste annual tonnage import: 280,000 Estimated date of commencement: By February 2020 (based on requirement for implementation specified in decision notice for planning application NY/2013/0128/ENV) Proposed Life of Site: Permanent
Proposed Land Use	Energy from Waste facility.
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	<5% of this site to the north west is located in Flood Zone 2. Flood defences are also evident beyond the north-west corner of the site, though the area is not shown as an area benefiting from flood defences and the standard of protection is not clear. <5% of the site is also subject to medium risk (1:100 (1%)) surface water flooding. Low risk (1:1000 (0.1%)) affects a further 5% of the site. Strategic groundwater flooding maps show that most of the site lies in a 1km square where between >25% to <50% of the area has conditions that might support superficial deposits groundwater flooding. The very western site area lies in a 1km square where >75% of the area has conditions that might support superficial deposits groundwater flooding.
Relevant Local SFRA	Selby
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. Functional floodplain (Flood Zone 3b) is defined in the Selby SFRA as Flood Zone 3 when it is undefended and outside of development limits. The EA urge caution about the use of the Selby SFRA functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding. Selby District Council are currently updating their SFRA.

Climate change	Climate change is likely to extend the area of the Flood Zones, with Flood Zone 2 likely to encroach further into the site and Flood Zone 3 potentially increasing to the extent of current day Flood Zone 2. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass. This site should be considered after WJP01, WJP13 and WJP25 but in preference to WJP02.
Exception Test Needed	No
Is an alternative site available which could help meet requirements for this waste facility, subject to other tests of suitability?	Yes, WJP01, WJP02, WJP13 and WJP25. WJP01, WJP13 and WJP25 are all in Flood Zone 1 and are at slightly lower risk from surface water flooding. WJP02 is in Flood Zones 2 and 3. Therefore this site should be considered after WJP01, WJP13 and WJP25 but before WJP02.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment was submitted with the planning application. Mitigation for surface water runoff using SuDS provision proposed.



North Yorkshire County Council

Key

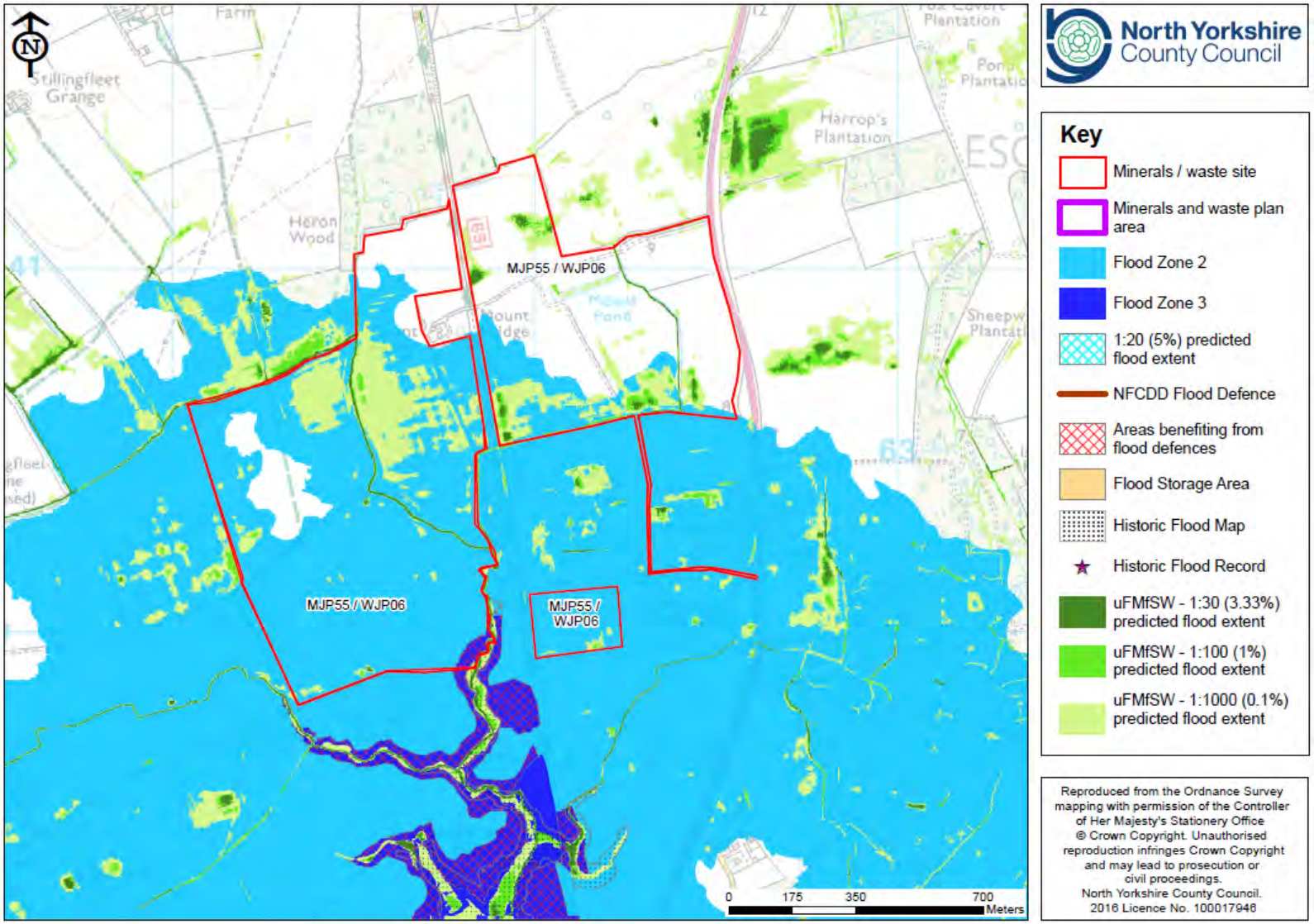
- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

Site Reference: WJP06 Land adjacent to former Escrick Brickworks, Escrick	
Site Information	This site would only be developed if minerals extraction within MJP55 preferred area occurs. Proposed access: Existing access via the former Escrick Brickworks and U722 unclassified road by Escrick Business Park onto the A19. Current use: Agriculture Site area: 112ha Waste annual tonnage import: 200,000 Estimated date of commencement: Approximately 2025 Proposed Life of Site: 31.5 years
Proposed Land Use	Landfill importation of inert waste for use in restoration of proposed clay extraction within preferred area (MJP55).
NPPF Vulnerability Classification	Landfill is more vulnerable, other uses are less vulnerable.
Overview of flooding	About 60% of this site lies in Flood Zone 2 with about 35% being in Flood Zone 1 and <5% being in Flood Zone 3, but benefiting from existing defences. About 15% of the site is at risk from surface water flooding. This is mainly low risk (1:1000 (0.1%)) with small areas of medium risk (1:100 (1%)) and high risk (1:30 (3.33%)). The southern part of this site lies within a series of three 1km squares where >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 two 1km squares where the proportion of the area which may support 'clear water' flooding is <25%. As a former clay site in a clear water flooding area the site's vulnerability to groundwater flow is likely to be negligible[35]. Therefore groundwater flooding is unlikely to cause any significant problems.
Relevant Local SFRA	Selby

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

1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. Functional floodplain (Flood Zone 3b) is defined in the Selby SFRA as Flood Zone 3 when it is undefended and outside of development limits. The EA urge caution about the use of the Selby SFRA functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding. Selby District Council are currently updating their SFRA.
Climate change	Present day Flood Zone 3 in the vicinity of the site is shown as being within an area benefiting from a flood defence with a design standard of 1:25 (4%). The level of protection is expected to reduce with climate change. The depth of flooding associated with Flood Zone 2 is likely to increase with climate change and the site may be at risk from Flood Zone 3 encroaching from the south east of the site. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	**Site would require an Exception Test demonstrated through a Level 2 SFRA to proceed.** WJP08, WJP19 and WJP16 should be considered before this site. However, this site is preferable to WJP15, WJP11, WJP05 and WJP18.
Actions to pass the Sequential Test	In order for this site to pass, subject to further consideration of the site's contribution to the supply of minerals or waste facilities, the redline boundary for any proposal needs to be outside of Flood Zone 3 (including areas benefiting from existing defences). If a proposed redline boundary for this site remains within Flood Zone 2 WJP08 and WJP19 would remain preferable to this site as they are located in Flood Zone 1. WJP05, WJP11, WJP15 (with revised boundaries) and WJP16 should be considered before this site. This site is preferable to WJP18.
Exception Test Needed	Yes, more vulnerable land use types in Flood Zone 3 require the Exception Test to be passed.
Is an alternative site available which could help meet requirements for this waste facility, subject to other tests of suitability?	Yes, WJP05, WJP08, WJP11, WJP15, WJP16, WJP18 and WJP19. WJP08 and WJP19 are in Flood Zone 1 and should be considered before this site. WJP16 is in Flood Zone 2 and therefore should be considered after WJP08 and WJP19 but before this site. However, this site is preferable to WJP15, WJP11, WJP05 and WJP18. As the landfilling of this site is associated with restoration this should be included in consideration for alternative site consideration.

Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment will be required which should confirm the impact of climate change on river flooding at this site. The flood risk assessment should also address the issues of draining surface water using SuDS, without causing additional flood risk. An emergency plan should be prepared in case of a flood event as this site is in Flood Zones 2 and 3.


North Yorkshire County Council
Key
Minerals / waste site
Minerals and waste plan area
Flood Zone 2
Flood Zone 3
1:20 (5%) predicted flood extent
NFCDD Flood Defence
Areas benefiting from flood defences
Flood Storage Area
Historic Flood Map
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uFMfSW - 1:30 (3.33%) predicted flood extent
uFMfSW - 1:100 (1%) predicted flood extent
uFMfSW - 1:1000 (0.1%) predicted flood extent
MJP55 / WJP06
MJP55 / WJP06
MJP55 / WJP06
Stillingfleet Grange
Heron Wood
Harrop's Plantation
0 175 350 700 Meters
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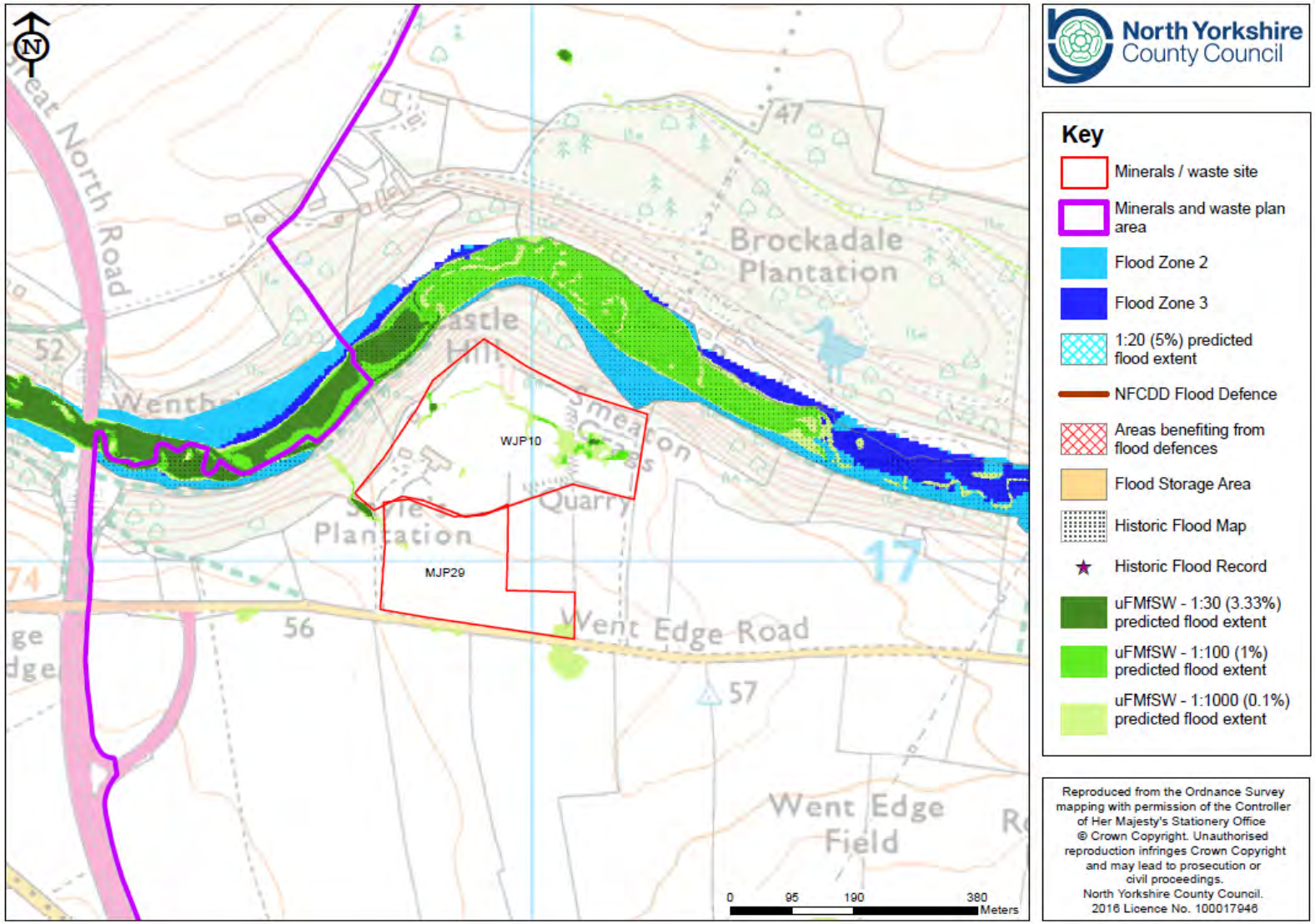
Site Reference: WJP10 Went Edge Quarry recycling, near Kirk Smeaton	
Site Information	Part of the WJP10 site has planning permission for the extraction of Magnesian limestone. Existing restoration scheme for quarry is to limestone grassland with blocks of woodland and scrub. Proposed access: Existing Went Edge Quarry access onto Went Edge Road (C344), approximately 290m east of A1(M) south-bound junction at Wentbridge. Current use: Part of existing quarry and industrial estate Site area: 7.24ha Waste annual tonnage import: 150,000 Estimated date of commencement: Unknown at present Proposed Life of Site: 15 years to 2032 (as MJP29)
Proposed Land Use	Recycling of construction and demolition waste for secondary aggregate.
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	This site is 100% in Flood Zone 1. It is affected by small patches of surface water flooding across the site but predominantly in the eastern site area. Flood risk is mostly low risk (1:1000 (0.1%)) but very small areas medium risk (1:100 (1%)) and high risk (1:30 (3.33%)) are present. This site lies across two 1km squares where <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 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 site[36]. More recently, according to a recent 2014 planning application for another part of the quarry immediately adjacent to the south, the quarry floor, at 20mAOD, is still six metres above the water table measured at its highest point (14mAOD)[37].
Relevant Local SFRA	Selby

[36] 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.

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

1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. Functional floodplain (Flood Zone 3b) is defined in the Selby SFRA as Flood Zone 3 when it is undefended and outside of development limits. The EA urge caution about the use of the Selby SFRA functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding. Selby District Council are currently updating their SFRA.
Climate change	Although the site is in Flood Zone 1 it is in close proximity to Flood Zone 2 to the north east corner. Flood Zone 2 may encroach the site with the impacts of climate change. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass
Exception Test Needed	No
Is an alternative site available which could help meet requirements for this waste facility, subject to other tests of suitability?	Yes, WJP21, WJP22 and WJP24. WJP21, WJP22 and WJP24 have similar levels of flood risk from surface water. WJP 21 and WJP24 are located in Flood Zone 1; WJP22 is within Flood Zones 2 and 3 to a minor extent. Therefore this site should be considered alongside WJP21 and WJP24 but is preferable to WJP22.
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 could be used for draining / storing surface water.


N
Great North Road
Brockadale Plantation
WJP10
MJP29
Went Edge Road
Went Edge Field
Quarry
Plantation
47
52
56
57
74
17
0 95 190 380
Meters
North Yorkshire County Council
Key
Minerals / waste site
Minerals and waste plan area
Flood Zone 2
Flood Zone 3
1:20 (5%) predicted flood extent
NFCDD Flood Defence
Areas benefiting from flood defences
Flood Storage Area
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uFMfSW - 1:30 (3.33%) predicted flood extent
uFMfSW - 1:100 (1%) predicted flood extent
uFMfSW - 1:1000 (0.1%) predicted flood extent
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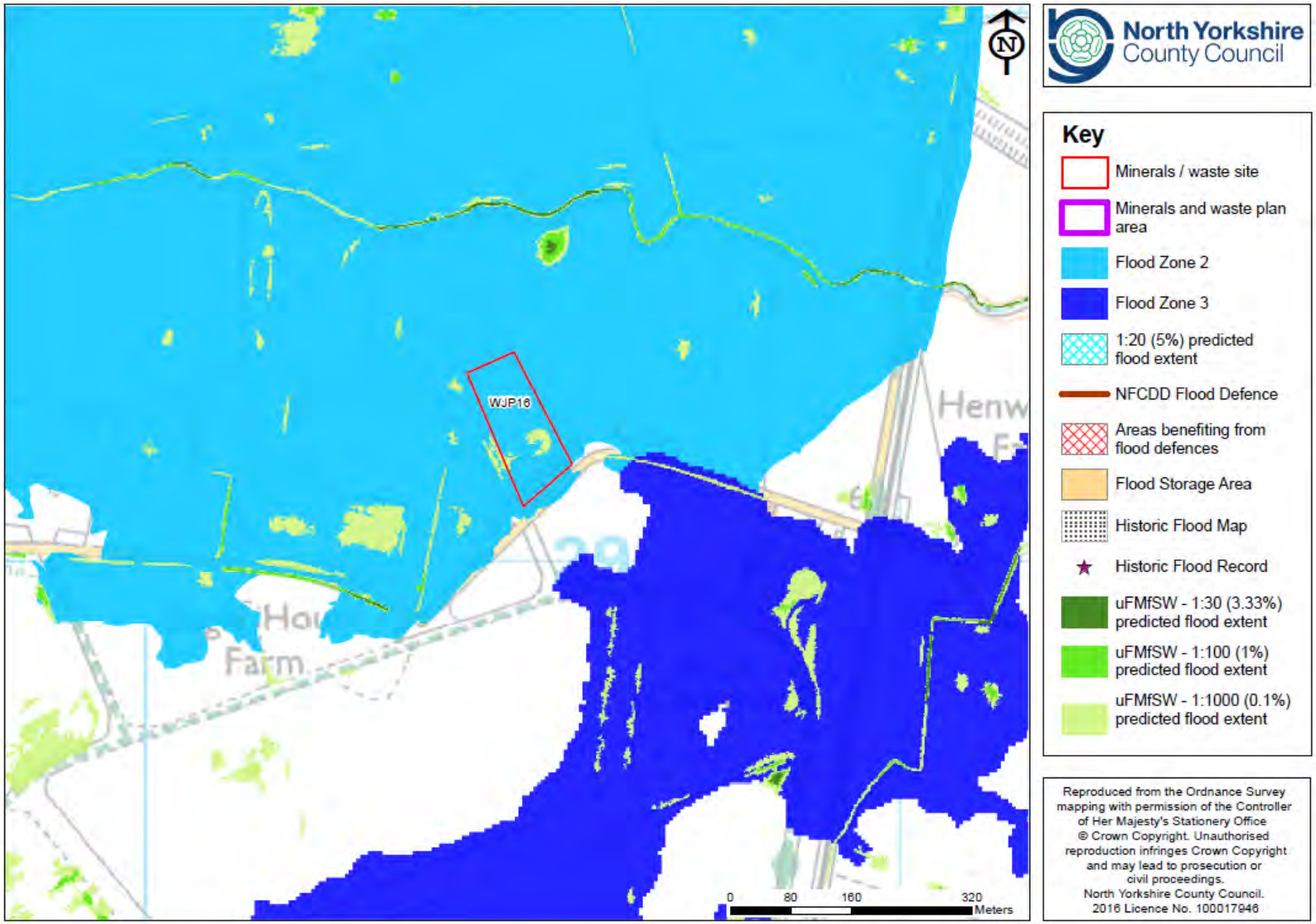
Site Reference: WJP16: Common Lane Burn	
Site Information	Adjacent to an existing waste recycling operation. Proposed access: Existing access onto Common Lane, Burn (C330) approximately 805m east of A19. Current use: Former airfield Site area: 1.42ha Waste annual tonnage import: 65,000 Estimated date of commencement: Within next 5 years Proposed Life of Site: 15 – 20 years
Proposed Land Use	Bulking and transfer of municipal and commercial waste
NPPF Vulnerability Classification24	Less vulnerable
Overview of flooding	This site is 100% in Flood Zone 2. About 5% of the site is at low risk (1:1000 (0.1%)) of surface water flooding. This site lies in a 1km square where <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.
Relevant Local SFRA	Selby
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. Functional floodplain (Flood Zone 3b) is defined in the Selby SFRA as Flood Zone 3 when it is undefended and outside of development limits. The EA urge caution about the use of the Selby SFRA functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding. Selby District Council are currently updating their SFRA.
Climate change	The depth of flooding associated with Flood Zone 2 is likely to increase with climate change and the site may be at risk from Flood Zone 3 encroaching from the south east of the site. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass. Sites WJP08 and WJP19 should be considered before this site. However, this site is preferable to WJP06, WJP15, WJP11 (with the current site boundary), WJP05 and WJP18.
Exception Test Needed	No

Is an alternative site available which could help meet requirements for this facility, subject to other tests of suitability?	Yes, WJP05, WJP06, WJP08, WJP11, WJP15, WJP18 and WJP19. WJP08 and WJP19 are at lower risk than this site. WJP06, WJP15, WJP11, WJP05 and WJP18 are at higher risk than this site. Therefore WJP08 and WJP19 should be considered before this site. However, this site is preferable to WJP06, WJP15, WJP11, WJP05 and WJP18.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment will be required. This should seek to confirm climate change risk to the site and address the issues of draining surface water without causing additional flood risk. SuDS could be used for draining / storing surface water.


WJP16
Farm
0
80
160
320
Meters
North Yorkshire
County Council
Key
Minerals / waste site
Minerals and waste plan area
Flood Zone 2
Flood Zone 3
1:20 (5%) predicted flood extent
NFCDD Flood Defence
Areas benefiting from flood defences
Flood Storage Area
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uFMfSW - 1:1000 (0.1%) predicted flood extent
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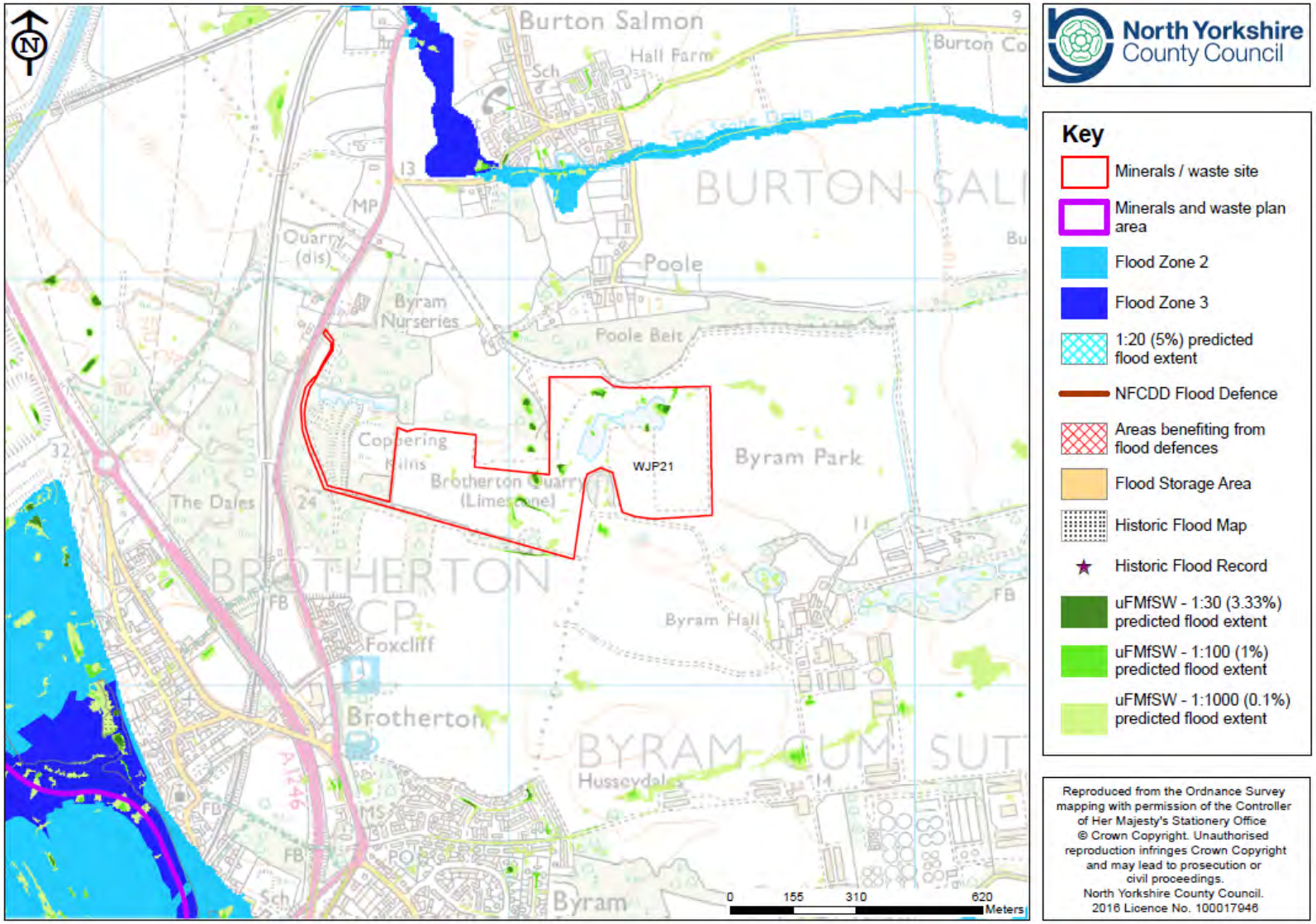
Site Reference: WJP21 Brotherton Quarry, Burton Salmon	
Site Information	Application NY/2013/0324/73, to extend the period of time for extraction and restoration of the eastern part of the site (which involves importing soils for restoration purposes) until 31 December 2020, was granted in October 2014. WJP21 would extend the area of proposed material import to include the western part of the quarry with a potential need for about 400,000 tonnes of inert material to restore the site. Proposed access: Existing Brotherton Quarry access onto A162 (approximately 50m south of Byram Nurseries), between Burton Salmon and Brotherton. Current use: Quarry Site area: 20.5ha Waste annual tonnage import: 250,000 Estimated date of commencement: To follow on from completion of restoration of area permitted under NY/2013/0324/73 Proposed Life of Site: Until 2020
Proposed Land Use	Import of inert waste for restoration purposes - landfill
NPPF Vulnerability Classification	More vulnerable
Overview of flooding	This site is 100% in Flood Zone 1. About 5% of the site is also subject to low risk (1:1000 (0.1%)) to high risk (1:30 (3.33%)). <2% of the site area is high risk (1:30 (3.33%)). More than half of the site lies in a 1km square where <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.
Relevant Local SFRA	Selby
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. Functional floodplain (Flood Zone 3b) is defined in the Selby SFRA as Flood Zone 3 when it is undefended and outside of development limits. The EA urge caution about the use of the Selby SFRA functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding. Selby District Council are currently updating their SFRA.

Climate change	Climate change to river flood risk is unlikely to affect the site in the latter part of the plan period. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass
Exception Test Needed	No
Is an alternative site available which could help meet requirements for this waste facility, subject to other tests of suitability?	Yes, WJP10, WJP22 and WJP24. WJP10, WJP22 and WJP24 have similar levels of flood risk from surface water. WJP10 is within close proximity to Flood Zone 2 and WJP22 is within Flood Zones 2 and 3 to a minor extent. Therefore this site should be considered alongside WJP24 and WJP10 and is preferable to WJP22.
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. Foul water will need to be dealt with via an environmental permit.


Burton Salmon
Hall Farm
Burton Co
BURTON SALI
Poole
Byram Nurseries
Poole Belt
Quarry (dis)
MP
Coppering Kilns
Brotherton Quarry (Limestone)
WJP21
Byram Park
The Dales
BROTHERTON CP
Foxcliff
Brotherton
Byram Hall
BYRAM CUM SUT
Husseydale
A1246
Byram
0 155 310 620
Meters
North Yorkshire County Council
Key
Minerals / waste site
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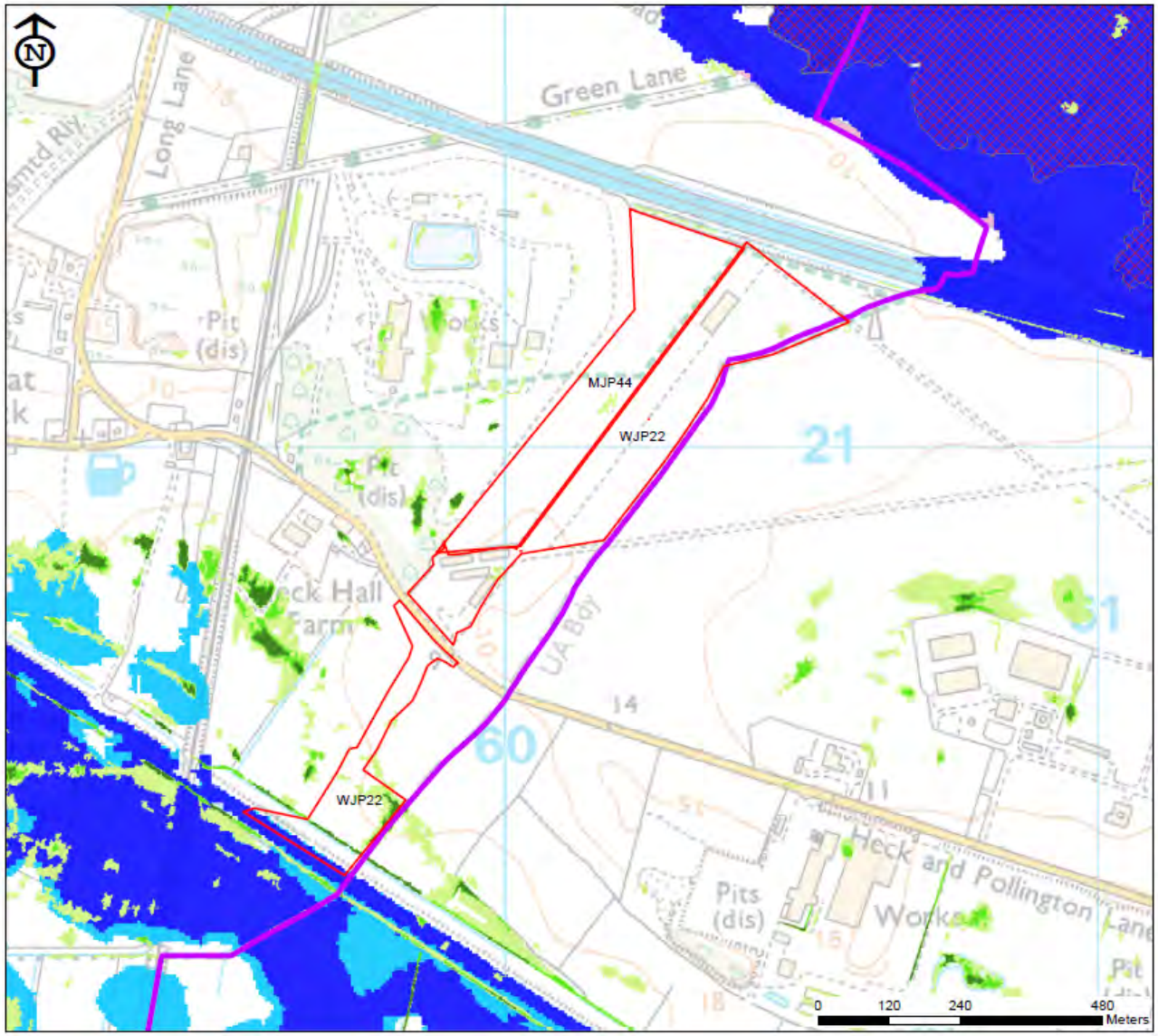
Site Reference: WJP22 Land on former Pollington Airfield	
Site Information	Planning permission (12.04.09.04/32C) has been granted to construct the biomass energy plant in the East Riding of Yorkshire Council area, but it has yet to be built. The permission area includes the WJP22 site and some land adjacent to the north-eastern boundary. Proposed access: Existing at site onto Heck and Pollington Lane (C340) approximately 490m east of East Coast mainline railway. Current use: Processing plant to create waste wood biomass fuel and processing plant to create waste wood pellets. Site area: 12.83ha Waste annual tonnage import: 160,000 – for wood processing (pellet production) Estimated date of commencement: By 2017 Proposed Life of Site: To 2040
Proposed Land Use	Import of waste wood for wood pellet production. Additional infrastructure associated with wood processing such as site access, waste wood fuel processing building, chip dryer and storage areas.
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	This site is almost entirely within Flood Zone 1 but with the very south western boundary lying in Flood Zones 2 and 3. There are small areas of surface flood risk within the site. One low risk (1:1000 (0.1%)) to the north east and low risk (1:1000 (0.1%)) to high risk (1:30 (3.33%)) areas to the south west. The northern part of this site lies in a 1km square where <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 is not expected to be significant issue.
Relevant Local SFRA	Selby
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. Functional floodplain (Flood Zone 3b) is defined in the Selby SFRA as Flood Zone 3 when it is undefended and outside of development limits. The EA urge caution about the use of the Selby SFRA functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding. Selby District Council are currently updating their SFRA.

Climate change	The extent and depth of flooding associated with both Flood Zones 2 and 3 is likely to increase with climate change. Therefore these are likely to encroach further in to the site over the Plan period with Flood Zone 1 currently adjacent to Flood Zone 2 becoming Flood Zone 2 and current day Flood Zone 2 becoming Flood Zone 3. Current day Flood Zone 3 is likely to increase in flood depth. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass. This site should be considered after WJP10, WJP21 and WJP24.
Exception Test Needed	No
Is an alternative site available which could help meet requirements for this waste facility, subject to other tests of suitability?	Yes, WJP10, WJP21 and WJP24. WJP10, WJP21 and WJP24 have similar levels of flood risk from surface water. WJP10, WJP21 and WJP24 are in Flood Zone 1, although WJP10 is within close proximity to Flood Zone 2. Therefore this site should be considered after WJP21, WJP24 and WJP10.
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 using SuDS and without causing additional flood risk.



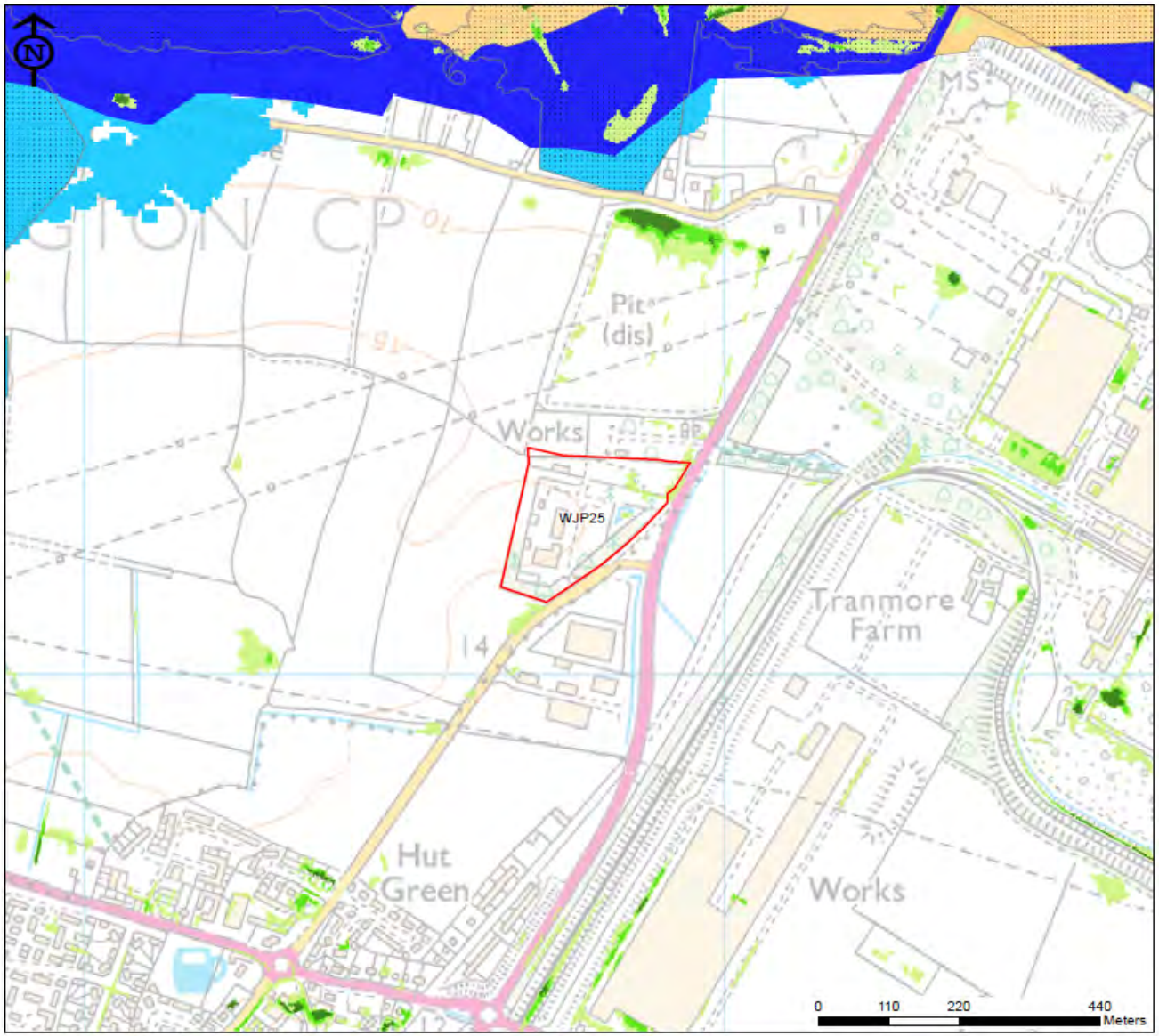
North Yorkshire County Council

Key

- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

Site Reference: WJP25 Former ARBRE Power Station, Eggborough	
Site Information	Planning application (NY/2014/0292/ENV) for this development was granted planning permission (C8/53/125F/PA) in May 2015. A subsequent planning application (NY/2016/0052/ENV) to vary some of the terms of the original permission was granted planning permission (C8/2016/0347/CPO) in May 2016. Proposed access: Existing access onto Selby Road (C410) approximately 125m off A19. Current use: Redundant former Arable Biomass Renewable Energy (ARBRE) facility Site area: 4.2ha Waste annual tonnage import: Up to 200,000 of Refuse Derived Fuel Estimated date of commencement: 2018 Proposed Life of Site: Initial 25 years, extendable to 40 years
Proposed Land Use	Energy Recovery facility with Advanced Thermal Treatment
NPPF Vulnerability Classification	Less vulnerable
Overview of flooding	This site is 100% in Flood Zone 1. <5% of the site is at low risk (1:1000 (0.1%)) of surface water flooding. Site is in a 1km square identified as susceptible to Clearwater 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.
Relevant Local SFRA	Selby
1:20 (5%) flood event or Local SFRA Functional Floodplain	This site is not at risk from the 1:20 (5%) flood event. Functional floodplain (Flood Zone 3b) is defined in the Selby SFRA as Flood Zone 3 when it is undefended and outside of development limits. The EA urge caution about the use of the Selby SFRA functional floodplain definition which is very precautionary and arguably not representative of where water has to flow or be stored in times of flooding. Selby District Council are currently updating their SFRA.
Climate change	Climate change to river flood risk is unlikely to affect the site in the latter part of the plan period. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	Pass
Exception Test Needed	No

Is an alternative site available which could help meet requirements for this waste facility, subject to other tests of suitability?	Yes, WJP01, WJP02, WJP03 and WJP13. WJP01 is at slightly lower risk from surface water flooding with WJP13 being at a similar level of risk. WJP03 is at a slightly higher level of risk from surface water flooding and is also within Flood Zone 2 to a minor extent. WJP02 is in Flood Zones 2 and 3. Therefore this site should be considered alongside WJP13 but after WJP01 and before WJP03 and WJP02.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	A site specific flood risk assessment was submitted with the planning application. Mitigation for surface water runoff using SuDS provision proposed.



North Yorkshire County Council

Key

- Minerals / waste site
- Minerals and waste plan area
- Flood Zone 2
- Flood Zone 3
- 1:20 (5%) predicted flood extent
- NFCDD Flood Defence
- Areas benefiting from flood defences
- Flood Storage Area
- Historic Flood Map
- Historic Flood Record
- uFMfSW - 1:30 (3.33%) predicted flood extent
- uFMfSW - 1:100 (1%) predicted flood extent
- uFMfSW - 1:1000 (0.1%) predicted flood extent

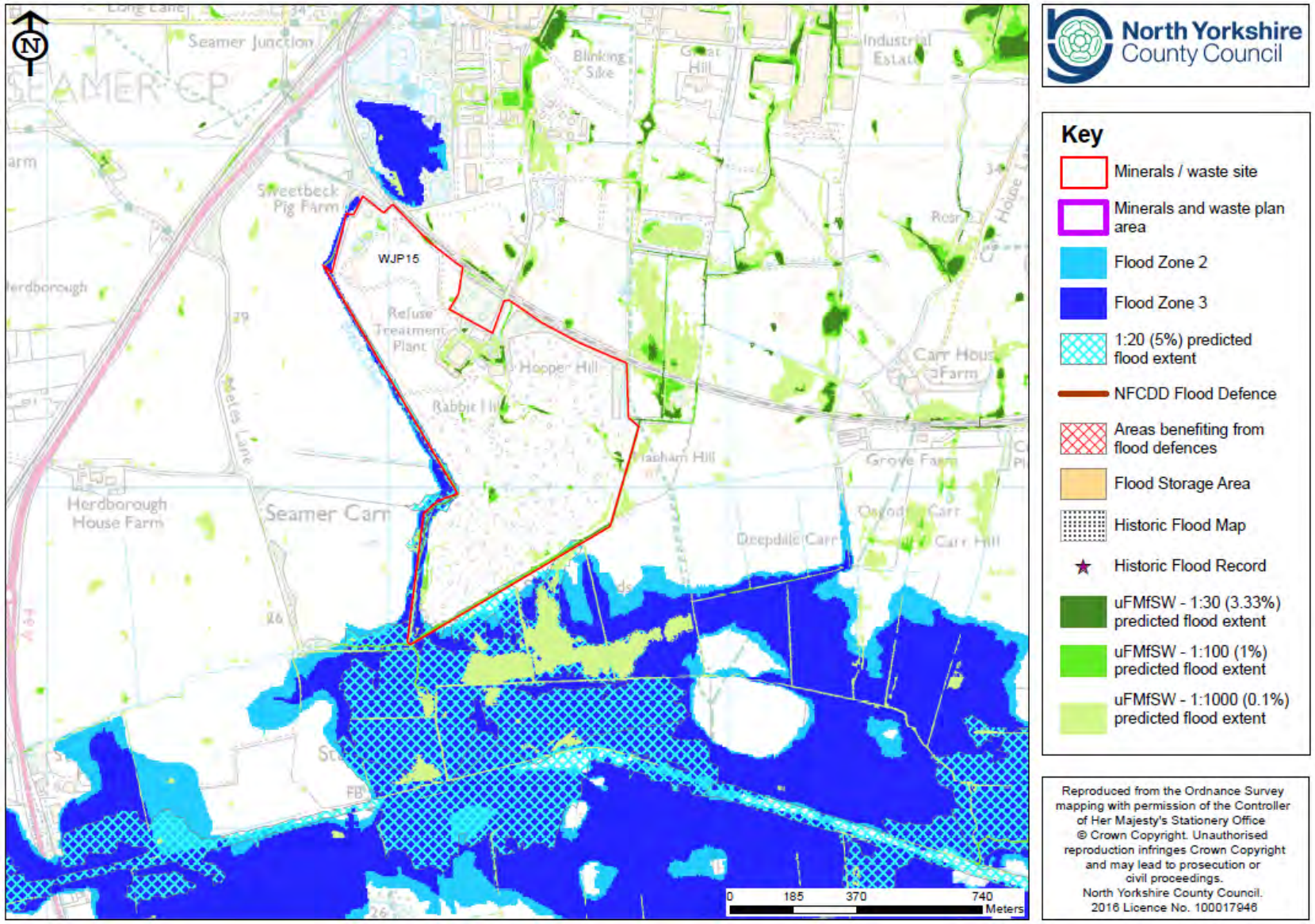
10. Scarborough Sites

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

Site Reference: WJP15 Seamer Carr, Eastfield, Scarborough	
Site Information	Compost to be used in restoration of landfill site, which is being restored to woodland, shrubs and grassland with original recycling building to be retained for continued use beyond the current planning permission end-date of 2020. Other recycling building not time limited. Energy from Waste (GEM plant currently time limited to 2020). Landfill gas utilisation plant to be removed when no longer required for that function. Proposed access: Existing Seamer Carr access via Dunslow Road (U825 unclassified road) onto Cayton Approach and Seamer Carr Road to A64. Current use: Landfill (under restoration), Recycling (including treatment, bulking and transfer), Open windrow composting and Energy from Waste (Biomass and Landfill Gas Utilization). Site area: 107.8ha Waste annual tonnage import (as at 2020): 25,000 Composting; 47,000 Kerbside Recycling - bulking and transfer in existing MRF; 75,000 C&I Recycling and Municipal Residual waste in 'new' MRF. Estimated date of commencement: From 2020 Proposed Life of Site: 15 – 20 years
Proposed Land Use	Retention of existing recycling (including treatment, bulking and transfer), open windrow composting, and energy from waste (biomass) facilities beyond end of current planning permissions which are currently limited to 2020 and new inert waste screening facility.
NPPF Vulnerability Classification	Less vulnerable

Overview of flooding	This site is almost entirely within Flood Zone 1 but small extent of the site area along the western and southern boundaries are lying in Flood Zones 2 and 3. Risk from surface water flooding exists in small patches across the site covering <5% of the area. This is mainly low risk (1:1000 (0.1%)) but occasionally rising to high risk (1:30 (3.33%)). Site lies across two 1km squares in the Environment Agency's 'Areas Susceptible to Groundwater Flooding' map. The northern part is susceptible to Clearwater and superficial deposits flooding (>50% to <75% of the km square is susceptible). The southern part is subject to superficial deposits flooding (<25% of the km square is susceptible).
Relevant Local SFRA	North East Yorkshire
1:20 (5%) flood event or Local SFRA Functional Floodplain	The 1:20 (5%) event extent mapping for this SFRA shows that <5% of this site is at 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 1:20 (5%) modelled fluvial flood risk (that affects a small part of the site) also considered as initial functional floodplain.
Climate change	Climate change is likely to increase the 1:20 (5%) predicted flood event extent within the site. Areas of Flood Zone 3 are likely to increase into areas that are shown as Flood Zone 2 and Flood Zone 2 is likely to increase in extent into the site. Climate change effects on surface water flooding are likely to increase the extents of the areas at risk and also the depth of flooding for each event respectively.
Sequential Test result	**Site is not suitable**. Less vulnerable land uses are not permitted at sites within functional floodplain. Sites WJP08 and WJP19 should be considered before this site followed by WJP16, WJP06. However, this site is preferable to WJP11, WJP05 and WJP18.
Actions to pass the Sequential Test	In order for this site to pass, subject to further consideration of the site's contribution to the supply of minerals or waste facilities, the redline boundary for any proposal needs to be outside of the 1:20 (5%) flood event or Local SFRA Functional Floodplain. If a proposed redline boundary for this site remains within Flood Zone 3 WJP08 and WJP19 would remain preferable to this site as they are located in Flood Zone 1. WJP11 (with revised boundary) and WJP16 would also remain preferable to this site. This site is preferable to WJP05, WJP06 and WJP18.

Exception Test Needed	No, however, less vulnerable land uses are not permitted at sites within functional floodplain.
Is an alternative site available which could help meet requirements for this waste facility, subject to other tests of suitability?	Yes, WJP05, WJP06, WJP08, WJP11, WJP16, WJP18 and WJP19. WJP08 and WJP19 are in Flood Zone 1 and are at lower risk than this site. WJP16 is in Flood Zone 2, WJP06 is in Flood Zones 1, 2 and 3 (benefiting from defences), and WJP11 is at slightly higher risk than this site along with WJP05 and WJP18. Sites WJP08 and WJP19 should be considered before this site followed by WJP16, WJP06. However, this site is preferable to WJP11, WJP05 and WJP18.
Site Specific Flood Risk Assessment Requirement and Mitigating Flood Risk	Waste management facilities classified as less vulnerable should not be located in the areas of 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 extent of functional floodplain along with 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 flood risk elsewhere.


N
Seamer Junction
SEAMER CP
Sweetbeck Pig Farm
WJP15
Refuse Treatment Plant
Hopper Hill
Rabbit Hill
Mires Lane
Herdborough House Farm
Seamer Carr
Deepdale Carr
Grove Farm
Carr Hill
Blinking Sike
Great Hill
Industrial Estate
Carr House Farm
0 185 370 740
Meters
North Yorkshire County Council
Key
Minerals / waste site
Minerals and waste plan area
Flood Zone 2
Flood Zone 3
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11. Summary

Key to mineral / waste category:

	Sand and Gravel (South)
	Sand and Gravel (North)
	Magnesian limestone
	Jurassic limestone
	Building stone
	Sand / Silica sand
	Recycling of inert waste
	Clay
	Distribution / Processing
	Energy from waste and waste transfer
	Household Waste Recycling Centre
	Landfill
	Recycling

Sequential Test result:

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

Sequential Test rank:

Number	Rank in specific mineral or waste category

Summary table of mineral and waste sites

Site	Region	Flood Risk Event / Flood Zone	NPPF Vulnerability Classification	Sequential Test Result
MJP06	Hambleton	1:20 (5%)	Water Compatible	1
MJP07	Hambleton	1:20 (5%)	Water Compatible	2
MJP14	Harrogate	1:20 (5%)	Water Compatible	3
MJP17	Hambleton / Richmondshire	1:20 (5%)	Water Compatible	2
MJP21	Hambleton / Richmondshire	1:20 (5%)	Water Compatible	3
MJP33	Hambleton	1:20 (5%)	Water Compatible	4
MJP43	Hambleton	1	Water Compatible	1
MJP10	Harrogate	1	Less Vulnerable	5
MJP11	Hambleton / Harrogate	1	Less Vulnerable	4
MJP23	Selby	1	Less Vulnerable	=2
MJP28	Selby	1	Less Vulnerable	1
MJP29	Selby	1	Less Vulnerable	=2
MJP08	Ryedale	1	Less Vulnerable	1
MJP63	Ryedale	1	Less Vulnerable	1
MJP22	Selby	3	Water Compatible	4
MJP30	Ryedale	1	Water Compatible	1
MJP44	Selby	1	Water Compatible	2
MJP54	Selby	1	Water Compatible	3
MJP26	Selby	1	Less Vulnerable	2
MJP27	Selby	1	Less Vulnerable	1
MJP45	Selby	1	Less Vulnerable	1
MJP52	York	1:20 (5%) 3	Less Vulnerable	3 3
MJP55	Selby	3	Less Vulnerable	2
MJP09	Selby	3	Less Vulnerable	2
MJP24	Selby	1	Less Vulnerable	1
WJP01	Richmondshire	1	Less Vulnerable	1
WJP02	York	3	Less Vulnerable	5
WJP03	Selby	2	Less Vulnerable	4
WJP25	Selby	1	Less Vulnerable	=2
WJP13	Craven	1	Less Vulnerable	=2
WJP17	Craven	1	Less Vulnerable	1
WJP05	York	1:20 (5%) **2**	More Vulnerable	=6 **6**
WJP06	Selby	3 **2**	More Vulnerable	4 **7**
WJP08	Harrogate	1	More Vulnerable	=1
WJP11	York	1:20 (5%) **2**	More Vulnerable	=6 **=3**
WJP15	Scarborough	1:20 (5%) **3**	Less Vulnerable	5 **5**
WJP16	Selby	2	Less Vulnerable	3
WJP18	Richmondshire	1:20 (5%)	Less Vulnerable	8
WJP19	North York Moors National Park	1	Less Vulnerable	=1

Site	Region	Flood Risk Event / Flood Zone	NPPF Vulnerability Classification	Sequential Test Result
WJP10	Selby	1	Less Vulnerable	3
WJP21	Selby	1	More Vulnerable	1
WJP22	Selby	3	Less Vulnerable	4
WJP24	Harrogate	1	Less Vulnerable	2

Contact us

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